RPS klotz associates

1160 Dairy Ashford, Suite 500, Houston, Texas 77079
T 281 589 7257 E email@klotz.com W www.rpsgroup.com | www.klotz.com

April 10, 2017

Mr. Curt Van De Walle, City Manager
City of Castle Hills
209 Lemonwood Drive
Castle Hills, Texas 78213

Subject: Revised Castle Hills BASIS Charter School Traffic Impact Analysis Review
City of Castle Hills, Texas
RPS Klotz Associates Project No. 1161.001.002

Dear Mr. Curt Van De Walle:

This technical memorandum presents a summary of the review for the Castle Hills BASIS Charter School Traffic Impact Analysis (TIA) dated March 3, 2017 and supplemental information prepared by Pape-Dawson Engineers. RPS Klotz Associates completed the review of the methodology utilized and as the City of Castle Hills TIA guidelines/criteria were not readily available online, content and methodology was evaluated based on industry standards such as the ITE Trip Generation Manual, 9th Edition, ITE Trip Generation Handbook, 2nd Edition, and Best Practices for Traffic Impact Studies prepared for the Oregon Department of Transportation and Federal Highway Administration.

The proposed Castle Hills BASIS Charter School located on S. Winston Lane is a 1,127 student charter school anticipated to have multiple arrival and departure times. The TIA analyzed the AM peak hour, the PM peak hour of the school, and the PM peak hour of the adjacent street. As part of the TIA, the following intersections were evaluated:

- Northwest Military Drive at Lockhill-Selma Road
- Northwest Military Drive at Winston Lane
- Northwest Military Drive at West Avenue
- West Avenue at Castle Lane

RECOMMENDATIONS

The TIA recommended several mitigation measures in order to address degradation in Level of Service (LOS) caused by the proposed school. The proposed mitigation measures are at the intersection of Northwest Military Drive at Lockhill-Selma, to make the eastbound right turn movement from Lockhill-Selma Road to Northwest Military Drive a free movement (i.e. the vehicles would not stop or yield prior to turning onto Northwest Military Drive). At the

intersection of Northwest Military Drive at Winston Lane, a 140 foot southbound right turn lane to Winston Lane and a dedicated eastbound left turn lane from Winston Lane are proposed.

With the proposed mitigations, the analysis results indicated during the AM peak hour that the intersection of Northwest Military Drive at Winston Lane will operate at an unacceptable LOS. In year 2017, this intersection is anticipated to operate at LOS E and in year 2022 it is anticipated to operate at LOS F. All other study intersections are anticipated to operate at an acceptable LOS or at a similar LOS as the No Build Condition.

During the PM peak hour of the school and the PM peak hour of the adjacent street, all study intersections will operate at an acceptable LOS or at a similar LOS as the No Build Condition with the exception of NW Military Drive at Lockhill-Selma Road. This intersection is in the jurisdiction of the City of San Antonio, therefore the mitigation measures must be approved by the City of San Antonio.

A SimTraffic queuing analysis was completed at the intersection of Northwest Military Drive at Winston Lane. The 95th percentile queue length is the queue length not anticipated to be exceeded 95 percent of the time and is used in the SimTraffic queuing analysis. This analysis indicated that the 95th percentile queue length is greater than the proposed 140 feet southbound right turn lane. However, a review of the simulation found that this was due to the through movement blocking the right turn lane. The queuing analysis indicated that the proposed 500 foot eastbound left turn lane should be sufficient.

DISCUSSION

RPS Klotz Associates complete a review of the Castle Hills BASIS Charter School TIA which was provided on March 7, 2017. The report provided was sealed on March 3, 2017. RPS Klotz Associate's review comments were provided to the City of Castle Hills and Pape-Dawson on March 20, 2017. Subsequently, all review comments were resolved when supplemental information was provided by Pape-Dawson in a Response to City Comments Memo dated March 24, 2017 and in follow-up discussions.

The intersection of Northwest Military Drive and Lockhill-Selma Road is within the City of San Antonio. The City of San Antonio indicated its desire that the right turn on red at the intersection of Northwest Military Drive and Lockhill-Selma Road not be made free unless the conflict with the pedestrians is resolved. The City of San Antonio suggested that in order to address this conflict, the movement is question could be changed to the operation as a Flashing Yellow Arrow signal head. Currently, it is a green arrow, but there could be a flashing yellow operation when the adjacent movement is a green ball. The signal would show red arrow when a pedestrian is crossing the street. This would help the movement act more like a free right turn and at the same time be beneficial to the pedestrians. Another potential way to improve the

pedestrian operations and safety is to add pedestrian detection. Currently the city does not operate any intersections with pedestrian detection devices but would be willing to test this as a pilot location.

REVIEW COMMENTS AND RESOLUTIONS

Please find below the review comments. Pape-Dawson's response is below the review comment in red and if needed, the final resolution is shown in blue.

General Comments

1. It is indicated multiple times within the report that coordination occurred with the City of Castle Hills staff concerning scoping and criteria of the TIA. One statement indicates the City of Castle Hills agreed to follow the City of San Antonio's requirements for the TIA. It is our understanding that no discussions occurred prior to the submittal of the TIA. The City of Castle Hills reserves the right to request addition information and/or standards.

   Pape-Dawson's response: It was agreed in a phone conversation with the City of Castle Hills prior to the start of the TIA to follow City of San Antonio TIA guidelines and requirements since the City of Castle Hills does not have specific TIA requirements. The Pape-Dawson project manager spoke initially with the City Administrator and then the Acting City Manager in mid-November 2016. Please advise if you would like details of what was discussed in the phone conversation. In addition, the TIA scope and procedure were also discussed at a joint meeting between the City of San Antonio, the City of Castle Hills, TxDOT, BASIS Charter School representatives and Pape-Dawson Engineers on January 20, 2017, hosted by the City of San Antonio Development Services.

   Resolution: The City reserves the right to request additional information/analysis beyond the City of San Antonio's requirements. It is our understanding that the TIA was prepared prior to the City of Castle Hills requesting the study and therefore, a kick-off meeting was not held to establish criteria for the study.

2. Please indicate within the report what grade levels are expected to attend the school.

   Pape-Dawson's response: The school will consist of middle school students (6th – 8th grade) and high school students (9th – 12th grades). Elementary school students will attend existing BASIS Charter School locations.

3. Please utilize the observed Peak Hour Factor (PHF) within the Synchro models.

   Resolution: The analysis was completed utilizing the observed PHF as this value can impact both the LOS results and queue lengths.

4. Please provide information concerning how pedestrians will access the school.

   Pape-Dawson's response: BASIS Charter School is addressing this issue separately with the City of Castle Hills. The school has agreed to construct a sidewalk along the north side of S. Winston lane which will connect to NW Military Drive.

Report Comments

1. Page 1, paragraph 3: Typically for a development generating 731 trips in the AM peak hour and 523 trips in the PM peak hour, a future year after the development is open and operational is required. The typical future year is five years after the development has opened.

   Resolution: After multiple discussions and at the urging of the City of Castle Hills, an analysis of the future year 2022 was completed and the results were provided to RPS Klotz Associates and the City of Castle Hills on April 3, 2017. The results of this future year analysis indicate that the intersection of Northwest Military Drive at Winston Lane will operate at an unacceptable LOS. In the AM peak hour in the opening year 2017, the LOS will degrade from LOS C in the No Build Condition to LOS F in the Build Condition with mitigation measures. A correction to the 2017 model was made to reflect the recommended length of 500' at proposed northbound left turn lane. With this correction, the Build Condition with mitigation measures is anticipated to operate at LOS E. In future year 2022, the No Build Condition LOS is anticipated to be LOS E and in the in the Build Condition with mitigation measures it is anticipate to operate at LOS F.

2. Page 2, paragraph 2: At the intersection of NW Military Drive at Lockhill-Selma Road, mitigation measures were recommended. The proposed mitigation is to change the eastbound right turn lane from a permitted signal controlled movement to a free movement with a barrier between the receiving lane and the adjacent lane. This would eliminate vehicles yielding prior to completing the right turn. It is indicated that coordination with Texas Department of Transportation (TxDOT) and City of San Antonio will be required due to the conflict with pedestrians as this change will impact pedestrian crossing. In addition,

this improvement would impact access to the Boy Scouts of America's property and coordination may be required with them.

Resolution: The City of San Antonio will determine what mitigation measures are acceptable. Per RPS Klotz Associate's discussion with Christina De La Cruz (City of San Antonio Traffic Plan Review Section Manager), the City of San Antonio desires that the right turn on red at the intersection of NW Military Drive and Lockhill-Selma Road not be made free as recommended in the TIA unless the conflict with the pedestrians is resolved. The City of San Antonio suggested that in order to address this conflict, the movement in question could be changed to the operation as a Flashing Yellow Arrow (FYA) signal head. Currently, it is a green arrow, but there could be a flashing yellow operation when the adjacent movement is a green ball. The signal would show red arrow when a pedestrian is crossing the street. This would help the movement act more like a free right turn and at the same time be beneficial to the pedestrians. Another potential way to improve the pedestrian operations and safety is to add pedestrian detection. Currently the city does not operate any intersections with pedestrian detection devices but would be willing to test this as a pilot location.

3. Page 3, paragraph 2: At the intersection of Winston Lane at NW Military Drive, the length of the proposed southbound right turn lane is 140 feet. Does this length follow the City of Castle Hills and/or TxDOT design guidelines?

   Pape-Dawson's response: All turn lane lengths were determined in accordance with the Texas Department of Transportation (TxDOT) Roadway Design Manual, which state that the deceleration length of a right turn lane on a 35-mph roadway should be 110 feet in length (using a 20-mph speed differential as typically used by the CoSA), plus an additional 30 feet of storage, giving the right turn lane a total length of 140 feet. (please see Table 3-3A).

   Resolution: A SimTraffic Queuing analysis was completed for this location. The analysis report indicated that the 95th percentile queue length is greater than the 140 feet; however, a review of the simulation found that this was due to the through movement blocking the right turn lane. The 95th percentile queue length is the queue length not anticipated to be exceeded 95% of the time.

4. Page 4, paragraph 1: At the intersection of Winston Lane at Driveway #2, the minimum length of the proposed westbound right turn lane is 105 feet. How was this minimum length determined? Also, it is recommended that this turn lane be 350 feet. Is this additional length to accommodate queuing for the drop-off/pick-up operations?

   Pape-Dawson's response: Based on the TxDOT standards mention in Comment 3, the turn lane should consist of a minimum of 75 feet of deceleration length, plus an additional 30 feet

of storage, for a total length of 105 feet based on a 30 mph speed limit. While the posted speed limit on Winston Lane is 25 mph, the minimum speed limit in Table 3-3A is 30 mph, therefore, a 30 mph was used and considered to be conservative. A 350 foot right turn lane was recommended as there is approximately 350 feet available between the driveways to extend the right-turn lane to help with the drop-off and pick-up operations.

Resolution: The 350 feet is to provide additional queue storage length for the parents picking up students in the afternoon. The MSTA queue length calculation indicated that the average queue would be contained on the school's property, however the maximum queue length would extend into this turn bay.

5. Page 19, paragraph 4: It is indicated that 80% of the school traffic will arrive and depart outside the peak hour. Please provide further explanation as to why this is anticipated to occur as this is not a typical arrival/dismissal pattern.

   Pape-Dawson's response: The arrival times will be staggered and the proposed times are shown in Appendix B of the report (please see attachments). As shown in the calculations below, approximately 80% of the students will arrive between 7:00 AM and 8:00 AM. An 80% rate was also used for the PM pick-up (3:00 PM to 4:00 PM) despite the PM pick up times being more spread out due to afterschool activities and this was considered a conservative estimate.

   AM – 66.67% of Students (7:00 – 7:35 AM) + 33.33% of Students (7:35 – 8:30 AM) x 25 min/60 mins = 80%

6. Page 20, Table 1: The size of the development is not within the range of data points utilized to develop the trip generation rates in the ITE Trip Generation Manual, 9th Edition. Page 15 of the ITE Trip Generation Handbook, 2nd Edition recommends the analyst should collect local data and establish a local rate.

   Pape-Dawson's response: The City of San Antonio has allowed the ITE rates provided for a Private School K-12 (Land Use 536) to be used in previous private school traffic studies of this size and has not required local data to be collected. The Private School K-12 ITE trip generation rates (536) have been used in the analysis of several approved TIA's for similar private and charter schools within the City of San Antonio and several other cities in Texas.

   Resolution: Observed trip generation information for the BASIS Scottsdale School was provided. This school is similar in size to the proposed BASIS Charter School in Castle Hills. In addition, historical data concerning the utilization of the shuttle bus at the two existing San Antonio campus along with the number of students signed up to use the shuttle for the 2017/2018 school year was provided. Based on the additional information

provided, it seems reasonable to utilize the ITE Trip Generation rates for the Castle Hills Basis Charter School.

7. Page 21, paragraph 2: Please clarify what traffic control will be used to restrict access to Driveway 1.

   Pape-Dawson's response: Driveway 1 will be used primarily for emergency access only and will be gated.

8. Figure 6: The trip distribution indicates on this figure that movements will be restricted at Driveway 2 preventing vehicles from turning left in and right out. Please clarify how this access will be restricted.

   Pape-Dawson's response: Multiple options are being explored to prevent vehicles from making a right-turn out of the school parking lot and into the neighborhood. The options discussed between BASIS Charter School and the City of Castle Hills include:

   - *Traffic Control by School Staff*
   - *Police Traffic Control*
   - *Signage prohibiting turns*
   - *Distribution of documents to parents*
   - *Gate a neighborhood entrance*

9. Figure 6: Typically the trip distribution of a site follows the existing traffic patterns. The trip distribution shown does not follow the existing traffic patterns and no reasoning was given to explain how it was developed. Please clarify how the trip distribution was developed.

   Pape-Dawson's response: The trip distribution was developed based on the major roadways serving the site and by projecting where the development, i.e. charter school site trips will be coming from. Due to the presence of several residential neighborhoods to the south of the development, as well as the proximity of IH 410, a major highway, the trip distributions were projected to be 60% from the south of the site (with some trips form the near west and east sides arriving via the south) and 40% from the north of the site. In addition, other school locations, including two BASIS Charter Schools which will serve a feeder schools for this BASIS school, were taken into consideration when developing the global trip distribution.

10. Page 35, paragraph 1: Please indicate how much queuing length is available and whether it is sufficient per the MSTA School Traffic Calculations.

Pape-Dawson's response: Approximately 2,500 feet of on-site queuing is available. In addition, the 350 foot right-turn lane into the development can serve as storage for the queueing, giving a total of 2,850 feet of queuing. Please see the attached site plan.

11. Appendix E, Preliminary Site Plan: On this figure there appears to be two queueing locations. Please clarify who will utilize each queue.

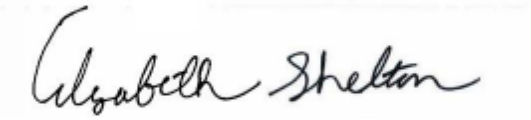
    Pape-Dawson's response: The school will have two separate drop-off/pick-up locations and both will serve the middle school and high school. School staff will direct vehicles to the shorter queue among the two queues to minimize delay and keep the queues moving efficiently.

12. Appendix G, MSTA School Traffic Calculations: Please use the latest version MSTA School Traffic Calculations to determine the queue length as this may change the results.

    Resolution: The MSTA School Traffic Calculations was updated to the latest version. The calculation indicates that with all 1,127 students arrive within an hour; the average queue length would be 2,742 feet. With the bell schedules, it is anticipated that 902 students will arrive during the hour resulting in an average queue length of 2,258 feet.

Please feel free to contact Luis Cuellar, P.E. or me if you have any questions or need further clarification.

Regards,



Elizabeth Shelton, PE
Project Manager
RPS Klotz Associates
Texas P.E. Firm Registration No. F-929