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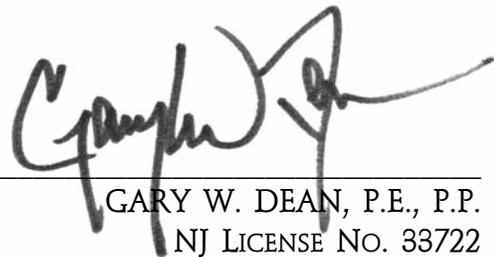
ACCESS and CIRCULATION STUDY

for



SOUTH FINLEY AVENUE
BERNARDS TOWNSHIP
SOMERSET COUNTY, NEW JERSEY

JUNE 18, 2012



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NJ LICENSE NO. 33722

INTRODUCTION

The Ridge High School (RHS) is part of the Bernards Township School District and currently serves grades 9 through 12. Though development growth for new homes in the Township has been largely abated since the “boom” years between 1980 – 2000, student enrollment is still projected to modestly increase over the next several years to approximately 1,925 students. Given this projected increase combined with operational concerns even with the current population, the School District has commissioned this traffic access and circulation study to both evaluate the current practices and to investigate short-term and longer range improvements that will better serve school traffic.

RHS is located along northbound South Finley Avenue at the traffic signal controlled intersection with Lake Road. Secondary egress to only northbound South Finley Avenue is provided via an unsignalized driveway north of the traffic signal through the Township Board of Health property. Although the school property itself has frontage only along South Finley Avenue, abutting parcels to the north and the east are owned by the Township and could provide an opportunity for potential alternate means of school access.

The Cedar Hill Elementary School is located immediately south of RHS and is currently used by high school busses for morning student drop-off, as directed by the school district to alleviate current congestion directly at RHS. In addition, a limited number of high school parents have informally adopted a similar student drop-off practice at the Cedar Hill School, again in an effort to avoid traffic congestion at the RHS main entrance.

Ridge High School currently has over 1,850 enrolled students in grades 9 through 12. Additional student growth of approximately 4% (to 1,925 students) is anticipated within the foreseeable future. Because of the current congestion experienced at the intersection of South Finley Avenue and Lake Road, which in turn negatively impacts internal school drive aisles during normal school hours, the Board of Education has commissioned this updated



traffic access evaluation to investigate reasons for the current congestion and to further explore additional improvements for vehicular access.

As is typically the case with high schools, although subscription bussing is offered to all students, many seniors (and in the spring months, juniors) have reached an age with driving privileges and thus no longer avail themselves of bus service, instead choosing to drive to school. For many underclassman (and even for older students), social and societal changes have also resulted in a shift away from bus ridership with a corresponding increase in parent drop-off.

The combination of these two factors has resulted in increased vehicular traffic, which is most highly concentrated at the sole school access: at the South Finley Avenue driveway. Though likely the most challenging policy to encourage or implement, the obvious mass efficiencies yielded by transporting more students in busses should be explored through incentive programs or some other form of public awareness (i.e., “green initiatives”). But falling short of banning outright or limiting periods of parent drop-off (e.g., disincentives), there are few means to vigorously promote more bus use.

The purpose of this analysis has been to first identify and quantify the current traffic activity and operational constraints arising from each identified user group:

- 1) school busses,
- 2) parent drop-off and,
- 3) employee and student parking.

Once these elements were defined, we then focused on feasible improvements, from an engineering perspective, to better manage/eliminate peak hour congestion that principally occurs for a very limited duration during morning school hours.



EXISTING CONDITIONS

Ridge High School is currently served by a two-way, main access road that forms the fourth “leg” of the intersection formed by South Finley Avenue and Lake Road. A secondary egress-only driveway exists north of the signalized access through the Township Board of Health site. The Ridge High School campus itself is entirely self-contained with no other regular means of vehicular ingress or egress except to South Finley Avenue. Although not accessible for regular vehicular access, there is a paved, interconnecting walkway between Ridge High School and the Cedar Hill School on Peachtree Road. The Cedar Hill School is accessed via Peachtree Road, which in turn leads to Homestead Road and Winding Lane.

As part of this evaluation, our office conducted new traffic volume counts in April 2012. These counts and observations were performed at the Ridge High School driveways, Cedar Hill School, the Bernards Municipal building and directly on-site to monitor specific patterns in drop-off/pick-up activity along the school frontage. Specifically, counts were conducted on the following dates and times:

- Tuesday, April 3 from 2:00 to 3:30 p.m. Lake Road/School entrance & Finley Avenue
- Tuesday, April 3 from 2:00 to 3:30 p.m. On-site – front school drop-off area
- Wednesday, April 4 from 6:45 to 8:00 a.m. On-site – front school drop-off area
- Wednesday, April 4 from 6:45 to 8:00 a.m.- Municipal Building drop-off
- Wednesday, April 4 from 6:45 to 7:30 a.m. Busses at Cedar Hill School
- Wednesday, April 4 from 6:45 to 8:00 a.m. At Lake Road/School entrance & Finley Avenue
- Tuesday, April 17 from 6:45 to 8:00 a.m. On-site – school drop-off area
- Wednesday, April 18 from 6:45 to 8:00 a.m. At Lake Road/School entrance & Finley Avenue

In addition to monitoring traffic flows and patterns, immediately after the morning counts and prior to the afternoon data collection, counts were also performed of the on-site parking lot use to identify sufficiency of the current parking supply.



Traffic studies typically focus on the “peak” 60 minutes of highest traffic concentration, known as the peak hour. To be described in further detail below, through the observed “system” morning peak hour at the Finley Avenue signalized access occurred from 7:00 a.m. to 8:00 a.m. (Figure 1), school traffic activity is most concentrated between 7:00 a.m. and 7:30 a.m. with very little activity afterward. Thus the actual peak “hour” occurs largely due to the simultaneous occurrence of peak school traffic and commuter flows on the adjacent roadway system.

The actual peak 60 minutes of maximum RHS traffic occurred from 6:45 a.m. to 7:45 a.m., slightly earlier than the street (or “system”) peak hour. Similarly, the afternoon school “dismissal” peak hour occurred between 2:30 p.m. and 3:30 p.m., while the street peak hour does not occur until much later, well after 4:30 p.m.

Appended Figures 1, 2 and 3 show the peak hour traffic at each location based on the recent traffic counts.

As noted, the maximum high school traffic activity occurs during the morning peak hour with nearly 40% less traffic generated during the afternoon. This change principally occurs due to after school activities, which tend to more evenly distribute (or spread) school traffic over a several hour period. By contrast during the morning, virtually all school traffic is concentrated just prior to the start of classes. This sharp “spike” in demand creates some of the chronic operational constraints given the limited on-site circulation options and single means of ingress.

As further evidenced from the recent counts conducted at the high school entrance, peak traffic activity at the school and resulting congestion occurs for a limited duration, generally between 7:15 a.m. and 7:30 a.m. This “sub-peak” occurs principally as a result of inbound school traffic with the highest concentration occurring between 7:20 a.m. and 7:30 a.m. The trends of school arrival traffic are shown on the graphs included in the Technical Appendix. Other than these limited times – which are largely endemic to almost any school operation



and difficult to control - throughout the balance of the morning peak hour, traffic generally flowed smoothly with minimal congestion or disruption.

The appended graphs show the 5-minute ingress traffic fluctuations as observed at the school driveways. They also illustrate the bus drop-offs at the Cedar Hill School and student drop-off at the Municipal building. As shown, all peaks typically occur between 7:00 a.m. and 7:35 a.m., though a slight temporal shift is noted with nearly all busses arriving between 7:00 a.m. and 7:10 a.m. whereas the highest drop-off activity (by parents) occurred closer to 7:30 a.m.

The parking was counted in each of primary areas depicted on Figure 3. For this study, the parking field to the west/south of the building was designated Lot A, the lot in front of the school Lot B, the smaller lot in the northwest corner, Lot C and the main parking field to the north Lot D. Shown on Table I are the observed occupancy load and vacancies as identified “post drop-off” and “pre pick-up”, thus should represent maximum parking demands.

TABLE I
RIDGE HIGH SCHOOL
EXISTING PARKING DEMANDS – APRIL 2012

Lot	Total Striped Spaces	Occupied spaces 8:00 a.m.	Occupied spaces 1:30 p.m.	Minimum Vacant
A	155	86	103	52
B	62	38	34	24
C	74	62	56	12
D	312	252	255	57
TOTAL	603	438	448	155 (25.7%)

From these results, there does not appear to be an acute parking shortage – especially for the time of year when demands would be higher than during fall/winter months.



ASSESSMENT OF EXISTING TRAFFIC OPERATIONS

In this analysis, we have considered the northwesterly façade of the school as the “front” for general orientation purposes. As currently configured, there is a very wide (approximately 37 feet), non-delineated access aisle (i.e., “the oval”) directly across the entrance running in a southwest to northeast orientation. This one-way flow is intended to principally facilitate passenger-side discharge for pick-up and drop-off and to provide access to the northerly parking lots closest to Astor Field.

Running perpendicular to the front access aisle are two painted crosswalks that lead to the front parking area. The crosswalks are painted with high-visibility striping and are further supplemented with auxiliary R1-6a regulatory signs indicating that motorists must stop to pedestrians in the crosswalk.



As observed during the traffic counts, the absence of any pavement markings and travel path ambiguity within the primary front access aisle of “the oval” leads to considerable driver confusion. Vehicles were observed to occasionally “slalom” the pedestrian crossing signs given the unmarked designation and absence of meaningful traffic control signage or direction. As a result of this configuration, there is considerable “weaving” between vehicles vying for the limited curb frontage positions for drop-off and vehicles simultaneously trying to exit the drop-off lane. Students were also observed to be dropped off at both the northerly and southerly school entrances along the front, creating additional weaving conflicts between entering and exiting drop-off traffic.

As is the case with almost all types of curbside drop-off activity, increasing the amount of available linear curb frontage greatly improves capacity and can facilitate multiple drop-offs and pick-ups simultaneously. However at Ridge High School, drop-off parents tend to congregate at the location closest to the entry door, which creates additional conflicts and



competition for limited available space. Figure 3 shows the large number (390) of drop-off vehicles that further conflict with the traffic simply passing through (261 vehicles) to reach the upper parking areas (lots C and D).

The overall efficiency of this system is greatly reduced as typically only two to three vehicles off load at a time whereas if the entire curb frontage were used, significantly more vehicles could simultaneously discharge. The congestion at the main school drop-off entrances in turn leads to queuing that extends into or close to the South Finley Avenue intersection during peak drop-off hours.

This acute congestion at the school entrance has resulted in the implementation of an alternate location for school bus drop-off at the Cedar Hill School. Although our office has not performed any type of analysis prior to the implementation of this system, without question, the effective segregation of automobile and bus traffic has improved traffic operations at the school, particularly given the larger size of school busses and their concentration generally during primary parents' drop-off and arrivals.

Finally, as noted from the traffic counts, parents were observed to use the Municipal complex, which has its only means of access via Collyer Lane further to the north. As there is virtually no other traffic or parking activity within the Municipal complex during peak school arrival (approximately 7:20 a.m. to 7:30 a.m.) there are no inherent conflicts created by this informal practice allowing a very effective drop-off pattern. Students who are dropped off must cross Astor Field and the northerly parking area, which does not currently have prominently visible, delineated pedestrian walkways.

Compounding the issue is that all school ingress and (virtually all) egress traffic is concentrated directly at the South Finley Avenue/Lake Road intersection. Without another access, traffic conditions will always be constrained, particularly given the limited stacking distance from the school entrance to the intersection.



As part of this study, the traffic-signal controlled intersection operation itself was evaluated to gauge its effectiveness in processing school and street traffic. In traffic studies, intersection and street operations are usually qualitatively described by Levels of Service (LOS), which is a descriptive term to help understand the dynamics of traffic flow. LOS is calculated on the basis of vehicular delay, which at a signal controlled intersection, is regulated by the signal sequences, the number of roadway lanes, and how drivers react to the signal indications given other operating characteristics. Suffering long delays while waiting at a traffic signal is indicative of poor Levels of Service. LOS ranges from favorable conditions at LOS A to constrained or long delays at LOS F.

Based on the current intersection design and signal timing sequencing as implemented by Somerset County, the existing overall intersection operating conditions are rather poor, operating at LOS E during the critical morning peak hour. Traffic exiting the school and approaching on Lake Road operates at LOS F, while the other approaches on South Finley Avenue are better.

The intersection also operates with a modest degree of inefficiency with a “split” phase operation wherein the school driveway operates independently from Lake Road. Ideally, the minor street approaches to an intersection operate concurrently, thereby making more efficient use of the signal “green” time allocated. It is also noted the entire signal sequence time – to change from green-to-red- back to green (known as the cycle length) – is unusually long for a non-highway, isolated intersection. Because so much signal time favors South Finley Avenue, yet there is not a corresponding and proportional demand, the Lake Road and School Driveway approaches suffer from unnecessarily long delays when there is little traffic on South Finley Avenue.

A summary of the existing LOS and optimized operations are shown in the Technical Appendix. As noted, all LOS F conditions can be eliminated principally by “fine-tuning” the traffic signal timings and reducing the overall cycle length.



To be described in further detail within this report, once the current traffic demands and patterns have been identified, the next step is to evaluate improvements that could better accommodate existing demands and projected traffic increases. Those improvements consist both of minor policy or operational changes that could be quickly implemented and/or minor construction that can be completed during the summer recess.

Other long-term improvements have been considered in this analysis that due to anticipated high construction costs and associated budget impacts combined with longer lead time for outside agency approval would take more time to implement. These circulation options include:

1. Routing of School Busses to the Municipal Building
2. Improvements to the existing Health Department driveway
3. Construction of a new school driveway to South Finley Avenue
4. Construction of a new access to South Maple Avenue
5. Internal circulation loop to Lot A for an alternate school bus drop-off.
6. Construction of a new access/“switchback” road to connect to the municipal public works yard on South Maple Avenue
7. Construction of a permanent roadway connection to the municipal building
8. Construction of a new police-only driveway to Collyer Lane



PROPOSED SHORT-TERM IMPROVEMENTS

As the current school year draws to a close, the summer recess provides a convenient time to examine the benefits and consequences of the current traffic control measures currently employed by the school, specifically to segregate bus traffic at the Cedar Hill School. Also during the recess, there are opportunities to implement short-term improvements for the Fall 2012 school year that would improve overall safety and efficiency for drop-off, and better enhance on-site circulation.

Absent long-range improvements to be discussed in a subsequent section of this report, the continued segregation of bus traffic at the Cedar Hill School has virtually no fiscal implications otherwise necessitated by physical construction/capital improvements. Given the relatively low number of busses (approximately 22 that used the Cedar Hill School) the benefits of continuing this practice are clear for both enhanced student safety as well as to lessen traffic congestion at the front entrance.

In furtherance of this practice, this study includes an inventory of existing street conditions along Peachtree Road to ascertain the continued viability of directing high school busses to the Cedar Hill School; elementary school busses that currently travel on Peachtree Road would be unaffected. Peachtree Road is best characterized as a residential street, serving the abutting single-family homes between Winding Lane to the south and the Board of Education Offices/Cedar Hill Elementary School to the north. Sidewalks exist along Peachtree Road and the overall alignment is relatively straight on a generally uniform grade increasing in elevation from south to north. Sight distances are unconstrained.

As noted from the traffic counts, high school bus activity on Peachtree Road is concentrated but with a very short duration; most busses arrived between 6:55 a.m. and 7:15 a.m. But for this limited “window” of bus activity, there is virtually no other high school related bus activity outside of this 20-minute interval. At an average headway of approximately one bus



per minute, such activity is not overly invasive and the neighborhood street system can readily accommodate the bus traffic with no measurable impact on roadway capacity or operating conditions. The continued use of this option will provide the most cost-effective solution.

Alternate 1

It is recognized that there may be certain neighborhood sensitivity to additional traffic along Peachtree Road as generated by the high school busses. Although the Cedar Hill School generates its own bus activity, the practice of directing additional high school busses has seemingly garnered negative criticism by neighbors along Peachtree Road.

As a slight compromise for short-term planning, in lieu of directing all RHS bus traffic to Peachtree Road, modest improvements could be made to the asphalt paved pathway between the Cedar Hill School and Ridge High School, which is currently gate-controlled for access by delivery and maintenance vehicles. Although the gate control would presumably remain, a one-way counterclockwise circulation could be employed allowing busses to enter RHS via Peachtree Road, but continue north on an improved access drive (with cost implications to construct) allowing drop-off on the southerly side of the high school. Busses would then exit through the southerly parking field and proceed directly to South Finley Avenue or through the “oval”. Modifications in the on-site traffic control could be necessary if direct left turns were permitted from the smaller parking field and/or the use of traffic control directors to ensure busses are given priority to exit to South Finley Avenue.

Alternate 2

While the continued use of Cedar Hill School affords virtually unimpeded and completely segregated bus access for drop-off, a second alternate was considered to keep all RHS traffic activity self-contained on-site, including busses. However, instead of directing busses to the main front entrance for drop-off, busses could be directed immediately to the south upon



entering and proceed through Lot A to the southeast corner of the school. Traveling in a counter-clockwise pattern, busses would loop through the lot, stopping to discharge passengers at the appropriate location along the building sides.

Depending on the discharge point, up to twenty (20) busses could be queued within Lot A with no “spill-over” into the primary school entrance. A concept sketch of the design (Figure 4) is attached. Sufficient turning radii exist to accommodate the school busses, however during these periods access to/from the parking spaces would be blocked by queued busses.

Although such a scheme could be implemented with relatively minimal costs, additional bus traffic would be introduced at a location where there is currently stacking from parent drop-offs, which will create additional conflicts that have thus far been remedied by using Cedar Hill School for both entering and exiting bus activity.

Parent Drop-Off

To lessen the amount of queuing directly at the high school entrance, several improvements are recommended to better control traffic movement and enhance safety. First, we observed excessive travel speeds along the “oval” access aisle, which create obvious safety concerns. Typical of “rush” hours, both parents and students often appear to be running late, thus contributing to higher-than-appropriate travel speeds within the high school campus. Particularly after experiencing longer delays in arriving to the school and then waiting in a long queue, once students are dropped off, travel speeds were noted to increase, perhaps in an eagerness to leave the school, which appropriately should be discouraged.

To improve safety and implement an element of traffic calming, elevated speed humps should be considered directly at the school entrance. Ideally comprised of an elevated sidewalk leading to and from the front parking field (Lot B), the speed humps (or speed tables) provide vertical relief requiring drivers to travel slowly. Reducing travel speeds will



improve safety directly at the school entrance. It may also be desirable to install similar devices along the exit access aisle of the “oval” (closest to the Board of Health property) to consistently maintain low travel speeds while traversing school property.

In addition, the wide, unrestricted entrance aisle of the oval creates certain ambiguity in appropriate travel flow, particularly as most drivers are accustomed to driving on the right when on public streets. Similar to the striping scheme at the Cedar Hill School, it is recommended that designated lane striping be installed along the school entrance under the following minimum configuration:

- Lane 1 (left most lane) – BY-PASS LANE - This circulation lane of ideally 15 feet would be used for access to the northerly parking fields only. The lane would allow bypass of all drop-off and pick-up activity, and would further designate the lane for through movements only.
- Lane 2 (Drop-off/Curb Lane) - An approximately 22-foot lane would be designated directly across the curb frontage for pick-up and drop-off only. An 8-foot “standing” zone could be used to denote the area directly along the curb for drop-off/pick-up. The use of this “drop-off” lane would be only for drop-off activity and segregated from the “through” traffic in Lane 1

By better organizing and designating the front access aisle into separate lanes each with a specific function, better operations will result and the visual cues of individual lanes will lessen higher travel speeds and will better move traffic directly along the front of the building. The scheme can be immediately implemented through simple pavement markings, striping and signs.

If the elevated sidewalk/speed table concept is favored by the Board, additional consideration could be given to constructing a covered walkway, which would provide a secondary means of student drop-off within the parking field directly in front of the school (LOT B). The



covered walkway would also present another visual reference that would tend to slow traffic, but would also allow an opportunity for overhead lane use control signs to better designate the intended use of each of the designated lanes across the school frontage. Although difficult to ascertain the cost or construction timeline, such an improvement is considered as short-term, given the relatively simple construction required for such an amenity.

Alternate

Similar to the current informal practice of using the two school entrances along the “oval” to better distribute drop-offs along the curb frontage, to further reduce congestion parents should be directed/encouraged to pull as far north as possible prior to dropping off. The potential availability of a covered access along the entire front sidewalk area would make for a more attractive route, although arguably further from the building entrance. Initially, traffic control personnel may be necessary to encourage parents to pull as far forward as possible to maximize the available curb frontage, thereby allowing greater simultaneous pick-up and drop-off.

As another alternate, a third point of entry could be considered at the northeastern corner of the school, by directing parents of other grades (i.e., 9 & 10) to circulate into the northern parking field closest to Astor Field and drop-off at another location. Through the use of the multi-lane entrance along the “oval” with a by-pass lane and by allowing other drop-off points, this operation would lessen the congestion directly at the building entrance, which in turn has obvious benefits in terms of improving overall ingress directly from Finley Avenue and Lake Road.

The one-way circulation aisle that currently exists along the northerly side of the building would greatly facilitate curbside drop-off and should be considered, if practical, depending on the location of homerooms, classrooms, etc. This recommendation is a low-cost, easy-to-



implement improvement that while maintaining the same total traffic volume entering and exiting the school campus, provides better internal traffic distribution by reducing the maximum concentration in relative close proximity to the South Finley Avenue entrance.

Policy Changes

As noted from the morning arrival activity graph, during the days observed, the peak time of parent drop-off activity occurred at 7:30 a.m. whereas the peak time of bus activity occurred prior to 7:15 a.m., a full 15 minutes earlier. As noted, arrival activity occurs as early as 6:45 a.m. and steadily increases throughout the morning, reaching its peak at 7:30 a.m. Though enforcement would be a practical challenge (requiring major behavioral changes by parents), the simple prohibition of parent drop-off activity between 7:00 a.m. and 7:10 a.m. to favor only bus activity may represent a way to manage traffic by creating a traffic “blackout” period.

To successfully implement this scheme, on-site personnel would be necessary to barricade the drop-off lanes to parent automobile traffic, giving full priority to bus activity. The “blackout” could discourage some parent drop-off and given that bussing is offered, could marginally improve bus ridership. It is unknown whether there are morning instructional or other programs that necessitate earlier parent arrivals, however a concept of a “blackout” period to favor busses may have secondary benefits other than improving traffic operations.

One final issue to consider with an AM period “blackout” is the impact and control of staff arrivals. A sticker or other type of program to readily identify staff vehicles could be considered, and while helpful, there would be certain inherent difficulties in effectively controlling parent drop-off without very strict enforcement by on-premises personnel.



Parking

Finally, consideration has been given to a better organization of the interior parking fields to maximize efficiency and yield additional parking spaces. As a general practice, where ever possible, perimeter parking should be employed in a hidden fashion around the periphery of all parking areas. Through a modest restriping and/or removal of existing end islands, additional parking spaces can be provided.



LONG RANGE IMPROVEMENTS

With essentially only a single means of ingress and egress to the Ridge High School property, traffic will always be inherently constrained at the “bottleneck”, which is regulated by the traffic signal at South Finley Avenue and Lake Road. As noted from the traffic counts, motorists are currently taking advantage of the exit driveway adjacent to the Board of Health property to return back to points further north in the center of Basking Ridge. Very few motorists proceed to the traffic signal to turn right and continue north.

Similarly, there is a relatively low traffic volume turning right from Lake Road to continue south on South Finley Avenue. In light of these two circumstances, the traffic signal operations were analyzed using both the current timing as implemented by Somerset County as well as recommended modified timing that would better improve overall efficiency.

To gain significant capacity and operational improvements, a re-designation of the lanes and reconstruction of the intersection is recommended to provide dedicated left-turn only lanes along both Lake Road as well as exiting the school property with the adjacent lane designated for shared through and right movements only. Although slightly offset from the receiving side of each east/west approach lane, such a scheme can be safely implemented using additional pavement markings for travel path guidance.

The improvements will effectively double the available capacity by segregating the left-turn movements from the through traffic, which are otherwise impeded by the left-turning vehicles. In addition, the scheme would allow the removal of the current “split” phase operation, wherein the school driveway operates separately by Lake Road. Table I on the following page shows the current level of service, an improved level of service with a simple recalibration and retiming of the traffic signal and the long-range level of service that can be provided through a reconstruction of the intersection.



As noted from the comparison, aside from improving the level of service, overall delays can be reduced which in turn will lessen the amount of queuing or “stacking” directly along each approach. Better efficiency can be realized through this modification which would more effectively process traffic.

As previously identified, other long-term improvements have also been considered in this analysis; a general feasibility assessment has been included for each option that outlines the relative benefits contrasted with the perceived constraints to implement. These options would each have higher construction costs with longer permitting requirements, depending on the local, county or state agency with jurisdiction.

1. Routing of School Buses to the Municipal Building
2. Improvements to the existing Health Department driveway
3. Construction of a new school driveway to South Finley Avenue
4. Construction of a new access to South Maple Avenue
5. Internal circulation loop to Lot A for an alternate school bus drop-off.
6. Construction of a new access/“switchback” road to connect to the municipal public works yard on South Maple Avenue
7. Construction of a permanent roadway connection to the municipal building
8. Construction of a new police-only driveway to Collyer Lane

1. *Routing of School Buses to the Municipal Building*

Although generally possible, the introduction of routing school buses to the Municipal building raises several initial concerns, principally related to the constrained driveway geometry at the Municipal building entrance on Collyer Lane. Specifically, the presence of the two large stone columns create an effective “bottleneck” which in turn makes access by larger wheelbase vehicles (e.g. buses) difficult, particularly for simultaneous entering and exiting movements. While detailed engineering analysis



has not been conducted, from a field review, the relatively narrow driveway width combined with the larger turning radii needed for busses, would create certain inherent conflicts directly at the site entrance. Furthermore, the steeper grade and internal geometry of the driveway itself, further constrain effective bus access.

Furthermore, once on the Municipal property, discharge from busses would be on the opposite site of the athletic fields. For students to walk to the high school at least 400 feet of new sidewalk would be required so that a stable walkway surface is provided to the school property. To preserve the integrity of the athletic fields, presumably such an access would be directed around the perimeter of the athletic fields. Moreover, during inclement weather, such a long access path to the building entrance would be infrequently used by parents, thus leading to more parent drop-off directly at the school entrance – precisely what should be discouraged.

Finally, aside from the new sidewalk construction, additional improvements would be necessary within the parking lot to provide a dedicated walkway leading to the school entrance. Parking spaces would most likely need to be eliminated to create the walkway. The total walkway distance from the Municipal access road would be approximately 736 feet from a bus drop-off point to the school entrance, and such is considered to be too far for a practical solution.

2. *Improvements to the Existing Health Department Driveway*

Currently an egress-only driveway from Ridge High School is provided through property owned by the Municipal Health Department leading to South Finley Avenue. Because of a significant sight distance constraint due to the prominent stone wall across the Health Department driveway to the north, full egress movements are not permitted and are restricted to right-turn only. For full left and right egress, a complete reconstruction of the Health Department property frontage would be needed including the elimination of the stone wall to provide improved sight distance.



However, even if these extensive improvements were made, it is unlikely that left turn exits would be permitted by Somerset County given the safe and more viable alternative to turn left via the traffic signal immediately south at the main high school entrance. Although obviously feasible, the aesthetic impacts and considerable cost to remove the stone wall, would have limited effectiveness in providing overall improved traffic access or circulation to the high school.

The driveway segment closest to South Finley Avenue was constructed to an approximate 20-foot width, which although narrow, does allow two-way traffic flow. East of the connection to the Health Department parking lot (where curbed), the driveway narrows to approximately 18 feet and ideally should be widened for two-way bus traffic. As part of this analysis, consideration has been given to revising the access on the Health Department driveway for either reversible or full-time, two-way traffic flow. Associated with the improvement would be a probable need to revise the striping along South Finley Avenue for a dedicated left-turn lane into the driveway and improve the right turn radius for northbound turns from South Finley Avenue.

As noted on the attached Figure 5, consideration could be given to revising the access aisle away from the Parking Lot B, also to permit two-way traffic movements, thus allowing busses a segregated route for pick-up and drop-off. Toward the rear of the school building, a “bus only” drop off point would be designated and internal traffic control necessary, (i.e. similar to the current practice of using removable saw horses or other barricades) to provide school busses with a delineated route.

If the Board preferred to have bus drop-off at the main entrance, the health department driveway could be used for non-drop-off, automobile traffic that continues to Lots C&D and does not exit the school property. Based on the traffic counts, under such a scheme, approximately 260 vehicles would be “removed” from the drop-off activity at the main entrance and would greatly lessen congestion and improve safety at the entrance.



Combined with this practice would be the possible need to revise the circulation for parent drop-off to permit exiting movements through the primary parking field on Lot B. The traffic flow would be reversed from the current practice, which currently permits only northbound traffic movements. With the recommended striping of approach lanes on the entrance side of the "oval", by changing the traffic patterns within the internal parking lot, segregated circulation for automobile traffic and school busses can be provided. Because the driveway was constructed for only egress movements, improvements to the northbound right-turn radius to facilitate vehicular ingress may be necessary.

Somerset County approval would be required to revise the striping on southbound South Finley Avenue for a left turning lane. It is conceivable that the County would require additional roadway widening further north to provide an adequate southbound turning lane for entrance movements. Although detailed survey information has not been reviewed, it is believed that sufficient right-of-way exists to accommodate the widening, though small retaining walls may be necessary due to the grade changes on the westerly side of South Finley Avenue.

3. Construction of a New School Driveway at South Finley Avenue

Other than the school access directly opposite Lake Road, Ridge High School has no other access along existing public streets to provide alternate means of ingress/egress. As described in Option 2 above, the Health Department driveway provides a limited means of site egress - which has helped traffic operations at the traffic signal controlled intersection - but warrants further consideration for possible future use as an access.

In this analysis, consideration has been given to the benefits of providing a second means of direct access to South Finley Avenue directly from the high school. Such an access would necessitate acquisition of private property from one of the abutting homeowners currently fronting on South Finley Avenue. For such an option, there is



an obvious initial private property acquisition cost and the associated loss of a tax ratable for the municipality.

While beyond the scope of this analysis to address such fiscal impacts, also of consideration is the general topography between South Finley Avenue and the southwestern corner of Ridge High School where the access theoretically could be provided. Of the houses that currently front South Finley Avenue, the acquisition would be one of the first four homes as any acquisitions further south then would intersect at the rear athletic/play facilities of Cedar Hill School and not connect directly to Ridge High School.

However, aside from the property acquisition itself, the general topographic and environmental constraints along the western boundary of Ridge High School and the abutting homes would represent a considerable concern to feasibly develop any form of new access road to South Finley Avenue. The grading of such a driveway would be a significant concern to meet recognized design standards. In addition, there would be a loss of forested areas and a potential culvert or other drainage design that would carry potentially significant environmental permitting constraints relative to wetlands crossings or other state open waters, if applicable.

From a traffic engineering perspective, the provision of such an access to South Finley Avenue that is south of Lake Road would also have certain operational constraints regarding northbound queued (or stacked) traffic at the signalized intersection. Particularly during morning peak hours, northbound queues extend well into the vicinity of the homes that would provide the most logical point of access, thus during the most critical traffic periods the driveway itself would be blocked. In summary, while somewhat feasible, providing such an access (particularly in light of the availability of the Health Department driveway) offers no meaningful relief in terms of traffic circulation and would not be recommended as a viable alternate at this time.



4. Construction of a New Access to South Maple Avenue

Similar to the constraints along South Finley Avenue, the Ridge High School property does not have any direct frontage to South Maple Avenue. The only means of access would be through the construction of a new road through the Engineering Services Building property that in turn, leads to South Maple Avenue. The area in question is heavily forested and has steep grades, which necessitate several “switchbacks” for larger vehicle access.

Although there are several existing paved walkways for access to abutting athletic fields, the grades are too steep for safe vehicular travel, if such were widened or otherwise improved for consideration as a future access road. In particular, the grades approaching the Engineering Services Building from the west are very constrained and would create inherent operational difficulties within the maintenance yard which necessitates regular access by larger vehicles for materials, construction equipment and other public works operations. A detailed steep slope analysis would be necessary to fully evaluate the feasibility of such an access; however at this time the severe topography and grade change appear to effectively preclude such an option as a viable alternative.

5. Internal Circulation Loop to Lot A for an Alternate School Bus Drop-Off

Under this scheme, consideration has been given to creating a perimeter circulation aisle to lessen movements within Lot A for bus drop-off. Ideally such a circulation road would travel outside of the existing parking areas, and a field inspection reveals that such a road can be constructed with presumably minimal, if any, environmental impacts and relatively low construction costs. The design would allow busses to circulate in a counterclockwise flow, and similar to the concept of simply using the internal access aisles of Road A, such an access aisle would also improve delivery drop-



off to the rear of the school building without interfering with on-site parking movements.

The limitation in such an access is that while such would eliminate use of Cedar Hill School, such necessitates entry by all school busses via the main signalized driveway opposite Lake Road. The design would further require a revision to the exit movements which as currently configured, directs all traffic within the Parking Lot Area A directly toward the front of the high school-in direct conflict with the parent drop-off.

Given the acute stacking that occurs during student drop-off by parents, while this option is theoretically available, the practical limitations of creating breaks in the traffic flow to allow busses an opportunity to exit, creates a generally impractical means to effectively accommodate such movements without the use of traffic directors or other personnel to manage internal traffic circulation. Given the cost of a providing the circulation aisle, there do not appear to be measurable benefits, given the conflicts with efficiently exiting bus traffic.

6. Construction of a Permanent Roadway Connection to the Municipal Building

From a field investigation, the northeast corner of Parking Lot D currently connects via a semi-improved, gravel driveway to the maintenance buildings for the high school which then leads directly to the Municipal complex parking lot. With minor reconstruction, the grades are favorable for a passenger-vehicle only driveway that would allow vehicular access (either ingress or egress) through the Municipal complex to Collyer Lane.

Particularly during morning peak hours, the traffic volumes on Collyer Lane are lower than found on South Finley Avenue and would therefore provide a favorable level of service for exiting vehicles through the Municipal complex. Minor internal



construction would be necessary on the RHS property to improve corner radii at select locations. It would also be necessary to designate a different drop-off point for parent vehicles to accommodate the desirable traffic flow of parent ingress via South Finley Avenue with egress through the municipal complex. Rather than initially directing ALL parents through the municipal complex, a trial period is recommended (if this option is pursued) to gauge the impacts of reducing traffic with the alternate route.

As an option within this option, an improved connection to the municipal building could alternatively also be used for direct ingress to Lots C & D. Under this design, there would be no exiting traffic through the municipal property, only ingress traffic. Similar to the concept of improving the health department driveway, this concept would eliminate approximately 260 morning peak hour traffic movements from the “oval”, thus greatly reducing congestion at the main entrance. Barriers would be needed during the morning to essentially close the connection to Lots C & D from the oval, to ensure all entering traffic is directed through the municipal property. With this scheme, busses could be re-introduced to the “oval” for drop-off.

The implementation cost would be relatively minimal for this connection option by using the majority of the existing infrastructure and requires only minimal modifications to successfully introduce. Overall, the construction of a permanent connection better integrates the high school with the balance of the Municipal facilities and provides for better connection of these two critical community components.

It is recognized however, that the Township Police Department is currently served only by the shared driveway from the Municipal complex on Collyer Lane. Overall, there is a relatively short duration of the parent drop-off, which is further limited to no more than one half of the year (180 days). With the further understanding that the traffic flows could be exiting-only (i.e. virtually no inbound traffic) during these hours, police would have the ability to exit the Municipal building with exiting drop-off parents



appropriately yielding (as would be the case on any municipal street or other two-way road). Therefore, given the limited construction costs to implement, this option should be pursued.

7. Construction of a New Police-Only Driveway to Collyer Lane

To address a potential concern regarding police response (if Option 6 were used), consideration was given to the construction of a new “police-only” driveway to Collyer Lane. Because of the severe topography and grades, it is not believed that such a driveway could be reasonably constructed, meeting appropriate engineering and other design standards for such driveway. The cost of retaining walls and the potential need for switchbacks would tend to negate any benefits in providing the secondary access.

8. Construction of Rear Circulation Road to Segregate Busses

Similar to the scheme considered under Option 5, the construction of a rear building circulation road has been considered that would completely segregate all bus activity from parent drop-off. Although such a scheme would continue to necessitate the shared use of the primary school driveway opposite Lake Road, the rear circulation road would have obvious secondary benefits for firefighting (and other maintenance uses).

A majority of the infrastructure is currently in place due to existing pedestrian walkways and other paths behind the Ridge High School building. More than adequate queuing and stacking can be provided with a separate road.

Given the constraints at the primary school entrance, it is anticipated that such a flow would be counterclockwise around the school building, although such could be readily reversed and is generally preferred to ensure passenger-side drop-off. Although less than ideal, under a counterclockwise flow, students could be dropped off on the right-



hand side of the vehicle and then cross between or in front of stopped school busses with all traffic appropriately yielding under State law, allowing students to proceed safely and directly into the school building.

Concerns associated with this option include the need for potential improvements to the existing retaining wall outside of the school entrance, (nearest the football field and track), which is currently only approximately 17 feet wide. Additional engineering and surveying information would be needed to evaluate the grades to reach the northeastern portion of the school. Given the vast rear lawn area, it is believed that an access road could be provided without significant construction costs or engineering difficulty.

As an alternate to directing all school busses to exit via the main entrance opposite Lake Road, consideration could be given (as noted in Option 6) for a permanent connection between the northeastern corner of the school parking lot and the Municipal services building, with movements under this option restricted to bus use only. Under such a scheme, the number of vehicles exiting through the Municipal complex can be reduced to only school busses, thus having the least amount of impact on concerns for police response.

Similar to using Cedar Hill School, all bus traffic can be segregated from car traffic, while being managed on-site. With a minor re-construction of a retaining wall and limited areas of new pavement, this access road can provide for significant circulation around the entire building perimeter. From a field inspection, the grading is conducive to constructing such a “ring” road and many of the improvements are currently in place.



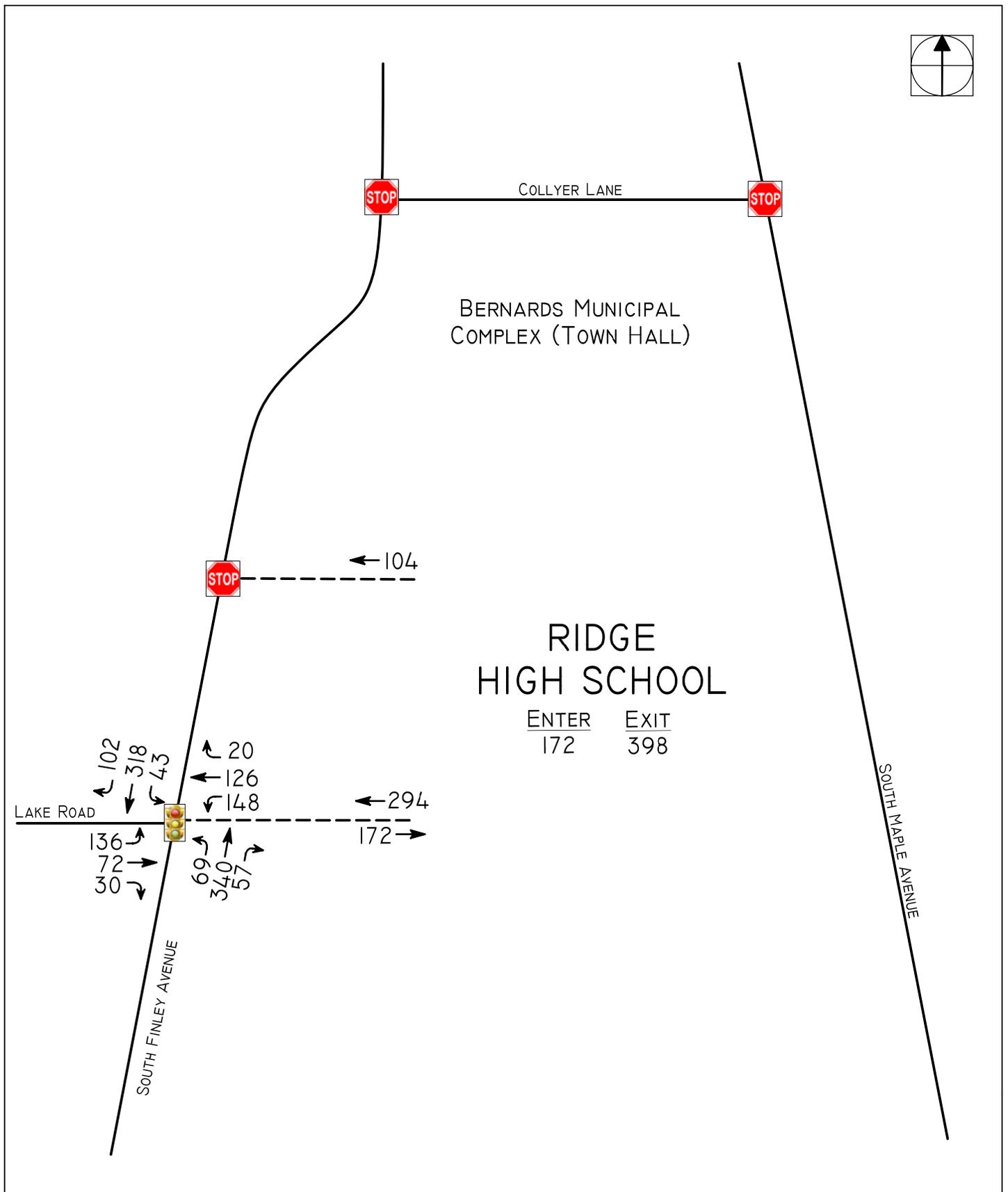
CONCLUSIONS AND RECOMMENDATIONS

As noted in this evaluation, there are many options to improve access and circulation at Ridge High School. Given the fiscal impacts and lead time required for design, approvals and construction, longer range options have been outlined that ideally will foster a dialogue between the school board, community and Township to reach an optimum solution. In the interim, there are several, low-cost means that are recommended to provide immediate relief in addressing the traffic concerns including:

1. Revise the traffic signal timing to better match existing traffic demands.
2. Provide striped lanes with lane-use control signing at the “oval”.
3. Install speed humps/tables along the “oval”.
4. Use health department driveway in reverse or municipal lot for ingress-only to Lots C & D (to remove 260 vehicles from the “oval”)
5. If option 4 is implemented, re-route busses to Lot A for drop-off.



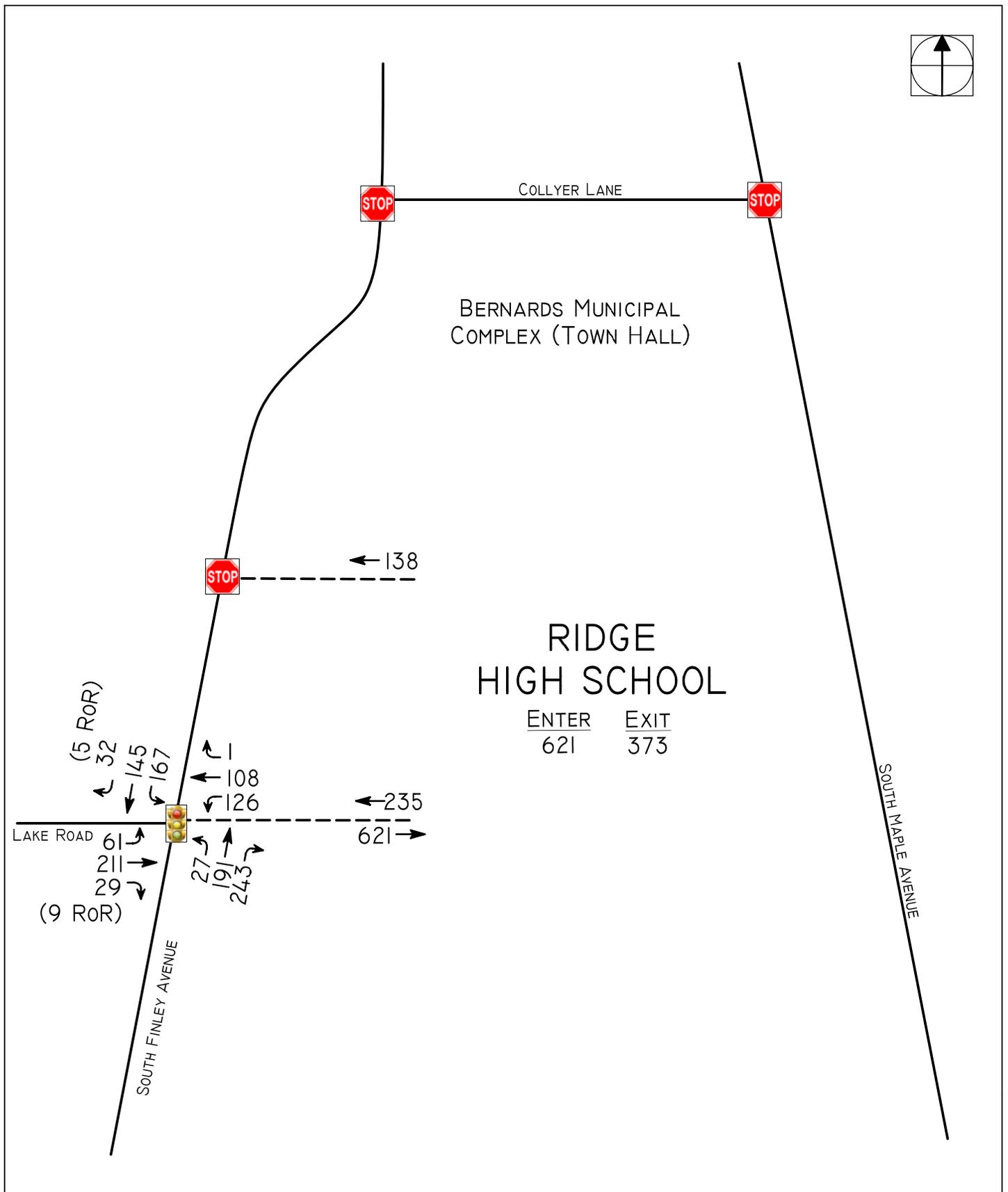
TECHNICAL APPENDIX



RIDGE HIGH SCHOOL
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY, NEW JERSEY

FIGURE 2

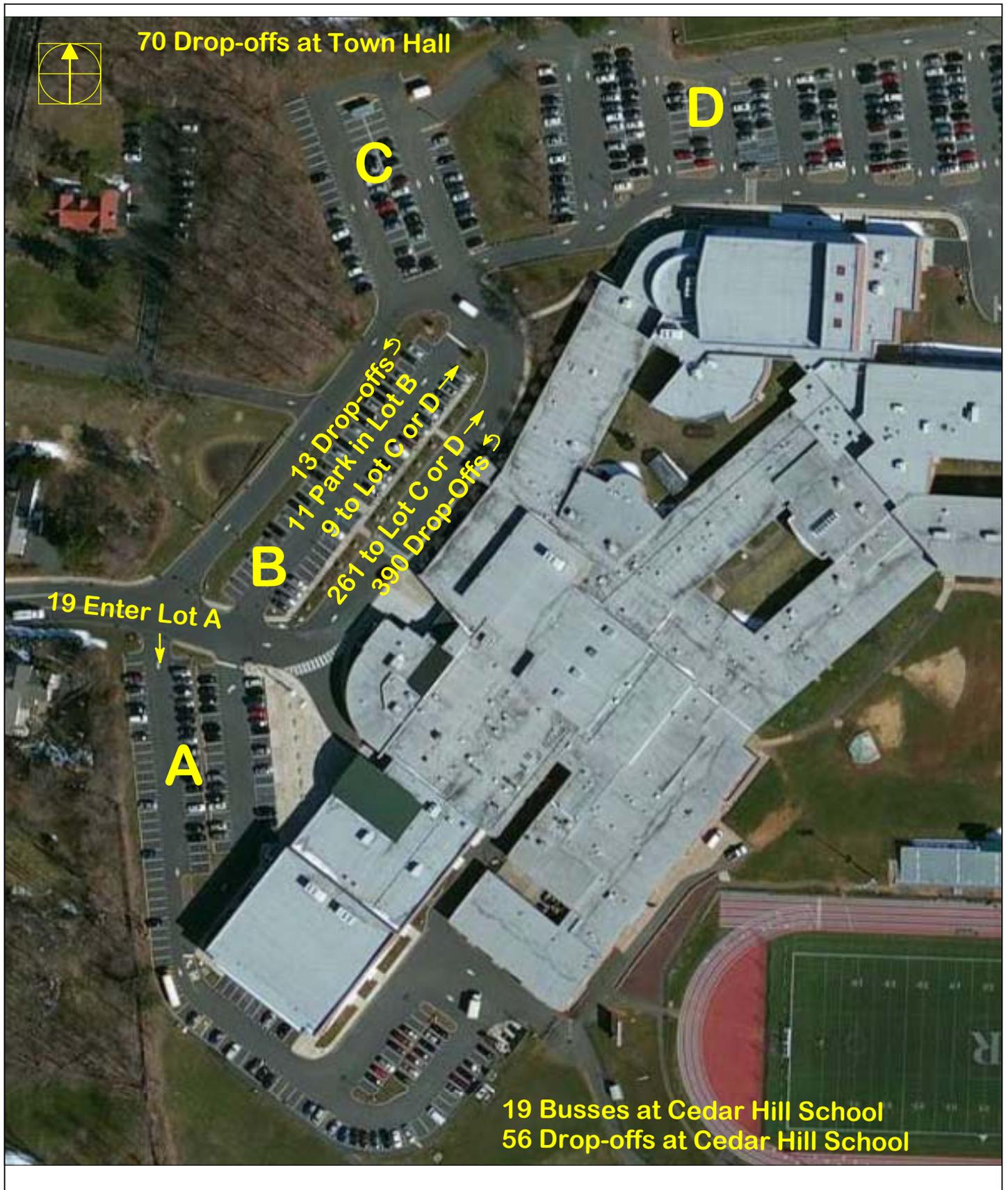
2012 EXISTING TRAFFIC VOLUMES
 EVENING INTERSECTION PEAK HOUR
 2:30 TO 3:30 P.M.



RIDGE HIGH SCHOOL
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY, NEW JERSEY

FIGURE 1

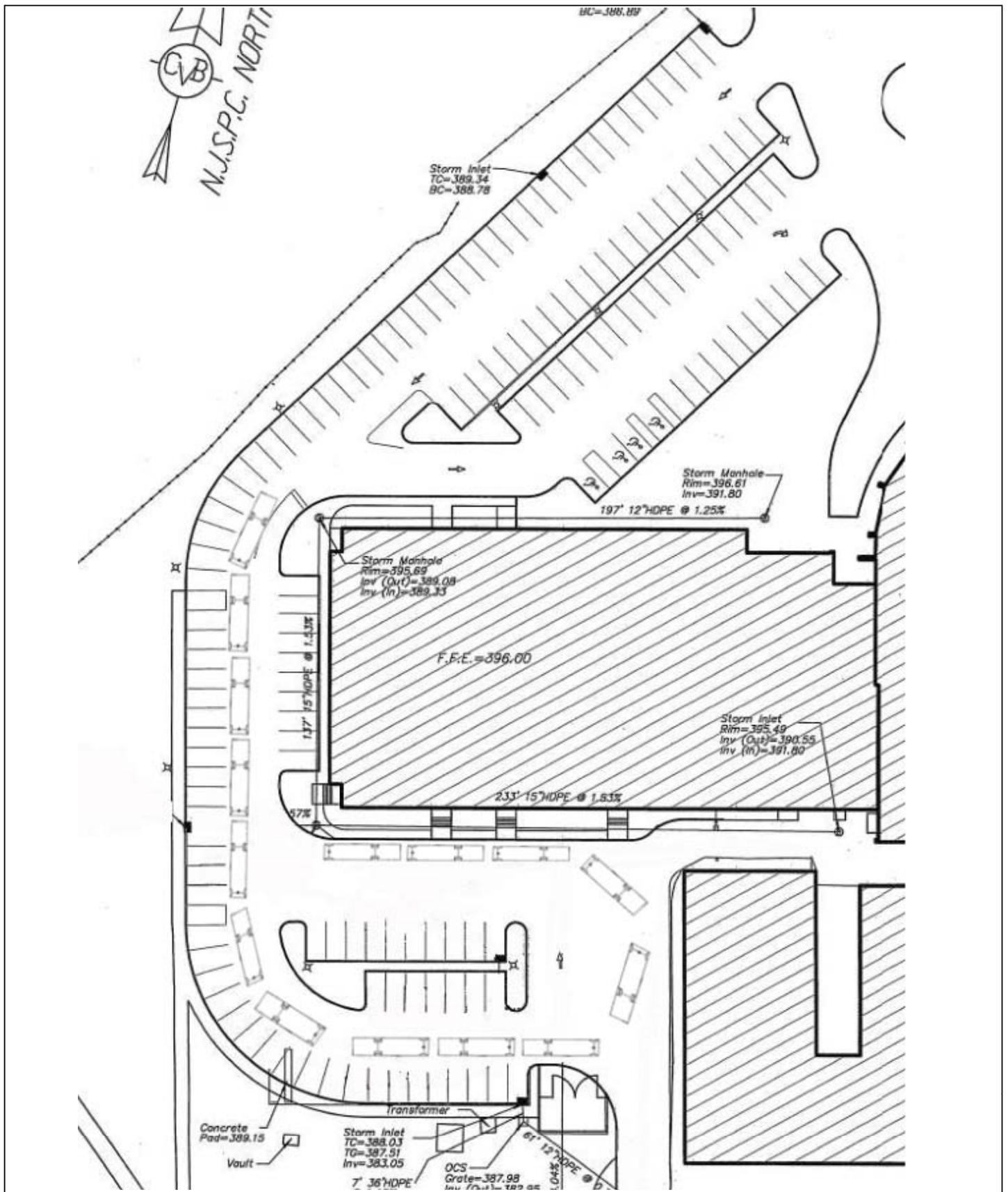
2012 EXISTING TRAFFIC VOLUMES
 MORNING INTERSECTION PEAK HOUR
 7:00 TO 8:00 A.M.



RIDGE HIGH SCHOOL
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY, NEW JERSEY

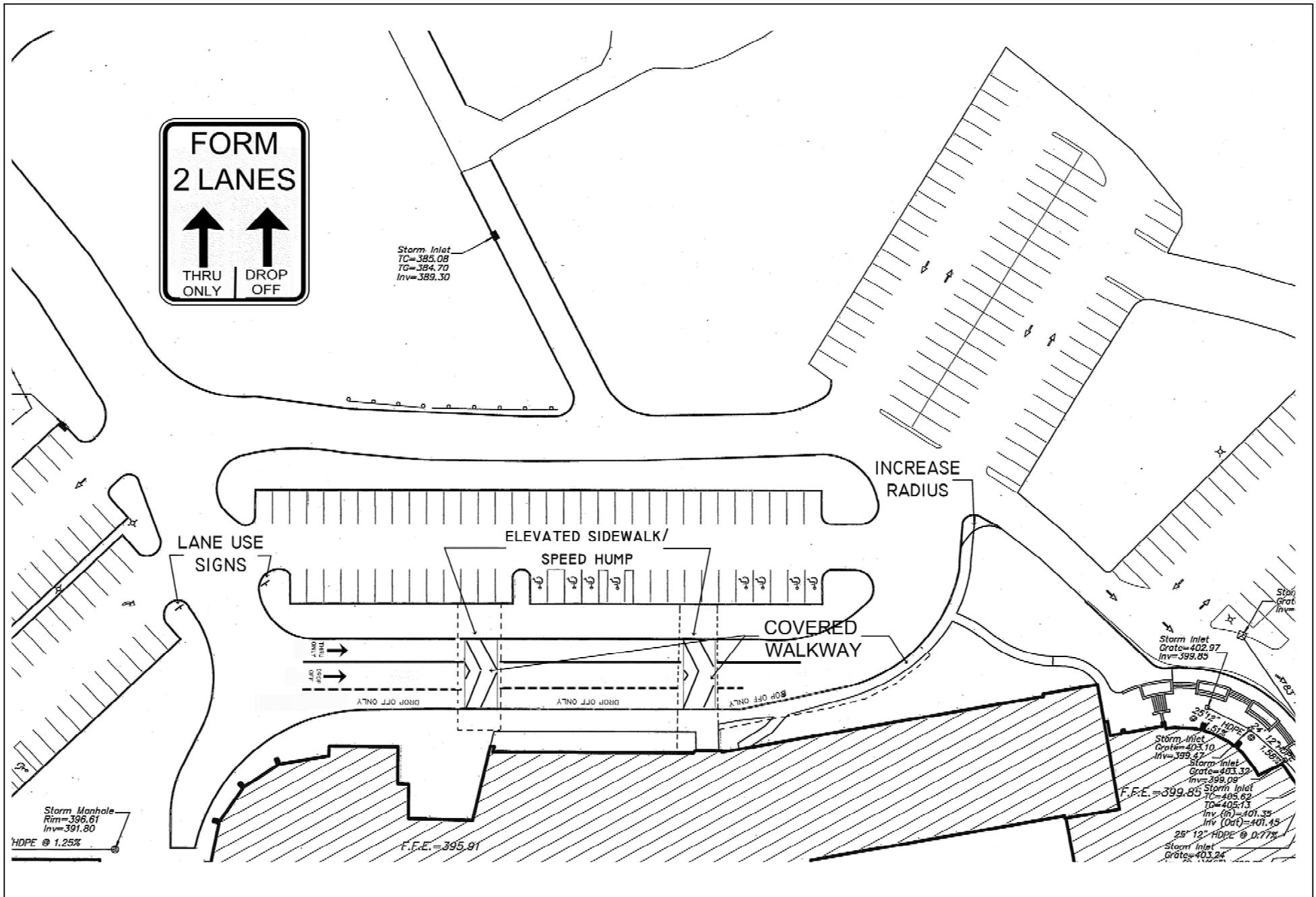
FIGURE 3

2012 EXISTING TRAFFIC VOLUMES
 MORNING SCHOOL PEAK HOUR
 ARRIVAL ACTIVITY - 6:45 TO 7:45 A.M.



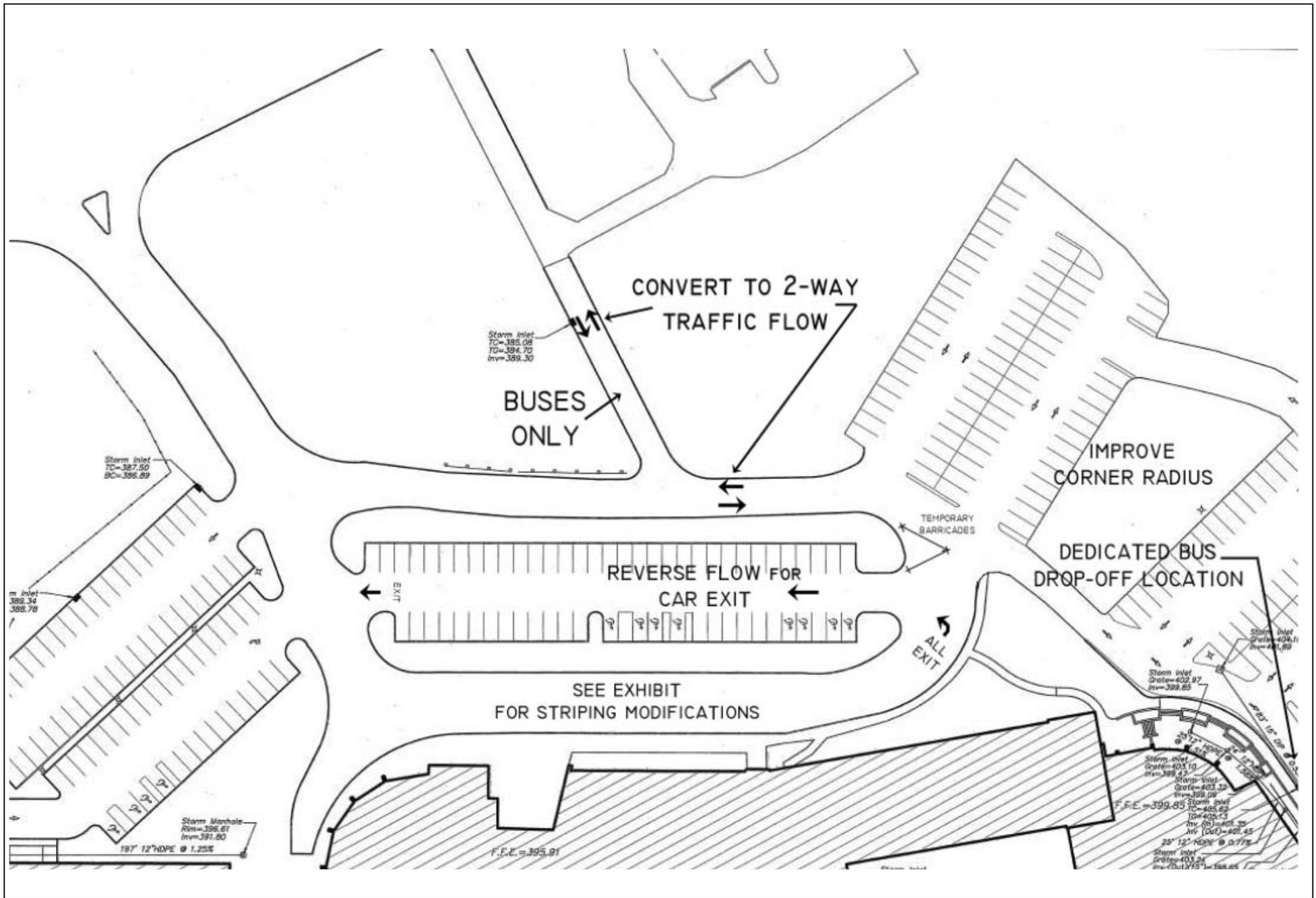
RIDGE HIGH SCHOOL
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY, NEW JERSEY

FIGURE 4



RIDGE HIGH SCHOOL
TOWNSHIP OF BERNARDS
SOMERSET COUNTY, NEW JERSEY

FIGURE 5



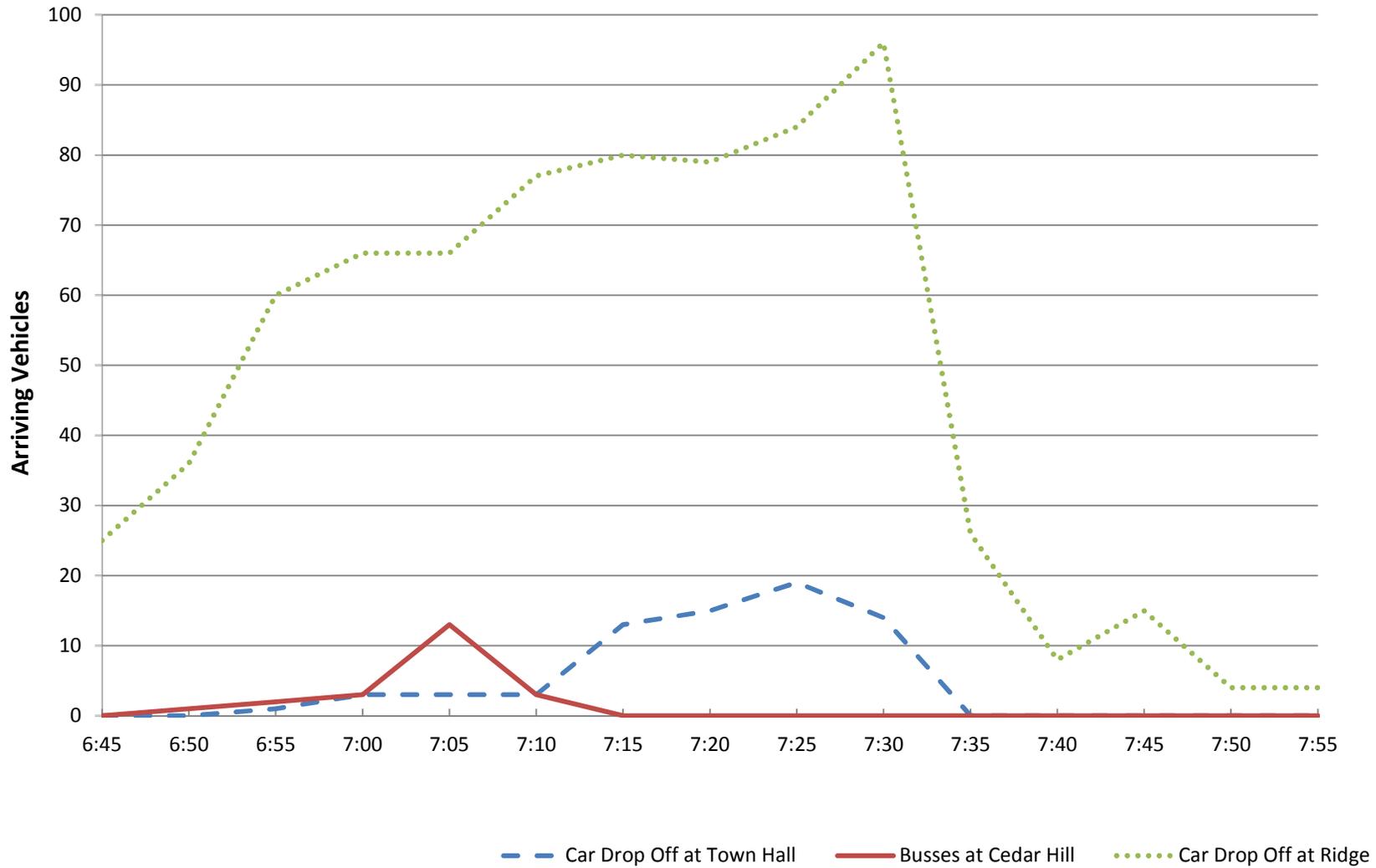
RIDGE HIGH SCHOOL
 TOWNSHIP OF BERNARDS
 SOMERSET COUNTY, NEW JERSEY



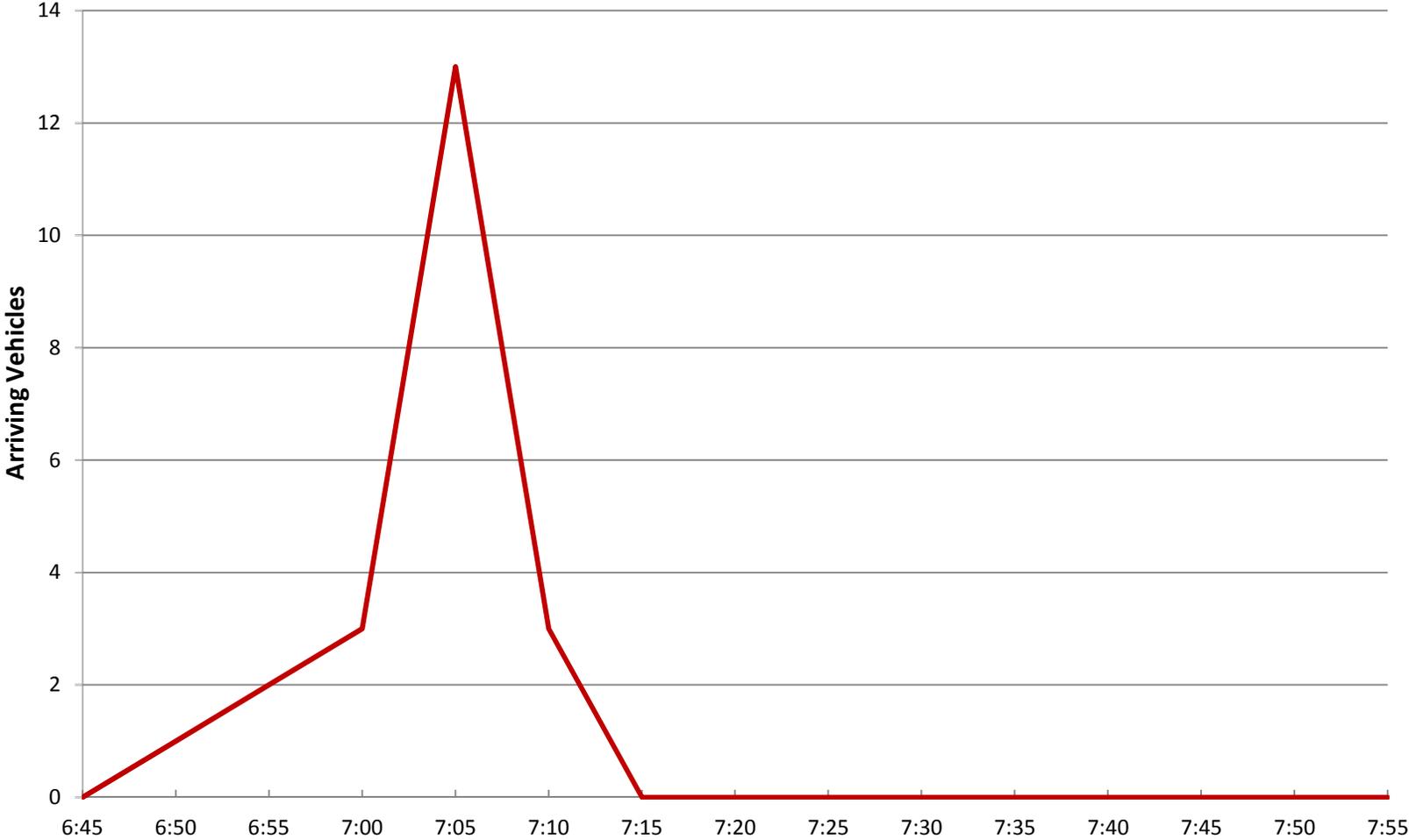
FIGURE 6

HEALTH DEPARTMENT
 ACCESS IMPROVEMENTS

Ridge High School Morning Arrival Activity - April 2012



Ridge High School - Busses at Cedar Hill School Morning Arrival Activity - April 2012



BERNARDS TOWNSHIP BOARD OF EDUCATION – RIDGE HIGH SCHOOL

Recommended Short-term Improvements:

- Reduce Traffic Signal Cycle from 150 Sec. To 100 Sec.
- Redistribute Green-time between phases

Existing LOS Summary

Approach	LOS	Delay
Eastbound LT	F	83.7
Eastbound R	D	49.6
Westbound LT	F	102.1
Westbound R	D	53.0
Northbound L	C	26.6
Northbound TR	D	40.6
Southbound L	C	25.9
Southbound TR	B	19.0
OVERALL INTERSECTION	E	55.5

Mitigated LOS Summary

Approach	LOS	Delay
Eastbound LT	E	67.3
Eastbound R	C	33.4
Westbound LT	E	66.9
Westbound R	C	34.5
Northbound L	C	21.8
Northbound TR	D	42.0
Southbound L	C	29.4
Southbound TR	B	16.6
OVERALL INTERSECTION	D	46.1

Operational Analysis

South Finley Avenue and Ridge HS Access/Lake Road

BERNARDS TOWNSHIP BOARD OF EDUCATION – RIDGE HIGH SCHOOL

Recommended Long-term Improvements:

- Reduce Traffic Signal Cycle from 150 Sec. To 100 Sec.
- Modify Lake Road and Ridge Access to provide left-turn lanes and shared through/right lanes
- Modify Phasing to provide protected left-turn lead phase for Lake Road and Ridge Access
- Redistribute Green-time between phases

REMOVE ISLANDS

Existing LOS Summary

Approach	LOS	Delay
Eastbound LT	F	83.7
Eastbound R	D	49.6
Westbound LT	F	102.1
Westbound R	D	53.0
Northbound L	C	26.6
Northbound TR	D	40.6
Southbound L	C	25.9
Southbound TR	B	19.0
OVERALL INTERSECTION	E	55.5

Mitigated LOS Summary

Approach	LOS	Delay
Eastbound L	B	17.8
Eastbound TR	C	33.8
Westbound L	C	20.1
Westbound TR	C	29.7
Northbound L	B	19.2
Northbound TR	C	32.0
Southbound L	C	22.2
Southbound TR	B	14.8
OVERALL INTERSECTION	C	26.6

Operational Analysis

South Finley Avenue and Ridge HS Access/Lake Road



RIDGE HIGH SCHOOL

BUS ROUTE