Traffic Impact Study
For
King David Community Retirement Center
Gwinnett County, Georgia

Prepared for:
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Project Description

This Traffic Impact Study (TIS) is for a mixed-use development located on 1.94 acres in Gwinnett County, Georgia. The development is called the King David Center & Tower (proposed at 11 floors). The first floor of the King David Tower will be for non-residential land use, while the top 10 floors will be comprised of residential use. Each residential floor will have 24,750 square feet. King David is located on Singleton Road at Tech Drive in Lilburn, Ga. The Site Map is shown in Figure 1. Vehicular access to the site will be provided at Tech Drive and one driveway on Singleton Road. The building will house many mixed land uses all accessed within the building.

The site plan is shown in Figure 2. The development will include the following:

Parcel	Proposed Land Use	Acres	Size
External Trip Attractions			
A	Continuing Care Retirement Community (530 units for 10 floors)	1.94	247,500 sq ft
Internal Trips within CCRC on first floor			
A	Recreational Community Center		2,200 sq ft
A	Church		2,200 sq ft
A	Library		4,400 sq ft
A	Single Tenant Office		4,400 sq ft
A	Medical Dental Office		550 sq ft
A	Specialty Retail Store		1,100 sq ft
A	Pharmacy		1,100 sq ft
A	ATM/Banking		550 sq ft
A	Beauty/Barbershop		1,100 sq ft
A	Cafeteria/Dining Hall		11,000 sq ft
	Total	1.94	276,100 sq ft

The area around the site is suburban and is developed and the site is currently zoned as Commercial (C-2). The proposed driveway for the community center will align with Tech Drive at Singleton Road. All trips at the site will be internal trips within the King David Tower except for the CCRC. The majority of external trips during peak hours will be taken by employees coming and going to work. Due to this unique development, very few trips will be planned during the AM and PM peak hours. The tenants at the Tower will mainly leave the Tower between the hours of 9 am and 4 pm, and have no significant impact on the roadway around the proposed Tower during peak hours.

Gwinnett County Transit has two bus routes with service to the development. Route 20 starts at MARTA's Doraville station, and runs from 5:39 am to 8:40 pm, passing the King David Center on the right via Singleton Road before turning left at Tech Drive.

Route 30 starts at Gwinnett Place Mall and services the development via Singleton Road as well, with a right turn onto Tech Drive going east from the development that runs from 6:11am to 8:41 pm.

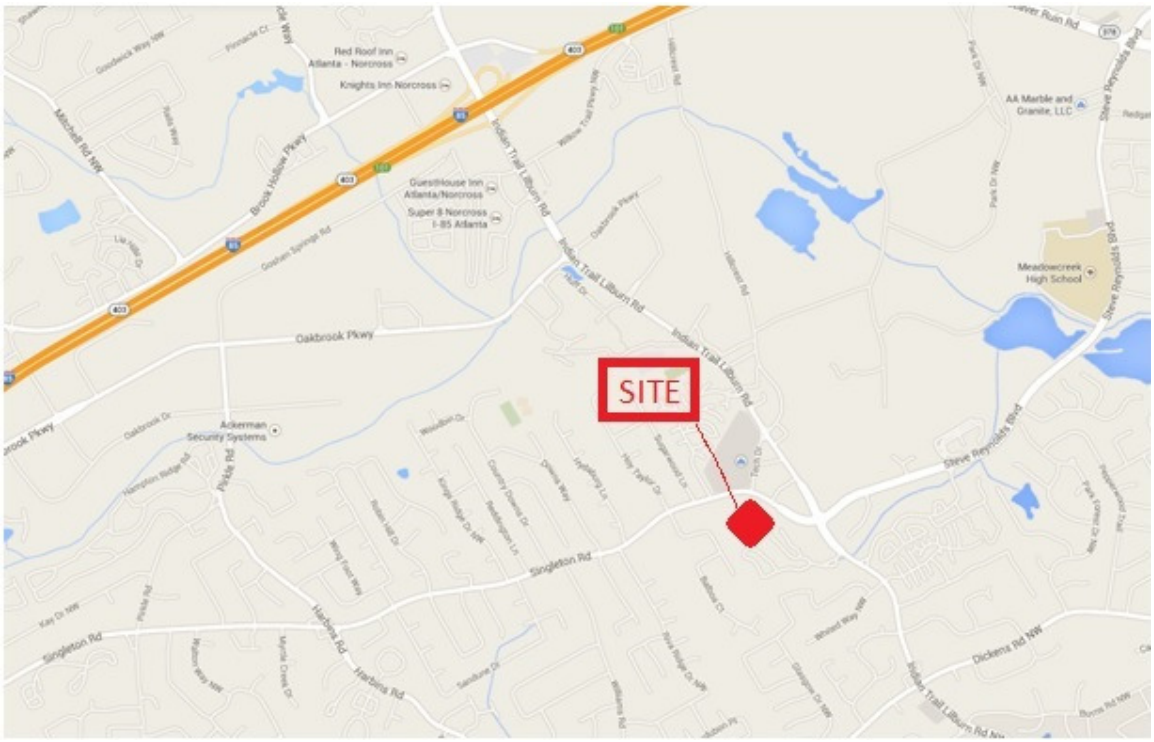
The area around this development is in a suburban setting with an adjacent shopping center on Singleton Road, a fast food restaurant across the street from the site at Singleton Road and Tech Drive, and a gas station on the other side of Tech Drive facing Singleton Road.

Local Plan Summary

King David is a planned mixed-use development which complies with the Gwinnett County 2020 Comprehensive Plan and Land Use Plan Map. The current zoning for the property is C-2 and the proposed development is asking for O/I (office and industrial). The proposed zoning is consistent with the vision for an integrated community and revitalization of the area and is consistent with the spirit of the Gwinnett County Land Use.

Figure 1

Site Map



The only TIP project in the area of King David development is located at the entrance to the King David Community Center. Gwinnett County has a 2014 SPLOST project at the intersection of Singleton Road and Tech Drive to improve the geometrics at the intersection as well as installing a traffic signal. The project is planned to begin construction and be completed in 2016.

Project Phasing

King David is planned to be built in one phase.

Phase 1 will include all the Land Uses shown in Table 1. The development is planned to be opened in 2017 and be fully occupied by 2018. A traffic signal has already been approved for use at the main entrance to the proposed development, across from Tech Drive. The signal will be designed by Gwinnett County and will have pedestrian crossings as well as a protected/permissive left turn phase for Singleton Rd - Eastbound Left.

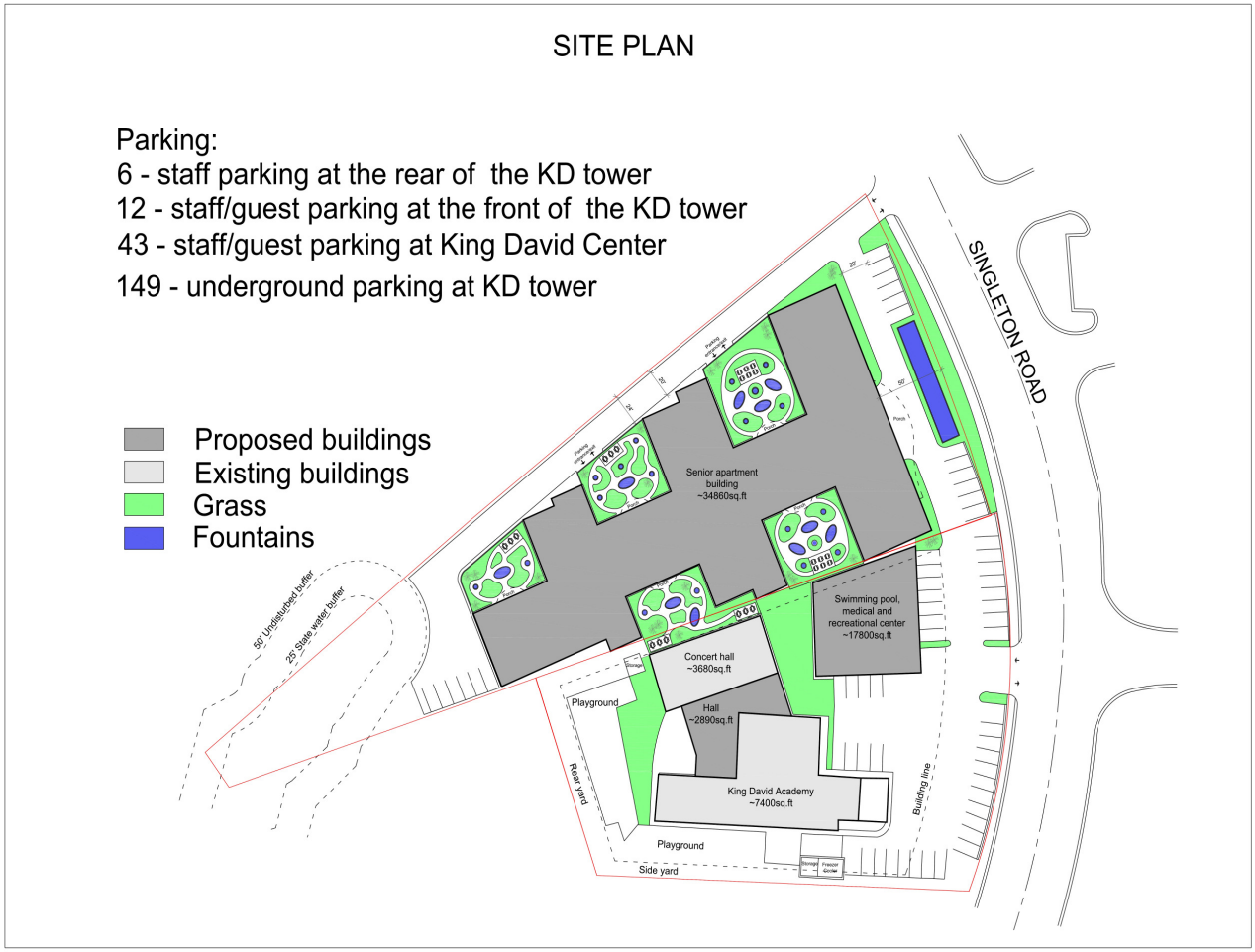
Site Plan

The site plan is shown in Figure 2. The site includes mixed-use development of residential, commercial/retail and office. The mix of land uses should encourage residents and visitors to interact within the different types of developments within the King David Tower. It is expected that this development will have all internal trips, thus minimizing trips on external roads, except for trips for the CCRC. The proposed development will minimize the level of transportation impact on the existing road system.

The main access to the site will be on Singleton Road at Tech Drive. The proposed site plan has been discussed with Gwinnett County DOT staff and has been modified to address their original comments. The developer will work with the county to expedite installation of the traffic signal at the intersection of Singleton Road and Tech Drive that will serve as the main entrance to this development. The developer has agreed to donate easements for the strain poles that will support the traffic signal heads for the new signal.

Figure 2

Site Plan



See the Appendix for a detailed Site Plan

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Table 1
Internal Trips for King David Center

Pod to Pod	Percent Internal Trips by Distance (miles) <1/4
Residents to Community	100%
Residents to Church	100%
Residents to Library	100%
Residents to Office	100%
Residents to Medical Office	100%
Residents to Retail	100%
Residents to Pharmacy	100%
Residents to Bank	100%
Residents to Beauty Shop	100%
Residents to Dining Hall	100%

Note: No internal trips are planned during the AM & PM peak hours. All internals trips are expected to occur between 9am and 4 pm and will be within the King David Tower at 5064 Singleton Road.

All internal trips are expected to be within the King David Tower between the first floor (all non-residential land uses) and the residential floors (2 thru 11). These internal trips are expected to be on foot or with wheel chairs. All internal trips during the AM and PM peak hour will be within King David Tower as residents eat their breakfast, lunch and dinner and get access to services they desire on the first floor. There is not expected to be any significant traffic volume from outside the King David Tower during the AM and PM peak hours. Most visitors will be allowed access between 10 am and 3 pm, as will trips outside the King David Tower.

This development type is typical for CCRC's. For further description and information, see the description of ITE Land Use #255 on page 11.

Transit Facilities

There are no existing transit facilities in the vicinity of King David, but Gwinnett County Transit has two bus routes that service the development.

Route 20 starts at MARTA's Doraville station, and runs from 5:39 am to 8:40 pm, passing the King David Center on the right via Singleton Road before turning left at Tech Drive. Route 30 starts at Gwinnett Place Mall and services the development via Singleton Road as well, with a right turn onto Tech Drive going east from the development that runs from 6:11am to 8:41 pm.

Employees may be able to utilize the Gwinnett bus routes to get to and from work and avoid auto trips to the site. However, this study will assume no employees use the bus to be conservative in our estimates of traffic impact on this site.

Trip Generation

In this study, the methodology used for estimating future traffic volume projections will be provided in accordance with the generally accepted ITE Trip Generation Manual, 9th Edition, 2012 and the ITE Trip Generation Handbook, 2012.

The study will add the estimated future traffic counts at intersections near the site to the existing traffic and the background traffic for the proposed phase. It will also analyze any new intersections or driveways.

The proposed development will consist of a multi-use development situated on 1.94 acres in Gwinnett Co., Ga. The analysis will review the development in one phase. Phase 1 will include 530 units of Continuing Care Retirement Center (CCRC) within the King David Tower. Within the CCRC building will include the following land uses: Community Space, Church, Library, Office, Medical Office, Retail, Pharmacy, Bank, Beauty Shop, and Dining Hall. All these land uses will be provided for the tenants use only and no outside trips are expected to use these services at the King David Center. The site will primarily have access served by Tech Drive and one right in/out driveway on Singleton Road. The site plan for the development is shown in Figure 2.

Trip generation for the project was based on the trip rates and equations published in the 9th Edition (2012) of the Institute of Transportation (ITE) Trip Generation report. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generations are based on ITE land use descriptions. Engineering judgment was used to estimate the best comparison of the proposed site development land uses and the 'standard' ITE land uses.

A. Assumptions:

This study was conducted in accordance to the guidelines in the ITE Trip Generation Handbook, 2012, Section 3.3. The study uses ITE Trip Generation (9th Edition) equations when the r-squared is greater than 0.74, otherwise the study used the average trip rates (per the 2012 ITE Trip Generation Handbook). The study chose the land use with the greatest number of studies to maximize the statistical significance of the estimated trip rates.

B. Gross Trip Ends

The proposed project's A.M., P.M., and daily trip generations are shown in Table 2.

A trip is a single or one-direction vehicular trip with the origin (outbound) or destination (inbound) or both inside the study area. Each trip has two trip ends. For trip generation

purposes, the total trip ends for a land use over a given period of time are the total of all trips entering plus all trips exiting a site during a designed time period.

Examples:

A parent takes a trip from home, to the day care, to the gas station, to the bank and then to work. This trip includes 8 trip ends. The trip ends when you park the vehicle. Usually, these are considered external trips from and to the development.

If a person were to take a trip within a mixed-use development a trip might be like this; leave home, go to bank, then to the dry cleaners, the hardware store, the supermarket and then to the office. This trip includes 12 trip ends that are classified as internal. This trip would only include travel on the county road system to get to the mixed use site. All other trips would not include any travel on the external road system.

Some land uses are trip generators. These include single family detached housing, apartments and townhouses. Other land uses are attractions. Attractions include offices, hotels, day care centers, shopping centers, restaurants and banks. Different land uses are stronger attractions than others. A strong attraction is a shopping center. People will plan trips to go shopping. Another strong attraction is entertainment (like movie theaters). Trip Generation and determining trips can be confusing to understand. An example of this is a single family home. Each home averages about 10 trip ends per day. This may seem high until we think about who 'uses' a subdivision. The husband and wife both go to work. The work trips include four (4) trip ends. One spouse may make a trip to the store or bank before or after they get home from work. This trip would add another two (2) trip ends. Then there are many service providers for homeowners. These include mail trucks, garbage pick-up, plumbers, lawn care, meter readers, newspaper delivery and many other services. When you add up all the traffic generated, 10 trips per day becomes an accurate estimate based on hundreds of actual trip generation studies.

Listed below is a brief description of each land use as described by the ITE Trip Generation Manual:

Continuing Care Retirement Community (CCRC – ITE Land Code #255) – These are land uses that provide multiple elements of senior adult living. CCRC's combine aspects of independent living with increased care, as lifestyle needs change with time. Housing options may include various combinations of senior adult detached, senior adult attached, congregate care, assisted living and skilled nursing care – aimed at allowing the resident to live in one community as their medical needs change. The communities may also contain special services such as medical, dining, recreational and some limited, supporting retail facilities. CCRC's are usually self-contained villages.

Recreational Community Center (ITE Land Code #495) – Recreational facilities are stand-alone facilities similar to and including YMCA's. These facilities often include classes and clubs for adults and children; day care or nursery school; meeting rooms; swimming pools and whirlpools; saunas; tennis; racquetball; handball; basketball; and

volley ball courts; outdoor athletic fields/courts; exercise classes; weightlifting and gymnastics equipment; locker rooms; and a restaurant or snack bar. Typically, public access is allowed but a fee may be charged.

Church (ITE Land Code #560) – A church is a building in which public worship services are held. A church houses an assembly hall or sanctuary; it may house meeting rooms, classrooms and occasionally dining, catering or party facilities.

Library (ITE Land Code #590) – A library can be either a public or private facility that consists of shelved books, reading rooms or areas and sometimes meeting rooms.

Single Tenant Office Building (ITE Land Code #715) – A single tenant office building generally contains offices, meeting rooms and space for file storage and data processing for a single business or company, and possibly other service functions – including a restaurant or cafeteria.

Medical-Dental Office Building (ITE Land Code #720) – A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis, but is unable to provide prolonged in-house medical and surgical care. This type of facility is generally operated by one or more physicians or dentists.

Specialty Retail Center (ITE Land Code #814) – Specialty retail centers are generally small strip shopping centers that contain a variety of retail shops and specialize if quality apparel; hard goods; and services, such as real estate offices, dance studios, florists, and small restaurants.

Pharmacy without Drive-Thru (ITE Land Code #880) – Pharmacies/drugstores are retail facilities that primarily sell prescriptions and non-prescription drugs. These facilities may also sell cosmetics, toiletries, medications, stationery, personal care products, limited food products and general merchandise.

Walk-in Bank (ITE Land Code #911) – Generally, these are free standing buildings with their own parking lots. These banks do not have drive-in lanes and may or may not contain automatic teller machines (ATMs).

High Turnover (Sit Down Restaurant) (ITE Land Code #932) – This land use consists of sit-down, full service eating establishments with turnover rates of about one hour or less. This type restaurant is usually moderately priced and frequently belongs to a restaurant chain. Generally, these restaurants serve lunch and dinner: they may also be open for breakfast and sometimes open 24 hours per day. These restaurants typically do not take reservations. Some facilities contained within this land use may also contain a bar area for serving food and alcoholic drinks.

C. Net Trips – Mixed Use Reductions

The Trip Generation Manual allows special adjustments for mixed-use developments. The basic premise behind the data presented in the Trip Generation Manual (Chapter 7) is that they are collected at a single-use, free standing site. Mixed-use developments have the potential for interactions among those land uses within the multi-use site, particularly where the trip can be made by walking or driving within the site without utilizing the major street system. As a result, the total trip generation of vehicle trips entering and exiting the multi-use site may be reduced from simple survey of individual, discrete trips generated by each land use.

One key characteristic of a multi-use development is that trips among various land uses can be made on site and these internal trips are not made on the existing street system. The internal trips can be made either by walking on internal pathways, or by vehicle on internal roadways without using the streets external to the site.

Internally captured trips can be a significant component in the travel patterns of multi-use developments. Internal trips must be balanced between trip origins and destinations within the site. The number of trips between a particular pair of internal land uses is limited to the lesser number between the trip origin and destination.

The proximity to competing markets is expected to influence internal capture rates. The greater the distance to external competing uses, the greater the likelihood of capturing trips internally within a multi-use development site. The proximity and density of the residential, retail, office and hotel uses will affect internal trip-making. Generally, the greater the density and closer the proximity of the complementary uses on site, the greater the level of internalization of trips.

WMB Engineering and King David Center have estimated the internal capture rates not provided in the ITE Trip Generation Manual. The estimates were very conservative and always used the lowest of the estimated ranges for each land use. Table 3 shows the mixed-use development internal and external trips. Origin trips are shown on the left side of the chart and destinations are shown across the top of the page.

There are 3,375 daily trips generated by the proposed development. Based on the many internal trips because of the mixed-use development, the site will generate 1,325 external (new) trips.

The internal trips are shown on Table 3. Table 4 shows the traffic generated by the Phase 1 development and is the result of Table 3 being deducted from Table 2. Table 4 shows only external new trips that King David will generate.

C. Net Trips – Alternate Modes of Transportation

Besides the reduction for the internal capture, this study is not going to take any alternate modes of transportation credits. There are no plans for MARTA to serve the site within the study period (2018). There are two bus routes via Gwinnett County Transit with service to the development.

Route 20 starts at MARTA's Doraville station, and runs from 5:39 am to 8:40 pm, passing the King David Center on the right via Singleton Road before turning left at Tech Drive. Route 30 starts at Gwinnett Place Mall and services the development via Singleton Road as well, with a right turn onto Tech Drive going east from the development that runs from 6:11am to 8:41 pm.

Pass-by and Diverted Link Trips

The ITE Trip Generation Manual allows special adjustments for certain land uses that have shown to attract trips from the existing traffic on the road(s) at the site.

Pass-by trips are not new trips to the site. Pass-by trips are made as immediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. King David development is not expected to have any pass-by trips as it is not land use that creates demand by driving by.

Diverted link trips are different than pass-by trips. Diverted link trips add trips to adjacent roads at a proposed site, but may not add trips to major roads. Diverted link trips are often difficult to identify. Therefore, diverted link trips should be treated as similar to primary trips.

Trip Distribution

The trip distribution is the percentage of site traffic that travels on each of the various roadways to and from the site. The trip distribution for the proposed development was determined based on the existing traffic flow at the intersection of Singleton Road at Tech Drive and the locations of commercial and retail attractions along with major roads that will serve this development. The trip distribution developed for this project is shown in Figure 3. The site-generated traffic for the development is shown in Table 4, and was distributed to the roadway network based on the trip distribution.

The site trips were assigned to the two streets within the development. Using the trip distribution as a guide, the trips were distributed between the two streets in King David.

Figure 3

Trip Distribution

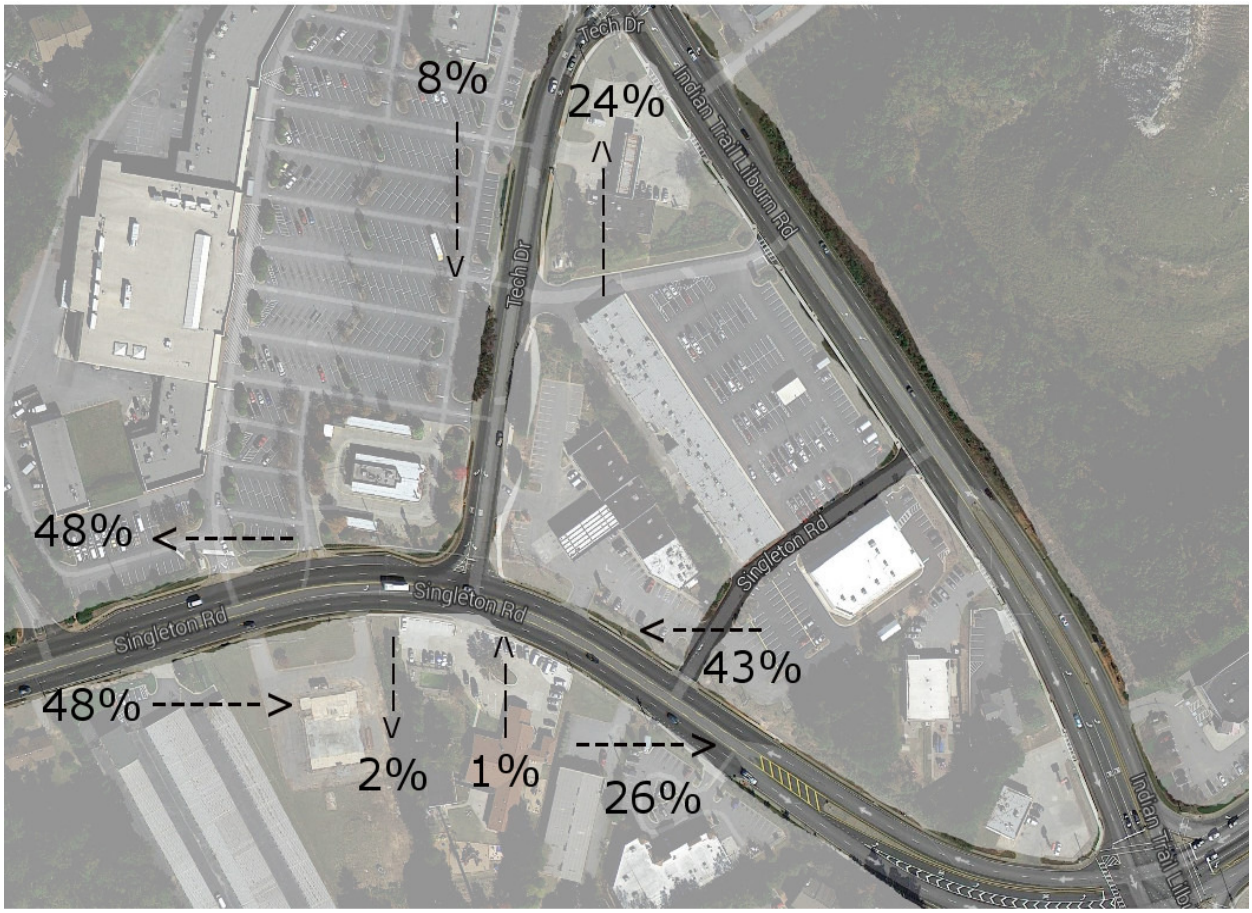

Table 2
King David Tower Trip Generation – All trips

		AM Peak Hr.			PM Peak Hr.			
Land Use (ITE Land Use)	Size	Enter	Exit	Total	Enter	Exit	Total	Total
CCRC (255)	530 units	52	28	80	42	64	106	1325
Community (495) Space	2.2/ 1000 sq. ft.	3	2	5	3	3	6	74
Church (560)	2.2 /1000 sq. ft.	1	0	1	0	0	0	20
Library (590)	4.4 /1000 sq. ft.	3	1	4	15	17	32	247
Office (715)	4.4 /1000 sq. ft.	7	1	8	1	7	8	51
Medical-Dental (560)	0.6 /1000 sq. ft.	1	0	1	1	1	2	20
Retail (826)	1.1 /1000 sq. ft.	4	4	8	1	2	3	49
Pharmacy (880)	1.1 /1000 sq. ft.	1	1	2	2	2	4	99
Bank (912)	0.6 /1000 sq. ft.	2	2	4	4	4	8	81
Beauty Shop (918)	1.1 /1000 sq. ft.	1	0	1	0	1	1	10
Dining Hall (932)	11.0 /1000 sq. ft.	37	31	68	37	25	62	1399
PROJECT TOTAL		112	70	182	106	126	232	3,375 *

* These are the total daily trips to and from the project site. Table 3 shows the adjustments to the trips because of internal trips. The proposed development will generate 1,250 new trips in the county (Table 4).

Notes: The study used ITE Trip Generation equations (ITE trip Generation Manual, 9th Edition) when R^2 > 0.74, otherwise used average trip rates. Choose the land use with the greatest number of studies to maximize statistical significance. (per ITE Trip Generation Handbook, 2012, Section 3.3)

Table 3
Mixed Use Development
Internal & External Peak Hour Trips - 2018

Land Use to Land Use	Percent Internal Trips by Distance (miles) <1/4
Residents to Community	100%
Residents to Church	100%
Residents to Library	100%
Residents to Office	100%
Residents to Medical Office	100%
Residents to Retail	100%
Residents to Pharmacy	100%
Residents to Bank	100%
Residents to Beauty Shop	100%
Residents to Dining Hall	100%

Note: No internal trips are planned during the AM & PM peak hours. All internals trips are expected to occur between 9am and 4 pm and will be within the King David Tower at 5064 Singleton Road.

		-------- Balance Volume of Internal Trips ---------	
Land Use	Peak Hr Trips	Internal Trips	External Trips
CCRC	186	0	186
Community	11	11	0
Church	1	1	0
Library	36	36	0
Office	16	16	0
Medical	3	3	0
Retail	11	11	0
Pharmacy	6	6	0
Bank	12	12	0
Beauty Shop	2	2	0
Dining Hall	130	130	0
TOTAL	412	228	186

Note: Internal trip origins and trip destinations must match (ITE Trip Handbook, Section 7.4)

Table 4
King David Tower
Trip Generation – External trips only (2018)

Land Use (ITE Land Use)	Size	AM Peak Hr. Enter	AM Peak Hr. Exit	AM Peak Hr. Total	PM Peak Hr. Enter	PM Peak Hr. Exit	PM Peak Hr. Total	Daily Total
CCRC (#255)	500 units	52	28	80	42	64	106	1325
Total		52	28	80 *	42	64	106 *	1325

* These are the total peak hour trips to and from the project site. This table shows the adjustments to the trip generation because of internal trips (Table 2 – Table 3= Table 4. The proposed development for phase 1 will generate 186 new trips in the county (412-228 trips) during the peak hours (AM & PM).

A. Summary of Existing Conditions

A capacity review of the existing intersection was conducted on the study area intersections. The capacity analysis for the study was completed using the Highway Manual (HCM), 2010 edition. This is the generally accepted methodology for the analysis of traffic conditions. The analysis was conducted using the 2010 Highway Capacity Software, Streets v6.41 (2012), as supported by Mc Trans of Florida. A summary of the capacity analysis print-outs are included in the Appendix.

Highway Capacity analysis is used to analyze the operating conditions of an intersection. The intersections are analyzed in terms of level of service (LOS) and apply to all approaches to the intersection. LOS is measured by "control delay". Levels of Service A through E are considered acceptable operations in peak hours in urban and suburban areas. Level of Service F is generally considered unacceptable for peak hour operation.

Traffic operations at unsignalized intersections, with stop sign control on only the minor street, are evaluated for the minor street approaches and for the left turn from the major street. This is because the major street traffic is assumed to have no delay since there is no traffic control for these movements. It is common for the side street to experience poor levels of service because the major street does not stop. The LOS criteria for signalized and unsignalized intersections are shown in Table 5.

Table 5
Level of Service Delay Criterion

Level of Service	Control Delay (seconds per vehicle) Signal Control	No Signal Control
A	<10	<10
B	>10 & < 20	>10 & < 15
C	>20 & < 35	>15 & < 25
D	>35 & < 55	>25 & < 35
E	>55 & < 80	>35 & < 50
F	>80	>50

The results of the intersection capacity analysis for existing conditions are shown in Table 6. If operating conditions were found to be poor, improvements were tried to bring the operations to acceptable levels.

Table 6
Existing Levels of Service

Intersection	Control	Approach	LOS – No * Improvements AM Peak	PM Peak	Improvements
Indian Trail Rd at Singleton Rd	signal	All	E (55)	F (71)	None
Indian Trail Rd at Tech Dr	signal	All	F (63)	C (27)	None
Singleton Rd at Tech Dr	signal#	All	A (9)	B (12)	None

\# will be installed by Gwinnett County by 2016 as part of 2014 SPLOST program before this property is open for business

* Level of Service from A to F (delay in seconds per vehicle)

Note: The HCS 2010 analysis for each intersection is included in the Appendix

Table 7
Roadway Segment Level of Service - Existing

Capacity Study	Facility Type	Existing Peak Hr Vol.	Level of Service*
Highway Capacity Manual**			
Singleton Rd btwn Indian Trl Rd & Harbins Rd	5L	2139	B (13)

**Copy of Capacity Analysis in Appendix

Planned and Programmed Improvements in Study Network

This TIS looked at the Atlanta Regional Commission (ARC) Transportation Impact Program (TIP) and the ARC Regional Transportation Plan (RTP), MARTA's work program and Georgia DOT's construction work program. The only project in the study area is the construction of an intersection improvement project including signalization at Singleton Rd. and Tech Dr. The project is planned to be under construction in 2016. The county has no details on any geometric improvements that may be part of the project.

Future Year Background Traffic

Gwinnett County provided traffic history on their website and WMB Engineering determined the traffic growth rates based on this data and data collected for this study.

	2014-2018
Singleton Rd	3%

WMB Engineering decided to use 3% growth rates for all roads in 2018.

Future Year Total Traffic

The background (2018 No Build) traffic for the study is shown in the appendix.

A complete highway capacity manual study was conducted on Singleton Road between Indian Trail Rd and Harbins Road. A summary of the roadway level of service is shown in Table 11.

The study distributed the project traffic for the 2018 study network. The traffic assignments for 2018 are shown in the appendix. The data is used to complete the Total

Traffic analysis. The total traffic includes the background traffic added to the project site traffic.

The final step of the study was to include all background traffic and proposed traffic to be loaded onto a Total Traffic for 2018 (located in appendix). This shows the total affect the project will have on the study network.

Table 8
Background 2018
Roadway Segment Level of Service

Capacity Study	Facility Type	2018 Peak Hr Vol	Level of * Service
Highway Capacity Manual**			
Singleton Rd btwn Indian Trl Rd & Harbins Rd	5L	2409	B(15)

**Copy of Capacity Analysis in Appendix

Table 9
Total Traffic 2018
Roadway Segment Level of Service

Capacity Study	Facility Type	2018 Peak Hr Vol	Level of * Service
Highway Capacity Manual**			
Singleton Rd between Indian Trail Rd & Harbins Rd	5L	2457	B(15)

**Copy of Capacity Analysis in Appendix

Facility Needs Analysis

A. Roadway Segment and Intersection Analysis

1. Background Analysis

Background traffic is estimated based on growing the existing traffic (2014 – Table 7) by the estimated traffic growth rate. The estimated traffic growth rate is estimated to be 3% from 2014 to 2018.

Any intersection improvements used in Table 8 were included in the no improvements analysis for Table 10. Any intersection improvements used in Table 10 were included in the no improvements analysis for Table 11.

2. Analyze Future Conditions

Future conditions were analyzed based on any geometric improvement added in the background condition.

Table 10
Background (No Build) 2018 Levels of Service

Intersection	Control	Approach	LOS – No * Improvements AM Peak	LOS – No * Improvements PM Peak	Improvements	LOS – No * Improvements AM Peak	LOS – No * Improvements PM Peak
Indian Trail Rd at Singleton Rd	signal	All	F (84)	F (100)	Add thru lane on Ind Trl Rd (NB&SB)	D (46)	E(60)
Indian Trail Rd at Tech Dr	signal	All	F (96)	C (34)	Add left turn lane EB	E (61)	C (27)
Singleton Rd at Tech Dr	signal#	All	B (12)	B (12)	None		

\# will be installed by Gwinnett County by 2016 as part of 2014 SPLOST program before this property is open for business

* Level of Service from A to F (delay in seconds per vehicle)

Note: The HCS 2010 analysis for each intersection is included in the Appendix

Table 11
Total Traffic (Build) 2018 Levels of Service

Intersection	Control	Approach	LOS – No * Improvements AM Peak	LOS – No * Improvements PM Peak	Improvements	LOS – No * Improvements AM Peak	LOS – No * Improvements PM Peak
Indian Trail Rd at Singleton Rd	signal	All	F (86)	F (106)	Add thru lane on Ind Trl Rd (NB&SB)	D (48)	E(61)
Indian Trail Rd at Tech Dr	signal	All	F (97)	C (35)	Add left turn lane EB	E (67)	C (27)
Singleton Rd at Tech Dr	signal#	All	B (13)	B (14)	None		

will be installed by Gwinnett County by 2016 as part of 2014 SPLOST program before this property is open for business
* Level of Service from A to F (delay in seconds per vehicle)
Note: The HCS 2010 analysis for each intersection is included in the Appendix

Conclusions and Recommendations

Existing and No Build Conditions

In the AM peak hour, the intersections of Indian Trail Rd at Singleton Rd and Tech Dr are both at Level of Service of F. This is because traffic volumes are very high on Indian Trail Rd. For Indian Trail Rd at Singleton Rd, the PM is as equally congested as the AM peak hour. There are no apparent operational problems on Singleton Rd in the study area for the Existing and No Build road systems.

Proposed Condition

Analyses were performed to determine the traffic impact that would result from the development of 1.94 acres of mixed use development near the intersection of Singleton Rd and Tech Drive in Gwinnett County, Georgia. The results of these studies are discussed below.

The proposed site will generate 3,375 (Table 2) trips per day. Most of these trips will be internal mixed use trips. After adjusting for these trips, this site will generate 1,250 (Table 4) trips per day.

Hourly traffic entering and exiting the streets was estimated based on the ITE Trip Generation Manual and analysis by WMB Engineering. These traffic volumes were used to analyze the effect the proposed development will have on the existing road system in the study area.

In the AM peak hour for the Build condition the intersections of Indian Trail Rd at Singleton Rd and Tech Dr are both at Level of Service of F. For Indian Trail Rd at Singleton Rd the PM is equally congested as the AM peak hour. This is because traffic volumes are very high on Indian Trail Rd. There are no apparent operational problems on Singleton Rd in the study area for the Build road system.

Recommendations & Executive Summary

The results of this transportation impact analysis study found the following:

1. The critical part of the site design for traffic flow is getting traffic to enter the main driveway at the signal to ensure traffic is not impeded within the proposed development. The developer has proposed a roundabout at the main driveway within his right-of-way to insure adequate storage of vehicles to avoid conflicts at the entrance

Site Access Analysis

The internal site traffic for 2018 was analyzed for the driveway on Singleton Road. The existing land plot has two driveways with full access. This development proposes to eliminate one driveway and change the other driveway from full access to right in and out only. Capacity analysis was completed for all driveways and roads that front public roads. A summary is shown in Table 12.

Table 12
Site Access Analysis
2018 Levels of Service

Intersection	Control	Approach	LOS – No * Improvements AM Peak	PM Peak	Improvements
Singleton Rd at Right In/Out dw	stop	NB	B(12)	B(13)	None

* Level of Service from A to F (delay in seconds per vehicle)

Appendix

Trip Distribution

WMB Engineering proposed allocating all land uses by the existing traffic flow at the intersection of Singleton Road and Tech Drive. The proposed trip distribution is as follows:

Road	Entering Distribution
Singleton Rd, east of site	43%
Singleton Rd, west of site	48%
Tech Dr, north of site	8%
Tech Dr, south of site (internal)	1%

Road	Exiting Distribution
Singleton Rd, east of site	26%
Singleton Rd, west of site	48%
Tech Dr, north of site	24%
Tech Dr, south of site (internal)	2%

Traffic Counts

- Existing Turning Movement Counts – Greater Traffic Co.
- Existing (AM/PM) – Traffic Volume Analysis, Excel
- No Build 2018 (AM/PM) – Traffic Volume Analysis, Excel
- Total Build 2018 (AM/PM) – Traffic Volume Analysis, Excel

Capacity Analysis – Signalized Intersections(3)

- Existing Traffic (2014 – AM/PM)
- No Build Traffic (2018 – AM/PM) & No Build Improved (2018 – AM/PM)
- Total Traffic (2018 – AM/PM) & Build Improved (2018 – AM/PM)

Capacity Analysis – Multi-Lane Roads

- Existing (2014 – AM/PM)
- No Build (2018 – AM/PM)
- Total Build (2018 – AM/PM)

Capacity Analysis – Unsignalized Intersections

- Total Traffic (2018 – AM/PM)

11 x 17 Size Site Plan

Traffic Counts – 3 Intersections

Existing Turning Movement Counts – Greater Traffic Co.
Existing (AM/PM) – Traffic Volume Analysis, Excel
No Build 2018 (AM/PM) – Traffic Volume Analysis, Excel
Total Build 2018 (AM/PM) – Traffic Volume Analysis, Excel

Capacity Analysis – Signalized Intersections(3)

Indian Trail Rd at Singleton Rd
- Existing Traffic (2014 – AM/PM)
- No Build Traffic (2018 – AM/PM))
- Total (Build) Traffic (2018 – AM/PM)
- No Build Traffic with Improvements (2018 – AM/PM)
- Total (Build) Traffic with Improvements (2018 – AM/PM)

Indian Trail Rd at Tech Drive
- Existing Traffic (2014 – AM/PM)
- No Build Traffic (2018 – AM/PM))
- Total (Build) Traffic (2018 – AM/PM)
- No Build Traffic with Improvements (2018 – AM/PM)
- Total (Build) Traffic with Improvements (2018 – AM/PM)

Tech Drive at Singleton Rd
- Existing Traffic (2014 – AM/PM)
- No Build Traffic (2018 – AM/PM))
- Total (Build) Traffic (2018 – AM/PM)

Capacity Analysis – Multi-Lane Roads

- Existing (Peak Hr)
- No Build 2018 (Peak Hr)
- Total Build 2018 (Peak Hr)

Capacity Analysis – Unsignalized Intersections

Total Traffic (2018 – AM/PM)

11 x 17 Size Site Plan