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Ms. Jacki Byerley, AICP
Town Planner
Town of Andover
36 Bartlet Street
Andover, Massachusetts 01810

June 25, 2019

Ref. T0681

Re: The Dascomb Road Project – Transportation Peer Review
Response to Greenman-Pedersen, Inc. (GPI) Comments

Dear Ms. Byerley:

TEC, Inc. (TEC) is pleased to provide the enclosed response to transportation peer review comments on the Dascomb Road Project, located at 146 Dascomb Road in Andover, Massachusetts. The following information is supplied to address the several peer review comments generated by Greenman-Pedersen, Inc. (GPI) during review of the Traffic Impact, Access, and Parking Study dated October 16, 2018 and the site plans dated October 31, 2018. The **bold** text is from GPI's memorandum, and the regular text is TEC's response.

Greenman-Pedersen, Inc. (Rebecca L. Brown, P.E., PTOE) – November 29, 2018

Traffic Impact, Access, and Parking Study

1. **None of the buildings on the site plan have been labeled to provide easy identification of the buildings. Therefore, for the purposes of this review letter, GPI has assigned labels to the buildings in a clockwise order beginning at the northeast corner of the site as described below … From this point forward, the labels above will be utilized to describe the proposed buildings.**

   The enclosed Site Plan has been revised to identify the buildings as requested.

2. **Based on the scope of the proposed development and the number of new primary trips generated on the adjacent roadways, GPI agrees that the study area for the TIA is adequate and appropriate to assess project related impacts.**

   No response required.

3. **No traffic analysis has been provided for any of the intersections along Smith Way or internal to the site. At a minimum, GPI recommends analyzing the two main site driveways on Smith Way to verify whether turning lanes will be required and the first internal intersection entering the site from the Easterly Site Driveway at Dascomb Road / Frontage Road (4-Way STOP) to ensure traffic will not back onto Dascomb Road.**

   TEC has completed supplemental analysis of the two site driveways along Smith Way to determine the warranting condition for left-turn lanes / pockets; as well as an all-way stop control intersection at the internal intersection south of Dascomb Road. Left-turn lane warrants analyses are provided in Attachment A. Supplemental capacity and queue analyses; including an evaluation of an all-way stop control intersection at the internal

intersection is provided in Attachment B. Both analyses were included as part of the TIAPS submitted to the Massachusetts Environmental Policy Act (MEPA) Office within the Project's Expanded Environmental Notification Form (EENF), dated December 31, 2018.

The traffic volumes indicate that an exclusive left-turn lane is not warranted along the Smith Way southbound approach at either the Northerly Site Driveway or the Southerly Site Driveway. Although not specifically warranted, TEC recommends the construction of a short left-turn pocket at the Northerly Site Driveway to remove left-turning vehicles from the Smith Way through traffic as only 200-feet exist along Smith Way between Dascomb Road and the Northerly Site Driveway. This short roadway segment allows for a potential for queuing along Smith Way southbound if a left-turning vehicle is conflicted with Smith Way northbound traffic. Should this conflict occur, the 200-foot segment (shorter between stop lines) without the left-turn pocket may not be able to support a worst-case condition and vehicles would queue onto the Dascomb Road mainline. It is the Proponent's intent to provide a short left-turn pocket to alleviate any potential concern for queuing along the approach as the roadway cross-section currently supports the installation of the turn lane without curb line adjustments.

The supplemental capacity and queue analysis indicate that the all-way stop condition at the internal site intersection is not anticipated to generate a queue that will extend to Dascomb Road. The analysis, as conducted utilizing the industry standard HCM 2010 indicates that the greatest 95th percentile queue along this approach will extend approximately 50-feet (Saturday midday peak hour). This is due to the lower levels of opposing traffic expected at this internal intersection where many site related trips have other points or access and egress from parking fields and the parking structure.

4. **TMCs and ATR counts were conducted in the morning Thursday, September 13, 2018, on the day of the Greater Lawrence Gas Disaster, which caused fires, explosions, road closures, and mass evacuations in the communities of Lawrence, Andover, and North Andover due to over-pressurization of a low-pressure gas line. As the first fire as a result of this event was reported to have occurred after 3:00 PM, use of any traffic count data prior to 3:00 PM on September 13, 2018 is acceptable and represents normal traffic operations.**

   No response required.

5. **Weekday evening and Saturday midday TMCs were collected on Thursday, September 20 and Saturday, September 22, 2018, following the Greater Lawrence Gas Disaster. Although the majority of roads in the area had been reopened at this point in time, many homes and businesses were a complete loss or remained closed at this time, pending repairs and restoration of gas to the home. On the date of the counts, many families were still residing in shelters. In addition, there are numerous properties located just outside of the study area for the TIAPS that do not have gas restored and are not scheduled for relight until November 28, 2018. According to a restoration update provided by Columbia Gas on November 17, 2018, gas has been restored to approximately 80 percent of businesses and 67 percent of residential homes. Within the Town of Andover, approximately 375 homes and 30 businesses remain without gas service. Therefore, traffic volumes collected on September 20 and 22, 2018 may have been impacted by the number of**

area families and businesses that remain displaced due to the Greater Lawrence Gas Disaster.

To assess the impact the Greater Lawrence Gas Disaster had on traffic volumes in the study area, GPI compared TMCs collected during the weekday PM peak hours on September 20, 2018 to ATR counts collected on September 12, 2018 during the same time period at the following locations:

- **o Dascomb Road between Partridge Hill Road and Surrey Lane**
- **o Dascomb Road at I-93 Overpass**
- **o Dascomb Road west of Smith Way**

The results of the comparison indicate that TMCs along collected Dascomb Road during the weekday PM peak hour on September 20th were approximately 2.3 percent lower than ATR counts collected on September 12th during the same time period. However, based on MassDOT seasonal adjustment factors, traffic volumes in September are approximately 3.5 percent higher than average-month condition. Therefore, the volumes collected on September 20th would still represent an above average-month condition.

TEC concurs with GPI's assessment of traffic-volume levels on the date of the traffic counts.

On Saturday, December 1, 2018 through Tuesday, December 4, 2018, TEC collected additional daily traffic volume counts to provide a further comparison to the traffic volumes from September 2018 that were presented in the TIAPS. These Automatic Traffic Recorder (ATR) count locations coincided with the locations of the raw traffic counts collected in September 2018 as part of the original TIAPS to provide a direct comparison of volumes.

Table 1 TIAPS Development Program Summary for Trip Generation

Location	Time Period	September 2018 [1]	December 2018 [2]	Sept Difference
Frontage Road, south of Interstate 93 Ramps	*Weekday AM Peak*	1,550	1,623	- 4.7%
	Weekday PM Peak	1,102	1,136	- 3.1%
Dascomb Road, below Interstate 93	*Weekday AM Peak*	2,211	2,106	+ 4.7%
	Weekday PM Peak	1,868	1,931	- 3.4%
Dascomb Road, east of Cardinal Lane	*Weekday AM Peak*	1,820	1,624	+ 10.8%
	Weekday PM Peak	1,220	1,531	- 25.5

[1] From TMCs conducted on September 13, 2018 and September 20, 2018 as reported in 2018 Exiting for TIAPS (unadjusted for seasonal)
[2] From ATRs conducted on December 4, 2018 seasonally adjusted by 5.7%.

The direct comparison shows that the September 2018 volumes are generally comparable to counts conducted in December 2018 upon a seasonal adjustment factor for the December traffic-volumes which upwardly increases the December traffic volume by 5.7%. Note that the seasonal adjustment factor for December is based upon the I-93 corridor (the nearest permanent count station for MassDOT) and may not fully represent the arterial commuter and commercial corridor of Dascomb Road which most likely experiences a more even ADT month-by-month.

Based on Table 1, the September and December counts are recorded as -4.7 to +10.8 difference. Much of these differences are negligible as they represent a standard difference of traffic from day-to-day. The only significant difference in traffic volumes is the weekday evening peak hour along Dascomb Road, east of Cardinal Lane. As the traffic volumes along the rest of Dascomb Road to the west and Frontage Road are comparable, this would suggest that there was an increase in I-93 Off-Ramp traffic turning right towards Andover Center during the December traffic count. Otherwise this difference would be directly experienced at the traffic count conducted at Dascomb Road below I-93. Any additional analysis as a result would therefore only be assessed on the I-93 Off-Ramp right-turn movement.

6. **The Tewksbury Street Bridge over the Pan Am Railroad in Andover, MA was closed in early August 2018 and remains closed pending MassDOT determination of a plan to reopen. The TIAPS notes that traffic volumes along Dascomb Road collected in September 2018 were elevated due to traffic detours resulting from this bridge closure. Based on MassDOT historic traffic counts, Tewksbury Street carries approximately 1,990 vehicles per day over the Pan Am Railroad, with approximately 235 vehicles using Tewksbury Street during the weekday AM and PM peak hours. Therefore, traffic volumes along Dascomb Road could be inflated by as much as 11 to 15 percent as a result of the Tewksbury Street bridge closure.**

   TEC concurs with GPI's assessment of traffic-volume levels along Tewksbury Street. The TIAPS does not take credit for the redistribution of traffic-volumes to Dascomb Road in order to provide a conservative analysis. No response required.

7. **GPI agrees with the Proponent's decision not to seasonally adjust the traffic volumes, as the September traffic volumes are higher than the yearly average volumes.**

   No response required.

8. **While the Greater Lawrence Gas Disaster may have reduced traffic volumes along Dascomb Road during the weekday PM and Saturday midday peak hour conditions, this reduction was likely outweighed by the additional traffic generated by the Tewksbury Street Bridge detour and volumes being collected in September, an above average month. Therefore, the 2018 Existing Conditions Peak Hour Traffic Volumes estimated in the TIAPS are likely to be conservative.**

   TEC concurs with GPI's assessment of traffic-volume levels reported in the TIAPS. No response required.

9. **The collision data analysis indicates that only one collision occurred at the Dascomb Road / Clark Road / Bannister Road intersection from 2011 to 2017. However, based on a review of collision records provided on MassDOT's crash portal, a total of 12 collisions were reported at this location between 2011 and 2016, resulting in a crash rate of 0.39 crashes per MEV. One of these collisions was a rear-end collision that occurred on Clark Road approaching the intersection with Dascomb Road due to queuing on this approach. The remaining eleven collisions were all angle collisions involving vehicles entering or exiting Clark Road.**

   The TIAPS only provided crash data at the intersection of Dascomb Road / Clark Road / Bannister Road for the years 2015 to 2017. The condensed time frame was included as this intersection was added to the study area subsequent to the in-depth crash analysis

for the project conducted during the project's Road Safety Audit process. The timeframe meets the minimum MassDOT scope (three-years) for analysis of crash history. During this timeframe, crash reports provided by the Town of Andover Police Department indicated one crash at the intersection; however, the TIAPS does note that up to three (3) additional crashes were defined in the vicinity of the intersection. TEC has updated the crash rate worksheets and crash data for the intersection to reflect and assume that the MassDOT non-locatable crashes are included as part of the intersection's crash rate. Revised crash data is provided in Attachment C.

10. **The intersection of Dascomb Road / Frontage Road is an HSIP-eligible crash cluster, experiencing an average of over 14 crashes per year and a crash rate significantly higher than the state and district-wide averages. The TIAPS notes that over 50 percent (51 of 101) of the crashes were angle crashes, which are described as being typical of signalized intersections. It should be noted that angle collisions are NOT typical of signalized intersections, and in fact, signalizing an intersection is often considered as a means for reducing angle collisions. As part of the Project, the intersection will be reconstructed with all new traffic signal equipment and phasing to accommodate the proposed site driveway as a fourth leg to the intersection. In addition, Frontage Road and Dascomb Road will be widened to provide additional lanes. Emergency-vehicle detection and bicycle detection will be provided at the signal, in addition to new vehicle-demand based signal equipment. ADA-compliant ramps, crosswalks, and signals with audio/vibratory equipment will be provided. These measures are anticipated to significantly improve the safety of the intersection.**

    TEC incorrectly worded the statement referring to angled crashes at signalized intersection. The intent of the statement was meant to define that angled-type crashes are more regularly seen at signalized intersection with permitted left-turn signal phasing; especially with multiple through lanes in the opposing direction. The intersection of Dascomb Road / Frontage Road experienced 36 angled crashes for the left-turn from Dascomb Road onto Frontage Road from 2011 to 2016; a high number of one type of crash along one specific movement. The terminology used in the TIAPS has been corrected in the subsequent state-review submissions; such as the EENF submission to the MEPA office. The off-site roadway mitigation, as noted in the TIAPS will remove the permitted signal phase from this movement and add a second left-turn lane to offset the resulting capacity increase with a protected-only signal phase. This change, as GPI notes, will significantly improve the safety of the intersection.

11. **The Dascomb Road / Andover Street intersection experienced more than 6 collisions per year and a crash rate significantly higher than the state and district-wide averages. Approximately 55 percent (11 of 20) of these collisions were angle or head-on collisions, which were likely due to the awkward geometry of the intersection. Sixty percent (12 of 20) of the collisions occurred during the peak commute hours, indicating traffic congestion is likely a contributing factor to collisions at this location. Traffic exiting Dascomb Road onto Andover Street currently experiences long delays during the weekday PM peak hour, which will be exacerbated by the additional traffic generated by the Project. GPI recommends the Applicant evaluate options for safety and operational improvements at this location as mitigation for the proposed development.**

TEC met with Town Staff and GPI to review potential improvements at the Dascomb / Andover Street intersection. As noted above, the awkward geometry of the intersection results in conflicting turning movements and driver confusion. During the meeting, Town Staff identified the desired geometric improvements to the intersection, which TEC and GPI concurred with. The Applicant has committed to construct the geometric improvements at the intersection to minimize conflicts and driver confusion, improving the safety of the intersection. Our team will continue to work with Town Staff and GPI through the final design and construction of the geometric improvements at Dascomb / Andover Street to enhance traffic safety at the intersection.

12. **The TIAPS notes that sight lines looking west exiting the Hewlett-Packard (HP) driveway and Smith Way are restricted by vegetation along the edge of the roadway. GPI recommends clearing and trimming of the vegetation within the public right-of-way or property controlled by the Proponent to maximize sight lines to the west of these driveways.**

    The Applicant will commit to provide brush clearing and tree trimming of the vegetation within the public right-of-way or on Proponent controlled property as part of the off-site transportation improvements as mitigation for the project.

13. **GPI agrees with applying a 1.0 percent growth rate to base year volumes in order to grow to future year volumes based on traffic growth patterns on surrounding area roadways. This is also consistent with other projects in the area.**

    No response required.

14. **GPI concurs with the No-Build traffic volume methodology and the volumes shown on Figure 3 and notes that the traffic volumes are conservative as they were projected to an 8-year horizon and no credit was applied for trips generated by the reoccupancy of existing office and industrial space on the site.**

    No response required.

15. **GPI agrees with the methodology presented within the TIAPS to estimate and distribute site-generated vehicle trips to the adjacent roadway network.**

    No response required.

16. **GPI concurs with the Build traffic volume methodology and the volumes shown on Figure 7.**

    No response required.

17. **The capacity and queue analysis contained within the TIAPS for the Dascomb Road / Frontage Road intersection are shown as Free operations for the westbound and southbound channelized right-turn lanes for the Existing and No-Build conditions. These movements actually operate under YIELD control as described in the TIAPS. Based on feedback received from Trafficware, the most appropriate method for modeling channelized right-turns under YIELD control at a signalized intersection is to assume that the movement is signalized with permitted and overlap phasing.**

    Although a yield-sign is present, TEC notes that the right-turn along Dascomb Road westbound is under an 'Add Lane' condition as the turning movement enters its own lane along Frontage Road northbound. Upon observation, the overwhelming majority of right-turning vehicles on this movement do not yield because of the 'Add Lane' condition. The

capacity and queue analysis depicted this condition in order to calibrate the model to the appropriate usage of the movement. As part of the future design, the Yield-sign will be removed from this movement as it is not warranted.

Along the Frontage Road southbound approach, TEC has modified the capacity and queue analyses to assume that this movement is signalized with permitted and overlap phasing, as GPI suggested, for the Existing, No-Build, Build, and Build with Mitigation conditions. As part of the off-site improvements, the future design intends to formally signalize this movement. Upon application, the modification does not result in a significant change in the reporting of intersection operations.

The methodology was used in the TIAPS in the subsequent state-review submissions; such as the EENF submission to the MEPA office. Supplemental capacity and queue analyses are provided in Attachment B.

18. **The Dascomb Road eastbound left-turn movement at the Dascomb Road / Acorn Drive / Lovejoy Road intersection currently operates under permitted/protected phasing, although only a single general-purpose lane is provided on this approach. As a result, through vehicles become trapped behind left-turning vehicles. GPI recommends the Applicant evaluate the warranting condition and feasibility for installing a dedicated left-turn lane on this approach.**

The Town of Andover requested that the Proponent evaluate the need and feasibility of a left-turn lane along Dascomb Road eastbound at Lovejoy Road independent of the Dascomb Road Project. TMCs collected in September 2018 indicate that an exclusive left-turn lane is warranted along the approach under existing signalized conditions based on the 100-vehicle threshold outlined in the MassHighway (now MassDOT) *Project Development and Design Guide (PDDG)*. Eastbound left-turns at this intersection are more prevalent during the latter hours of the day; including approximately 120 turning movements during the weekday evening peak hour. Even with the high turning movement, conditions along this approach operate with acceptable levels-of-service (LOS C or better) during the peak hour scenarios. Upon construction of the Dascomb Road Project, the Project is expected to contribute approximately 13 percent of the movement's traffic. Under this Build scenario, the movement will continue to operate with acceptable levels-of-service (LOS D or better).

TEC met with Town Staff and GPI to evaluate potential geometric improvements to the existing traffic signal. Given the tight right-of-way constraints it was agreed that the Applicant will widen the eastbound general purpose lane on Dascomb Road to allow vehicles to pass queued vehicles waiting to turn left onto Lovejoy Road. Additionally, the Applicant is committed to provide traffic signal timing optimization post-occupancy, if needed. TEC will continue to coordinate with Town Staff and GPI through the final design and construction of the widening of the general purpose lane to improve the operation and safety of the intersection. Supplemental warrant analyses are provided in Attachment A.

19. **Although installation of a traffic signal is warranted at the Dascomb Road / Clark Road / Bannister Road intersection under existing conditions, TEC does not recommend installation of a signal at this location at this time. Clark Road provides a major cut-through route between Dascomb Road and Andover Street. Although the crash rate is lower than the statewide and District-wide averages, over 90 percent (11 of 12) of the collisions at this location were angle collisions involving a**

vehicle entering or exiting Clark Road, and could have been corrected by a traffic signal. Traffic exiting Clark Road onto Dascomb Road experiences long delays and queues under existing conditions, particularly during the weekday AM and PM peak hours, which will be exacerbated by the additional traffic generated by the proposed development. The Project will result in an increase of 80 to 155 additional vehicle trips through this congested intersection. Therefore, the Applicant should consider improvements at this intersection to enhance operations and safety as mitigation for the proposed Project, including, but not limited to, installation of a traffic signal.

TEC met with Town Staff and GPI to review the Dascomb / Clark/Bannister intersection. During the meeting a number of improvement ideas were discussed to improve the operation and safety of the intersection. The convergence of Clark and Bannister at the intersection pushes the stop bar for Clark Road southerly, causing limited sight distance and increased delay on Clark due to the inefficient geometry. During the meeting, there was concurrence that a geometric improvement that allowed the stop bar on Clark to move closer to Dascomb would represent a safety and operational improvement. The Applicant committed to creating a geometric improvement to separate Clark and Bannister through the use of a truck apron, a flush scored concrete island that will separate vehicles while still accommodating a fire truck coming northbound on Clark to turn right onto Bannister. This improvement will allow the stop bar on Clark Road to shift north, closer to Dascomb, improving sight distance at the intersection. TEC will continue to coordinate with Town Staff and GPI through the final design and construction of the safety and operational improvements at the intersection.

20. **The Dascomb Road / I-93 NB Ramps intersection is proposed to be signalized under Build w/ Mitigation conditions. However, the channelized right-turn movements for the eastbound and northbound approaches are modeled under FREE control. MassDOT has a policy that channelized right-turns at signalized intersections are to be signalized to avoid conflicts with left-turning vehicles. GPI recommends that the analysis be modified to include signalization of the channelized movements.**

    TEC has revised the capacity and queue analysis to depict a signalized condition for the channelized right-turn movements for the I-93 NB Off-Ramp northbound approach. This has not been conducted for the Dascomb Road eastbound channelized lane to the I-93 on-ramp as this MassDOT policy is not meant for these specific on-ramp conditions. This condition along the I-93 NB off-ramp will be reflected in the traffic signal plans upon the future design.

    A similar condition is apparent at the Frontage Road / I-93 SB Off-Ramp intersection. Similarly, this change has not been conducted for the Frontage Road northbound channelized lane to the I-93 on-ramp as this MassDOT policy is not meant for these specific on-ramp conditions.

    The methodology was used in the TIPAS in the subsequent state-review submissions; such as the EENF submission to the MEPA office. Supplemental capacity and queue analyses are provided in Attachment B.

Overall Site Plans

Narrative: Please note that the project is currently at the Masterplan level. Additional details, including specific building loading patterns and needs will be identified as tenants are identified

at subsequent Site Plan Reviews by the Planning Board. Site Plan Reviews will occur prior to each phase of construction when the building dimensions and tenant characteristics are defined.

21. **The proposed parking supply of 1,760 parking spaces exceeds zoning requirements the zoning requirement of 1,747 spaces by 13 parking spaces. The zoning bylaws do not account for sharing of parking spaces between multiple uses. It is anticipated that significant sharing of parking spaces will occur on the site as employees of the offices or hotel patrons may choose to dine at the restaurants or shop at the retail on site. In addition, the offices will generate their peak parking demand during the day, while the restaurants may experience heavier parking demands in the evenings. As a result, the actual parking demand is anticipated to be significantly lower than estimated by zoning ordinances. Based on Institute of Transportation Engineers (ITE) data, the peak parking demand during the peak December month is anticipated to be 1,728 parking spaces. The Applicant has proposed a Transportation Demand Management (TDM) program for the site. As part of this TDM program, the Applicant should consider reducing the parking supply to encourage trips by alternative modes (walking, biking, carpooling, transit) to the site.**

    TEC agrees with the GPI's assessment of the parking. During Planning Board hearings, we have committed to reduce parking supply by providing "banked parking spaces" to create additional greenspace onsite in lieu of unnecessary paved parking spaces. Further, as the project progresses through the various phases, it will appear before the Planning Board for Site Plan Review for each proposed phase. A review of parking supply and demand will be conducted at Site Plan Review and it is anticipated that in a later phase of the project, we will likely request a Special Permit for parking reduction. As the project continues to build-out, an assessment of the actual utilization of parking can be performed and will serve as valuable information for a potential future Special Permit request to reduce parking. The attached Site Plan depicts implementing of the initially planned banked parking areas. Further reduction in parking to encourage alternative modes of transportation is anticipated via a Special Permit request at later stages of the project.

22. **Vehicles entering and exiting the southerly parking aisle near Building H will be in significant conflict with traffic traveling along the main drive aisle through the site. Consideration should be given to eliminating this row of parking to minimize conflicts along the main drive aisle.**

    The Site Plan has been revised to remove the fifteen (15) parking spaces identified above and note them as banked parking spaces, consistent with the response to Comment #21.

23. **Based on the TIAPS, the Applicant proposed to provide preferential parking spaces for rideshare, carpool, and hybrid vehicles; as well as provide electric vehicle charging stations. The locations of these spaces should be identified on the site plan and located closest to the major entryways to the buildings.**

    The Applicant has committed to provide initially twenty (20) preferential parking spaces and twenty (20) electrical vehicle parking spaces on-site; scattered at specific locations to service each building and the parking structure. The parking spaces have been located to be in close proximity to doorways or elevators / stairwells (parking structure). These locations have been noted on the attached Site Plan from the site plan in Attachment D. Note that the graphic shows only six (6) of both electric charging spaces and rideshare

parking. The remaining twelve (14) spaces of each will be located within the parking structure, spread over each level. The locations are subject to relocation based on any changes in doorways as the architectural plans are refined to maintain close proximity to doorways or elevators / stairwells. In addition, the Applicant will look to increase the number of these preferential parking and electric vehicle spaces based on demand post-occupancy.

24. **The Applicant proposes to implement an intelligent parking system to direct drivers to open parking spaces in the parking garage. The location of any signage or equipment required for this system should be depicted on the site plan to ensure it does not conflict with sight lines, vehicle turning paths, utilities, etc. It should be noted that provision of such a system reduces the need to provide additional parking spaces on site to minimize recirculation of vehicles searching for a space.**

    The final design of the intelligent parking system will be designed alongside the final design of the parking structure. The Applicant and design team will closely review signage associated with the system to ensure that it does not conflict with sight lines, vehicle turning paths, or utilities.

25. **Although pedestrian access is provided along the westerly side of the Easterly Site Driveway (opposite Frontage Road) via a multi-use path, there are no sidewalks proposed along the easterly side of this driveway. Therefore, pedestrians traveling to/from Buildings A, B, C, and D will need to cross the roadway at least twice to remain on a sidewalk to travel between Dascomb Road East and the proposed buildings.**

    The Site Plan has been revised to propose a sidewalk along the easterly side of the main site driveway (opposite Frontage Road) between Dascomb Road and the internal four-way intersection as requested.

26. **GPI recommends providing a crosswalk across the main drive aisle to connect the pocket-park just east of Building H to the large park area in the center of the property. In order to provide a continuous pedestrian connection from Dascomb Road into the center park area, GPI recommends installing a crosswalk on the westerly leg of the 4-way STOP intersection at the Easterly Site Driveway / main drive aisle.**

    The Site Plan has been revised to include a crosswalk and associated Americans with Disabilities Act (ADA) / Architectural Access Board (AAB) curb ramps across the main drive aisle connecting the pocket-park adjacent to Building “H” to the large park area in the center of the property.

27. **GPI recommends a pedestrian connection from Smith Way along the main drive aisle to Buildings F and H.**

    The Site Plans has been revised to include a sidewalk from Smith Way to the internal sidewalk network, past Building “F” and “H” along the northerly side of the main drive aisle. Consideration was given to also providing a sidewalk on the south side of the drive aisle, however, based on the expected low usage of a sidewalk on this portion of the site, preference was given to maintaining greenspace.

28. **Pedestrians are likely to travel between Buildings E, F, G, and H and Buildings C and D along the sidewalk, crossing the access/egress for the spiral ramp to the**

parking garage. Sight lines exiting the ramp may be limited by the ramp walls. Therefore, GPI recommends installing a crosswalk across this ramp access point. In addition, consideration should be given to providing an auditory warning to pedestrians that a vehicle is exiting the ramp.

The attached Site Plan has been revised to include a crosswalk and associated Americans with Disabilities Act (ADA) / Architectural Access Board (AAB) curb ramps across the entrance to the ramp. The Applicant will give consideration to providing an auditory warning to pedestrians that a vehicle is exiting the ramp.

29. **Similarly, pedestrians are likely to cross the parking garage ramp on the easterly side of Building B. Consideration should also be given to striping a crosswalk across this ramp and providing an auditory warning to pedestrians that a vehicle is exiting the ramp.**

    The attached Site Plan has been revised to include a crosswalk and associated Americans with Disabilities Act (ADA) / Architectural Access Board (AAB) curb ramps across the P2 level garage entrance on the east side of Building B.

30. **The site is located directly across Dascomb Road from the Andover Dascomb Road Park and Ride, to which both MVRTA and LRTA bus service is provided. The Applicant has agreed, as part of its TDM program, to coordinate with MVRTA and LRTA to extend bus service into the site. Should bus service to the site be provided, GPI recommends locating a bus stop with shelter along the northerly side of the main drive aisle in either of two locations:**

    a. **Adjacent to the pocket park just east of Building H, or**

    b. **Opposite Building F/G where GPI previously recommended removing the perpendicular parking spaces along the main drive aisle. Removing these parking spaces would allow for a bus turnout in this area to optimize traffic flow through the site.**

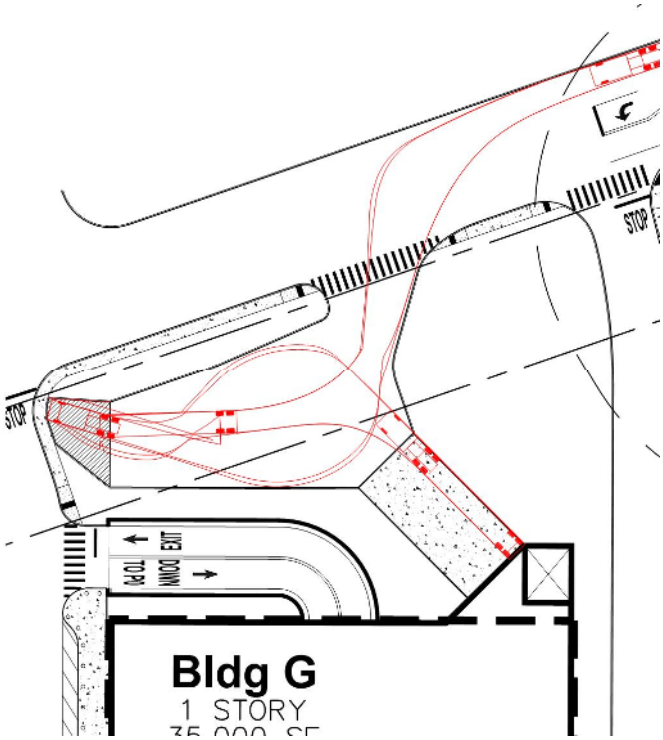
    Buses could then enter the site via the signalized Easterly Site Driveway opposite Frontage Road, circulate through the site and make a right turn back onto Dascomb Road via Smith Way.

    Upon further review of the LRTA and MVRTA bus service routes, bus routes are approximately 2 miles from the project site and service is not currently provided to the Park-n-Ride facility along Frontage Road.

    We discussed the possibility of extending bus service with to the site with Town Staff but it was determined to be infeasible at this time, at least until a critical mass of employees onsite warranted the service. On the attached Site Plan, we have reserved an area on the west side of the main entrance for a future bus stop and shelter, in the event that future ridership warrants an extension of bus service to the site.

31. **In order to access the loading dock for Building G, a truck will need to back up along Smith Way into the loading dock. As two of the access points into the parking garage are located further south on Smith Way, trucks backing on Smith Way will create significant conflict with vehicles traveling south on Smith Way to access the Restaurant Depot and the proposed parking garage.**

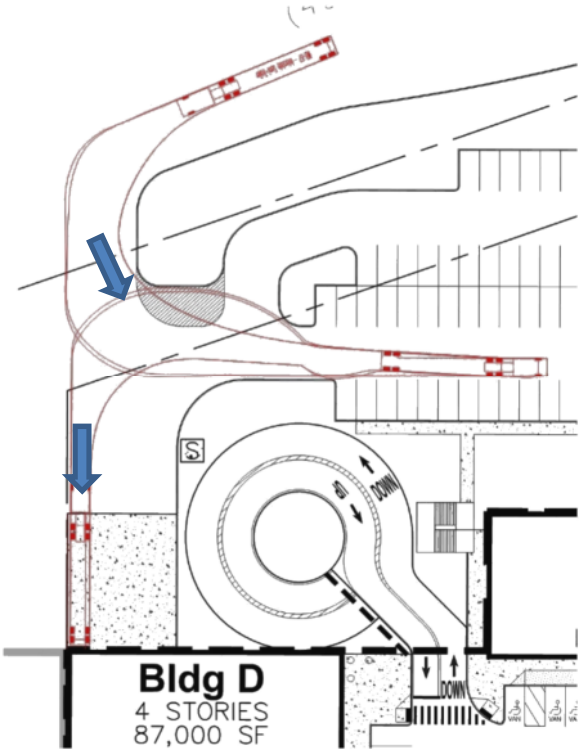
The Site Plan has been revised to accommodate truck movements within a dedicated loading area as to not impact Smith Way.



32. Sheet C-24 indicates that trucks accessing the loading dock for Building D, as well as accessing Buildings A, B, C, F, and H will need to cross onto property controlled by the adjacent Restaurant Depot. Cross-access easements will be required to ensure that these movements can be made legally.

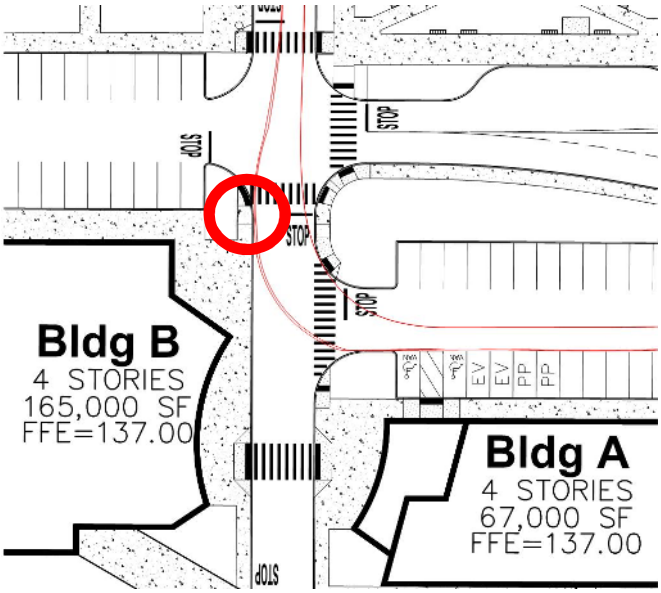
To minimize the disruption of truck access on the adjacent property, a less intrusive truck access path for a WB-67 is depicted for Building D below.

The subject parcel was purchased subdivided and purchased from Restaurant Depot (adjacent property owner) for development and Applicant maintains a strong relationship. Cross-easements are in place for access, utilities, drainage, landscaping, etc. Conceivably, the easements may need to be adjusted depending on the configuration of the final few phases of the project.



33. It appears that the truck turning path for a WB-50 vehicle encroaches on the curb at the northwest corner of Building B while exiting the parking field for Building A.

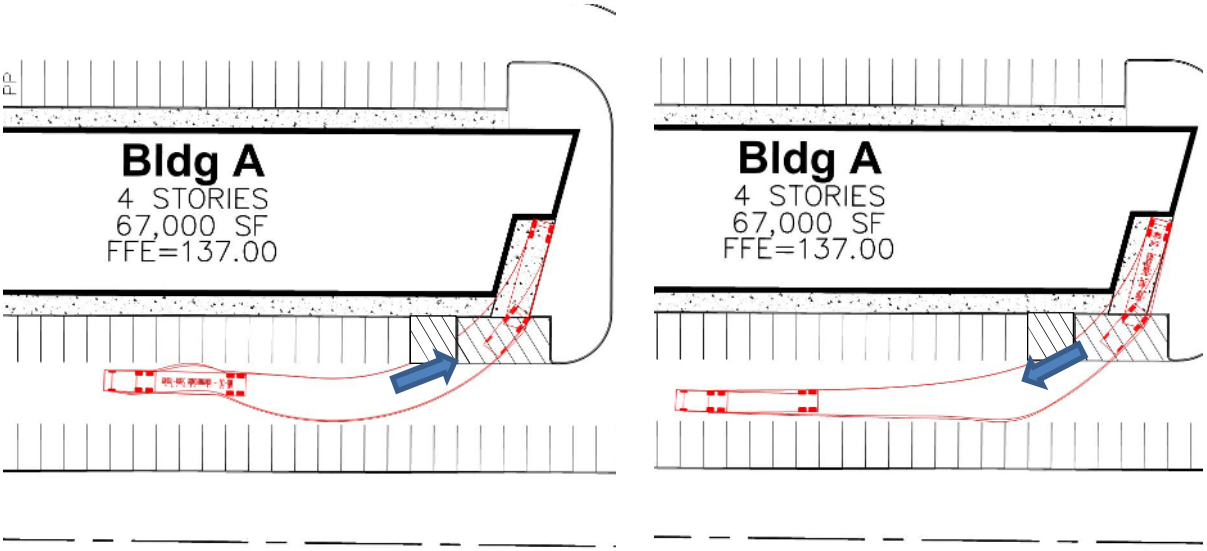
The turning path has been refined to ensure the WB-50 does not encroach the curb at the northwest corner of Building B.



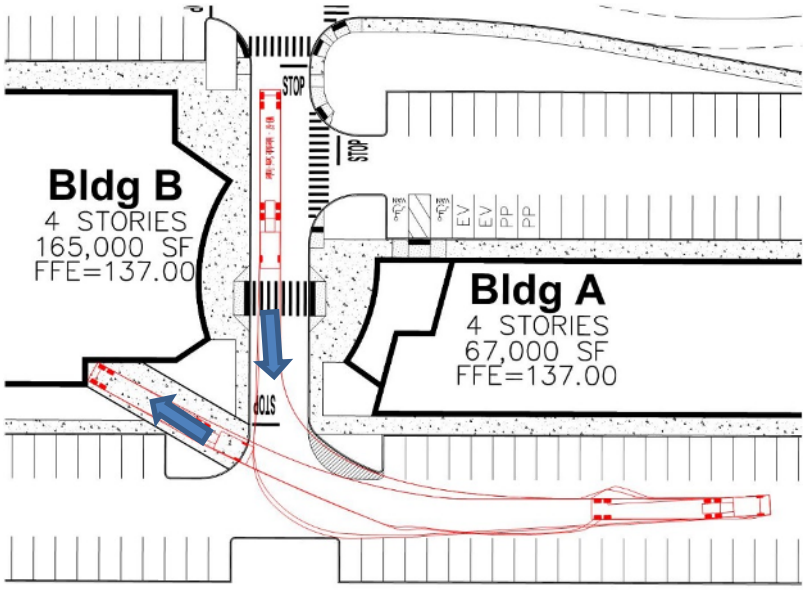
34. Loading docks are proposed for Buildings A, B, and H. Although the site plans depict a WB-50 truck circulating through the parking lots, passing by these buildings, truck turning diagrams have not been provided to depict truck paths entering and exiting these loading areas. Entering and exiting the loading docks at Buildings A and H appears difficult due to perpendicular parking provided in close proximity to the loading areas.

The plans have been revised to improve truck access for Buildings A, B, and H.

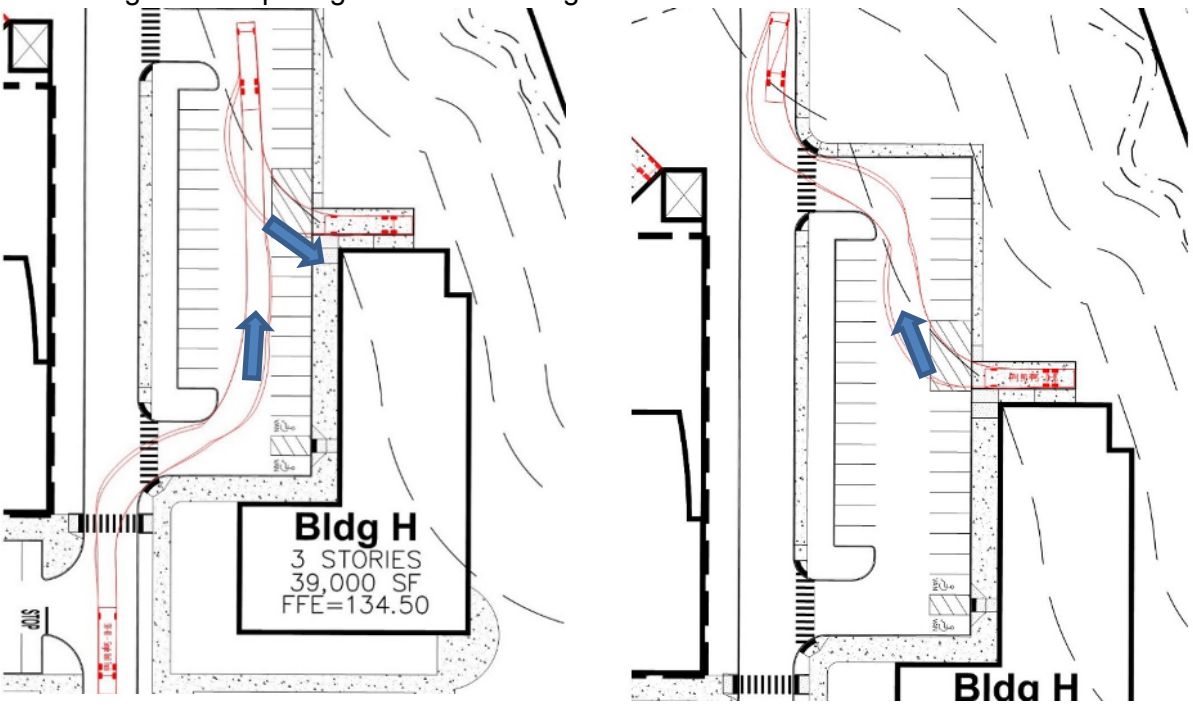
Building A: WB-50 backing into and pulling out of the loading area as follows:



Building B: WB-50 backing into loading area is depicted below was the more difficult maneuver:

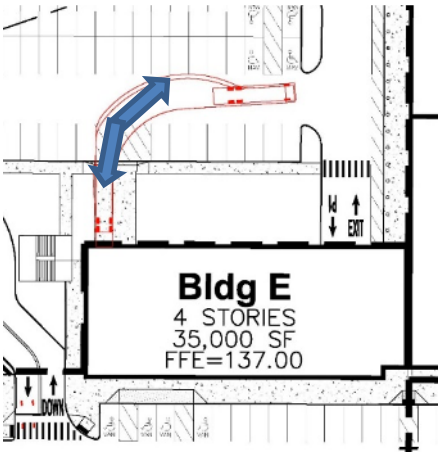


Building H: Single-Unit Truck (40') is the largest truck utilized for loading Building H, backing into and pulling out of the loading area as follows:



35. It appears that no loading areas are provided for Buildings C, E, and F. The Applicant should indicate where loading/unloading is proposed to occur for these buildings.

At this early Masterplan phase it is anticipated that Building C will be connected by elevator and service corridors to the loading docks at Building D and Building B. Building F is anticipated to be connected by elevator and service corridor to the loading dock for Building G. A loading dock location has been added to the Site Plan to service Building E, loading for the building is provided to accommodate a 40' box truck (see below). Loading to these buildings (and all other buildings) will be re-visited at each Site Plan Review to ensure adequate loading is provided for each building based on its tenant mix.



36. The site plans do not provide a truck turning diagram for an emergency vehicle accessing the lower floors of the parking garage. At a minimum, an ambulance should be able to access the lower levels of the parking garage. The Andover Fire Chief should confirm that fire apparatus access to the interior of the parking garage is not required for this development. Should fire apparatus access be required to the lower levels of the parking garage, the Applicant should provide a vehicle turning diagram depicting a fire apparatus navigating through the parking garage to enter and exit.

TEC confirmed with the Andover Fire Department that emergency vehicle access is not required within the parking structure. Below is a copy of the e-mail correspondence:

From: Michael Mansfield
Sent: Monday, December 10, 2018 12:36 PM
To: Jacki Byerley <jbyerley@andoverma.gov>
Cc: Paul Materazzo <pmaterazzo@andoverma.gov>; Ryan Beal <RBea@andoverps.net>; Chris Clemente <cclemente@andoverma.gov>; Michael Mansfield <MMan@andoverps.net>
Subject: Dascomb Road project

Good afternoon,

In reviewing once again the recommendations from GPI Inc., regarding the Dascomb Road project, and looking at several parking garage facilities that already exist in Andover, I have concluded that Andover Fire Rescue will not require that the height of the parking garage be high enough to allow access for an ambulance.

There are no other existing parking garage structures that were required to meet this recommendation and I see no need to require that with this project. However, I am interested in the fire protection capabilities of this structure as the plans continue to move forward.

If you have any questions feel free to contact me.

Sincerely,

Michael B. Mansfield

Fire Chief

Andover Fire Rescue

32 North Main Street

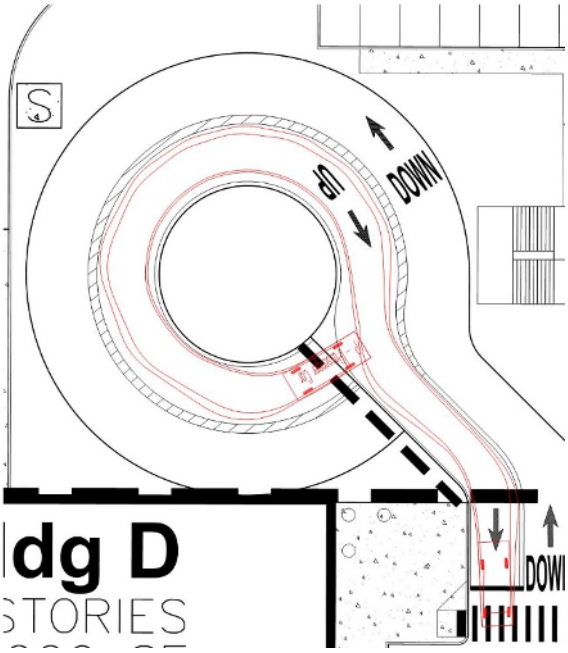
Andover, Massachusetts 01810

(P) 978-475-1281

(F) 978-475-6654

37. A spiral ramp is proposed to provide access into the parking garage. The Applicant should provide a vehicle turning diagram to depict the turning path for the largest vehicle that maneuver around this spiral ramp and into the parking garage.

Only passenger vehicles will utilize the structured parking, below is a PV turning template on the inside curve, the tighter radius:



Mitigation Measures

38. **Improvements are proposed at the Dascomb Road / I-93 NB Ramps intersection and the Frontage Road / I-93 SB Ramps intersection, which include installation of a traffic signal at both locations to be coordinated with other signals along the corridor and widening of the ramps to provide additional lanes. These improvements will require review and approval by MassDOT as these locations are under MassDOT's jurisdiction.**

    Off-Site improvements along Dascomb Road and Frontage Road will be review by the Massachusetts Department of Transportation (MassDOT) as part of the ongoing state review by the Massachusetts Environmental Policy Act (MEPA) office and subsequent review as part of a Permit to Access State Highway through MassDOT.

39. **The TIAPS notes that improvements are not proposed at the Dascomb Road / Lovejoy Road / Acorn Drive intersection as mitigation for the Project. However, the 2026 Build with Mitigation conditions includes in Table 9 reflects signal timing modifications at this intersection to be completed as part of post-occupancy fine-tuning. As traffic exiting Lovejoy Road is expected to operate at LOS under 2026 Build conditions, the Applicant should commit to implementing signal timing improvements, including post-occupancy fine-tuning, at this intersection as mitigation for the development.**

    Within the TIAPS's improvement outline, fine-tuning of traffic signal timings at the intersection post-occupancy is defined as mitigation for the project, if warranted. The capacity and queue analysis described in the TIAPS does not reflect any change in traffic signal timings beyond general maintenance that may be performed by the Town of Andover Department of Public Works (DPW) in the interim. The Applicant is committed to implement signal timing modifications post-occupancy at the intersection of Dascomb Road / Lovejoy Road / Acorn Drive as part of the off-site mitigation, if needed.

Since the filing of the TIAPS, the Applicant has also committed to geometric improvements at the intersection that will be coordinated with Town Staff and GPI throughout the design and construction of those improvements.

40. **As previously noted, the Applicant has not proposed any project-specific mitigation at the Dascomb Road / Clark Road / Bannister Road intersection. However, this intersection currently experiences a higher number of angle collisions due to traffic entering and exiting Clark Road. In addition, traffic exiting Clark Road experiences long delays and queues, which will be exacerbated by the project, and the intersection currently exceeds warranting conditions for installation of a traffic signal. Regardless of the route vehicles travel (Clark Road or Andover Street), the Project is expected to result in an increase of 80 to 155 additional vehicle trips per hour through the intersection during the peak hours (a 12% increase in volume). Therefore, the Applicant should consider implementing off-site mitigation measures at this intersection, including installation of a traffic signal. At a minimum, the Applicant should provide a fair share contribution, proportional to the percentage increase in trips through the intersection, for the future installation of a traffic signal and any geometric improvements required to accommodate a signal at this location.**

    See response to GPI Comment #19.

41. **No improvements have been proposed at the Dascomb Road / Andover Street intersection. This intersection experiences a high occurrence of collisions and crash rate significantly higher than the state and District averages due to the awkward geometry of the intersection. In addition, traffic exiting Dascomb Road is expected to experience long delays and queues during the weekday PM peak period under all analysis conditions. The Project will result in an additional 55 to 106 vehicle trips per hour through this intersection, a 4% to 14% increase. The Applicant should consider measures to improve the operations and safety of this intersection, and at a minimum, provide a fair share contribution toward future improvements at this intersection, proportional to the percentage increase in vehicle trips generated by the Project.**

    See response to GPI Comment #11.

42. **GPI concurs with the following additional off-site improvements proposed by the Applicant as mitigation for the Project:**

    a. **Signal timing modifications at the Dascomb Road / East Street / Shawsheen Street intersection to optimize operations and provide coordination with other signals along the corridor.**

    b. **Installation of a traffic signal at the Dascomb Road / Smith Way intersection, which will be coordinated with other signals along the corridor and widening on Dascomb Road and Smith Way to provide additional lanes.**

    c. **Reconstruction of the signal at the Dascomb Road / Frontage Road intersection to accommodate the new site driveway as a fourth leg and provide coordination with other signals along the corridor and widen Frontage Road and Dascomb Road to accommodate additional lanes.**

    No response required.

43. **The Applicant has committed to installation of significant sidewalk improvements, including construction of new sidewalk between Shawsheen Street and Frontage Road, to provide a continuous sidewalk connection between the site and the Ballardvale MBTA Commuter Rail Station. In addition, RRFBs will be installed at multiple crossings along the Dascomb Road corridor to enhance the safety of the crossings. GPI notes that these improvements will provide a significant benefit to the surrounding community.**

    No response required.

44. **Similarly, the Applicant is committed to installing bicycle lanes and shared-use bicycle markings along Dascomb Road between Shawsheen Street and Osgood Street to improve bicycle accessibility along the corridor. These improvements will require review and approval by MassDOT for the section of Dascomb Road between the I- 93 NB Ramps and Frontage Road, as this section of roadway is under the jurisdiction of MassDOT.**

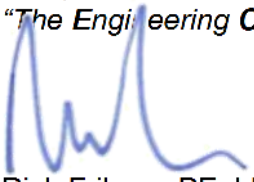
    We agree, see response to GPI Comment #38.

45. **The Applicant proposes to provide secure, weather-protected, long-term bicycle parking for employees, as well as bicycle racks for short-term parking by patrons. However, the location(s) of these bicycle facilities are not identified on the site plans.**

    The site plans have been revised to depict the location of bicycle racks. It is our intention to provide secure weather-protected, long-term bicycle parking for employees within the proposed buildings and/or within the parking structure onsite. Specific locations for weather-protected bicycle storage will be identified as each building is designed and will be depicted on the subsequent Site Plan Reviews for each phase for review by the Planning Board.

Please do not hesitate to contact me directly if you have any questions concerning our responses at 978-794-1792. Thank you for your consideration.

Sincerely,
TEC, Inc.
"The Engineering Corporation"



Rick Friberg, PE, LEED AP
Principal / Regional Director

Attachments: **Attachment A** – Left Turn Warrants
Attachment B – Supplemental Capacity and Queue Analysis
Attachment C – Revised Crash Data
Attachment D – Revised Site Plan

Attachment A

Left-Turn Lane Warrant Analysis

Left-Turn Lane Volume Warrants

Project: T0680 - The Dascomb Road Project (#146 Dascomb Road) - Andover, MA
Date: December 14, 2018
Analyst: TEC, Inc. / Samuel W. Gregorio, P.E., PTOE

Roadway Speed =	35
Assessed Speed =	40

Operating Speed	Opposing Volume	Advancing Motor Vehicle Volumes (veh/hr)			
		5% LT	10% LT	20% LT	30% LT
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
40 mph	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
	100	720	515	390	340
50 mph	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
	100	615	445	335	295
60 mph	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215
	100	505	370	275	240

Dascomb Road @ Main Site Driveway
2026 FUTURE YEAR DATA INPUT

Time	Advancing Dascomb WB LT	Advancing Dascomb WB	% Left Turns	Opposing Dascomb EB	Warranted
6-7 AM					
7-8 AM					
8-9 AM	96	1429	6.7%	1243	**YES**
9-10 AM					
10-11 AM					
11-12 PM					
12-1 PM					
1-2 PM					
2-3 PM					
3-4 PM					
4-5 PM	110	1070	10.3%	1218	**YES**
5-6 PM					

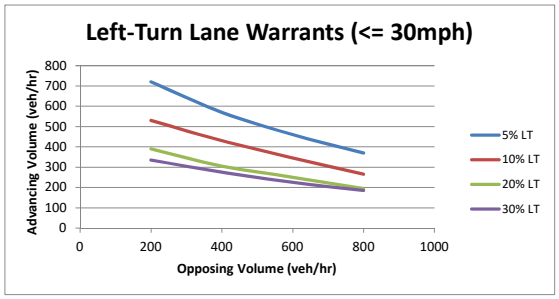
Signalized Intersections:

Left-Turn Lane Configuration	Minimum Turn Volume
Single exclusive left-turn lane	100 veh/hr
Dual exclusive left-turn lane	300 veh/hr

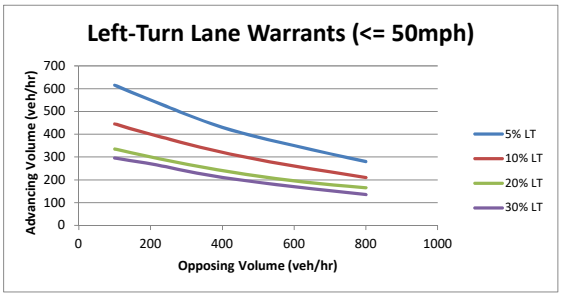
Source: Massachusetts Highway Department Design Manual, 2006 Edition, Exhibit 6-23
Source: AASHTO A Policy on Geometric Design of Highways and Streets, 2011 6th Edition, Table 9-23

Dascomb Road @ Main Site Driveway

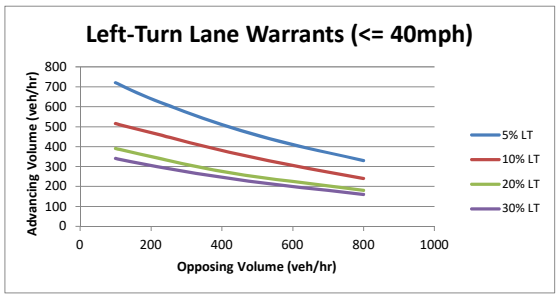
Left-Turn Lane Warranted?		
	Signalized	YES
	Unsignalized	YES



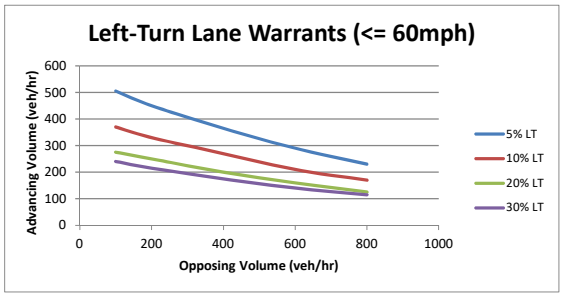
5% LT y = 0.0004x^2 - 0.955x + 895
10% LT y = 0.0001x^2 - 0.565x + 637.5
20% LT y = 0.0002x^2 - 0.5075x + 482.5
30% LT y = 0.0001x^2 - 0.375x + 405



5% LT y = 0.0003x^2 - 0.7581x + 687.65
10% LT y = 0.0002x^2 - 0.5068x + 493.54
20% LT y = 0.0002x^2 - 0.4095x + 374.26
30% LT y = 0.0001x^2 - 0.3425x + 329.9



5% LT y = 0.0003x^2 - 0.8622x + 800.98
10% LT y = 0.0001x^2 - 0.5196x +566.57
20% LT y = 0.0002x^2 - 0.4669x + 434.85
30% LT y = 0.0001x^2 - 0.3784x + 375.77



5% LT y = 0002x^2 -0.5581x + 557.15
10% LT y = 0001x^2 - 0.4108x + 408.87
20% LT y = 00008x^2 - 0.2912x + 303.8
30% LT y = 0001x^2 - 0.2682x + 265.46

Roadway Speeds
20
25
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Left-Turn Lane Volume Warrants

Project: T0680 - The Dascomb Road Project (#146 Dascomb Road) - Andover, MA
Date: December 14, 2018
Analyst: TEC, Inc. / Samuel W. Gregorio, P.E., PTOE

Roadway Speed = 30

Operating Speed	Opposing Volume	Advancing Motor Vehicle Volumes (veh/hr)			
		5% LT	10% LT	20% LT	30% LT
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
40 mph	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
	100	720	515	390	340
50 mph	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
	100	615	445	335	295
60 mph	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215
	100	505	370	275	240

Signalized Intersections:

Left-Turn Lane Configuration	Minimum Turn Volume
Single exclusive left-turn lane	100 veh/hr
Dual exclusive left-turn lane	300 veh/hr

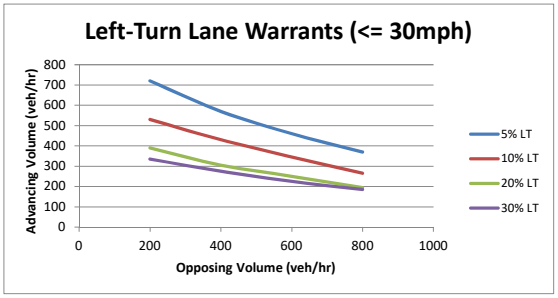
Source: Massachusetts Highway Department Design Manual, 2006 Edition, Exhibit 6-23
Source: AASHTO A Policy on Geometric Design of Highways and Streets, 2011 6th Edition, Table 9-23

Smith Way @ Northerly Site Driveway

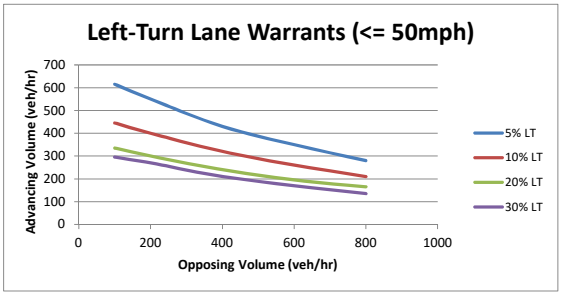
Left-Turn Lane Warranted?	Signalized	NO
	Unsignalized	NO

Smith Way @ Northerly Site Driveway
2026 FUTURE YEAR DATA INPUT

Time	Advancing Smith SB LT	Advancing Smith SB	Advancing % Left Turns	Opposing Smith NB	Warranted
6-7 AM					
7-8 AM					
8-9 AM	44	247	17.8%	70	NO
9-10 AM					
10-11 AM					
11-12 PM					
12-1 PM					
1-2 PM					
2-3 PM					
3-4 PM					
4-5 PM	43	206	20.9%	256	NO
5-6 PM					



5% LT y = 0.0004x^2 - 0.955x + 895
10% LT y = 0.0001x^2 - 0.565x + 637.5
20% LT y = 0.0002x^2 - 0.5075x + 482.5
30% LT y = 0.0001x^2 - 0.375x + 405



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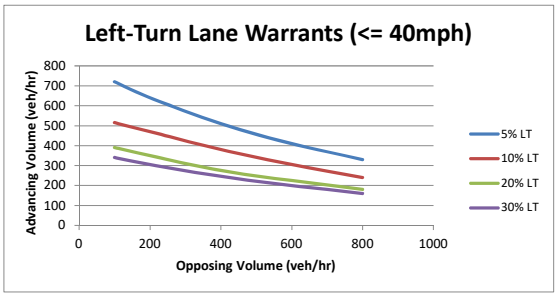

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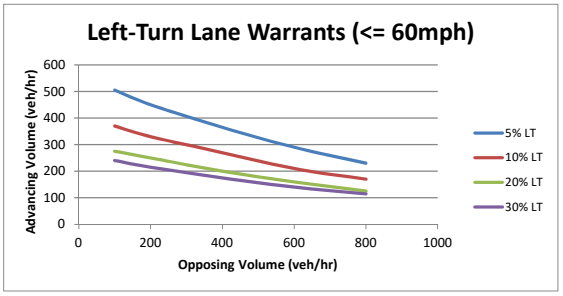

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30% LT y = 0001x^2 - 0.2682x + 265.46

Roadway Speeds
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Left-Turn Lane Volume Warrants

Project: T0680 - The Dascomb Road Project (#146 Dascomb Road) - Andover, MA
Date: December 14, 2018
Analyst: TEC, Inc. / Samuel W. Gregorio, P.E., PTOE

Roadway Speed = 30

Operating Speed	Opposing Volume	Advancing Motor Vehicle Volumes (veh/hr)			
		5% LT	10% LT	20% LT	30% LT
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
40 mph	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
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Signalized Intersections:

Left-Turn Lane Configuration	Minimum Turn Volume
Single exclusive left-turn lane	100 veh/hr
Dual exclusive left-turn lane	300 veh/hr

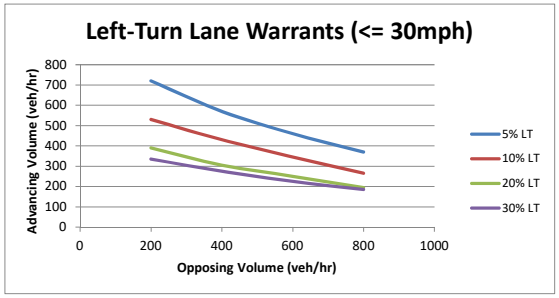
Source: Massachusetts Highway Department Design Manual, 2006 Edition, Exhibit 6-23
Source: AASHTO A Policy on Geometric Design of Highways and Streets, 2011 6th Edition, Table 9-23

Smith Way @ Southerly Site Driveway

Left-Turn Lane Warranted?
Signalized: YES
Unsignalized: NO

Smith Way @ Southerly Site Driveway
2028 FUTURE YEAR DATA INPUT

Time	Advancing Dascomb WB LT	Advancing Dascomb WB	% Left Turns	Opposing Dasomb EB	Warranted
6-7 AM					
7-8 AM					
8-9 AM	114	203	56.2%	35	**N/A**
9-10 AM					
10-11 AM					
11-12 PM					
12-1 PM					
1-2 PM					
2-3 PM					
3-4 PM					
4-5 PM	135	163	82.8%	76	**N/A**
5-6 PM					



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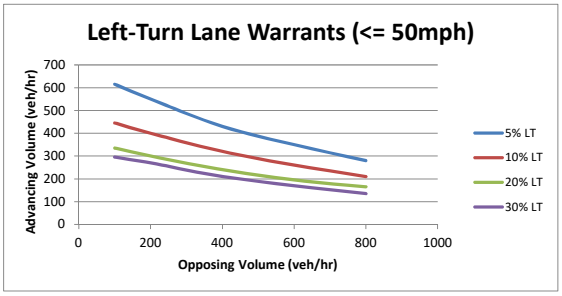

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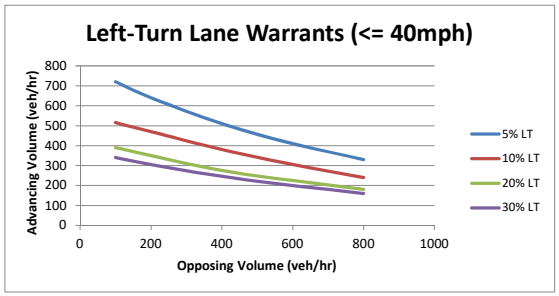

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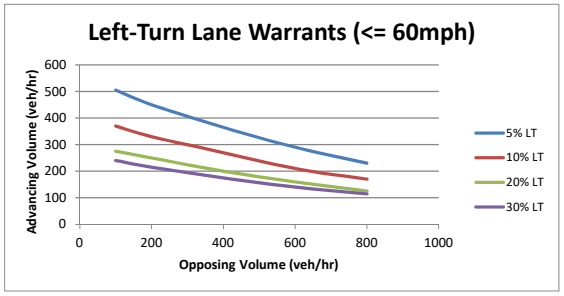

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30% LT y = 0001x^2 - 0.2682x + 265.46

Roadway Speeds
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Left-Turn Lane Volume Warrants

Project: T0680 - The Dascomb Road Project (#146 Dascomb Road) - Andover, MA
Date: December 14, 2018
Analyst: TEC, Inc. / Samuel W. Gregorio, P.E., PTOE

Operating Speed	Opposing Volume	Advancing Motor Vehicle Volumes (veh/hr)			
		5% LT	10% LT	20% LT	30% LT
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
40 mph	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
	100	720	515	390	340
50 mph	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
	100	615	445	335	295
60 mph	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215
	100	505	370	275	240

Signalized Intersections:

Left-Turn Lane Configuration	Minimum Turn Volume
Single exclusive left-turn lane	100 veh/hr
Dual exclusive left-turn lane	300 veh/hr

Source: Massachusetts Highway Department Design Manual, 2006 Edition, Exhibit 6-23
Source: AASHTO A Policy on Geometric Design of Highways and Streets, 2011 6th Edition, Table 9-23

Dascomb Road @ Lovejoy Road / Acorn Drive

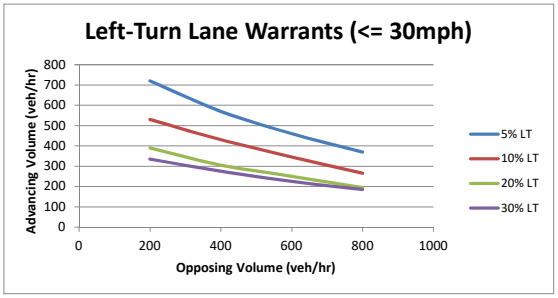
Left-Turn Lane Warranted?

Signalized	YES
Unsignalized	YES

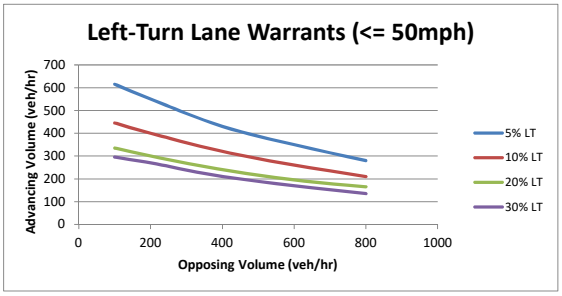
Roadway Speed = 40

Dascomb Road @ Lovejoy Road / Acorn Drive
2018 EXISTING YEAR DATA INPUT

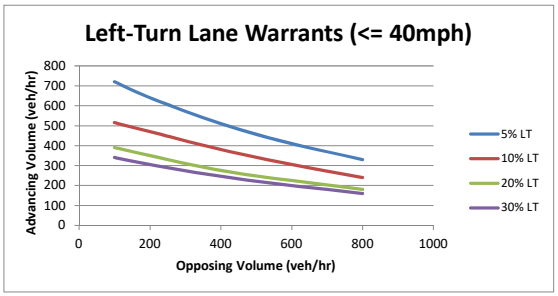
Time	Advancing Dascomb EB LT	Advancing Dascomb EB	Advancing % Left Turns	Opposing Dascomb WB	Warranted
6-7 AM					
7-8 AM	**45**	**713**	**6.3%**	**655**	**YES**
8-9 AM	**47**	**754**	**6.2%**	**743**	**YES**
9-10 AM					
10-11 AM					
11-12 PM					
12-1 PM					
1-2 PM					
2-3 PM					
3-4 PM					
4-5 PM	**121**	**598**	**20.2%**	**689**	**YES**
5-6 PM	**116**	**619**	**18.7%**	**637**	**YES**



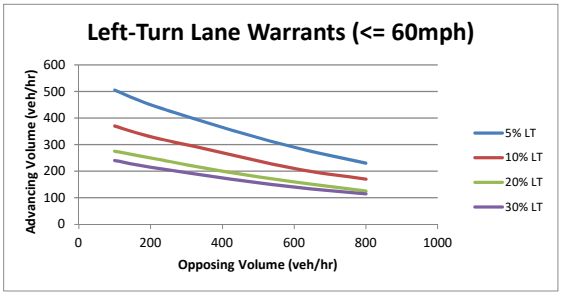
5% LT y = 0.0004x^2 - 0.955x + 895
10% LT y = 0.0001x^2 - 0.565x + 637.5
20% LT y = 0.0002x^2 - 0.5075x + 482.5
30% LT y = 0.0001x^2 - 0.375x + 405



5% LT y = 0.0003x^2 - 0.7581x + 687.65
10% LT y = 0.0002x^2 - 0.5068x + 493.54
20% LT y = 0.0002x^2 - 0.4095x + 374.26
30% LT y = 0.0001x^2 - 0.3425x + 329.9



5% LT y = 0.0003x^2 - 0.8622x + 800.98
10% LT y = 0.0001x^2 - 0.5196x +566.57
20% LT y = 0.0002x^2 - 0.4669x + 434.85
30% LT y = 0.0001x^2 - 0.3784x + 375.77



5% LT y = 0002x^2 -0.5581x + 557.15
10% LT y = 0001x^2 - 0.4108x + 408.87
20% LT y = 00008x^2 - 0.2912x + 303.8
30% LT y = 0001x^2 - 0.2682x + 265.46

Roadway Speeds
20
25
30
35
40
45
50
55
60
65

Attachment B

Intersection Capacity and Queue Analysis Worksheets

Table B – Intersection Capacity and Queue Analysis Summary

	2018 Existing				2026 No-Build				2026 Build				2026 Build w/ Mitigation			
Intersection / Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Dascomb Road / Frontage Road																
Weekday Morning Peak Period																
Dascomb Road EBL	0.77	15.2	B	88/307	0.86	23.2	C	119/392	1.02	88.5	F	337/533	0.88	39.4	D	101/207
Dascomb Road EBT/R	0.71	9.0	A	170/393	0.76	11.1	B	209/472	0.73	14.0	B	352/508	0.92	12.2	B	503/823
Dascomb Road WBL [WBL/T]	-	-	-	-	-	-	-	-	0.83	40.3	D	-	0.80	46.4	D	65/77
Dascomb Road WBT	0.64	17.6	B	135/226	0.68	19.5	B	154/253	0.88	44.6	D	344/488	0.55	15.2	B	240/288
Dascomb Road WBR	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25
Site Driveway NBL	-	-	-	-	-	-	-	-	0.16	54.3	D	<25/<25	0.09	44.9	D	<25/25
Site Driveway NBT	-	-	-	-	-	-	-	-	0.05	30.6	C	<25/32	0.19	45.0	D	<25/37
Site Driveway NBR	-	-	-	-	-	-	-	-	0.12	31.2	C	<25/25	0.22	39.0	D	<25/<25
Frontage Road SBL [SBL/T]	0.69	22.1	C	108/215	0.72	24.3	C	124/252	1.08	110.1	F	374/575	0.74	43.5	D	67/245
Frontage Road SBT	-	-	-	-	-	-	-	-	-	-	-	-	0.24	36.1	D	25/69
Frontage Road SBR	0.59	14.1	B	66/165	0.61	15.1	B	84/211	0.58	19.4	B	180/267	0.69	31.1	C	27/59
Overall Intersection	**0.59**	**14.7**	**B**	**-**	**0.63**	**17.5**	**B**	**-**	**0.59**	**47.0**	**D**	**-**	**0.55**	**25.3**	**C**	**-**
Weekday Evening Peak Period																
Dascomb Road EBL	0.73	13.3	B	55/203	0.80	18.8	B	79/280	1.08	95.6	F	213/376	0.86	38.5	D	111/201
Dascomb Road EBT/R	0.76	10.3	B	152/354	0.82	13.2	B	188/413	0.82	12.5	B	267/468	0.99	22.7	C	717/982
Dascomb Road WBL [WBL/T]	-	-	-	-	-	-	-	-	0.78	27.9	C	-	0.80	54.6	D	75/133
Dascomb Road WBT	0.61	17.6	B	106/190	0.65	19.6	B	130/207	0.87	31.0	C	206/335	0.46	30.5	C	93/197
Dascomb Road WBR	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25
Site Driveway NBL	-	-	-	-	-	-	-	-	0.38	35.7	D	<25/44	0.26	42.9	D	<25/57
Site Driveway NBT	-	-	-	-	-	-	-	-	0.24	24.3	C	30/67	0.44	43.0	D	51/98
Site Driveway NBR	-	-	-	-	-	-	-	-	0.78	38.2	D	27/90	0.80	52.7	D	66/137
Frontage Road SBL [SBL/T]	0.44	19.3	B	63/141	0.45	21.0	C	76/174	1.16	137.0	F	163/308	0.73	45.2	D	55/118
Frontage Road SBT	-	-	-	-	-	-	-	-	-	-	-	-	0.24	38.0	D	25/54
Frontage Road SBR	0.63	14.1	B	65/158	0.65	15.2	B	82/234	0.76	22.4	C	124/212	0.84	41.3	D	248/248
Overall Intersection	**0.57**	**14.2**	**B**	**-**	**0.61**	**16.8**	**B**	**-**	**0.70**	**41.9**	**D**	**-**	**0.57**	**34.5**	**C**	**-**
Saturday Midday Peak Period																
Dascomb Road EBL	0.68	10.1	B	44/118	0.74	12.6	B	50/185	1.00	66.4	E	217/383	0.83	35.2	D	90/150
Dascomb Road EBT/R	0.59	7.1	A	77/163	0.63	7.8	A	89/193	0.65	7.6	A	162/261	0.86	26.5	C	403/679
Dascomb Road WBL [WBL/T]	-	-	-	-	-	-	-	-	0.71	22.9	C	-	0.82	34.3	C	73/115
Dascomb Road WBT	0.55	15.7	B	65/123	0.57	17.0	B	80/136	0.77	24.1	C	157/258	0.41	3.9	A	88/196
Dascomb Road WBR	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25	0.00	0.0	A	<25/<25
Site Driveway NBL	-	-	-	-	-	-	-	-	0.37	34.5	C	<25/44	0.22	33.1	C	<25/52
Site Driveway NBT	-	-	-	-	-	-	-	-	0.19	23.0	C	25/58	0.32	32.7	C	33/73
Site Driveway NBR	-	-	-	-	-	-	-	-	0.57	26.4	C	<25/47	0.51	28.2	C	<25/41
Frontage Road SBL [SBL/T]	0.28	16.3	B	28/74	0.29	17.5	B	33/81	0.73	34.5	C	101/209	0.38	27.3	C	39/84
Frontage Road SBT	-	-	-	-	-	-	-	-	-	-	-	-	0.28	27.7	C	45/93
Frontage Road SBR	0.54	11.2	B	28/78	0.56	11.8	B	37/98	0.60	15.0	B	81/148	0.68	23.7	C	26/45
Overall Intersection	**0.49**	**11.2**	**B**	**-**	**0.52**	**12.4**	**B**	**-**	**0.58**	**25.8**	**C**	**-**	**0.49**	**23.4**	**C**	**-**

[a] Volume-to-capacity ratio;
[b] Delay expressed in seconds per vehicle (average)
[c] Level of service;
[d] 50th/95th Percentile Queue [95th Percentile Queue only for unsignalized intersections]

Table B (Continued) – Intersection Capacity and Queue Analysis Summary

	2018 Existing				2026 No-Build				2026 Build				2026 Build w/ Mitigation			
Intersection / Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Dascomb Road / I-93 NB Ramps																
Weekday Morning Peak Period																
Dascomb Road EBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.56	0.6	A	66/66
Dascomb Road EBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	<25/<25
Dascomb Road WBL	0.10	9.4	A	<25	0.11	9.7	A	<25	0.11	9.8	A	<25	0.16	4.1	A	<25/37
Dascomb Road WBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.80	10.9	B	425/689
NB Ramps NBL	>2.0	>999	F	840	>2.0	>999	F	955	>2.0	>999	F	1150	0.77	45.7	D	124/175
NB Ramps NBR	0.45	19.2	C	55	0.51	22.4	C	70	0.52	23.3	C	73	0.87	63.3	E	<25/62
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.50**	**17.2**	**B**	**-**
Weekday Evening Peak Period																
Dascomb Road EBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.48	13.7	B	63/295
Dascomb Road EBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	<25/82
Dascomb Road WBL	0.08	8.6	A	<25	0.09	8.8	A	<25	0.10	9.2	A	<25	0.20	15.6	B	<25/48
Dascomb Road WBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.44	6.7	A	150/270
NB Ramps NBL	>2.0	566.9	F	855	>2.0	804.8	F	1038	>2.0	>999	F	1330	0.84	41.1	D	166/207
NB Ramps NBR	0.41	15.3	C	50	0.46	17.0	C	60	0.53	20.7	C	75	0.84	42.6	D	<25/58
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.40**	**22.1**	**C**	**-**
Saturday Midday Peak Period																
Dascomb Road EBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.30	0.4	A	<25/135
Dascomb Road EBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	<25/234
Dascomb Road WBL	0.07	8.0	A	<25	0.08	8.1	A	<25	0.09	8.4	A	<25	0.12	3.9	A	<25/39
Dascomb Road WBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.41	5.5	A	105/199
NB Ramps NBL	1.20	156.9	F	395	1.45	257.8	F	533	>2.0	606.6	F	883	0.80	33.3	C	107/145
NB Ramps NBR	0.18	10.8	B	<25	0.20	11.1	B	<25	0.22	12.1	B	<25	0.55	31.6	C	<25/42
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.30**	**13.9**	**B**	**-**
Frontage Road / I-93 SB Ramps																
Weekday Morning Peak Period																
SB Ramps WBL	1.26	167.2	F	510	1.49	266.1	F	690	1.97	472.1	F	1145	0.88	38.6	D	201/241
SB Ramps WBR	-	0.0	A	<25	-	0.0	A	<25	-	0.0	A	<25	0.00	0.0	A	<25/<25
Frontage Road NBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.25	7.0	A	44/73
Frontage Road NBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	41/91
Frontage Road SB approach	0.09	8.1	A	<25	0.10	8.2	A	<25	0.10	8.2	A	<25	0.22	7.7	A	49/87
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.25**	**22.6**	**C**	**-**
Weekday Evening Peak Period																
SB Ramps WBL	1.10	113.3	F	365	1.31	193.3	F	508	1.68	346.4	F	825	0.86	41.0	D	166/208
SB Ramps WBR	-	0.0	A	<25	-	0.0	A	<25	-	0.0	A	<25	0.00	0.0	A	<25/<25
Frontage Road NBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.10	4.4	A	<25/<25
Frontage Road NBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	61/217
Frontage Road SB approach	0.14	7.8	A	<25	0.15	7.9	A	<25	0.15	7.9	A	<25	0.24	5.6	A	54/93
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.21**	**21.8**	**C**	**-**
Saturday Midday Peak Period																
SB Ramps WBL	0.52	14.2	B	75	0.57	15.5	C	93	0.78	24.3	C	198	0.84	31.4	C	143/179
SB Ramps WBR	-	0.0	A	<25	-	0.0	A	<25	-	0.0	A	<25	0.00	0.0	A	<25/<25
Frontage Road NBT	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.08	4.9	A	<25/<25
Frontage Road NBR	-	-	A	<25	-	-	A	<25	-	-	A	<25	0.00	0.0	A	104/175
Frontage Road SB approach	0.01	7.4	A	<25	0.02	7.4	A	<25	0.02	7.4	A	<25	0.05	4.8	A	<25/<25
Overall Intersection	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.14**	**24.5**	**C**	**-**

[a] Volume-to-capacity ratio,
[b] Delay expressed in seconds per vehicle (average)
[c] Level of service,
[d] 50th/95th Percentile Queue [95th Percentile Queue only for unsignalized intersections]

Table B (Continued) – Intersection Capacity and Queue Analysis Summary

Intersection / Lane Group	2018 Existing V/C[a]	2018 Existing Delay[b]	2018 Existing LOS[c]	2018 Existing Queue[d]	2026 No-Build V/C	2026 No-Build Delay	2026 No-Build LOS	2026 No-Build Queue	2026 Build V/C	2026 Build Delay	2026 Build LOS	2026 Build Queue	2026 Build w/ Mitigation V/C	2026 Build w/ Mitigation Delay	2026 Build w/ Mitigation LOS	2026 Build w/ Mitigation Queue
Northerly Site Driveway / East Drive Aisle / South Parking Aisle / Main Site Driveway																
Weekday Morning Peak Period																
Northerly Site Driveway EB approach									0.04	7.8	A	<25				
East Drive Aisle WB approach									0.04	7.2	A	<25				
South Parking Aisle NB approach									0.03	7.5	A	<25				
Main Site Driveway SB approach									0.28	8.5	A	28				
Weekday Evening Peak Period																
Northerly Site Driveway EB approach									0.20	9.5	A	<25				
East Drive Aisle WB approach		N/A				N/A			0.18	8.5	A	<25		NO CHANGE		
South Parking Aisle NB approach									0.18	9.1	A	<25				
Main Site Driveway SB approach									0.34	10.1	B	38				
Saturday Midday Peak Period																
Northerly Site Driveway EB approach									0.17	9.3	A	<25				
East Drive Aisle WB approach									0.16	8.5	A	<25				
South Parking Aisle NB approach									0.15	8.8	A	<25				
Main Site Driveway SB approach									0.41	10.8	B	50				
Smith Drive / Northerly Site Driveway																
Weekday Morning Peak Period																
Northerly Site Driveway WB approach									0.02	8.7	A	<25				
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.03	7.4	A	<25				
Weekday Evening Peak Period																
Northerly Site Driveway WB approach		N/A				N/A			0.09	10.2	B	<25		NO CHANGE		
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.04	7.9	A	<25				
Saturday Midday Peak Period																
Northerly Site Driveway WB approach									0.06	9.8	A	<25				
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.04	7.8	A	<25				
Smith Drive / Northerly Site Driveway																
Weekday Morning Peak Period																
Southerly Site Driveway WB approach									0.04	8.6	A	<25				
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.08	7.5	A	<25				
Weekday Evening Peak Period																
Southerly Site Driveway WB approach		N/A				N/A			0.20	9.6	A	<25		NO CHANGE		
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.10	7.6	A	<25				
Saturday Midday Peak Period																
Southerly Site Driveway WB approach									0.16	9.4	A	<25				
Smith Drive NB approach									-	-	A	<25				
Smith Drive SB approach									0.12	7.7	A	<25				

[a] Volume-to-capacity ratio,
[b] Delay expressed in seconds per vehicle (average)
[c] Level of service,
[d] 50th/95th Percentile Queue [95th Percentile Queue only for unsignalized intersections]

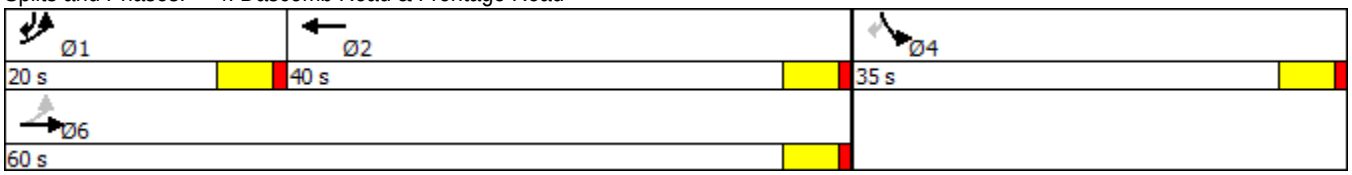
Dascomb Road at Frontage Road

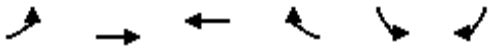
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	381	716	709	497	289	382
Future Volume (vph)	381	716	709	497	289	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	4%	1%	2%	2%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 65
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	405	762	754	529	307	406
v/c Ratio	0.79	0.69	0.72	0.29	0.67	0.41
Control Delay	26.6	13.5	24.9	0.4	31.5	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	13.5	24.9	0.4	31.5	9.3
Queue Length 50th (ft)	88	170	135	0	108	66
Queue Length 95th (ft)	#307	393	226	0	215	165
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	519	1525	1923	1812	953	1010
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.50	0.39	0.29	0.32	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	381	716	709	497	289	382
Future Volume (veh/h)	381	716	709	497	289	382
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1792	1827	1956	1937	1937
Adj Flow Rate, veh/h	405	762	754	0	307	406
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	6	4	1	2	2
Cap, veh/h	523	1071	1170	561	444	692
Arrive On Green	0.18	0.60	0.34	0.00	0.24	0.24
Sat Flow, veh/h	1691	1792	3563	1663	1845	1647
Grp Volume(v), veh/h	405	762	754	0	307	406
Grp Sat Flow(s),veh/h/ln	1691	1792	1736	1663	1845	1647
Q Serve(g_s), s	8.8	18.4	11.4	0.0	9.4	11.7
Cycle Q Clear(g_c), s	8.8	18.4	11.4	0.0	9.4	11.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	523	1071	1170	561	444	692
V/C Ratio(X)	0.77	0.71	0.64	0.00	0.69	0.59
Avail Cap(c_a), veh/h	630	1595	1966	942	896	1095
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	11.3	8.7	17.3	0.0	21.4	13.8
Incr Delay (d2), s/veh	3.9	0.3	0.2	0.0	0.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	9.0	5.5	0.0	4.9	11.0
LnGrp Delay(d),s/veh	15.2	9.0	17.6	0.0	22.1	14.1
LnGrp LOS	B	A	B		C	B
Approach Vol, veh/h		1167	754		713	
Approach Delay, s/veh		11.2	17.6		17.5	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	16.1	25.8		19.9		41.9		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	10.8	13.4		13.7		20.4		
Green Ext Time (p_c), s	0.3	7.5		1.2		8.4		

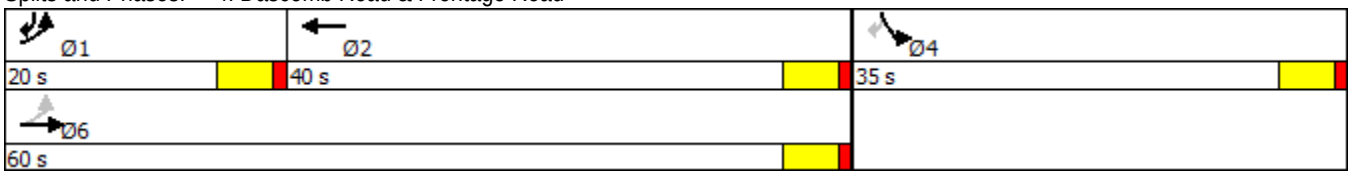
Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

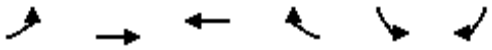
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	374	796	690	178	204	421
Future Volume (vph)	374	796	690	178	204	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	3%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 56.1
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	390	829	719	185	213	439
v/c Ratio	0.71	0.72	0.68	0.10	0.53	0.46
Control Delay	17.4	12.2	21.4	0.1	26.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	12.2	21.4	0.1	26.6	9.2
Queue Length 50th (ft)	55	152	106	0	63	65
Queue Length 95th (ft)	#203	354	190	0	141	158
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	621	1745	2308	1812	1121	1044
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.48	0.31	0.10	0.19	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	374	796	690	178	204	421
Future Volume (veh/h)	374	796	690	178	204	421
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1956	1956	1918
Adj Flow Rate, veh/h	390	829	719	0	212	439
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	3
Cap, veh/h	536	1087	1174	546	485	699
Arrive On Green	0.17	0.58	0.33	0.00	0.26	0.26
Sat Flow, veh/h	1792	1881	3668	1663	1863	1631
Grp Volume(v), veh/h	390	829	719	0	212	439
Grp Sat Flow(s),veh/h/ln	1792	1881	1787	1663	1863	1631
Q Serve(g_s), s	8.1	20.5	10.4	0.0	5.9	13.0
Cycle Q Clear(g_c), s	8.1	20.5	10.4	0.0	5.9	13.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	536	1087	1174	546	485	699
V/C Ratio(X)	0.73	0.76	0.61	0.00	0.44	0.63
Avail Cap(c_a), veh/h	669	1676	2027	943	906	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	11.3	9.8	17.4	0.0	19.1	13.8
Incr Delay (d2), s/veh	2.1	0.4	0.2	0.0	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	10.5	5.1	0.0	3.0	11.8
LnGrp Delay(d),s/veh	13.3	10.3	17.6	0.0	19.3	14.1
LnGrp LOS	B	B	B		B	B
Approach Vol, veh/h		1219	719		651	
Approach Delay, s/veh		11.2	17.6		15.8	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.4	25.3		21.1		40.7		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	10.1	12.4		15.0		22.5		
Green Ext Time (p_c), s	0.3	7.8		1.1		8.7		

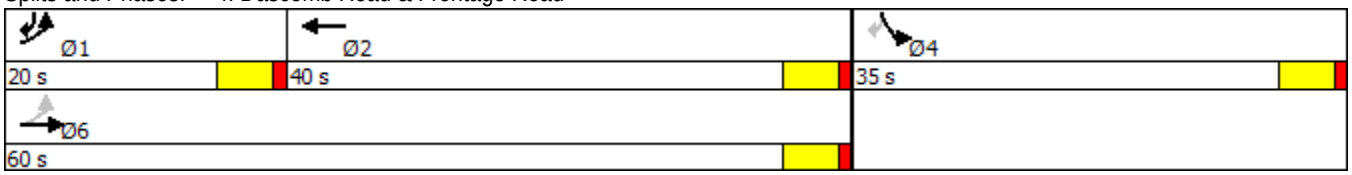
Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 LOS	B

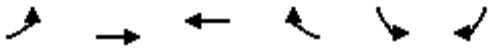
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	406	613	528	213	112	360
Future Volume (vph)	406	613	528	213	112	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	1%	1%	0%	1%	3%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 44.4
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	423	639	550	222	117	375
v/c Ratio	0.61	0.49	0.57	0.14	0.33	0.39
Control Delay	9.3	6.4	17.7	0.2	21.6	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	6.4	17.7	0.2	21.6	5.4
Queue Length 50th (ft)	44	77	65	0	28	28
Queue Length 95th (ft)	118	163	123	0	74	78
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	796	1866	2796	1561	1416	1088
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.34	0.20	0.14	0.08	0.34

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	406	613	528	213	112	360
Future Volume (veh/h)	406	613	528	213	112	360
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1881	1881	1900	1956	1918
Adj Flow Rate, veh/h	423	639	550	0	117	375
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	0	1	3
Cap, veh/h	620	1084	1002	453	423	693
Arrive On Green	0.20	0.58	0.28	0.00	0.23	0.23
Sat Flow, veh/h	1774	1881	3668	1615	1863	1631
Grp Volume(v), veh/h	423	639	550	0	117	375
Grp Sat Flow(s),veh/h/ln	1774	1881	1787	1615	1863	1631
Q Serve(g_s), s	7.7	11.1	6.7	0.0	2.6	8.7
Cycle Q Clear(g_c), s	7.7	11.1	6.7	0.0	2.6	8.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	620	1084	1002	453	423	693
V/C Ratio(X)	0.68	0.59	0.55	0.00	0.28	0.54
Avail Cap(c_a), veh/h	792	2034	2459	1111	1099	1284
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	6.9	15.6	0.0	16.2	10.9
Incr Delay (d2), s/veh	0.9	0.2	0.2	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	5.7	3.3	0.0	1.3	8.3
LnGrp Delay(d),s/veh	10.1	7.1	15.7	0.0	16.3	11.2
LnGrp LOS	B	A	B		B	B
Approach Vol, veh/h		1062	550		492	
Approach Delay, s/veh		8.3	15.7		12.4	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	15.1	19.3		16.6		34.3		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	9.7	8.7		10.7		13.1		
Green Ext Time (p_c), s	0.4	5.6		0.8		5.9		

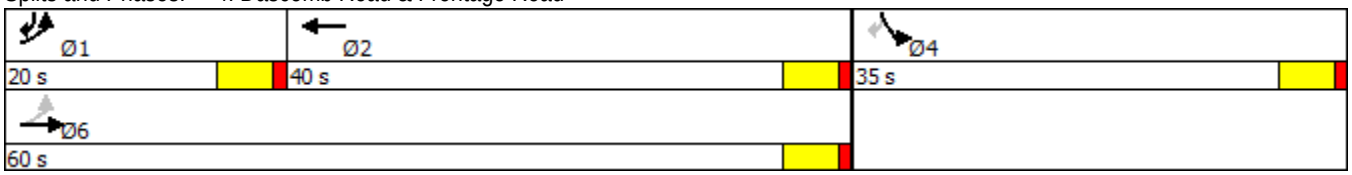
Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

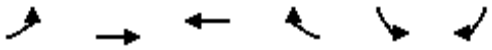
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	412	773	763	538	313	411
Future Volume (vph)	412	773	763	538	313	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	4%	1%	2%	2%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 69.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	438	822	812	572	333	437
v/c Ratio	0.90	0.75	0.74	0.32	0.71	0.44
Control Delay	40.8	15.7	25.8	0.5	33.9	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	15.7	25.8	0.5	33.9	11.2
Queue Length 50th (ft)	119	209	154	0	124	84
Queue Length 95th (ft)	#392	472	253	0	252	211
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	489	1458	1814	1812	898	985
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.56	0.45	0.32	0.37	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	412	773	763	538	313	411
Future Volume (veh/h)	412	773	763	538	313	411
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1792	1827	1956	1937	1937
Adj Flow Rate, veh/h	438	822	812	0	333	437
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	6	4	1	2	2
Cap, veh/h	512	1082	1196	573	462	719
Arrive On Green	0.19	0.60	0.34	0.00	0.25	0.25
Sat Flow, veh/h	1691	1792	3563	1663	1845	1647
Grp Volume(v), veh/h	438	822	812	0	333	437
Grp Sat Flow(s),veh/h/ln	1691	1792	1736	1663	1845	1647
Q Serve(g_s), s	10.6	23.0	13.7	0.0	11.3	14.0
Cycle Q Clear(g_c), s	10.6	23.0	13.7	0.0	11.3	14.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	512	1082	1196	573	462	719
V/C Ratio(X)	0.86	0.76	0.68	0.00	0.72	0.61
Avail Cap(c_a), veh/h	567	1437	1771	848	807	1027
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	10.0	19.2	0.0	23.5	14.8
Incr Delay (d2), s/veh	10.4	1.1	0.3	0.0	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	11.5	6.6	0.0	5.8	13.0
LnGrp Delay(d),s/veh	23.2	11.1	19.5	0.0	24.3	15.1
LnGrp LOS	C	B	B		C	B
Approach Vol, veh/h		1260	812		770	
Approach Delay, s/veh		15.3	19.5		19.1	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.8	28.6		22.2		46.4		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	12.6	15.7		16.0		25.0		
Green Ext Time (p_c), s	0.2	7.9		1.2		9.2		

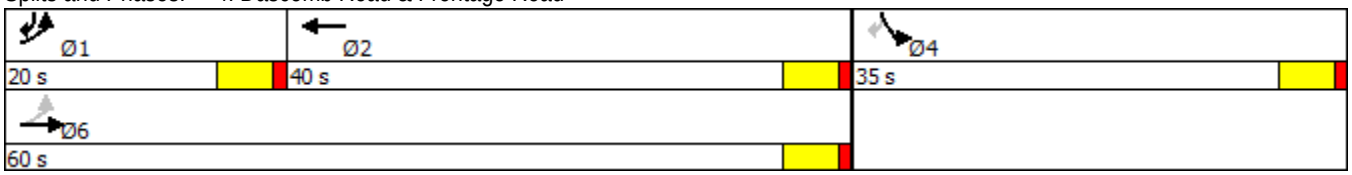
Intersection Summary	
HCM 2010 Ctrl Delay	17.5
HCM 2010 LOS	B

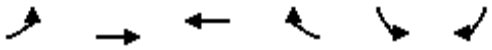
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	403	858	746	193	221	455
Future Volume (vph)	403	858	746	193	221	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	3%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 62.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	420	894	777	201	230	474
v/c Ratio	0.75	0.75	0.69	0.11	0.58	0.50
Control Delay	21.7	13.1	22.3	0.1	30.4	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	13.1	22.3	0.1	30.4	11.6
Queue Length 50th (ft)	79	188	130	0	76	82
Queue Length 95th (ft)	#280	413	207	0	174	234
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	576	1689	2082	1812	1011	970
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.53	0.37	0.11	0.23	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	403	858	746	193	221	455
Future Volume (veh/h)	403	858	746	193	221	455
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1956	1956	1918
Adj Flow Rate, veh/h	420	894	777	0	230	474
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	3
Cap, veh/h	522	1096	1199	558	507	728
Arrive On Green	0.17	0.58	0.34	0.00	0.27	0.27
Sat Flow, veh/h	1792	1881	3668	1663	1863	1631
Grp Volume(v), veh/h	420	894	777	0	230	474
Grp Sat Flow(s),veh/h/ln	1792	1881	1787	1663	1863	1631
Q Serve(g_s), s	9.7	26.0	12.7	0.0	7.0	15.6
Cycle Q Clear(g_c), s	9.7	26.0	12.7	0.0	7.0	15.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	522	1096	1199	558	507	728
V/C Ratio(X)	0.80	0.82	0.65	0.00	0.45	0.65
Avail Cap(c_a), veh/h	601	1504	1819	846	813	995
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	11.4	19.4	0.0	20.8	14.9
Incr Delay (d2), s/veh	5.9	1.8	0.2	0.0	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	13.7	6.3	0.0	3.7	14.0
LnGrp Delay(d),s/veh	18.8	13.2	19.6	0.0	21.0	15.2
LnGrp LOS	B	B	B		C	B
Approach Vol, veh/h		1314	777		704	
Approach Delay, s/veh		15.0	19.6		17.1	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	17.0	28.1		23.7		45.1		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	11.7	14.7		17.6		28.0		
Green Ext Time (p_c), s	0.3	8.4		1.1		9.3		

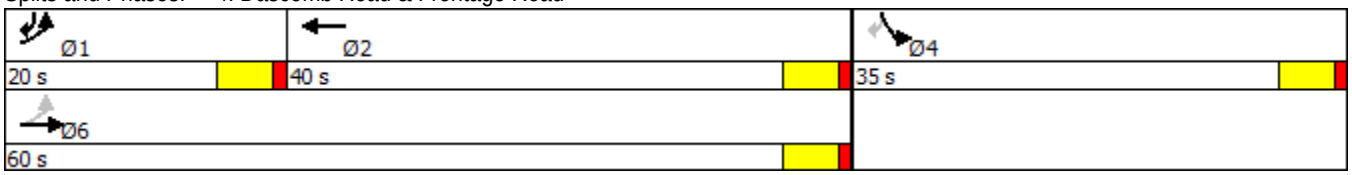
Intersection Summary	
HCM 2010 Ctrl Delay	16.8
HCM 2010 LOS	B

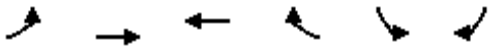
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	438	662	568	231	121	387
Future Volume (vph)	438	662	568	231	121	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	16	16
Storage Length (ft)	150			130	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		35	35		30	
Link Distance (ft)		200	1000		775	
Travel Time (s)		3.9	19.5		17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	1%	1%	0%	1%	3%
Shared Lane Traffic (%)						
Turn Type	pm+pt	NA	NA	Free	Prot	pm+ov
Protected Phases	1	6	2		4	1
Permitted Phases	6			Free		4
Detector Phase	1	6	2		4	1
Switch Phase						
Minimum Initial (s)	10.0	10.0	6.0		6.0	10.0
Minimum Split (s)	15.0	15.0	11.0		11.0	15.0
Total Split (s)	20.0	60.0	40.0		35.0	20.0
Total Split (%)	21.1%	63.2%	42.1%		36.8%	21.1%
Maximum Green (s)	15.0	55.0	35.0		30.0	15.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Recall Mode	None	Min	Min		None	None

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 47.3
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Dascomb Road & Frontage Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	456	690	592	241	126	403
v/c Ratio	0.65	0.51	0.60	0.13	0.36	0.42
Control Delay	11.8	6.7	18.9	0.1	23.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	6.7	18.9	0.1	23.2	6.4
Queue Length 50th (ft)	50	89	80	0	33	37
Queue Length 95th (ft)	#185	193	136	0	81	98
Internal Link Dist (ft)		120	920		695	
Turn Bay Length (ft)	150			130		
Base Capacity (vph)	763	1853	2654	1830	1347	1035
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.37	0.22	0.13	0.09	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	438	662	568	231	121	387
Future Volume (veh/h)	438	662	568	231	121	387
Number	1	6	2	12	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1881	1881	1976	1956	1918
Adj Flow Rate, veh/h	456	690	592	0	126	403
Adj No. of Lanes	1	1	2	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	0	1	3
Cap, veh/h	615	1098	1032	485	439	718
Arrive On Green	0.20	0.58	0.29	0.00	0.24	0.24
Sat Flow, veh/h	1774	1881	3668	1680	1863	1631
Grp Volume(v), veh/h	456	690	592	0	126	403
Grp Sat Flow(s),veh/h/ln	1774	1881	1787	1680	1863	1631
Q Serve(g_s), s	9.0	13.4	7.8	0.0	3.1	10.2
Cycle Q Clear(g_c), s	9.0	13.4	7.8	0.0	3.1	10.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	615	1098	1032	485	439	718
V/C Ratio(X)	0.74	0.63	0.57	0.00	0.29	0.56
Avail Cap(c_a), veh/h	731	1867	2258	1061	1009	1217
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	10.1	7.6	16.8	0.0	17.4	11.5
Incr Delay (d2), s/veh	2.5	0.2	0.2	0.0	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	6.8	3.9	0.0	1.6	9.7
LnGrp Delay(d),s/veh	12.6	7.8	17.0	0.0	17.5	11.8
LnGrp LOS	B	A	B		B	B
Approach Vol, veh/h		1146	592		529	
Approach Delay, s/veh		9.7	17.0		13.1	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	16.4	21.0		18.1		37.3		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	15.0	35.0		30.0		55.0		
Max Q Clear Time (g_c+I1), s	11.0	9.8		12.2		15.4		
Green Ext Time (p_c), s	0.3	6.2		0.9		6.6		

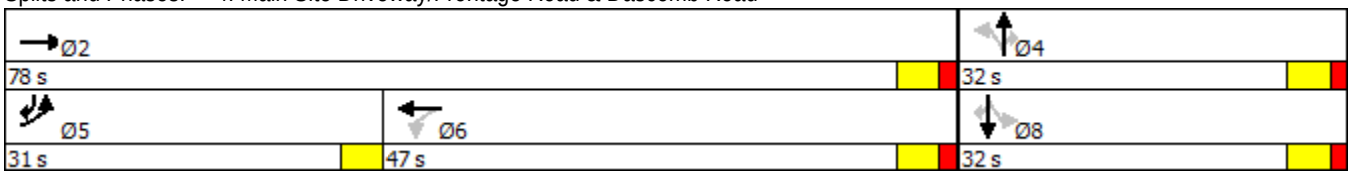
Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	414	787	17	96	799	534	10	20	44	312	115	458
Future Volume (vph)	414	787	17	96	799	534	10	20	44	312	115	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	11	11	11	16	16	16
Storage Length (ft)	150		0	0		130	150		150	0		0
Storage Lanes	1		0	0		1	1		1	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		200			1000			400			775	
Travel Time (s)		3.9			19.5			9.1			17.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	2%	2%	4%	1%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Perm	NA	Free	Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	5	2			6			4			8	5
Permitted Phases				6		Free	4		4	8		8
Detector Phase	5	2		6	6		4	4	4	8	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		10.0	10.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	15.0		15.0	15.0		11.0	11.0	11.0	11.0	11.0	9.5
Total Split (s)	31.0	78.0		47.0	47.0		32.0	32.0	32.0	32.0	32.0	31.0
Total Split (%)	28.2%	70.9%		42.7%	42.7%		29.1%	29.1%	29.1%	29.1%	29.1%	28.2%
Maximum Green (s)	27.5	73.0		42.0	42.0		27.0	27.0	27.0	27.0	27.0	27.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	0.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	3.5	5.0			5.0		5.0	5.0	5.0		5.0	3.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Min		Min	Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 109.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	440	855	952	568	11	21	47	454	487
v/c Ratio	1.04	0.72	0.98	0.31	0.17	0.05	0.11	1.14	0.49
Control Delay	96.6	16.3	58.2	0.5	40.3	32.2	8.0	126.4	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.6	16.3	58.2	0.5	40.3	32.2	8.0	126.4	15.7
Queue Length 50th (ft)	~337	352	344	0	6	11	0	~374	180
Queue Length 95th (ft)	#533	508	#488	0	24	32	25	#575	267
Internal Link Dist (ft)		120	920			320		695	
Turn Bay Length (ft)	150			130	150		150		
Base Capacity (vph)	422	1189	977	1812	65	443	417	400	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.72	0.97	0.31	0.17	0.05	0.11	1.14	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	414	787	17	96	799	534	10	20	44	312	115	458
Future Volume (veh/h)	414	787	17	96	799	534	10	20	44	312	115	458
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1794	1900	1900	1831	1956	1863	1863	1863	1976	1937	1937
Adj Flow Rate, veh/h	440	837	18	102	850	0	11	21	47	332	122	487
Adj No. of Lanes	1	1	0	0	2	1	1	1	1	0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	6	6	4	4	1	2	2	2	2	2	2
Cap, veh/h	432	1149	25	141	972	614	67	467	397	323	97	833
Arrive On Green	0.26	0.66	0.66	0.37	0.37	0.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1691	1750	38	269	2633	1663	809	1863	1583	1057	388	1647
Grp Volume(v), veh/h	440	0	855	438	514	0	11	21	47	454	0	487
Grp Sat Flow(s),veh/h/ln	1691	0	1787	1320	1583	1663	809	1863	1583	1445	0	1647
Q Serve(g_s), s	27.5	0.0	33.9	29.8	32.7	0.0	0.0	0.9	2.5	26.1	0.0	22.4
Cycle Q Clear(g_c), s	27.5	0.0	33.9	33.4	32.7	0.0	27.0	0.9	2.5	27.0	0.0	22.4
Prop In Lane	1.00		0.02	0.23		1.00	1.00		1.00	0.73		1.00
Lane Grp Cap(c), veh/h	432	0	1174	528	584	614	67	467	397	420	0	833
V/C Ratio(X)	1.02	0.00	0.73	0.83	0.88	0.00	0.16	0.05	0.12	1.08	0.00	0.58
Avail Cap(c_a), veh/h	432	0	1211	554	617	648	67	467	397	420	0	833
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	12.2	31.3	31.8	0.0	53.9	30.6	31.2	42.6	0.0	18.7
Incr Delay (d2), s/veh	48.4	0.0	1.9	9.0	12.8	0.0	0.4	0.0	0.0	67.5	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.5	0.0	17.2	13.5	16.4	0.0	0.3	0.5	1.1	20.2	0.0	10.2
LnGrp Delay(d),s/veh	88.5	0.0	14.0	40.3	44.6	0.0	54.3	30.6	31.2	110.1	0.0	19.4
LnGrp LOS	F		B	D	D		D	C	C	F		B
Approach Vol, veh/h		1295			952			79			941	
Approach Delay, s/veh		39.4			42.6			34.3			63.2	
Approach LOS		D			D			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		75.8		32.0	31.0	44.8		32.0
Change Period (Y+Rc), s		5.0		5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s		73.0		27.0	27.5	42.0		27.0
Max Q Clear Time (g_c+I1), s		35.9		29.0	29.5	35.4		29.0
Green Ext Time (p_c), s		11.4		0.0	0.0	4.4		0.0

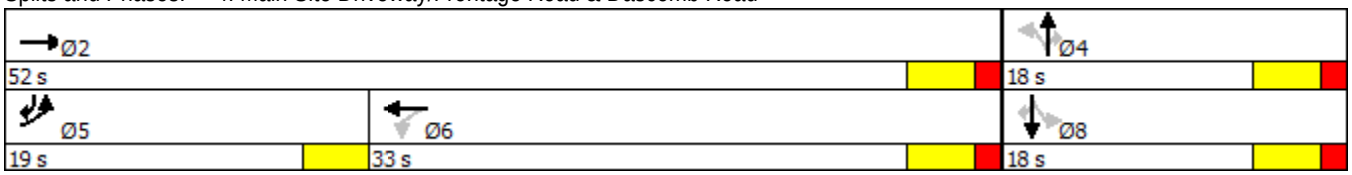
Intersection Summary	
HCM 2010 Ctrl Delay	47.0
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	413	952	33	110	773	187	37	79	220	214	97	488
Future Volume (vph)	413	952	33	110	773	187	37	79	220	214	97	488
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	11	11	11	16	16	16
Storage Length (ft)	150		0	0		130	150		150	0		0
Storage Lanes	1		0	0		1	1		1	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		200			1000			400			775	
Travel Time (s)		3.9			19.5			9.1			17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	2%	2%	2%	1%	2%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Perm	NA	Free	Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	5	2			6			4			8	5
Permitted Phases				6		Free	4		4	8		8
Detector Phase	5	2		6	6		4	4	4	8	8	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		6.0	6.0	6.0	10.0	10.0	10.0
Minimum Split (s)	13.5	15.0		15.0	15.0		11.0	11.0	11.0	15.0	15.0	13.5
Total Split (s)	19.0	52.0		33.0	33.0		18.0	18.0	18.0	18.0	18.0	19.0
Total Split (%)	27.1%	74.3%		47.1%	47.1%		25.7%	25.7%	25.7%	25.7%	25.7%	27.1%
Maximum Green (s)	15.5	47.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	15.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	0.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	3.5	5.0			5.0		5.0	5.0	5.0		5.0	3.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Min		Min	Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	430	1026	920	195	39	82	229	324	508
v/c Ratio	1.09	0.82	1.01	0.11	0.38	0.25	0.56	1.11	0.57
Control Delay	101.1	15.4	55.8	0.1	36.9	26.6	15.2	115.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.1	15.4	55.8	0.1	36.9	26.6	15.2	115.1	14.1
Queue Length 50th (ft)	~213	267	~206	0	15	30	27	~163	124
Queue Length 95th (ft)	#376	#468	#335	0	44	67	90	#308	212
Internal Link Dist (ft)		120	920			320		695	
Turn Bay Length (ft)	150			130	150		150		
Base Capacity (vph)	395	1257	911	1812	103	334	411	293	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.82	1.01	0.11	0.38	0.25	0.56	1.11	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	413	952	33	110	773	187	37	79	220	214	97	488
Future Volume (veh/h)	413	952	33	110	773	187	37	79	220	214	97	488
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1900	1879	1956	1863	1863	1863	1976	1950	1918
Adj Flow Rate, veh/h	430	992	34	115	805	0	39	82	229	223	101	508
Adj No. of Lanes	1	1	0	0	2	1	1	1	1	0	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	2	2	2	2	2	3
Cap, veh/h	398	1212	42	160	943	662	103	347	295	219	60	666
Arrive On Green	0.22	0.67	0.67	0.40	0.40	0.00	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1792	1808	62	231	2367	1663	809	1863	1583	707	320	1631
Grp Volume(v), veh/h	430	0	1026	357	563	0	39	82	229	324	0	508
Grp Sat Flow(s),veh/h/ln	1792	0	1870	974	1624	1663	809	1863	1583	1027	0	1631
Q Serve(g_s), s	15.5	0.0	28.0	15.8	22.3	0.0	0.0	2.6	9.6	10.4	0.0	13.0
Cycle Q Clear(g_c), s	15.5	0.0	28.0	24.7	22.3	0.0	13.0	2.6	9.6	13.0	0.0	13.0
Prop In Lane	1.00		0.03	0.32		1.00	1.00		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	398	0	1253	456	647	662	103	347	295	278	0	666
V/C Ratio(X)	1.08	0.00	0.82	0.78	0.87	0.00	0.38	0.24	0.78	1.16	0.00	0.76
Avail Cap(c_a), veh/h	398	0	1259	459	652	667	103	347	295	278	0	666
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.1	0.0	8.4	20.1	19.3	0.0	34.9	24.2	27.0	31.3	0.0	17.7
Incr Delay (d2), s/veh	68.4	0.0	4.1	7.8	11.7	0.0	0.8	0.1	11.2	105.6	0.0	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.1	0.0	15.4	7.5	11.9	0.0	0.8	1.4	5.1	13.4	0.0	9.2
LnGrp Delay(d),s/veh	95.6	0.0	12.5	27.9	31.0	0.0	35.7	24.3	38.2	137.0	0.0	22.4
LnGrp LOS	F		B	C	C		D	C	D	F		C
Approach Vol, veh/h		1456			920			350			832	
Approach Delay, s/veh		37.0			29.8			34.7			67.0	
Approach LOS		D			C			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		51.8		18.0	19.0	32.8		18.0
Change Period (Y+Rc), s		5.0		5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s		47.0		13.0	15.5	28.0		13.0
Max Q Clear Time (g_c+I1), s		30.0		15.0	17.5	26.7		15.0
Green Ext Time (p_c), s		9.7		0.0	0.0	1.1		0.0

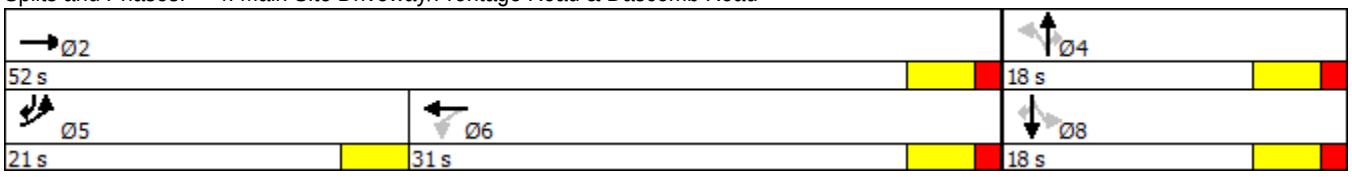
Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	440	720	45	136	608	222	40	66	166	117	118	426
Future Volume (vph)	440	720	45	136	608	222	40	66	166	117	118	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	16	11	11	11	16	16	16
Storage Length (ft)	150		0	0		130	150		150	0		0
Storage Lanes	1		0	0		1	1		1	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		200			1000			400			775	
Travel Time (s)		3.9			19.5			9.1			17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	1%	2%	2%	1%	0%	2%	2%	2%	1%	2%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Perm	NA	Free	Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	5	2			6			4			8	5
Permitted Phases				6		Free	4		4	8		8
Detector Phase	5	2		6	6		4	4	4	8	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		10.0	10.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	15.0		15.0	15.0		11.0	11.0	11.0	15.0	15.0	11.0
Total Split (s)	21.0	52.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	21.0
Total Split (%)	30.0%	74.3%		44.3%	44.3%		25.7%	25.7%	25.7%	25.7%	25.7%	30.0%
Maximum Green (s)	17.5	47.0		26.0	26.0		13.0	13.0	13.0	13.0	13.0	17.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	0.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	3.5	5.0			5.0		5.0	5.0	5.0		5.0	3.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Min		Min	Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 66.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	458	797	775	231	42	69	173	245	444
v/c Ratio	0.98	0.64	0.89	0.13	0.31	0.21	0.42	0.81	0.46
Control Delay	66.8	9.2	34.9	0.1	31.6	26.1	8.1	48.9	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	9.2	34.9	0.1	31.6	26.1	8.1	48.9	9.5
Queue Length 50th (ft)	~217	162	157	0	16	25	0	101	81
Queue Length 95th (ft)	#383	261	#258	0	44	58	47	#209	148
Internal Link Dist (ft)		120	920			320		695	
Turn Bay Length (ft)	150			130	150		150		
Base Capacity (vph)	467	1323	963	1830	148	353	439	335	974
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.60	0.80	0.13	0.28	0.20	0.39	0.73	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	720	45	136	608	222	40	66	166	117	118	426
Future Volume (veh/h)	440	720	45	136	608	222	40	66	166	117	118	426
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1880	1900	1900	1878	1976	1863	1863	1863	1976	1947	1918
Adj Flow Rate, veh/h	458	750	47	142	633	0	42	69	173	122	123	444
Adj No. of Lanes	1	1	0	0	2	1	1	1	1	0	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	1	1	0	2	2	2	2	2	3
Cap, veh/h	459	1156	72	221	824	587	114	358	304	198	137	735
Arrive On Green	0.26	0.66	0.66	0.35	0.35	0.00	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1774	1751	110	417	2357	1680	841	1863	1583	615	715	1631
Grp Volume(v), veh/h	458	0	797	339	436	0	42	69	173	245	0	444
Grp Sat Flow(s),veh/h/ln	1774	0	1861	1151	1623	1680	841	1863	1583	1330	0	1631
Q Serve(g_s), s	17.4	0.0	17.2	15.9	16.2	0.0	0.6	2.1	6.7	10.3	0.0	13.0
Cycle Q Clear(g_c), s	17.4	0.0	17.2	17.9	16.2	0.0	13.0	2.1	6.7	12.4	0.0	13.0
Prop In Lane	1.00		0.06	0.42		1.00	1.00		1.00	0.50		1.00
Lane Grp Cap(c), veh/h	459	0	1228	478	567	587	114	358	304	335	0	735
V/C Ratio(X)	1.00	0.00	0.65	0.71	0.77	0.00	0.37	0.19	0.57	0.73	0.00	0.60
Avail Cap(c_a), veh/h	459	0	1293	516	624	646	114	358	304	335	0	735
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	6.8	19.6	19.6	0.0	33.8	22.9	24.8	27.6	0.0	14.0
Incr Delay (d2), s/veh	41.4	0.0	0.8	3.3	4.5	0.0	0.7	0.1	1.6	6.9	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.7	0.0	8.9	6.2	7.9	0.0	0.8	1.1	3.1	5.1	0.0	6.4
LnGrp Delay(d),s/veh	66.4	0.0	7.6	22.9	24.1	0.0	34.5	23.0	26.4	34.5	0.0	15.0
LnGrp LOS	E		A	C	C		C	C	C	C		B
Approach Vol, veh/h		1255			775			284			689	
Approach Delay, s/veh		29.1			23.6			26.8			22.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		49.6		18.0	21.0	28.6		18.0
Change Period (Y+Rc), s		5.0		5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s		47.0		13.0	17.5	26.0		13.0
Max Q Clear Time (g_c+I1), s		19.2		15.0	19.4	19.9		15.0
Green Ext Time (p_c), s		8.9		0.0	0.0	3.8		0.0

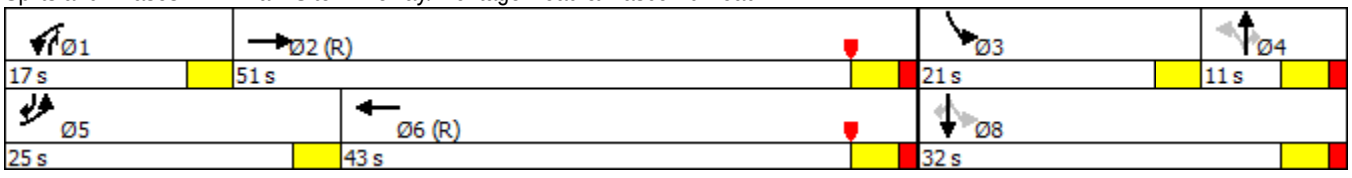
Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	414	787	17	96	799	534	10	20	44	312	115	458
Future Volume (vph)	414	787	17	96	799	534	10	20	44	312	115	458
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	15	11	11	11	11	11	15
Storage Length (ft)	250		0	160		130	150		150	0		150
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		625			1000			400			775	
Travel Time (s)		12.2			19.5			9.1			17.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	7%	6%	2%	2%	4%	1%	2%	2%	2%	2%	2%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			4	1	3	8	5
Permitted Phases						Free	4		4	8		8
Detector Phase	5	2		1	6		4	4	1	3	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	15.0		9.5	15.0		11.0	11.0	9.5	9.5	11.0	9.5
Total Split (s)	25.0	51.0		17.0	43.0		11.0	11.0	17.0	21.0	32.0	25.0
Total Split (%)	25.0%	51.0%		17.0%	43.0%		11.0%	11.0%	17.0%	21.0%	32.0%	25.0%
Maximum Green (s)	21.5	46.0		13.5	38.0		6.0	6.0	13.5	17.5	27.0	21.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		0.0	1.5		1.5	1.5	0.0	0.0	1.5	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	5.0		3.5	5.0		5.0	5.0	3.5	3.5	5.0	3.5
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	440	855	102	850	568	11	21	47	332	122	487
v/c Ratio	0.77	0.89	0.59	0.55	0.32	0.10	0.19	0.14	0.91	0.30	0.59
Control Delay	54.5	27.1	51.3	22.1	0.3	46.7	49.1	1.1	48.8	21.0	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.5	27.1	51.3	22.1	0.3	46.7	49.1	1.1	48.8	21.0	6.4
Queue Length 50th (ft)	101	~503	65	240	0	7	13	0	67	25	27
Queue Length 95th (ft)	207	#823	m77	m288	m0	25	37	3	#245	69	59
Internal Link Dist (ft)		545		920			320			695	
Turn Bay Length (ft)	250		160		130	150		150			150
Base Capacity (vph)	680	966	230	1543	1759	108	108	386	366	486	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.89	0.44	0.55	0.32	0.10	0.19	0.12	0.91	0.25	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	414	787	17	96	799	534	10	20	44	312	115	458
Future Volume (veh/h)	414	787	17	96	799	534	10	20	44	312	115	458
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1794	1900	1863	1827	1956	1863	1863	1863	1863	1863	1956
Adj Flow Rate, veh/h	440	837	18	102	850	0	11	21	47	332	122	487
Adj No. of Lanes	2	1	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	7	6	6	2	4	1	2	2	2	2	2	1
Cap, veh/h	501	915	20	128	1535	735	121	112	209	448	503	703
Arrive On Green	0.31	1.00	1.00	0.10	0.59	0.00	0.06	0.06	0.06	0.06	0.09	0.09
Sat Flow, veh/h	3281	1750	38	1774	3471	1663	809	1863	1583	1774	1863	1663
Grp Volume(v), veh/h	440	0	855	102	850	0	11	21	47	332	122	487
Grp Sat Flow(s),veh/h/ln	1640	0	1787	1774	1736	1663	809	1863	1583	1774	1863	1663
Q Serve(g_s), s	12.7	0.0	0.0	5.6	15.0	0.0	1.3	1.1	2.7	17.0	6.1	23.3
Cycle Q Clear(g_c), s	12.7	0.0	0.0	5.6	15.0	0.0	1.3	1.1	2.7	17.0	6.1	23.3
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	501	0	934	128	1535	735	121	112	209	448	503	703
V/C Ratio(X)	0.88	0.00	0.92	0.80	0.55	0.00	0.09	0.19	0.22	0.74	0.24	0.69
Avail Cap(c_a), veh/h	705	0	934	239	1535	735	121	112	209	448	503	703
HCM Platoon Ratio	2.00	2.00	2.00	1.33	1.33	1.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.77	0.00	0.77	0.46	0.46	0.00	1.00	1.00	1.00	0.77	0.77	0.77
Uniform Delay (d), s/veh	33.8	0.0	0.0	44.5	14.6	0.0	44.8	44.7	38.8	39.0	36.0	29.2
Incr Delay (d2), s/veh	5.6	0.0	12.2	2.0	0.7	0.0	0.1	0.3	0.2	4.5	0.1	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	3.2	2.8	7.2	0.0	0.3	0.6	1.2	8.8	3.2	11.1
LnGrp Delay(d),s/veh	39.4	0.0	12.2	46.4	15.2	0.0	44.9	45.0	39.0	43.5	36.1	31.1
LnGrp LOS	D		B	D	B		D	D	D	D	D	C
Approach Vol, veh/h		1295			952			79			941	
Approach Delay, s/veh		21.4			18.6			41.4			36.1	
Approach LOS		C			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.7	57.3	21.0	11.0	18.8	49.2		32.0
Change Period (Y+Rc), s	3.5	5.0	3.5	5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s	13.5	46.0	17.5	6.0	21.5	38.0		27.0
Max Q Clear Time (g_c+I1), s	7.6	2.0	19.0	4.7	14.7	17.0		25.3
Green Ext Time (p_c), s	0.1	10.8	0.0	0.3	0.6	8.7		0.4

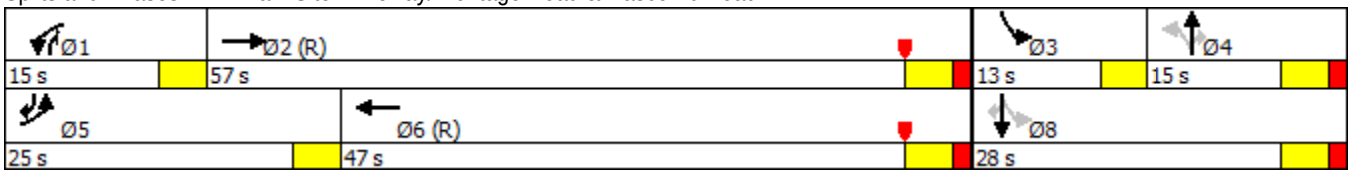
Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	413	952	33	110	773	187	37	79	220	214	97	488
Future Volume (vph)	413	952	33	110	773	187	37	79	220	214	97	488
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	15	11	11	11	11	11	15
Storage Length (ft)	250		0	160		130	150		150	0		150
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		625			1000			400			775	
Travel Time (s)		12.2			19.5			9.1			17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	2%	2%	2%	1%	2%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			4	1	3	8	5
Permitted Phases						Free	4		4	8		8
Detector Phase	5	2		1	6		4	4	1	3	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	15.0		9.5	15.0		11.0	11.0	9.5	9.5	11.0	9.5
Total Split (s)	25.0	57.0		15.0	47.0		15.0	15.0	15.0	13.0	28.0	25.0
Total Split (%)	25.0%	57.0%		15.0%	47.0%		15.0%	15.0%	15.0%	13.0%	28.0%	25.0%
Maximum Green (s)	21.5	52.0		11.5	42.0		10.0	10.0	11.5	9.5	23.0	21.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		0.0	1.5		1.5	1.5	0.0	0.0	1.5	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	5.0		3.5	5.0		5.0	5.0	3.5	3.5	5.0	3.5
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	430	1026	115	805	195	39	82	229	223	101	508
v/c Ratio	0.75	0.99	0.68	0.47	0.11	0.38	0.54	0.56	0.85	0.29	0.66
Control Delay	52.0	42.6	63.3	13.6	0.1	53.0	56.9	23.0	48.9	21.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	42.6	63.3	13.6	0.1	53.0	56.9	23.0	48.9	21.5	10.1
Queue Length 50th (ft)	111	~717	75	93	0	24	51	66	55	25	248
Queue Length 95th (ft)	201	#982	#133	197	0	57	98	137	#118	54	50
Internal Link Dist (ft)		545		920			320			695	
Turn Bay Length (ft)	250		160		130	150		150			150
Base Capacity (vph)	720	1038	196	1729	1759	124	180	428	261	414	834
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.99	0.59	0.47	0.11	0.31	0.46	0.54	0.85	0.24	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	413	952	33	110	773	187	37	79	220	214	97	488
Future Volume (veh/h)	413	952	33	110	773	187	37	79	220	214	97	488
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1900	1863	1881	1956	1863	1863	1863	1881	1863	1918
Adj Flow Rate, veh/h	430	992	34	115	805	0	39	82	229	223	101	508
Adj No. of Lanes	2	1	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	2	1	1	2	2	2	1	2	3
Cap, veh/h	497	1001	34	144	1758	818	153	186	287	305	428	608
Arrive On Green	0.29	1.00	1.00	0.03	0.16	0.00	0.10	0.10	0.10	0.03	0.08	0.08
Sat Flow, veh/h	3476	1808	62	1774	3574	1663	809	1863	1583	1792	1863	1631
Grp Volume(v), veh/h	430	0	1026	115	805	0	39	82	229	223	101	508
Grp Sat Flow(s),veh/h/ln	1738	0	1870	1774	1787	1663	809	1863	1583	1792	1863	1631
Q Serve(g_s), s	11.7	0.0	0.0	6.4	20.4	0.0	4.6	4.1	10.0	9.5	5.1	23.0
Cycle Q Clear(g_c), s	11.7	0.0	0.0	6.4	20.4	0.0	4.6	4.1	10.0	9.5	5.1	23.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	497	0	1035	144	1758	818	153	186	287	305	428	608
V/C Ratio(X)	0.86	0.00	0.99	0.80	0.46	0.00	0.26	0.44	0.80	0.73	0.24	0.84
Avail Cap(c_a), veh/h	747	0	1035	204	1758	818	153	186	287	305	428	608
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	0.78	0.00	0.78	0.75	0.75	0.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	34.8	0.0	0.0	47.8	29.8	0.0	42.6	42.4	39.2	38.8	37.9	33.5
Incr Delay (d2), s/veh	3.7	0.0	22.7	6.8	0.7	0.0	0.3	0.6	13.5	6.4	0.1	7.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	6.5	3.4	10.3	0.0	1.0	2.2	7.1	1.9	2.6	13.5
LnGrp Delay(d),s/veh	38.5	0.0	22.7	54.6	30.5	0.0	42.9	43.0	52.7	45.2	38.0	41.3
LnGrp LOS	D		C	D	C		D	D	D	D	D	D
Approach Vol, veh/h		1456			920			350			832	
Approach Delay, s/veh		27.4			33.5			49.3			42.0	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	11.6	60.4	13.0	15.0	17.8	54.2		28.0
Change Period (Y+Rc), s	3.5	5.0	3.5	5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s	11.5	52.0	9.5	10.0	21.5	42.0		23.0
Max Q Clear Time (g_c+I1), s	8.4	2.0	11.5	12.0	13.7	22.4		25.0
Green Ext Time (p_c), s	0.0	13.1	0.0	0.0	0.6	9.6		0.0

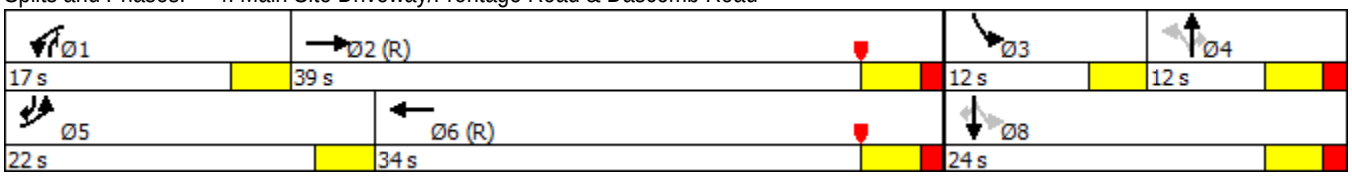
Intersection Summary	
HCM 2010 Ctrl Delay	34.5
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	440	720	45	136	608	222	40	66	166	117	118	426
Future Volume (vph)	440	720	45	136	608	222	40	66	166	117	118	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	15	11	11	11	11	11	15
Storage Length (ft)	250		0	160		130	150		150	0		150
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		625			1000			400			775	
Travel Time (s)		12.2			19.5			9.1			17.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	1%	2%	2%	1%	0%	2%	2%	2%	1%	2%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			4	1	3	8	5
Permitted Phases						Free	4		4	8		8
Detector Phase	5	2		1	6		4	4	1	3	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	9.5	15.0		9.5	15.0		11.0	11.0	9.5	9.5	11.0	9.5
Total Split (s)	22.0	39.0		17.0	34.0		12.0	12.0	17.0	12.0	24.0	22.0
Total Split (%)	27.5%	48.8%		21.3%	42.5%		15.0%	15.0%	21.3%	15.0%	30.0%	27.5%
Maximum Green (s)	18.5	34.0		13.5	29.0		7.0	7.0	13.5	8.5	19.0	18.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.0	1.5		0.0	1.5		1.5	1.5	0.0	0.0	1.5	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.5	5.0		3.5	5.0		5.0	5.0	3.5	3.5	5.0	3.5
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 4: Main Site Driveway/Frontage Road & Dascomb Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	458	797	142	633	231	42	69	173	122	123	444
v/c Ratio	0.72	0.84	0.63	0.39	0.13	0.38	0.46	0.34	0.46	0.34	0.56
Control Delay	39.0	25.0	42.3	17.7	0.1	45.0	45.4	5.5	39.9	41.8	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	25.0	42.3	17.7	0.1	45.0	45.4	5.5	39.9	41.8	10.3
Queue Length 50th (ft)	90	403	73	88	0	20	33	0	39	45	26
Queue Length 95th (ft)	150	#679	115	196	0	52	73	41	84	93	45
Internal Link Dist (ft)		545		920			320			695	
Turn Bay Length (ft)	250		160		130	150		150			150
Base Capacity (vph)	767	951	288	1607	1777	116	157	562	278	427	862
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.84	0.49	0.39	0.13	0.36	0.44	0.31	0.44	0.29	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	720	45	136	608	222	40	66	166	117	118	426
Future Volume (veh/h)	440	720	45	136	608	222	40	66	166	117	118	426
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1880	1900	1863	1881	1976	1863	1863	1863	1881	1863	1918
Adj Flow Rate, veh/h	458	750	47	142	633	0	42	69	173	122	123	444
Adj No. of Lanes	2	1	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	1	1	2	1	0	2	2	2	1	2	3
Cap, veh/h	553	868	54	174	1548	727	188	217	340	323	442	649
Arrive On Green	0.16	0.50	0.50	0.20	0.87	0.00	0.12	0.12	0.12	0.05	0.16	0.16
Sat Flow, veh/h	3442	1751	110	1774	3574	1680	841	1863	1583	1792	1863	1631
Grp Volume(v), veh/h	458	0	797	142	633	0	42	69	173	122	123	444
Grp Sat Flow(s),veh/h/ln	1721	0	1861	1774	1787	1680	841	1863	1583	1792	1863	1631
Q Serve(g_s), s	10.3	0.0	30.2	6.1	2.9	0.0	3.7	2.7	7.7	4.6	4.6	17.7
Cycle Q Clear(g_c), s	10.3	0.0	30.2	6.1	2.9	0.0	3.7	2.7	7.7	4.6	4.6	17.7
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	553	0	922	174	1548	727	188	217	340	323	442	649
V/C Ratio(X)	0.83	0.00	0.86	0.82	0.41	0.00	0.22	0.32	0.51	0.38	0.28	0.68
Avail Cap(c_a), veh/h	796	0	922	299	1548	727	188	217	340	375	442	649
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.80	0.00	0.80	0.81	0.81	0.00	1.00	1.00	1.00	0.73	0.73	0.73
Uniform Delay (d), s/veh	32.5	0.0	17.8	31.4	3.2	0.0	32.9	32.4	27.7	27.1	27.6	21.8
Incr Delay (d2), s/veh	2.7	0.0	8.7	2.9	0.6	0.0	0.2	0.3	0.5	0.2	0.1	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	17.5	3.1	1.4	0.0	0.9	1.4	3.4	2.3	2.4	8.3
LnGrp Delay(d),s/veh	35.2	0.0	26.5	34.3	3.9	0.0	33.1	32.7	28.2	27.3	27.7	23.7
LnGrp LOS	D		C	C	A		C	C	C	C	C	C
Approach Vol, veh/h		1255			775			284			689	
Approach Delay, s/veh		29.7			9.5			30.0			25.0	
Approach LOS		C			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	11.4	44.6	9.7	14.3	16.4	39.6		24.0
Change Period (Y+Rc), s	3.5	5.0	3.5	5.0	3.5	5.0		5.0
Max Green Setting (Gmax), s	13.5	34.0	8.5	7.0	18.5	29.0		19.0
Max Q Clear Time (g_c+I1), s	8.1	32.2	6.6	9.7	12.3	4.9		19.7
Green Ext Time (p_c), s	0.1	1.2	0.0	0.0	0.5	7.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.4
HCM 2010 LOS	C

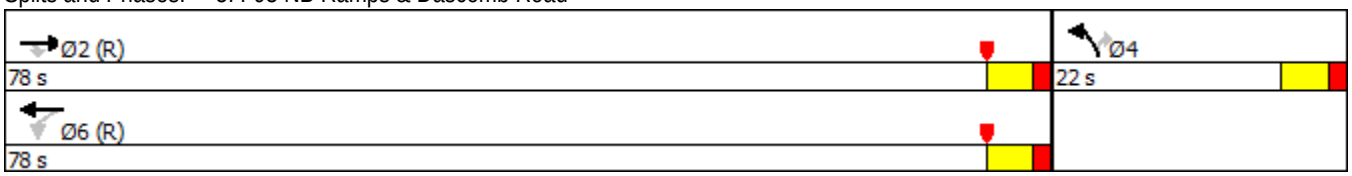
Dascomb Road @ I-93 NB Ramps

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	719	424	88	1059	370	197
Future Volume (vph)	719	424	88	1059	370	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)		200	200		200	200
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	30	
Link Distance (ft)	1000			2375	1000	
Travel Time (s)	19.5			46.3	22.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	3%	8%	4%	1%	6%	3%
Shared Lane Traffic (%)						
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	4	
Permitted Phases		2	6			4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	6.0
Minimum Split (s)	15.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	78.0	78.0	78.0	78.0	22.0	22.0
Total Split (%)	78.0%	78.0%	78.0%	78.0%	22.0%	22.0%
Maximum Green (s)	73.0	73.0	73.0	73.0	17.0	17.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 52 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 5: I-93 NB Ramps & Dascomb Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	765	451	94	1127	394	210
v/c Ratio	0.58	0.38	0.23	0.83	0.80	0.51
Control Delay	3.6	0.8	5.9	16.2	53.6	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	0.8	5.9	16.2	53.6	10.0
Queue Length 50th (ft)	66	0	16	425	124	0
Queue Length 95th (ft)	m20	m0	37	689	175	62
Internal Link Dist (ft)	920			2295	920	
Turn Bay Length (ft)		200	200		200	200
Base Capacity (vph)	1329	1193	402	1355	542	432
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.38	0.23	0.83	0.73	0.49

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	719	424	88	1059	370	197
Future Volume (veh/h)	719	424	88	1059	370	197
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1759	1827	1881	1792	1845
Adj Flow Rate, veh/h	765	0	94	1127	394	210
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	8	4	1	6	3
Cap, veh/h	1376	1115	584	1403	510	242
Arrive On Green	1.00	0.00	0.75	0.75	0.15	0.15
Sat Flow, veh/h	1845	1495	686	1881	3312	1568
Grp Volume(v), veh/h	765	0	94	1127	394	210
Grp Sat Flow(s),veh/h/ln	1845	1495	686	1881	1656	1568
Q Serve(g_s), s	0.0	0.0	4.0	38.0	11.4	13.1
Cycle Q Clear(g_c), s	0.0	0.0	4.0	38.0	11.4	13.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1376	1115	584	1403	510	242
V/C Ratio(X)	0.56	0.00	0.16	0.80	0.77	0.87
Avail Cap(c_a), veh/h	1376	1115	584	1403	563	267
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.39	0.00	0.57	0.57	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	3.7	8.1	40.6	41.3
Incr Delay (d2), s/veh	0.6	0.0	0.3	2.9	5.1	22.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.8	20.5	5.6	7.1
LnGrp Delay(d),s/veh	0.6	0.0	4.1	10.9	45.7	63.3
LnGrp LOS	A		A	B	D	E
Approach Vol, veh/h	765			1221	604	
Approach Delay, s/veh	0.6			10.4	51.8	
Approach LOS	A			B	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		79.6		20.4		79.6		
Change Period (Y+Rc), s		5.0		5.0		5.0		
Max Green Setting (Gmax), s		73.0		17.0		73.0		
Max Q Clear Time (g_c+I1), s		2.0		15.1		40.0		
Green Ext Time (p_c), s		16.8		0.3		14.0		

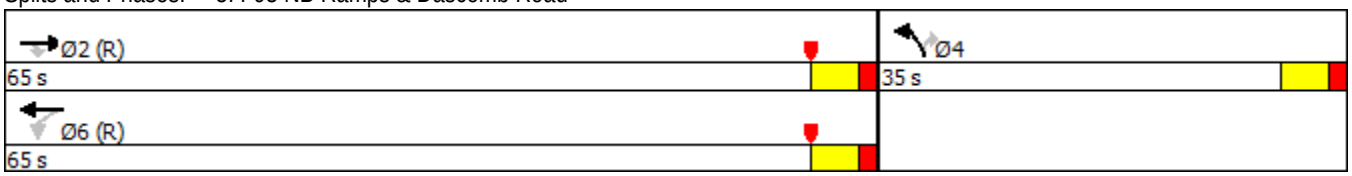
Intersection Summary	
HCM 2010 Ctrl Delay	17.2
HCM 2010 LOS	B

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	617	769	86	566	504	236
Future Volume (vph)	617	769	86	566	504	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)		200	200		200	200
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	30	
Link Distance (ft)	1000			2375	1000	
Travel Time (s)	19.5			46.3	22.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%
Shared Lane Traffic (%)						
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	4	
Permitted Phases		2	6			4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	6.0
Minimum Split (s)	15.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	65.0	65.0	65.0	65.0	35.0	35.0
Total Split (%)	65.0%	65.0%	65.0%	65.0%	35.0%	35.0%
Maximum Green (s)	60.0	60.0	60.0	60.0	30.0	30.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72 (72%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 5: I-93 NB Ramps & Dascomb Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	649	809	91	596	531	248
v/c Ratio	0.51	0.61	0.21	0.47	0.78	0.48
Control Delay	6.7	2.7	7.9	9.1	45.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	2.7	7.9	9.1	45.5	7.3
Queue Length 50th (ft)	63	2	18	150	166	0
Queue Length 95th (ft)	m295	m82	48	270	207	58
Internal Link Dist (ft)	920			2295	920	
Turn Bay Length (ft)		200	200		200	200
Base Capacity (vph)	1274	1320	438	1274	995	641
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.61	0.21	0.47	0.53	0.39

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	617	769	86	566	504	236
Future Volume (veh/h)	617	769	86	566	504	236
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1863	1900
Adj Flow Rate, veh/h	649	0	91	596	531	248
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	2	0
Cap, veh/h	1363	1147	459	1363	629	295
Arrive On Green	0.48	0.00	0.72	0.72	0.18	0.18
Sat Flow, veh/h	1900	1599	795	1900	3442	1615
Grp Volume(v), veh/h	649	0	91	596	531	248
Grp Sat Flow(s),veh/h/ln	1900	1599	795	1900	1721	1615
Q Serve(g_s), s	23.0	0.0	6.6	12.9	14.9	14.8
Cycle Q Clear(g_c), s	23.0	0.0	29.6	12.9	14.9	14.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1363	1147	459	1363	629	295
V/C Ratio(X)	0.48	0.00	0.20	0.44	0.84	0.84
Avail Cap(c_a), veh/h	1363	1147	459	1363	1032	484
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.31	0.00	0.81	0.81	1.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	14.9	5.8	39.5	39.4
Incr Delay (d2), s/veh	0.4	0.0	0.8	0.8	1.6	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.3	0.0	1.5	6.9	7.2	6.9
LnGrp Delay(d),s/veh	13.7	0.0	15.6	6.7	41.1	42.6
LnGrp LOS	B		B	A	D	D
Approach Vol, veh/h	649			687	779	
Approach Delay, s/veh	13.7			7.8	41.6	
Approach LOS	B			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		76.7		23.3		76.7		
Change Period (Y+Rc), s		5.0		5.0		5.0		
Max Green Setting (Gmax), s		60.0		30.0		60.0		
Max Q Clear Time (g_c+I1), s		25.0		16.9		31.6		
Green Ext Time (p_c), s		6.6		1.4		6.4		

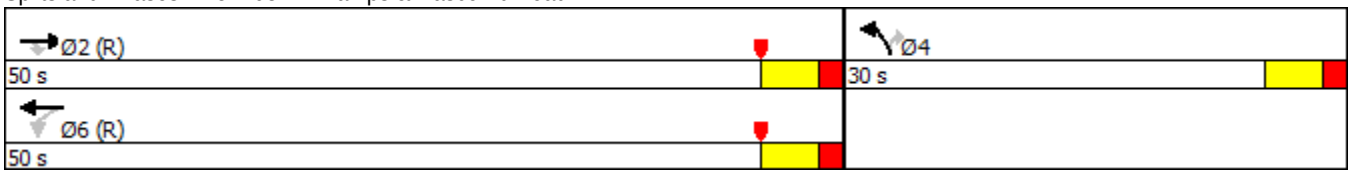
Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	390	613	97	536	430	138
Future Volume (vph)	390	613	97	536	430	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)		200	200		200	200
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	30	
Link Distance (ft)	1000			2375	1000	
Travel Time (s)	19.5			46.3	22.7	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	1%	2%	1%
Shared Lane Traffic (%)						
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	4	
Permitted Phases		2	6			4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	6.0
Minimum Split (s)	15.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	50.0	50.0	50.0	50.0	30.0	30.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	37.5%	37.5%
Maximum Green (s)	45.0	45.0	45.0	45.0	25.0	25.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Min	C-Min	C-Min	C-Min	None	None

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 69 (86%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 5: I-93 NB Ramps & Dascomb Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	402	632	100	553	443	142
v/c Ratio	0.32	0.50	0.16	0.44	0.71	0.35
Control Delay	4.4	3.1	5.9	7.6	36.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	3.1	5.9	7.6	36.6	7.4
Queue Length 50th (ft)	16	0	15	105	107	0
Queue Length 95th (ft)	m135	m234	39	199	145	42
Internal Link Dist (ft)	920			2295	920	
Turn Bay Length (ft)		200	200		200	200
Base Capacity (vph)	1260	1259	635	1247	1037	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.50	0.16	0.44	0.43	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	390	613	97	536	430	138
Future Volume (veh/h)	390	613	97	536	430	138
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1881	1863	1881
Adj Flow Rate, veh/h	402	0	100	553	443	142
Adj No. of Lanes	1	1	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	1	0	1	2	1
Cap, veh/h	1356	1141	803	1342	555	258
Arrive On Green	1.00	0.00	0.71	0.71	0.16	0.16
Sat Flow, veh/h	1900	1599	998	1881	3442	1599
Grp Volume(v), veh/h	402	0	100	553	443	142
Grp Sat Flow(s),veh/h/ln	1900	1599	998	1881	1721	1599
Q Serve(g_s), s	0.0	0.0	2.5	9.5	9.9	6.5
Cycle Q Clear(g_c), s	0.0	0.0	2.5	9.5	9.9	6.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1356	1141	803	1342	555	258
V/C Ratio(X)	0.30	0.00	0.12	0.41	0.80	0.55
Avail Cap(c_a), veh/h	1356	1141	803	1342	1076	500
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.00	0.88	0.88	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	3.6	4.6	32.3	30.9
Incr Delay (d2), s/veh	0.4	0.0	0.3	0.8	1.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.8	5.2	4.8	2.9
LnGrp Delay(d),s/veh	0.4	0.0	3.9	5.5	33.3	31.6
LnGrp LOS	A		A	A	C	C
Approach Vol, veh/h	402			653	585	
Approach Delay, s/veh	0.4			5.2	32.9	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		62.1		17.9		62.1		
Change Period (Y+Rc), s		5.0		5.0		5.0		
Max Green Setting (Gmax), s		45.0		25.0		45.0		
Max Q Clear Time (g_c+I1), s		2.0		11.9		11.5		
Green Ext Time (p_c), s		4.5		1.0		4.5		

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

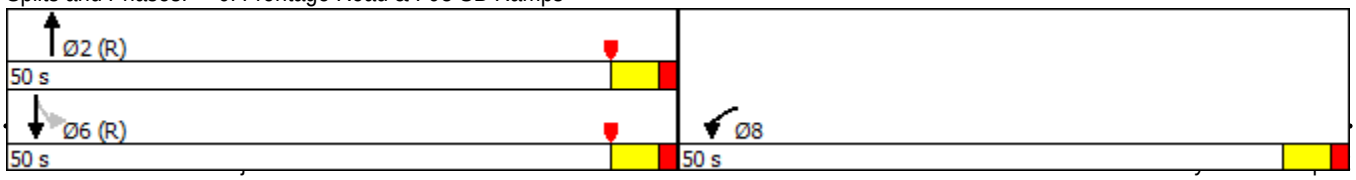
Frontage Road @ I-93 SB Ramps

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	644	81	313	659	124	242
Future Volume (vph)	644	81	313	659	124	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	15	11	15	11	11
Storage Length (ft)	200	200		0	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	1000		775			725
Travel Time (s)	22.7		17.6			16.5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	9%	1%	1%	4%	1%	5%
Shared Lane Traffic (%)						
Turn Type	Prot	Free	NA	Free	Perm	NA
Protected Phases	8		2			6
Permitted Phases		Free		Free	6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	6.0		10.0		10.0	10.0
Minimum Split (s)	11.0		15.0		15.0	15.0
Total Split (s)	50.0		50.0		50.0	50.0
Total Split (%)	50.0%		50.0%		50.0%	50.0%
Maximum Green (s)	45.0		45.0		45.0	45.0
Yellow Time (s)	3.5		3.5		3.5	3.5
All-Red Time (s)	1.5		1.5		1.5	1.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Minimum Gap (s)	2.0		2.0		2.0	2.0
Time Before Reduce (s)	2.0		2.0		2.0	2.0
Time To Reduce (s)	0.0		0.0		0.0	0.0
Recall Mode	None		C-Min		C-Min	C-Min

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 17 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 6: Frontage Road & I-93 SB Ramps



Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	657	83	319	672	374
v/c Ratio	0.80	0.05	0.28	0.39	0.24
Control Delay	41.5	0.0	5.2	2.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	0.0	5.2	2.3	9.1
Queue Length 50th (ft)	201	0	44	41	49
Queue Length 95th (ft)	241	0	73	91	87
Internal Link Dist (ft)	920		695		645
Turn Bay Length (ft)	200	200			
Base Capacity (vph)	1397	1759	1152	1708	1564
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.05	0.28	0.39	0.24

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	644	81	313	659	124	242
Future Volume (veh/h)	644	81	313	659	124	242
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1956	1881	1900	1900	1833
Adj Flow Rate, veh/h	657	0	319	0	127	247
Adj No. of Lanes	2	1	1	1	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	9	1	1	4	5	5
Cap, veh/h	743	383	1259	1081	578	1269
Arrive On Green	0.23	0.00	0.67	0.00	0.67	0.67
Sat Flow, veh/h	3221	1663	1881	1615	771	1979
Grp Volume(v), veh/h	657	0	319	0	175	199
Grp Sat Flow(s),veh/h/ln	1610	1663	1881	1615	1081	1585
Q Serve(g_s), s	19.7	0.0	6.8	0.0	5.6	4.8
Cycle Q Clear(g_c), s	19.7	0.0	6.8	0.0	12.3	4.8
Prop In Lane	1.00	1.00		1.00	0.73	
Lane Grp Cap(c), veh/h	743	383	1259	1081	786	1061
V/C Ratio(X)	0.88	0.00	0.25	0.00	0.22	0.19
Avail Cap(c_a), veh/h	1449	748	1259	1081	786	1061
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.85	0.00	1.00	1.00
Uniform Delay (d), s/veh	37.2	0.0	6.6	0.0	8.3	6.2
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.0	0.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	0.0	3.6	0.0	2.3	2.2
LnGrp Delay(d),s/veh	38.6	0.0	7.0	0.0	9.0	6.6
LnGrp LOS	D		A		A	A
Approach Vol, veh/h	657		319			374
Approach Delay, s/veh	38.6		7.0			7.7
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		71.9				71.9		28.1
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		45.0				45.0		45.0
Max Q Clear Time (g_c+I1), s		8.8				14.3		21.7
Green Ext Time (p_c), s		3.1				3.1		1.3

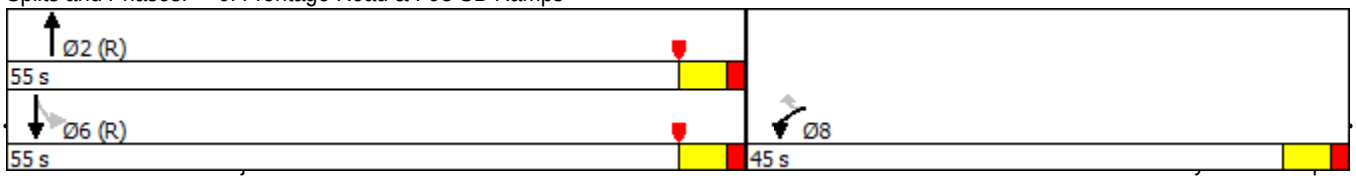
Intersection Summary	
HCM 2010 Ctrl Delay	22.6
HCM 2010 LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	508	18	132	504	204	255
Future Volume (vph)	508	18	132	504	204	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	15	11	15	11	11
Storage Length (ft)	200	200		0	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	1000		775			725
Travel Time (s)	22.7		17.6			16.5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	11%	0%	2%	0%	0%
Shared Lane Traffic (%)						
Turn Type	Prot	Perm	NA	Free	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		Free	6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	6.0	6.0	10.0		10.0	10.0
Minimum Split (s)	11.0	11.0	15.0		15.0	15.0
Total Split (s)	45.0	45.0	55.0		55.0	55.0
Total Split (%)	45.0%	45.0%	55.0%		55.0%	55.0%
Maximum Green (s)	40.0	40.0	50.0		50.0	50.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	5.0	5.0	5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Minimum Gap (s)	2.0	2.0	2.0		2.0	2.0
Time Before Reduce (s)	2.0	2.0	2.0		2.0	2.0
Time To Reduce (s)	0.0	0.0	0.0		0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 20 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 6: Frontage Road & I-93 SB Ramps



Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	535	19	139	531	483
v/c Ratio	0.77	0.05	0.11	0.30	0.27
Control Delay	44.7	12.5	2.6	2.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	12.5	2.6	2.7	6.9
Queue Length 50th (ft)	166	0	13	61	54
Queue Length 95th (ft)	208	18	21	217	93
Internal Link Dist (ft)	920		695		645
Turn Bay Length (ft)	200	200			
Base Capacity (vph)	1314	651	1264	1742	1820
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.03	0.11	0.30	0.27

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	508	18	132	504	204	255
Future Volume (veh/h)	508	18	132	504	204	255
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1780	1900	1937	1900	1900
Adj Flow Rate, veh/h	535	0	139	0	215	268
Adj No. of Lanes	2	1	1	1	0	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	11	0	2	0	0
Cap, veh/h	622	276	1363	1181	913	1240
Arrive On Green	0.18	0.00	0.72	0.00	0.72	0.72
Sat Flow, veh/h	3408	1513	1900	1647	1176	1814
Grp Volume(v), veh/h	535	0	139	0	230	253
Grp Sat Flow(s),veh/h/ln	1704	1513	1900	1647	1261	1643
Q Serve(g_s), s	15.2	0.0	2.2	0.0	6.3	5.1
Cycle Q Clear(g_c), s	15.2	0.0	2.2	0.0	8.5	5.1
Prop In Lane	1.00	1.00		1.00	0.94	
Lane Grp Cap(c), veh/h	622	276	1363	1181	974	1178
V/C Ratio(X)	0.86	0.00	0.10	0.00	0.24	0.21
Avail Cap(c_a), veh/h	1363	605	1363	1181	974	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.82	0.00	1.00	1.00
Uniform Delay (d), s/veh	39.6	0.0	4.3	0.0	5.6	4.7
Incr Delay (d2), s/veh	1.4	0.0	0.1	0.0	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	1.2	0.0	2.5	2.5
LnGrp Delay(d),s/veh	41.0	0.0	4.4	0.0	6.1	5.1
LnGrp LOS	D		A		A	A
Approach Vol, veh/h	535		139			483
Approach Delay, s/veh	41.0		4.4			5.6
Approach LOS	D		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		76.7				76.7		23.3
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		50.0				50.0		40.0
Max Q Clear Time (g_c+I1), s		4.2				10.5		17.2
Green Ext Time (p_c), s		2.7				2.7		1.0

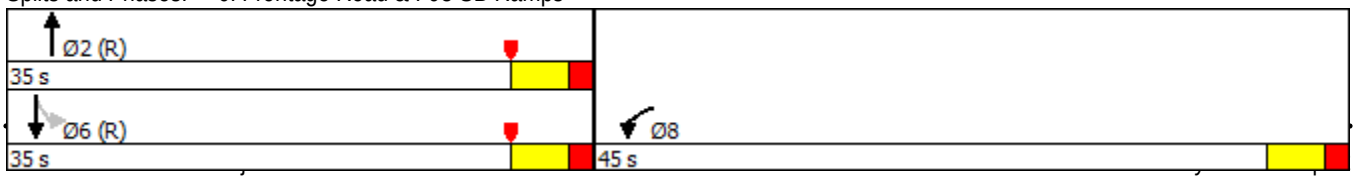
Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	550	11	92	643	21	78
Future Volume (vph)	550	11	92	643	21	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	15	11	15	11	11
Storage Length (ft)	200	200		0	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	1000		775			725
Travel Time (s)	22.7		17.6			16.5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	0%	0%	1%	0%	0%
Shared Lane Traffic (%)						
Turn Type	Prot	Free	NA	Free	Perm	NA
Protected Phases	8		2			6
Permitted Phases		Free		Free	6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	6.0		10.0		10.0	10.0
Minimum Split (s)	11.0		15.0		15.0	15.0
Total Split (s)	45.0		35.0		35.0	35.0
Total Split (%)	56.3%		43.8%		43.8%	43.8%
Maximum Green (s)	40.0		30.0		30.0	30.0
Yellow Time (s)	3.5		3.5		3.5	3.5
All-Red Time (s)	1.5		1.5		1.5	1.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	5.0		5.0			5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Minimum Gap (s)	2.0		2.0		2.0	2.0
Time Before Reduce (s)	2.0		2.0		2.0	2.0
Time To Reduce (s)	0.0		0.0		0.0	0.0
Recall Mode	None		C-Min		C-Min	C-Min

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 16 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 6: Frontage Road & I-93 SB Ramps



Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	604	12	101	707	109
v/c Ratio	0.74	0.01	0.09	0.40	0.06
Control Delay	33.1	0.0	3.0	3.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	0.0	3.0	3.4	6.9
Queue Length 50th (ft)	143	0	8	104	10
Queue Length 95th (ft)	179	0	m16	175	23
Internal Link Dist (ft)	920		695		645
Turn Bay Length (ft)	200	200			
Base Capacity (vph)	1627	1777	1146	1759	1971
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.01	0.09	0.40	0.06

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	550	11	92	643	21	78
Future Volume (veh/h)	550	11	92	643	21	78
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1976	1900	1956	1900	1900
Adj Flow Rate, veh/h	604	0	101	0	23	86
Adj No. of Lanes	2	1	1	1	0	2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	0	0	1	0	0
Cap, veh/h	715	356	1260	1103	463	1771
Arrive On Green	0.21	0.00	0.66	0.00	0.66	0.66
Sat Flow, veh/h	3375	1680	1900	1663	603	2757
Grp Volume(v), veh/h	604	0	101	0	58	51
Grp Sat Flow(s),veh/h/ln	1688	1680	1900	1663	1631	1643
Q Serve(g_s), s	13.7	0.0	1.5	0.0	0.0	0.9
Cycle Q Clear(g_c), s	13.7	0.0	1.5	0.0	0.8	0.9
Prop In Lane	1.00	1.00		1.00	0.40	
Lane Grp Cap(c), veh/h	715	356	1260	1103	1145	1089
V/C Ratio(X)	0.84	0.00	0.08	0.00	0.05	0.05
Avail Cap(c_a), veh/h	1688	840	1260	1103	1145	1089
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.85	0.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	4.8	0.0	4.7	4.7
Incr Delay (d2), s/veh	1.1	0.0	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	0.8	0.0	0.5	0.4
LnGrp Delay(d),s/veh	31.4	0.0	4.9	0.0	4.8	4.8
LnGrp LOS	C		A		A	A
Approach Vol, veh/h	604		101			109
Approach Delay, s/veh	31.4		4.9			4.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		58.1				58.1		21.9
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		40.0
Max Q Clear Time (g_c+I1), s		3.5				2.9		15.7
Green Ext Time (p_c), s		0.7				0.7		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

Smith Way and Site Intersections

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	5	5	0	2	32	2	21	0	85	71	72
Future Volume (vph)	21	5	5	0	2	32	2	21	0	85	71	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		400			400			400			400	
Travel Time (s)		9.1			9.1			9.1			9.1	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	5	5	0	2	32	2	21	0	85	71	72
Future Vol, veh/h	21	5	5	0	2	32	2	21	0	85	71	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	5	5	0	2	35	2	23	0	92	77	78
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.2	7.5	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	68%	0%	37%
Vol Thru, %	91%	16%	6%	31%
Vol Right, %	0%	16%	94%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	23	31	34	228
LT Vol	2	21	0	85
Through Vol	21	5	2	71
RT Vol	0	5	32	72
Lane Flow Rate	25	34	37	248
Geometry Grp	1	1	1	1
Degree of Util (X)	0.03	0.043	0.041	0.273
Departure Headway (Hd)	4.264	4.6	3.995	3.961
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	783	901	902
Service Time	2.353	2.601	1.996	2.008
HCM Lane V/C Ratio	0.03	0.043	0.041	0.275
HCM Control Delay	7.5	7.8	7.2	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	1.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	15	70	0	44	203
Future Volume (vph)	0	15	70	0	44	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)	0	0		0	30	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	200		250			200
Travel Time (s)	4.5		5.7			4.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	70	0	44	203
Future Vol, veh/h	0	15	70	0	44	203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	76	0	48	221

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	392	76	0	0	76	0
Stage 1	76	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	612	985	-	-	1523	-
Stage 1	947	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	593	985	-	-	1523	-
Mov Cap-2 Maneuver	593	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	985	1523	-
HCM Lane V/C Ratio	-	-	0.017	0.031	-
HCM Control Delay (s)	-	-	8.7	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	35	0	114	89
Future Volume (vph)	0	35	35	0	114	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Link Speed (mph)	30		30			30
Link Distance (ft)	200		350			250
Travel Time (s)	4.5		8.0			5.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	35	0	114	89
Future Vol, veh/h	0	35	35	0	114	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	38	0	124	97

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	383	38	0	0	38	0
Stage 1	38	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	620	1034	-	-	1572	-
Stage 1	984	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	569	1034	-	-	1572	-
Mov Cap-2 Maneuver	569	-	-	-	-	-
Stage 1	984	-	-	-	-	-
Stage 2	657	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	4.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1034	1572	-
HCM Lane V/C Ratio	-	-	0.037	0.079	-
HCM Control Delay (s)	-	-	8.6	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	11	11	0	10	119	10	112	0	93	75	72
Future Volume (vph)	105	11	11	0	10	119	10	112	0	93	75	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		400			400			600			400	
Travel Time (s)		9.1			9.1			13.6			9.1	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	105	11	11	0	10	119	10	112	0	93	75	72
Future Vol, veh/h	105	11	11	0	10	119	10	112	0	93	75	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	114	12	12	0	11	129	11	122	0	101	82	78
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8.5	9.1	10.1
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	83%	0%	39%
Vol Thru, %	92%	9%	8%	31%
Vol Right, %	0%	9%	92%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	122	127	129	240
LT Vol	10	105	0	93
Through Vol	112	11	10	75
RT Vol	0	11	119	72
Lane Flow Rate	133	138	140	261
Geometry Grp	1	1	1	1
Degree of Util (X)	0.182	0.198	0.175	0.338
Departure Headway (Hd)	4.936	5.152	4.504	4.666
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	721	692	789	767
Service Time	3.006	3.221	2.573	2.725
HCM Lane V/C Ratio	0.184	0.199	0.177	0.34
HCM Control Delay	9.1	9.5	8.5	10.1
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	0.7	0.7	0.6	1.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	61	256	0	43	163
Future Volume (vph)	0	61	256	0	43	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)	0	0		0	30	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	200		250			200
Travel Time (s)	4.5		5.7			4.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	61	256	0	43	163
Future Vol, veh/h	0	61	256	0	43	163
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	66	278	0	47	177

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	549	278	0	0	278	0
Stage 1	278	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	497	761	-	-	1285	-
Stage 1	769	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	479	761	-	-	1285	-
Mov Cap-2 Maneuver	479	-	-	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	747	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	761	1285	-
HCM Lane V/C Ratio	-	-	0.087	0.036	-
HCM Control Delay (s)	-	-	10.2	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	180	76	0	135	28
Future Volume (vph)	0	180	76	0	135	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Link Speed (mph)	30		30			30
Link Distance (ft)	200		350			250
Travel Time (s)	4.5		8.0			5.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	180	76	0	135	28
Future Vol, veh/h	0	180	76	0	135	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	196	83	0	147	30

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	407	83	0	0	83	0
Stage 1	83	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	600	976	-	-	1514	-
Stage 1	940	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	541	976	-	-	1514	-
Mov Cap-2 Maneuver	541	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	6.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	976	1514	-
HCM Lane V/C Ratio	-	-	0.2	0.097	-
HCM Control Delay (s)	-	-	9.6	7.6	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	14	14	0	11	104	11	88	0	115	93	91
Future Volume (vph)	80	14	14	0	11	104	11	88	0	115	93	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		400			400			600			400	
Travel Time (s)		9.1			9.1			13.6			9.1	
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	80	14	14	0	11	104	11	88	0	115	93	91
Future Vol, veh/h	80	14	14	0	11	104	11	88	0	115	93	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	87	15	15	0	12	113	12	96	0	125	101	99
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	8.5	8.8	10.8
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	74%	0%	38%
Vol Thru, %	89%	13%	10%	31%
Vol Right, %	0%	13%	90%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	108	115	299
LT Vol	11	80	0	115
Through Vol	88	14	11	93
RT Vol	0	14	104	91
Lane Flow Rate	108	117	125	325
Geometry Grp	1	1	1	1
Degree of Util (X)	0.147	0.169	0.158	0.41
Departure Headway (Hd)	4.925	5.171	4.563	4.547
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	723	689	780	787
Service Time	2.99	3.235	2.627	2.597
HCM Lane V/C Ratio	0.149	0.17	0.16	0.413
HCM Control Delay	8.8	9.3	8.5	10.8
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	0.5	0.6	0.6	2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	46	216	0	54	246
Future Volume (vph)	0	46	216	0	54	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Storage Length (ft)	0	0		0	30	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	200		250			200
Travel Time (s)	4.5		5.7			4.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	46	216	0	54	246
Future Vol, veh/h	0	46	216	0	54	246
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	30	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	50	235	0	59	267

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	620	235	0	0	235	0
Stage 1	235	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	452	804	-	-	1332	-
Stage 1	804	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	432	804	-	-	1332	-
Mov Cap-2 Maneuver	432	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	658	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	804	1332	-
HCM Lane V/C Ratio	-	-	0.062	0.044	-
HCM Control Delay (s)	-	-	9.8	7.8	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	140	76	0	161	85
Future Volume (vph)	0	140	76	0	161	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11
Link Speed (mph)	30		30			30
Link Distance (ft)	200		350			250
Travel Time (s)	4.5		8.0			5.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	140	76	0	161	85
Future Vol, veh/h	0	140	76	0	161	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	83	0	175	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	525	83	0	0	83	0
Stage 1	83	-	-	-	-	-
Stage 2	442	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	513	976	-	-	1514	-
Stage 1	940	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	450	976	-	-	1514	-
Mov Cap-2 Maneuver	450	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	569	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	976	1514	-
HCM Lane V/C Ratio	-	-	0.156	0.116	-
HCM Control Delay (s)	-	-	9.4	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.4	-

Attachment C

Crash Data

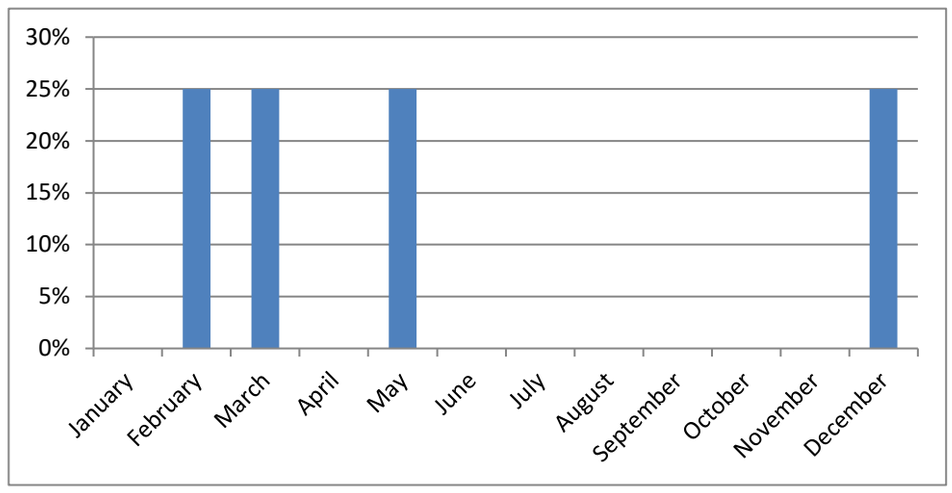
Crash Data Summary Tables
Dascomb Road @ Clark Road / Bannister Road - Andover, MA
01/01/2015 - 12/31/2017

No.	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
							V1	V2	V3	V4					
1	2/17/2015	11:23 AM	Daylight	Clear	Other	2	W	W			Property Damage Only	0	Angled	Inattention / Distracted	[Directly from MassDOT Crash Portal. Andover PD did not provide the crash report for this crash.]
2	3/30/2015	11:32 AM	Daylight	Cloudy	Wet	2	E	S			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	[Directly from MassDOT Crash Portal. Andover PD did not provide the crash report for this crash.]
3	5/22/2015	8:40 AM	Daylight	Clear	Dry	2	N	E			Non-fatal Injury	1	Angled	Failure to Yield Right-of-Way	[Directly from MassDOT Crash Portal. Andover PD did not provide the crash report for this crash.]
4	12/23/2017	11:00 PM	Not Reported	Not Reported	Not Reported	1					Property Damage Only	0	Not Reported		

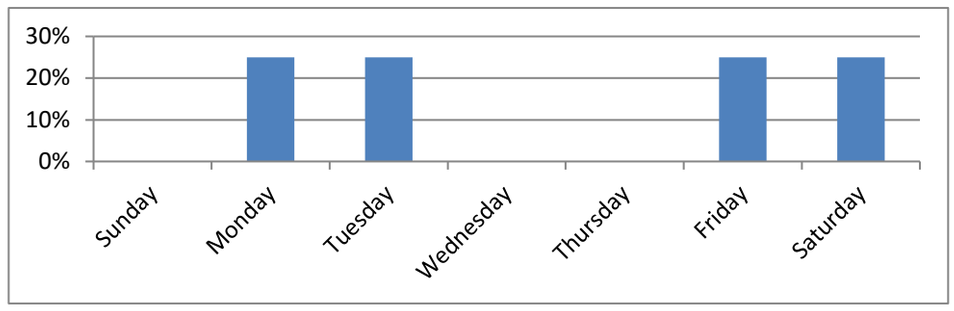
Crash Data Summary Tables
Dascomb Road @ Clark Road / Bannister Road - Andover, MA
01/01/2015 - 12/31/2017

Dascomb Road @ Clark Road / Bannister Road *4*

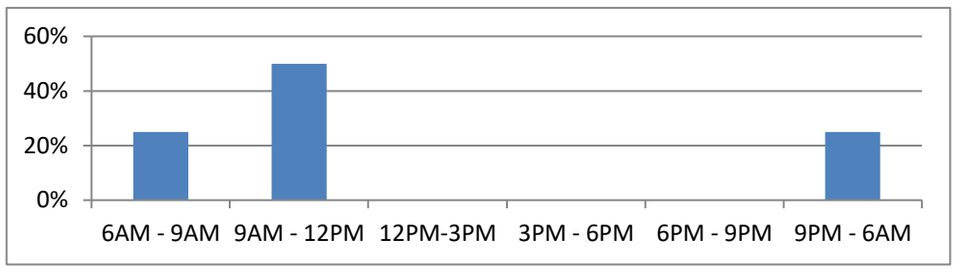
Month	#	%
January	0	0%
February	1	25%
March	1	25%
April	0	0%
May	1	25%
June	0	0%
July	0	0%
August	0	0%
September	0	0%
October	0	0%
November	0	0%
December	1	25%



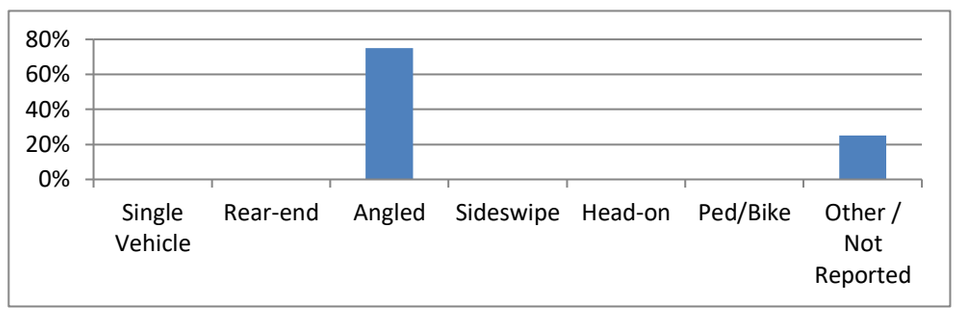
Day of Week	#	%
Sunday	0	0%
Monday	1	25%
Tuesday	1	25%
Wednesday	0	0%
Thursday	0	0%
Friday	1	25%
Saturday	1	25%



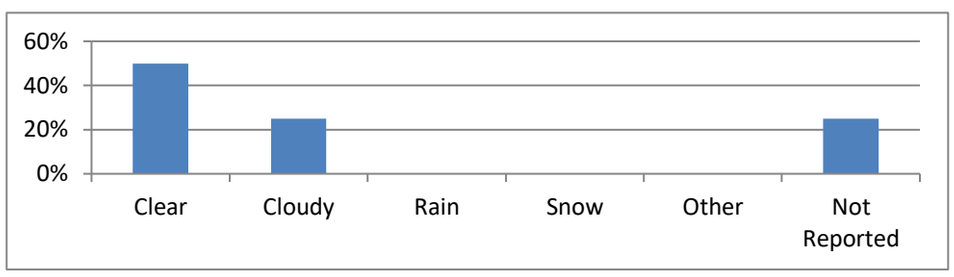
Time of Day	#	%
6AM - 9AM	1	25%
9AM - 12PM	2	50%
12PM-3PM	0	0%
3PM - 6PM	0	0%
6PM - 9PM	0	0%
9PM - 6AM	1	25%



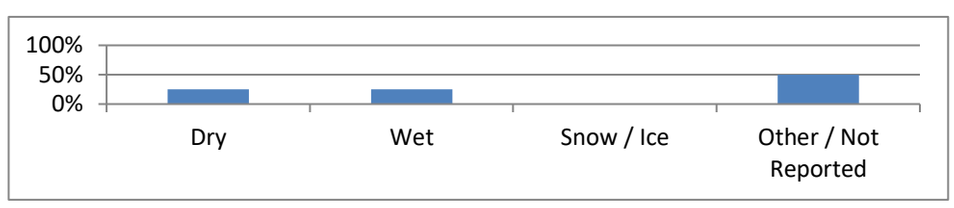
Manner of Collision	#	%
Single Vehicle	0	0%
Rear-end	0	0%
Angled	3	75%
Sideswipe	0	0%
Head-on	0	0%
Ped/Bike	0	0%
Other / Not Reported	1	25%



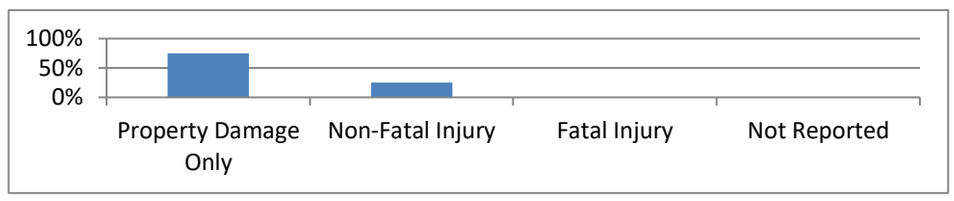
Weather Conditions	#	%
Clear	2	50%
Cloudy	1	25%
Rain	0	0%
Snow	0	0%
Other	0	0%
Not Reported	1	25%



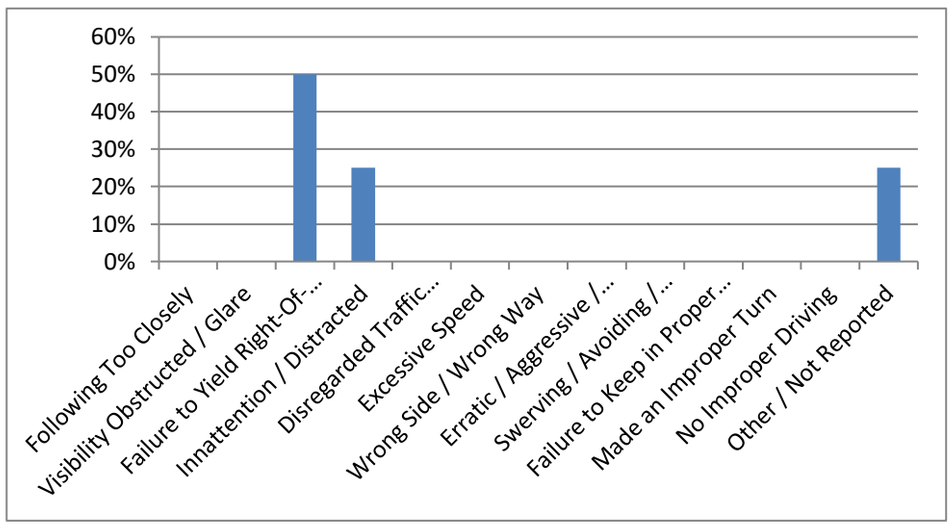
Road Surface	#	%
Dry	1	25%
Wet	1	25%
Snow / Ice	0	0%
Other / Not Reported	2	50%



Crash Severity	#	%
Property Damage Only	3	75%
Non-Fatal Injury	1	25%
Fatal Injury	0	0%
Not Reported	0	0%



Main Contributing Factor from Narrative	#	%
Following Too Closely	0	0%
Visibility Obstructed / Glare	0	0%
Failure to Yield Right-Of-Way	2	50%
Innattention / Distracted	1	25%
Disregarded Traffic Controls	0	0%
Excessive Speed	0	0%
Wrong Side / Wrong Way	0	0%
Erratic / Aggressive / Reckless Driving	0	0%
Swerving / Avoiding / Over-Steering / Over-Correcting	0	0%
Failure to Keep in Proper Lane	0	0%
Made an Improper Turn	0	0%
No Improper Driving	0	0%
Other / Not Reported	1	25%



INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Andover | COUNT DATE : Sep-18

DISTRICT : 4 | UNSIGNALIZED : **YES** | SIGNALIZED : NO

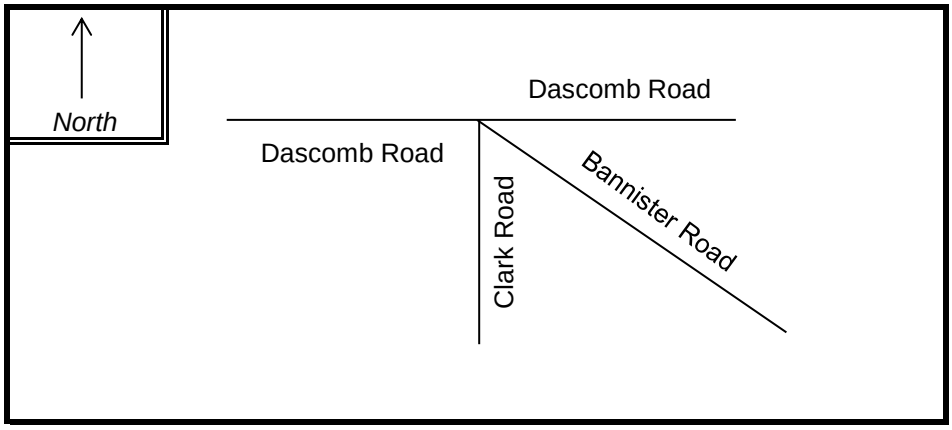
~ INTERSECTION DATA ~

MAJOR STREET : Dascomb Road

MINOR STREET(S) : Clark Road

Bannister Road

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	NWB		
PEAK HOURLY VOLUMES (PM) :	637	405	281			**1,323**

" K " FACTOR : **0.093**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **14,226**

TOTAL # OF CRASHES : 4

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **1.33**

CRASH RATE CALCULATION : **0.26**

RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : K Factor based on ATR counts along Dascomb Road

Project Title & Date: The Dascomb Road Project (#146 Dascomb Road)

Attachment D

Revised Site Plan

PARKING TABLE

PROPOSED DEVELOPMENT USE	AREA	PARKING REQUIRED	OCCUPANTS/SEATS	SPACES
OFFICE	293,000 SF	1/300 SF	N/A	977
RETAIL	80,000 SF	1/250 SF	N/A	320
RESTAURANT	20,000 SF	1/2 SEATS + 1.5/2 EMPLOYEES	200 SEATS, 60 EMPLOYEES	145
GROCERY STORE	35,000 SF	1/300 SF	N/A	117
FITNESS	30,000 SF	MAX OCCUPANTS/4	150 OCCUPANTS	38
HOTEL	66,000 SF	1/ROOM + MAX ASSEMBLY ROOM OCCUPANTS/4	100 ROOMS, 200 ASSEMBLY ROOM OCCUPANTS	150
TOTAL	524,000 SF			1,747
PROPOSED PARKING (OPEN AIR)	498 SPACES			
PROPOSED PARKING (PARKING STRUCTURE)	1,256 SPACES			
PROPOSED PARKING (TOTAL)	1,754 SPACES			
REQUIRED HANDICAP PARKING	IF >1,001 SPACES, 20 PLUS 100 OVER EACH 1,000 (1 VAN PER 8 ACCESSIBLE) 28 SPACES (4 VAN SPACES)			
PROPOSED ACCESSIBLE PARKING	22 (OPEN AIR) + 10 (PARKING STRUCTURE) = 32 SPACES (9 VAN SPACES)			
PARKING DIMENSIONS	REQUIRED	PROVIDED		
HANDICAP PARKING SPACE	12' X 18' (MIN)	12' X 18'		
COMPACT PARKING SPACE	8' X 16' (MIN)	8.5' X 17		
STANDARD PARKING SPACE	9' X 18' (MIN)	9' X 18'		

SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN (in) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (in) LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED
R1-1	30	30	STOP	SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			12
R4-7	24	30					1
R7-8*	12	18	HANDICAPPED PARKING PENALTY $250				32
R7-8SP**	12	6	VAN				32
R8-3GPR	24	18	LOADING ZONE				3
R8-3GPL	24	18	LOADING ZONE				2

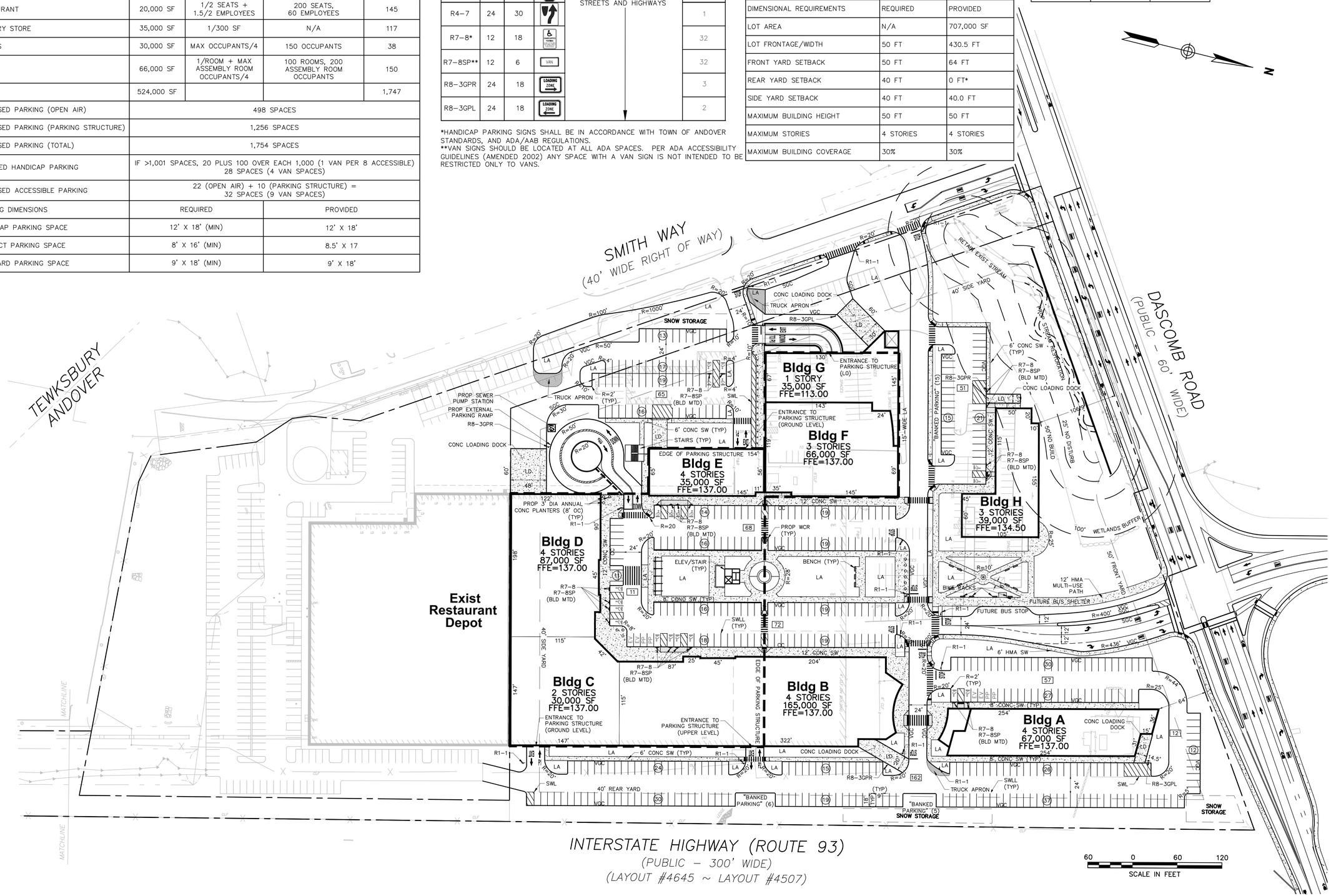
*HANDICAP PARKING SIGNS SHALL BE IN ACCORDANCE WITH TOWN OF ANDOVER STANDARDS, AND ADA/AAB REGULATIONS.
**VAN SIGNS SHOULD BE LOCATED AT ALL ADA SPACES. PER ADA ACCESSIBILITY GUIDELINES (AMENDED 2002) ANY SPACE WITH A VAN SIGN IS NOT INTENDED TO BE RESTRICTED ONLY TO VANS.

ZONING TABLE

ZONING DISTRICT	INDUSTRIAL D2 (ID2)	
PROPOSED USE	SEE PARKING TABLE	
PROPOSED USE ALLOWABLE BY	BY RIGHT	
DIMENSIONAL REQUIREMENTS	REQUIRED	PROVIDED
LOT AREA	N/A	707,000 SF
LOT FRONTAGE/WIDTH	50 FT	430.5 FT
FRONT YARD SETBACK	50 FT	64 FT
REAR YARD SETBACK	40 FT	0 FT*
SIDE YARD SETBACK	40 FT	40.0 FT
MAXIMUM BUILDING HEIGHT	50 FT	50 FT
MAXIMUM STORIES	4 STORIES	4 STORIES
MAXIMUM BUILDING COVERAGE	30%	30%

WETLAND SETBACK TABLE

	REQUIRED	PROVIDED
BUILDINGS	50 FT	50 FT
PARKING LOT (>4 VEHICLES)	50 FT	50 FT



PERMITTING SET - NOT FOR CONSTRUCTION

TEC, Inc.
146 Dascomb Road
Andover, MA 01810
(978) 794-1792
169 Ocean Boulevard
Unit 101, PO Box 249
Hampton, NH 03842
(603) 601-8154
www.TheEngineeringCorp.com

DESIGNED BY	CPR
DRAWN BY	DGR
CHECKED BY	RJF
DATE	10/31/2018
SCALE	1" = 60'

PREPARED FOR

Dascomb Road Development, LLC
354 Merrimack Street
Suite 1
Lawrence, MA 01843

REVISIONS

1. STORMWATER RTC	6-5-2019
2. STORMWATER RTC	6-19-2019
3. TRAFFIC RTC	6-25-2019

ISSUED FOR

Permitting

PROJECT TITLE

The Dascomb Road Project

PROJECT LOCATION

146 Dascomb Road
Andover, MA

DRAWING TITLE

Attachment D
Revised Site Plan

PROJECT NO.
T0681

TEC CAD FILE
T0681_LM PB COMMENTS.dwg

DRAWING NO.
C-1

SHEET 1 OF 1