

## Paul Michaud

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**From:** Paul Mood  
**Sent:** Friday, November 16, 2018 9:04 AM  
**To:** Brian Dalke; Jeremy Knapp  
**Cc:** Dawn Marie Buckland; Paul Michaud; Paul Mood  
**Subject:** Lincoln Drive Median Access  
**Attachments:** Lincoln Median Access - Engineering Dept. Review.pdf; ATT00001.htm; Lincoln Median Access Kimley Horn 3rd Party Review.pdf; ATT00002.htm

Brian and Jeremy,

Attached is my review and Kimley-Horn analysis. You should receive 2 attachments.

This can be sent to Council and the applicants.

I am working off of my phone so you can clean up the text below for the council weekly update.

Let's me know if you have questions.

Paul

**Staff Recommendation:** Staff recommends Option 2 (shared full median access) with the modifications listed below. This alternative will achieve full left in/left out access for the Smoke Tree Resort and Lincoln Medical Plaza, minimum driveway spacing, minimum left turn storage length and minimum taper length required per AASHTO and City of Scottsdale requirements.

Option 2 (shared full median access) should be modified as follows:

- Extend left turn storage length on Lincoln Dr. from 90' to 115'
- Relocate the shared access driveway location as required to accommodate additional left turn storage.
- Add dedicated right turn lane at shared access driveway (minimum 100' storage and 90' taper).
- Eliminate western Smoke Tree Resort driveway.
- Eliminate western Lincoln Medical Plaza driveway.
- Provide shared access easement between the Smoke Tree Resort and Lincoln Medical Plaza.
- Provide a non-vehicular access easement (NVAE) along the eastern and southern property lines of the Lincoln Medical Plaza parcel.



November 15, 2018

Paul Mood, P.E.  
Town Engineer  
Town of Paradise Valley

Jeremy Knapp, AICP  
Community Development Director  
Town of Paradise Valley

**RE: Lincoln Drive Median Access from Mockingbird Lane to the Eastern Town Limits**

The Smoke Tree Resort and Lincoln Medical Plaza have submitted applications for Major Special Use Permit Amendments. Through the Statement of Direction Process (SOD) the Planning Commission and Staff were asked to look at the traffic and access related issues. The traffic and access related items from the SODs are as follows:

Smoke Tree Resort & Lincoln Medical SOD:

Traffic, Parking, Access, and Circulation. The proposed density and location within a heavily-traveled and mixed-use density area near the City of Scottsdale creates a heightened need for ensuring the proposed redevelopment does not have a negative impact on traffic safety, parking, and circulation.

- Number of access points in/out of the site
- Coordination with Town improvements along Lincoln, i.e. the entry/exit and roadway medians
- Deceleration turn lane for eastbound traffic entering the site
- Full build-out of The Ritz-Carlton Resort Special Use Permit
- Any cross-access easement(s) with the owners of the AJs to the east/Andaz to the south/Smoke Tree to the west.

The Town recently completed 30% design plans for the CIP roadway improvement project for Lincoln Drive from Mockingbird Lane to the eastern Town limits. Traffic data was not available from the Smoke Tree Resort or Lincoln Medical Plaza at the time the plans were developed. The 30% design plans called for a westbound left turn median break into the Applewood Pet Resort and a solid median from Quail Run Rd. to the eastern town limits. This raised median provides for only right in/right out access to the SUP properties.

CivTech was retained by the applicants to provide three potential access options as follows:

Option 1\*: full median access for Smoke Tree Resort and Lincoln Medical Plaza

Option 2\*: shared full median access for Smoke Tree Resort and Lincoln Medical Plaza

Option 3\*: right in/right out only access for Smoke Tree Resort and Lincoln Medical Plaza

\*All access options include full median access for the Applewood Pet Resort at their western driveway.

Both applicants have expressed a desire to maintain full access (left in/left out) onto Lincoln Drive as their preferred access option. Since CivTech is a subconsultant on the Town's Lincoln Drive CIP project, Kimley-Horn was retained as a 3<sup>rd</sup> party to review the following:

- Traffic volume calculations
- Left turn lane geometry including storage length and minimum taper lengths
- The need for exclusive right turn lanes
- Review and comment on the three access options

A copy of Kimley-Horn's Lincoln Drive Median Access from Mockingbird Lane to the Eastern Town Limits 3<sup>rd</sup> Party Traffic Review Memorandum is attached. Below are general comments from the memorandum as well as brief review of each access option:

- Median access options were reviewed against The American Society of State Highway and Transportation Officials (AASHTO) and City of Scottsdale design standards.
- A traffic volume of 13,870 vpd on Lincoln Drive was taken from the 2015 Ritz Carlton Traffic Impact Analysis.
- Using the projected year 2025 peak hour volumes, the daily traffic volumes on Lincoln Drive are estimated to exceed 20,000 vpd.
- Left turn lanes at Mockingbird Lane and Quail Run Road are shown per the Five Star Development Agreement for the Ritz Carlton Resort.
- A new traffic signal at Quail Run Road is shown per the Five Star Development Agreement for the Ritz Carlton Resort.
- Field observations were conducted on October 30, 2018 during the AM and PM peak hours. Eastbound traffic backed up in the inside lane and blocked both of the Lincoln Medical Plaza driveways and the Smoke Tree Resort eastern driveway on three occasions in the AM peak hour and five occasions in the PM peak hour.
- Motorists left gaps when traffic backed up so that westbound traffic could turn into the AJ's Shopping Complex. Near miss collisions were observed by Kimley-Horn.
- Lincoln Drive does not have sufficient width for U-turn movements.

#### **Applewood Resort Full Median Access**

- Full median access is shown at the Applewood Resort's western driveway.
- The western driveway is approximately 714' east of Mockingbird Lane and 612' west of Quail Run Rd.

**Staff Comments:** Staff recommends that the full median access be moved to the Applewood Pet Resort's western driveway in order to maximize the distance from Mockingbird Lane and Quail Run Road. This location will also be positioned for the future South Lincoln Drive Development Area access point if necessary. No other median breaks are recommended between Mockingbird Lane and Quail Run Road.

#### **Option 1: Full Median Access (left in/left out)**

##### **Lincoln Medical Access**

- The eastern driveway is right in/right out only and is in its current location.
- The western driveway has a median break for full access and is in its current location.
- The western driveway minimum left turn taper length is 90'. Only 43'-3" is provided.

- The western driveway minimum left turn storage requirement is 70'. A storage length of 70' is provided and is adequate.
- Driveway spacing is approximately 132' and does not meet the minimum requirement of 250'. It should be noted that the Lincoln Medical Plaza only has approximately 200' of frontage on Lincoln Drive.

#### Smoke Tree Resort Access

- The western driveway is right in/right out only and is in its current location.
- The eastern driveway has a median break for full access and is moved to a new location approximately 183' from the Lincoln Medical Plaza western driveway (approximately 154 feet from the eastern property line).
- The eastern driveway minimum left turn taper length is 90'. Only 40' is provided.
- The eastern driveway minimum left turn storage requirement is 55'. A storage length of 75' is provided and is adequate.
- The driveway spacing does not meet the minimum requirements of 250' from Quail Run Rd. or other adjacent driveways.

**Staff Comments:** Staff does not recommend full access for both properties as shown since driveway spacing is not met and left turn taper lengths do not meet the minimum standards necessary to safely transition vehicles from the Lincoln Drive through lane into the left turn lanes. Kimley-Horn's traffic observations also show that eastbound traffic will back up in front of the Lincoln Medical Plaza's driveways. Lincoln Medical Plaza access should be restricted to right in/right out to mitigate potential collisions.

#### **Option 2: Shared Full Median Access (left in/left out)**

- The Lincoln Medical Plaza eastern driveway is right in/right out only and is in its current location.
- The Lincoln Medical Plaza western driveway has been removed.
- The Smoke Tree Resort western driveway is right in/right out only and is approximately 134' east of Quail Run Rd.
- The shared access driveway minimum left turn storage length on Lincoln Drive is 115'. Only 90' of storage is provided.

**Staff Comments:** Staff recommends that that left in/left out shared access can be provided so long as the minimum left turn storage length on Lincoln Drive is extended from 90' to 115'. The Smoke Tree Resort western driveway shall be removed since it cannot meet the minimum spacing requirement of 250' from both Quail Run Rd. and the shared access driveway. A dedicated right turn deceleration lane (minimum 100' storage and 90' taper) is also recommended for the shared access driveway. Additionally, a non-vehicular access easement (NVAE) shall be placed along the eastern and southern property lines of the Lincoln Medical Plaza parcel to prevent future access from the AJs Shopping Complex and Andaz Resort.

#### **Option 3: Right In/Right/Out Access**

- The Lincoln Medical Plaza eastern and western driveways are right in/right out only and in their current locations.
- The Smoke Tree Resort western driveway is right in/right out only and is in its current location approximately 134' east of Quail Run Rd.

- The Smoke Tree Resort eastern driveway is right in/right out only and is approximately 66 ' west of the Lincoln Medical Plaza western driveway (32 feet west of the property line).

**Staff Comments:** Staff recommends that right in/right out access can be provided so long the Smoke Tree Resort driveways and Lincoln Medical Plaza driveways are consolidated into one driveway for each property. The driveways should be located to maximize spacing and each driveway shall have a dedicated right turn deceleration lane (minimum 100' storage and 90' taper). The right in/right out turning movements are the safest turning movements but may result in motorists trying to make U-turns on Lincoln Drive that is not wide enough.

**Staff Recommendation:** Staff recommends Option 2 (shared full median access) with the modifications listed below. This alternative will achieve full left in/left out access for the Smoke Tree Resort and Lincoln Medical Plaza, minimum driveway spacing, minimum left turn storage length and minimum taper length required per AASHTO and City of Scottsdale requirements.

Option 2 (shared full median access) should be modified as follows:

- Extend left turn storage length on Lincoln Dr. from 90' to 115'.
- Relocate the shared access driveway location as required to accommodate additional left turn storage.
- Add dedicated right turn lane at shared access driveway (minimum 100' storage and 90' taper).
- Eliminate western Smoke Tree Resort driveway.
- Eliminate western Lincoln Medical Plaza driveway.
- Provide shared access easement between the Smoke Tree Resort and Lincoln Medical Plaza.
- Provide a non-vehicular access easement (NVAE) along the eastern and southern property lines of the Lincoln Medical Plaza parcel.

## MEMORANDUM

To: Paul Mood, Town Engineer  
Paradise Valley, Arizona

From: Kimberly Carroll, P.E., PTOE  
Sr. Traffic Engineer  
Kimley-Horn and Associates, Inc.

Date: November 9, 2018

Subject: Lincoln Drive, Mockingbird Lane to Town of Paradise Valley (TOPV) Jurisdiction  
Median Breaks and Access  
Third Party Traffic Review Comments



Expires: 03/31/21

Dear Paul:

As requested by Town Staff, Kimley-Horn has conducted a third-party traffic review of the Lincoln Drive Access Assessment Exhibits (Options 1 through 3) prepared by CivTech for Lincoln Drive, from Mockingbird Lane to the TOPV jurisdictional boundary. We understand that raised medians are proposed for installation as part of the TOPV capital improvements projects. We also understand that two developments (Smoke Tree Resort and Lincoln Medical Plaza) are also proposed within the corridor. The developments will generate additional traffic and would like to maintain full access to their parcels from Lincoln Drive. The purpose is to review each of the Access Assessment Options, traffic analysis, and data provided by CivTech. Kimley-Horn's (KH) evaluation and review consisted of the following:

- *Review of the traffic volume calculations prepared by CivTech, which is the basis for calculating the storage length requirements*
- *Left turn lane geometric requirements<sup>1</sup> including minimum storage length requirements and minimum median opening taper rates*
- *Observation of existing traffic operations and safety during a typical weekday morning and afternoon peak hour*
- *Review and comment on the Access Assessment Options exhibits prepared by CivTech*
- *Evaluate the need for exclusive right turn lanes based on the traffic volumes generated*

<sup>1</sup> Based on AASHTO, *Geometric Design of Highways and Streets and Design Standards*, 2011; and City of Scottsdale, *Design Standards & Policies Manual*, 2018

## TRAFFIC VOLUMES AND OPERATIONS REVIEW AND COMMENTS

Lincoln Drive is classified as a major arterial in the TOPV 2012 General Plan, has a 40-mph posted speed limit between Mockingbird Lane and TOPV jurisdictional boundary, and 13,870 vpd, which was provided in the 2015 daily traffic volumes collected as part of the Ritz Carlton Resort Traffic Impact Analysis, prepared by CivTech, 2016. Using the projected year 2025 peak hour volumes provided by CivTech, the daily traffic volumes are estimated to exceed 20,000 vpd.

- Existing peak hour turning movement counts were collected at each of the intersections and existing driveways within the corridor on Thursday May 31, 2018.

**KH Comment 1:** While the day collected falls on a typical weekday, the data was collected at a time of the year when volumes drop around the Maricopa Region because school is no longer in session and winter residents have left the region. For this reason, we recommend that existing traffic volumes be seasonally adjusted and traffic analysis be revised based on these adjustments and comments that follow.

**Response to Comment 1:** CivTech updated the traffic volumes to reflect a seasonal adjustment (factored by 1.03).

- Trips were generated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10<sup>th</sup> Edition to determine the number of vehicles entering and exiting the driveways of the proposed developments. A summary of the trip generation analysis by CivTech is provided in **Appendix 1**.

**KH Comment 2:** Through coordination with TOPV staff we understand the Smoke Tree Resort is proposed to develop 150 rooms and 30 residential units. The trip generation analysis conducted was based on 132 rooms and 20 residential units and is provided in **Appendix 1**. We recommend the trip generation be updated to match the proposed development improvements.

**Response to Comment 2:** CivTech has updated the trip generation rates to reflect 150 rooms, 30 residential units, and 3500 square foot quality restaurant. The revised trip generation and calculations are provided in **Appendix 2**.

**KH Comments 3:** Smoke Tree Resort analysis was based on ITE Land Use Code (LUC) 330. The number of rooms proposed for development seem low and inconsistent for a resort hotel. The number of data points and size of the independent variable more closely align with the Hotel LUC 310, which has higher trip generation rate than resort hotel. Please provide additional support that would classify Smoke Tree as a resort (LUC 330) as opposed to a hotel (LUC 310).

**Response to Comment 3:** CivTech has updated the trip generation rates to reflect a blended rate between LUC 310 and 330. The trip generation calculation and approach were considered acceptable.

**KH Comments 4:** Smoke Tree Resort utilized equations as opposed to average rates. KHA went through the ITE Trip Generation Handbook process presented in Figure 4.2 assuming proposed number of units for resort hotel (LUC 330). The results of this process are presented below and KH redlines provided in **Appendix 1**.

Resort hotel (LUC 330) AM peak hour between 7-9am

- The number of rooms is way out of range of the data extremes; the lowest number of rooms in the manual is roughly 370 compared to the 132 that are proposed
- If you follow the equation, which happens to be a straight line and not a logarithmic function, then 132 rooms will generate a very low number of trips
- The number of data points is equal to 6
- The R2 value is close to the required 0.75, so you could argue it either way
- The standard deviation is less than 55% of the average rate

Because the rooms are not within the data extremes and the R2 value is less than 0.75, we recommend the weighted rates be used. Using the rates as opposed to the equation results in double the trips being generated in the AM peak hour.

Resort hotel PM peak hour between 4-6pm

- The number of rooms is just outside of the data extremes
- The number of data points is greater than 6
- The R2 value is well above the required 0.75
- The standard deviation is less than 55% of the average rate

Because the number of data points and the R2 value are high enough and the standard deviation requirement is met, the use of the equation during the PM peak is appropriate.

**Response to Comment 4:** CivTech has updated the trip generation rates to reflect a blended rate between LUC 310 and 330 as discussed in response to comment #3. The trip generation calculations were also revised to reflect 150 rooms, 30 residential units, and 3500 square foot quality restaurant. The revised trip generation calculations and approach were considered acceptable. The revised trip generation calculations, based on 150 rooms, 30 residential units, and 3500 square foot quality restaurant, are provided in **Appendix 2**.

**KH Comments 5:** A proposed growth of 1.125 was utilized through year 2025. Please provide background support on for the growth rate being utilized.

**Response to Comment 5:** CivTech developed future background volumes by comparing historic counts from 2012 to 2014 on Scottsdale Road between Indian Bend and Lincoln Drive.

## **LEFT TURN LANE GEOMETRIC REQUIREMENTS**

The physical geometry of the left turn is generally made up of storage length and deceleration length. Each of the components as it relates to this project are described in more detail as follows:



- *Storage length is described as the queue length necessary to sufficiently store the estimated number of left turning vehicles during a critical period. In this case, the critical period is the during the peak hour. This storage length should be long enough to avoid vehicles from spilling back or stopping in the through lanes. If the storage length is not sufficient, there is a potential for rear end collisions due to the spill back or stopping of vehicles in the through lanes.*

*Per American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design for Highways and Streets, 6<sup>th</sup> Edition, the storage length at unsignalized intersections should be determined as follows:*

*“At unsignalized intersection, the storage lengths should be determined by an intersection traffic analysis based on the number of turning vehicles likely to arrive in an average two-minute period within the peak hour. Space for at least two passenger vehicles should be provided.”*

*AASHTO further recommends using the Transportation Research Board (TRB) Access Control Manual for additional support.*

*Based on this review, the storage length calculation<sup>2</sup> is summarized as:*

$$L \text{ or } Q = (V * s * k) / N = (2.0 * V * 25) / 30$$

*L or Q = Storage Length (ft)*

*V = Estimated left turn volume (vph) during the peak hour*

*N = Number of cycles per hour, which (Per AASHTO) is based on a two-minute period at unsignalized intersections ( $N = 3600 \text{ (sec/hr)} / 120 \text{ (sec/cycle)} = 30 \text{ cycles/hr}$ )*

*s = Average vehicle length, including space between vehicles assumed to be 25 feet*

*k = Factor of 2.0 is commonly used for major arterials to account for the longest expected queue*

**KH Comment 6:** *All storage lengths should be updated based on the revised traffic volumes previously commented above.*

**Response to Comment 6:** *CivTech updated exhibits and calculations. See KH Comments 9 through 13.*

**KH Comment 7:** *Calculation presented by CivTech uses an N value of 60 minutes per hour rather than 30 cycles per hour. One could argue the two-minute period. The two-minute period is a function of opposing volumes and the time necessary to make the left turn maneuver. Considering the high opposing volumes on Lincoln Drive, we recommend that no less than a two-minute period be utilized. For this reason, all storage lengths for each left turn lane should be updated. Furthermore, based on AASHTO, the minimum storage length shall be 50 feet (not 25 foot) to accommodate at least two passenger vehicles.*

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<sup>2</sup> Per Transportation Research Board (TRB), Access Management Manual, Second Edition, Section 16-1.

**Response to Comment 7:** CivTech updated calculations. See KH Comments 9 through 13.

- Deceleration Length is described as the maneuver distance to decelerate from the through lane into the turn bay (opening taper) plus the distance necessary to complete a stop. Per AASHTO Table 9-22, 275 feet of deceleration is necessary for a 40-mph speed. Where constraints, such as closely spaced driveways or adjacent intersections exist, deceleration by drivers can be accomplished before entering the left turn bay as part of the opening taper length. In this case, the opening taper is being utilized for deceleration as well as the transition from through lane to the left turn lane.

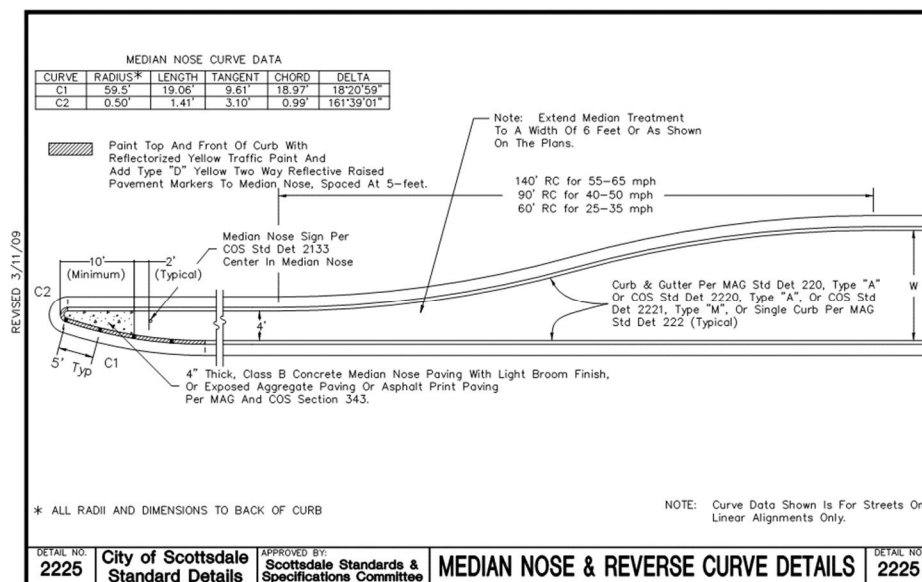
The opening taper length is also a function of speed as well as the rate at which vehicles traverse from the through lane to the left turn lane. Per AASHTO, an 8:1 rate for design speeds up to 30 MPH and 15:1 rate for design speeds up to 50 MPH or greater. In short, when a vehicle moves one (1) foot laterally, the same vehicle will need 8 feet (for 30 mph) or 15 feet (for 50 mph) to travel longitudinally. Example calculations include:

Traverse Distance from Through Lane to Left Turn Lane = 12 foot

Taper Length (30 mph) = 8 x 12 = 96 feet

Taper Length (50 mph) = 15 x 12 = 180 feet.

It should be noted that AASHTO also suggests that shorter tapers can be utilized in urban conditions when peak periods result in slower speeds. In this case and recognizing that the Town of Paradise Valley may follow the City of Scottsdale Standards, Kimley-Horn defaulted to the City of Scottsdale's, Design Standards & Policies Manual, 2018 and Standard Detail 2225 shown on the next page. Per the detail, a minimum taper of 90 feet should be provided for a 40 to 50 mph roadway.



**KH Comment 8:** *Posted speed limit of Lincoln Drive within the project limits is 40 MPH. We recommend that at a minimum an opening taper length of 90 feet be provided at all left turn bays to allow for the deceleration and safe transition of vehicles from the through lane into the left turn lane.*

## OBSERVATION OF TRAFFIC OPERATIONS AND SAFETY

Kimley-Horn conducted a field observation on Tuesday, October 30<sup>th</sup> during the morning (from 7:30 to 8:30 am) and afternoon (from 4:30pm to 5:45 pm) peak hours. The following was observed:

- Eastbound traffic on Lincoln Drive at Scottsdale Road, queued (stacked) to just west of the existing Smoke Tree Resort eastern most driveway during both the AM and PM peak hours. Lincoln Medical Plaza as well as the eastern most driveway to Smoke Tree Resort was blocked during these queueing events. Three of these events were observed during the AM peak hour and five were observed during the PM peak hour.
- During the afternoon peak, the side friction associated with vehicles turning in/out of the existing driveways (AJ's Shopping Center, Lincoln Apartments, and Spectrum Office), between Scottsdale Road and Smoke Tree Resort eastern driveway, contributed to the stacking of the eastbound vehicle queueing length.
- The queueing occurred in the inner most eastbound lane leaving the outer lane free for vehicles to drive to the Lincoln Drive and Scottsdale Road intersection.
- Eastbound traffic provided gaps for left turning vehicles destined for the commercial parcels (AJ Shopping Center) on the south side of Lincoln Drive. However, near misses or potential collisions between eastbound vehicles on Lincoln Drive traveling in the outer eastbound lane and left turning vehicles were observed.

## ACCESS ASSESSMENT OPTION EXHIBITS

Kimley-Horn reviewed the Access Assessment Options, prepared by CivTech, considering the comments listed above. The exhibits as well as Kimley-Horn comments are provided in **Appendix 3**. A summary of the comments are as follows:

**KH Comment 9:** *This comment applies to all CivTech exhibits prepared. Traffic volumes were not available for the driveways between Mockingbird Lane and Quail Run. In the absence of these volumes, AASHTO A Policy on Geometric Design of Highways and Street (2011), TRB Access Control Manual (2<sup>nd</sup> Edition), City of Scottsdale Design Standards & Policy Manual (2018), and engineering judgement was utilized to comment and make recommendations for full median break recommendations on Lincoln Drive between Mockingbird Lane and Quail Run.*

- *Lincoln Drive functional classification is Major Arterial, per TOPV 2012 General Plan*
- *Posted Speed Limit = 40 MPH*
- *Westbound 95% queue length at Mockingbird Lane (301 feet) per CivTech Synchro Results*
- *Eastbound 95% queue lengths at Quail Run (322 feet) per CivTech Synchro Results*
- *Per AASHTO (page 9-182), "Ideally driveways should be placed upstream and downstream outside the functional area of an intersection or the influence area of adjacent driveways." Per*

AASHTO, the influence area includes the impact length or distance back from the driveway that cars begin to be affected, the perception-reaction distance, and the car length.

- Per TRB Access Control Manual (Exhibit 14-12), the Ideal Downstream Functional Distance Based on Decision Sight Distance to Stop is 690 feet for 40 MPH urban condition.
- Per City of Scottsdale, Design Standards and Policy Manual, Section 5, on minor arterials, full median breaks should be no closer than 1/8-mile intervals with preferable 1/4 mile spacing.
- Through discussion with Town staff, we understand the southwest quadrant of Quail Run and Lincoln Drive will be redeveloped in the future. Access to this future development is expected to be located on Lincoln Drive west of Quail Run. While a traffic study has not been completed, additional traffic is expected to be generated. The need to accommodate this storage should be factored into the location of median break and full access Lincoln Drive between Mockingbird Lane and Quail Run.
- The existing spacing between Mockingbird Lane to Quail Run (centerline to centerline) is approximately 1325 feet (+/-).

Based on the bullet points above, we recommend that the full access median break distance on Lincoln Drive between Mockingbird Lane and Quail Run be maximized at 660-foot spacing between the intersections. Currently, Applewood Pet Resort western most access is positioned approximately 714 feet east of Mockingbird Lane and approximately 612 feet west of Quail Run (centerline to centerline) and provides the most desirable location for a full access median break.

### **Access Assessment Option #1 (Individual Full Access) Exhibit**

**KH Comment 10:** Storage length at Spectrum Office Driveway/AJ Driveway calculation ((29 vph x 25 feet x2)/30) is 48 feet. Per AASHTO, the minimum storage length is 50 feet. Exhibit illustrates a minimum of 50 foot being provided. This is considered acceptable.

**KH Comment 11:** As shown in Option #1 exhibit, access improvements include closure of the existing eastern access on Smoke Tree Resort, a new Smoke Tree Resort access approximately 183 feet west of Lincoln Medical Plaza access, and the existing Smoke Tree Resort western access to remain as right in/right out. The proposed improvements result in the following spacing (centerline to centerline) of driveways:

- Approximately 134 feet from Quail Run to Smoke Tree Resort western right in/right out driveway;
- Approximately 183-feet from Smoke Tree Resort western right in/right out to the proposed Smoke Tree Resort full access median break;
- Approximately 183-feet from the proposed Smoke Tree Resort full access median break to the proposed Lincoln Medical Plaza full access median break; and
- Approximately 132 feet from the proposed Lincoln Medical Plaza full access median break to the eastern Lincoln Medical Plaza right in/right out access.

Per City of Scottsdale Design Standards & Policy Manual (2018), the minimum driveway spacing is presented in the Figure on the following page. It should be noted that a major arterial in the City of Scottsdale is configured as a six-lane divided roadway. Lincoln Drive is a four-lane divided roadway, so a minor arterial classification was utilized to determine the minimum spacing required (250 feet) on Lincoln Drive.

STREET TYPE	STANDARD DRIVEWAY SPACING	MINIMUM DRIVEWAY SPACING
Local Residential / Local Collector	50 feet	50 feet
Local Industrial / Local Commercial	165 feet	125 feet
Minor Collector	165 feet	125 feet
Major Collector	250 feet	150 feet
Minor Arterial	330 feet	250 feet
Major Arterial	500 feet	300 feet

FIGURE 5-3.35 DRIVEWAY SPACING

Based on the results, Kimley-Horn recommends the western Smoke Tree Resort driveway be closed to achieve the minimum spacing from Quail Run.

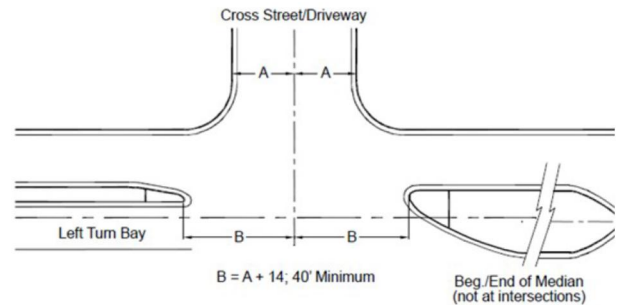
**KH Comment 12:** The storage length shown in Option #1 exhibit for Lincoln Medical Plaza is 70 feet. Per AASHTO calculations, storage length should be no less than 70 feet to adequately store the estimated number of vehicles generated by Lincoln Medical Plaza. This is considered acceptable. The storage length for the Smoke Tree Resort eastern driveway is 75 feet. Per AASHTO calculations, storage length should be no less than 55 feet to adequately store the estimated number of vehicles generated by the Smoke Tree Resort. This is considered acceptable.

**KH Comment 13:** As shown in Option 1 exhibit prepared by CivTech, opening bay tapers are 40 feet at Smoke Tree Resort and 43-3" feet at Lincoln Medical Plaza. KH recommends that no less than a 90-foot opening taper be utilized to safely traverse traffic from the through lane to the left turn lane on Lincoln Drive, per the criteria and discussion on Page 4, 5, and 6 of this document. Kimley-Horn recommends the median be extended and access points to Lincoln Medical Plaza be restricted to right in/right out only movements for two reasons:

- a) A minimum spacing of 290 feet (centerline to centerline), from Spectrum Office Driveway to Lincoln Medical Plaza driveway, is necessary to adequately store the estimated vehicles without spilling back into the Lincoln Drive through lanes as well as safely transition vehicles from the through lane to left turn lane. Currently the spacing (centerline to centerline) is approximately 220 feet (+/-) and is less than adequate. Calculations are summarized as follows:



- Peak Hour Left Turn Volume at Lincoln Medical Plaza = 42 vph
- Lincoln Medical Plaza Storage Length =  $2 \times 25 \times 42 / 30 = 70$  feet
- Opening Taper Length = 90 feet (see KH Comment #8)
- Spectrum Office Storage Length = 50 feet (minimum per AASHTO)
- Distance (Spectrum centerline to median nose) = 40-foot (see COS Figure 5-3.28)
- Distance (Lincoln Medical Plaza centerline to median nose) = 40-foot (see COS Figure 5-3.28)
- Total length (centerline to centerline) = 290 feet



Notes:  
1. This sketch is for a three leg intersection. If the intersection has four legs, the right side will also have an auxiliary lane for left turns, and the median on the right side will have the same configuration as the one on the left side rotated 180 degrees.  
2. See COS Standard Details for median dimensions.

FIGURE 5-3.28 MEDIAN OPENINGS FOR INTERSECTIONS

- b) The observed queueing during the peak hours coupled with the near misses observed between the left turning vehicles (discussed on page 6 of this document) further support restricting Lincoln Medical Plaza access points to right in/right out to mitigate potential collisions between left turning vehicles into/out of Lincoln Medical Plaza and eastbound Lincoln Drive traffic.

## Access Assessment Option #2 (Shared Full Access) Exhibit

**KH Comment 14:** As shown in Option #2 exhibit, access improvements include closure of the western Lincoln Medical Plaza access, a new shared access for the Smoke Tree Resort / Lincoln Medical Plaza approximately 55 feet from the shared Smoke Tree Resort / Lincoln Medical Plaza parcel line, and right in/right out to all other access points between Quail Run and TOPV jurisdictional boundary line. The proposed improvements in this option result in the following spacing (centerline to centerline) of driveways:

- Approximately 134 feet from Quail Run to Smoke Tree Resort western right in/right out driveway;
- Approximately 284-feet from Smoke Tree Resort western right in/right out to the proposed shared Smoke Tree Resort/Lincoln Medical Plaza full access median break;
- Approximately 221-feet from the proposed shared Smoke Tree Resort/Lincoln Medical Plaza full access median break to eastern Lincoln Medical Plaza right in/right out access.

Per City of Scottsdale Design Standards & Policy Manual (2018), the minimum driveway spacing is presented the minimum spacing required (250 feet) on Lincoln Drive. Kimley-Horn recommends the western Smoke Tree Resort driveway be closed to achieve the minimum spacing from Quail Run.

**KH Comment 15:** As shown in Option 2 exhibit prepared by CivTech, opening bay taper to the shared Smoke Tree Resort and Lincoln Medical Plaza is 90 feet. This is considered adequate.

**KH Comment 16:** The storage length shown in Option #2 exhibit for the shared Smoke Tree Resort/Lincoln Medical Plaza access is proposed at 90 feet. Per AASHTO calculations, storage length should be no less than 115 feet to adequately store the estimated number of vehicles generated by

*Smoke Tree Resort and Lincoln Medical Plaza. For this option, the shared access should move a minimum of 25 feet west of the location shown in the CivTech exhibit to accommodate the minimum storage length necessary to adequately store the estimated left turn volumes without spilling back into Lincoln Drive through lanes. This would result in placing the shared driveway a minimum of 80 feet from the Smoke Tree resort/Lincoln Medical Plaza parcel line.*

*It should also be noted that moving the driveway west will further improve the spacing between the shared Smoke Tree Resort/Lincoln Medical Plaza driveway and the Lincoln Medical Plaza eastern right in/right out driveway.*

### **Access Assessment Option #3 (Full Median - Right In / Right Out Only) Exhibit**

**KH Comment 17:** *As shown in Option #3 exhibit, all existing driveways between Quail Run and eastern Lincoln Medical Plaza access points, will remain and be restricted to right in/right out only. This results in the following spacing (centerline to centerline) between the existing driveways:*

- *Approximately 134 feet from Quail Run to Smoke Tree Resort western right in/right out driveway;*
- *Approximately 308-feet from Smoke Tree Resort western right in/right out to the existing eastern Smoke Tree Resort driveway;*
- *Approximately 67-feet from the eastern Smoke Tree Resort Driveway to the western Lincoln Medical Plaza driveway; and*
- *Approximately 132-feet from the western Lincoln Medical Plaza driveway to the eastern Lincoln Medical Plaza driveway.*

*Per City of Scottsdale Design Standards & Policy Manual (2018), the minimum driveway spacing is presented the minimum spacing required (250 feet) on Lincoln Drive. Kimley-Horn recommends the western Smoke Tree Resort driveway be closed to achieve the minimum spacing from Quail Run. We further recommend that with the improvements to both Smoke Tree Resort and Lincoln Medical Plaza that the driveways be improved to achieve the minimum spacing.*

**KH Comment 18:** *This option does provide the safest option by removing the conflict points that would occur with left in/left out maneuvers. It should be noted that Lincoln Drive does not provide enough pavement width necessary to safely make U-turn maneuvers. Providing an access point that is located to safely transition and adequately store the estimated left turn volumes will reduce the need for U-turn maneuvers. Allowing shared access between the Smoke Tree Resort and Lincoln Medical Plaza parcels would remove the need for any U-turn maneuvers. For this option, should it be determined that shared access will not be provided, Kimley-Horn recommends U-turns be restricted.*

### **EXCLUSIVE RIGHT TURN EVALUATION**

Kimley-Horn evaluated the need for exclusive right turn lanes based on the City of Scottsdale, Design Standards & Policy Manual, 2018, per Section 5-3.206 Deceleration Lanes. Per Section 5-3.206 (p 325), the criteria to determine the need for exclusive right turn deceleration lanes is provided below:

- A. At least 5,000 vpd are expected to use the street;

Daily traffic volumes collected in 2015 indicate 13,870 vpd travel on Lincoln Drive within the project limits. This criterion is met is only expected to increase overtime as the developments in this area are built out.

- B. The 85th percentile traffic speed on the street is at least 35 mph;

Posted speed limit on Lincoln Drive within the project limits is 40 mph. This criterion is met.

- C. At least 30 vehicles will make right turns into the driveway during a 1-hour period.

- All the driveways, shown in Access Assessment Option 1 exhibit, are estimated to generate less than 30 vehicles. For Option 1 this criterion is not met.
- The proposed shared Smoke Tree Resort / Lincoln Medical Plaza access, shown in Access Assessment Option 2 exhibit, is estimated to generate less than 30 vehicles during the peak hour. For Option 2, this criterion is not met. However, with the recommended removal of the Smoke Tree Resort western driveway, the estimated right turn volumes would increase to 24 vehicles during the AM peak hour at the single access point to Smoke Tree Resort. In this case, we recommend a right turn deceleration lane (minimum 100-foot storage with 90-foot taper) be installed at the shared Smoke Tree Resort / Lincoln Medical Plaza access.
- Review of Access Assessment Option 3 exhibit is summarized as:
  - The western access to Lincoln Medical Plaza is estimated to generate more than 30 vehicles during the AM peak hour. The eastern access to Lincoln Medical Plaza falls short by 4 vehicles from meeting this criterion. This criterion is met at the Lincoln Medical Plaza western driveway. However, Kimley-Horn recommends a right turn deceleration lane (100-foot storage and 90-foot taper) be installed at both locations. It should be noted that the western Lincoln Medical Plaza driveway shown in the exhibit does not have enough frontage along their parcel and would impact the Smoke Tree Resort parcel to install the recommended right turn deceleration lane. Consolidation of the west and eastern Lincoln Medical Plaza driveways into one driveway would improve the driveway spacing.
  - The western driveway to Smoke Tree Resort is estimated to generate 30 vehicles during the PM peak hour. This criterion is met at the Smoke Tree Resort western driveway. However, as discussed in KH Comment #17, the spacing between Quail Run and Smoke Tree Resort western driveway is not available and should be considered for closure to improve spacing. It is recommended that the two Smoke Tree Resort driveways be consolidated to achieve the minimum driveway spacing between Quail Run on the west and Lincoln Medical Plaza on the east. With the consolidation of the two driveways, the estimated right turn volumes would increase to 42 vehicles during the AM peak hour and 50 vehicles during the PM peak hour. We recommend that right turn deceleration lane (100-foot storage and 90-taper) be installed. In this option, placing the consolidated access point a minimum of 250 east of Quail Run would also achieve approximately 270 feet separation from the Lincoln Medical Plaza western access point.



## **APPENDIX 1**

CivTech Trip Generation Calculation

Kimley-Horn Trip Generation Review and Redlines

## Smoke Tree Resort

Proposed

## Trip Generation

October 2018

Appendix D

This form facilitates trip generation estimation using data within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual* and *Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

**Box 1 - Define Study Site Land Use Type & Site Characteristics**, **Box 2 - Define Site Context** and **Box 3 - Define Analysis Objectives Types of Trips & Time Period**

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The *Manual* does not have data for all settings of all land use codes. The "General Urban/Suburban" setting is used by default.

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

### Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Resort Hotel	132 Rooms	330	Resort Hotel
Apartments	20 Dwelling Units	220	Multifamily Housing (Low-Rise)

### Box 4 - Is Study Site Multimodal?

Per the Handbook, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the Box 5 through 8 approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicular trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening, example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve Type: Equation Used [Equated Rate]

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Resort Hotel	WA: [ ]	FC: $T=0.38 \times X-28.58$ [0.16]	FC: $T=0.52 \times X-55.42$ [0.10]	
Apartments	FC: $T=7.56 \times X-40.86$ [5.52]	FC: $LN(T)=0.95 \times LN(X)-0.51$ [0.52]	FC: $LN(T)=0.89 \times LN(X)-0.02$ [0.71]	

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and in/out Distributions)

#### Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Resort Hotel	50%	100	100	200	72%	16	6	22	43%	6	7	13	
Apartments	50%	55	55	110	23%	2	8	10	63%	9	5	14	
Totals		155	155	310		18	14	32		15	12	27	



## Lincoln Medical Center Proposed

## Trip Generation October 2018

Appendix D

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual* and *Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

### Box 1 - Define Study Site Land Use Type & Site Characteristics, Box 2 - Define Site Context and Box 3 - Define Analysis Objectives Types of Trips & Time Period

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The *Manual* does not have data for all settings of all land use codes. The "General Urban/Suburban" setting is used by default.

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

### Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Medical, dental or health office buildings and clinics	31,000 1,000 square feet	720	Medical-Dental Office Building

### Box 4 - Is Study Site Multimodal?

Per the *Handbook*, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the Box 5 through 8 approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicular trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve ("Type: Equation Used [Equated Rate])

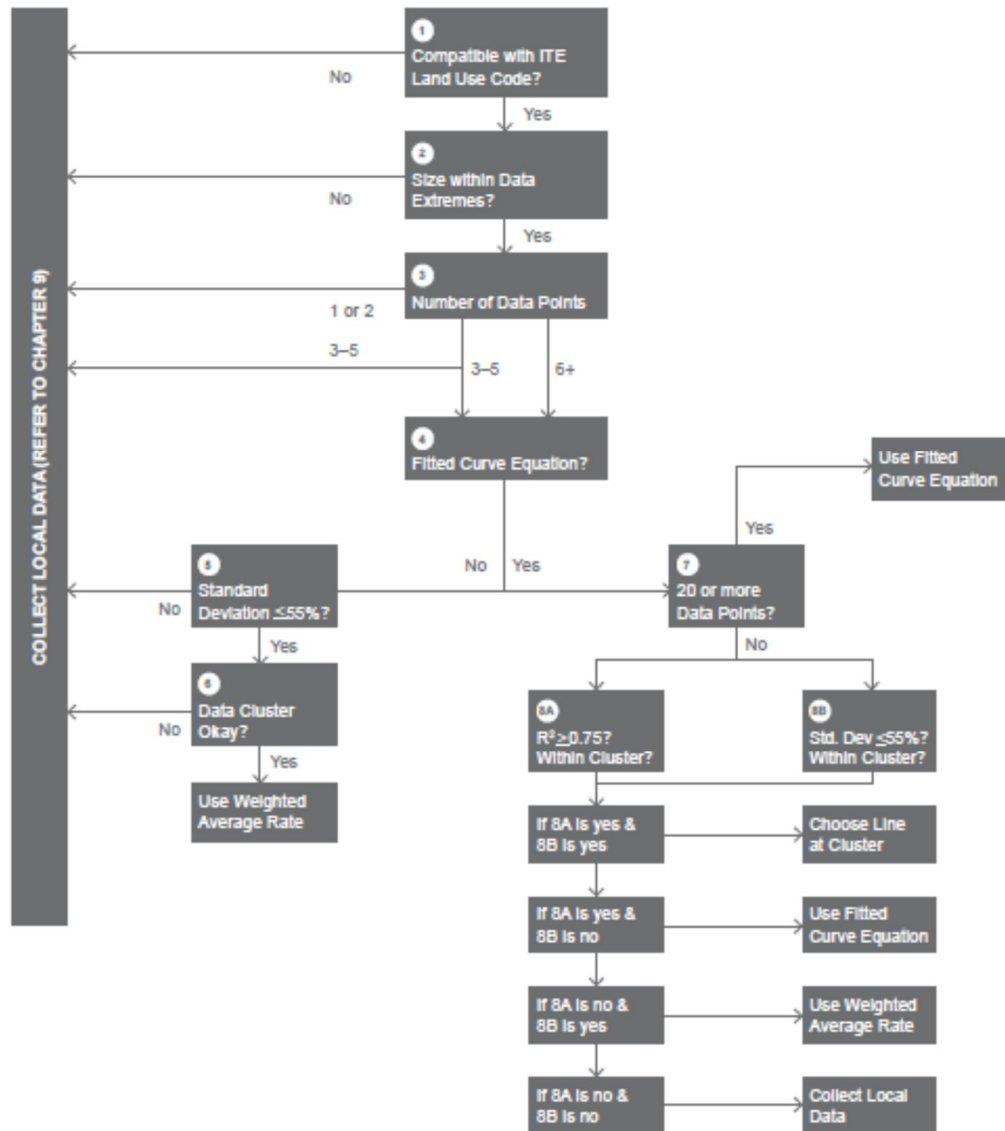
Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Medical, dental or health office buildings and clinics	FC: $T=38.42 \times X-87.62$ [35.59]	FC: $LN(T)=0.89 \times LN(X)+1.31$ [2.54]	FC: $T=3.39 \times X+2.02$ [3.46]	

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and In/out Distributions)

### Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Medical, dental or health office buildings and clinics	50%	552	552	1,104	78%	62	17	79	28%	30	77	107	
<b>Totals</b>		<b>552</b>	<b>552</b>	<b>1,104</b>		<b>62</b>	<b>17</b>	<b>79</b>		<b>30</b>	<b>77</b>	<b>107</b>	

Figure 4.2 Process for Selecting Average Rate or Equation  
in Trip Generation Manual Data



1 ✓  
2 X → COLLECT LOCAL DATA  
3 ✓  
4 ✓  
7 X  
8a X } NO \$ YES  
8b ✓ } USE AVG

## Resort Hotel (330)

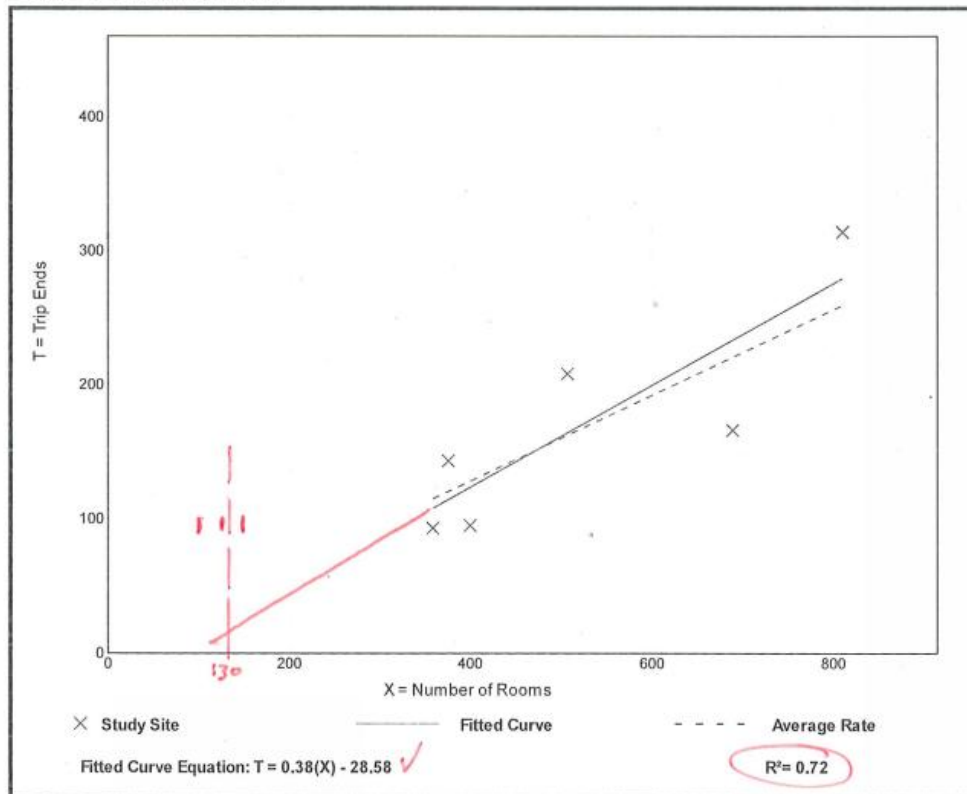
Vehicle Trip Ends vs: Rooms  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.  
Setting/Location: General Urban/Suburban  
Number of Studies: 6  $\geq 6$  &  $< 20$   
Avg. Num. of Rooms: 524  
Directional Distribution: 72% entering, 28% exiting

### Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.32	0.24 - 0.41	0.08

$$\frac{0.08}{0.32} = 0.25$$

### Data Plot and Equation



1 ✓  
2 ✓  
3 ✓  
4 ✓  
7 X

8a ✓ } YES & YES  
8b ✓ } USE WEST CLUSTER

## Resort Hotel (330)

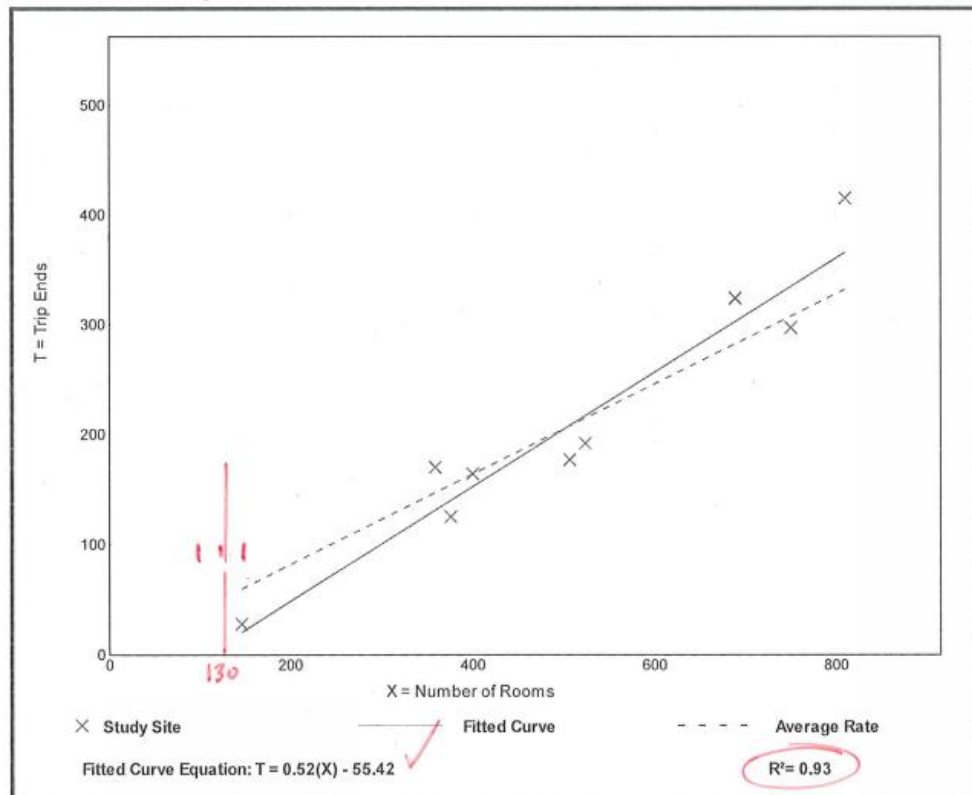
Vehicle Trip Ends vs: Rooms  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 4 and 6 p.m.  
Setting/Location: General Urban/Suburban  
Number of Studies: 9  $\geq 6$  &  $< 20$   
Avg. Num. of Rooms: 507  
Directional Distribution: 43% entering, 57% exiting

### Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.41	0.19 - 0.51	0.08

$$\frac{0.08}{0.41} = 0.195$$

### Data Plot and Equation





## **APPENDIX 2**

CivTech Revised Trip Generation Calculations

## Smoke Tree Resort

Proposed

## Trip Generation

November 2018

Appendix D

### Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual and Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

### Box 1 - Define Study Site Land Use Type & Site Characteristics

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

#### Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Resort Hotel	150 Rooms	330	Resort Hotel
Condos	30 Dwelling Units	220	Multifamily Housing (Low-Rise)
Quality Restaurant	3,500 1,000 square feet	931	Quality Restaurant

### Box 2 - Define Site Context

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The *Manual* does not have data for all settings of all land use codes. See the table on the next page titled "Site Context and Time Periods" - if this table is not provided, the "General Urban/Suburban" setting is used by default.

### Box 3 - Define Analysis Objectives Types of Trips & Time Period

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

### Box 4 - Is Study Site Multimodal?

Per the Handbook, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the Box 5 through 8 approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)





## Smoke Tree Resort

Proposed

## Trip Generation

November 2018

Appendix D

Vehicle trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve ("FC"), or Custom ("C"))

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Resort Hotel	WA: [ ]	FC: $T=0.38 \cdot X-28.58$ [0.19]	FC: $T=0.52 \cdot X-55.42$ [0.15]	
Condos	FC: $T=7.56 \cdot X-40.86$ [6.20]	FC: $\ln(T)=0.95 \cdot \ln(X)-0.51$ [0.51]	FC: $\ln(T)=0.89 \cdot \ln(X)-0.02$ [0.67]	
Quality Restaurant	WA: $T=X \cdot 83.84$ [83.84]	WA: $T=X \cdot 0.73$ [0.73]	WA: $T=X \cdot 7.8$ [7.80]	

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and in/out Distributions)

### Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Resort Hotel	50%	389	389	778	72%	42	17	59	43%	32	43	75	
Condos	50%	93	93	186	23%	3	12	15	63%	13	7	20	
Quality Restaurant	50%	147	147	294	0%	0	3	3	67%	18	9	27	
Totals		629	629	1,258		45	32	77		63	59	122	

### Box 6 - Convert Baseline Vehicle Trips to Person Trips

If no vehicle trip reductions are to be applied, this portion may be ignored. The *Handbook* states "There are not enough samples to derive precise percentages by mode...however, for all but one, ...the motor vehicle percentage of total person trips is at least 90 percent." and "[vehicle occupancy for] many of the most commonly analyzed land use codes are not [available]." This form assumes that the total baseline vehicle trips for all land use codes accounts for 90% of total person trips. Unless otherwise specified, this form later reverses the conversion in Box 8.

### Box 7 - Estimate Internal Person Trips, External Walk/Bike Trips, Transit Person Trips, External Person Trips (Internal Capture)

Internal capture occurs for mixed-use developments when a portion of the trips generated by the site are expected to have the both the origin and destination within the site. Internal capture is



## Smoke Tree Resort

Proposed

## Trip Generation

November 2018

Appendix D

not dependent on mode choice. The table below presents the internal capture percentages and trips in units of vehicle trips. CivTech can provide trips in units of persons if requested.

### Adjustments for Internal Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total	
Resort Hotel	0%	0	0	0	0%	0	0	0	0%	0	0	0	
Condos	0%	0	0	0	0%	0	0	0	0%	0	0	0	
Quality Restaurant	50%	74	74	148	50%	0	2	2	50%	9	5	14	
<b>Totals</b>		<b>74</b>	<b>74</b>	<b>148</b>		<b>0</b>	<b>2</b>	<b>2</b>		<b>9</b>	<b>5</b>	<b>14</b>	

### Box 8 - Convert Person Trips to Final Vehicle Trips

The vehicle occupancy and baseline alternate mode are now factored out from the external trips in vehicles, after any adjustments for internal capture and additional alternate mode from Box 7. In Box 6, vehicle trips were considered to account for 90% of total person trips. Alternate mode trips in addition to the baseline, if any, are accounted for in Box 7. It is estimated that vehicle trips should be reduced by an additional 0% due to carpooling. The final external trips in vehicles is multiplied by  $90\% - 0\% = 90\%$  to produce the external vehicle trips.

### External Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	In	Out	Total		In	Out	Total		In	Out	Total		
<b>Totals</b>	<b>555</b>	<b>555</b>	<b>1,110</b>		<b>45</b>	<b>30</b>	<b>75</b>		<b>54</b>	<b>54</b>	<b>108</b>		

### Box 10 - Estimate Vehicle Trip Subsets Pass-by/Diverted Trips, Truck Trips (Pass-By Trips)

Some trips may be classified as "pass-by" trips, where some vehicle trips generated by the study site are already traveling on an adjacent road and make a stop while passing by. These trips do not add traffic volume to the roadway. The Handbook does not specify that a "pair" of pass-by trips must enter and exit the same driveway. The current edition of the Handbook indicates that pass-by trips should have directional distribution applied (%in/%out), though reviewers often comment when pass-by trip "pairs" do not occur within a the specified time period. This is likely due to ease of calculation and traditional methodology found in the first edition of the Handbook. As such, the analyst may ignore the direction distribution divide the total pass-by trip volume by 2 to apply pass-by "pairs". In addition, the analyst may consider pass-by rates at a reduced rate. Data is not available for all land use codes and all periods, assumptions are highlighted. The percentage is applied to total external vehicle trips.

## Lincoln Medical Proposed

## Trip Generation November 2018 Appendix D

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual* and *Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

**Box 1 - Define Study Site Land Use Type & Site Characteristics**, **Box 2 - Define Site Context** and **Box 3 - Define Analysis Objectives Types of Trips & Time Period**

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The *Manual* separates data into 4 setting categories - **Rural**, **General Urban/Suburban**, **Dense Multi-Urban Use** and **Center City Core**. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The *Manual* does not have data for all settings of all land use codes. The "General Urban/Suburban" setting is used by default. This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

### Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Medical, dental or health office buildings and clinics	32,630 1,000 square feet	720	Medical-Dental Office Building

### Box 4 - Is Study Site Multimodal?

Per the *Handbook*, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the *Box 5 through 8* approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicular trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the *Handbook* has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve ("Type: Equation Used [Equated Rate])

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Medical, dental or health office buildings and clinics	FC: $T=38.42 \times X^{-0.72}$ [35.74]	FC: $LN(T)=0.89 \times LN(X)+1.31$ [2.53]	FC: $T=3.39 \times X+2.02$ [3.45]	

### Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and In/out Distributions)

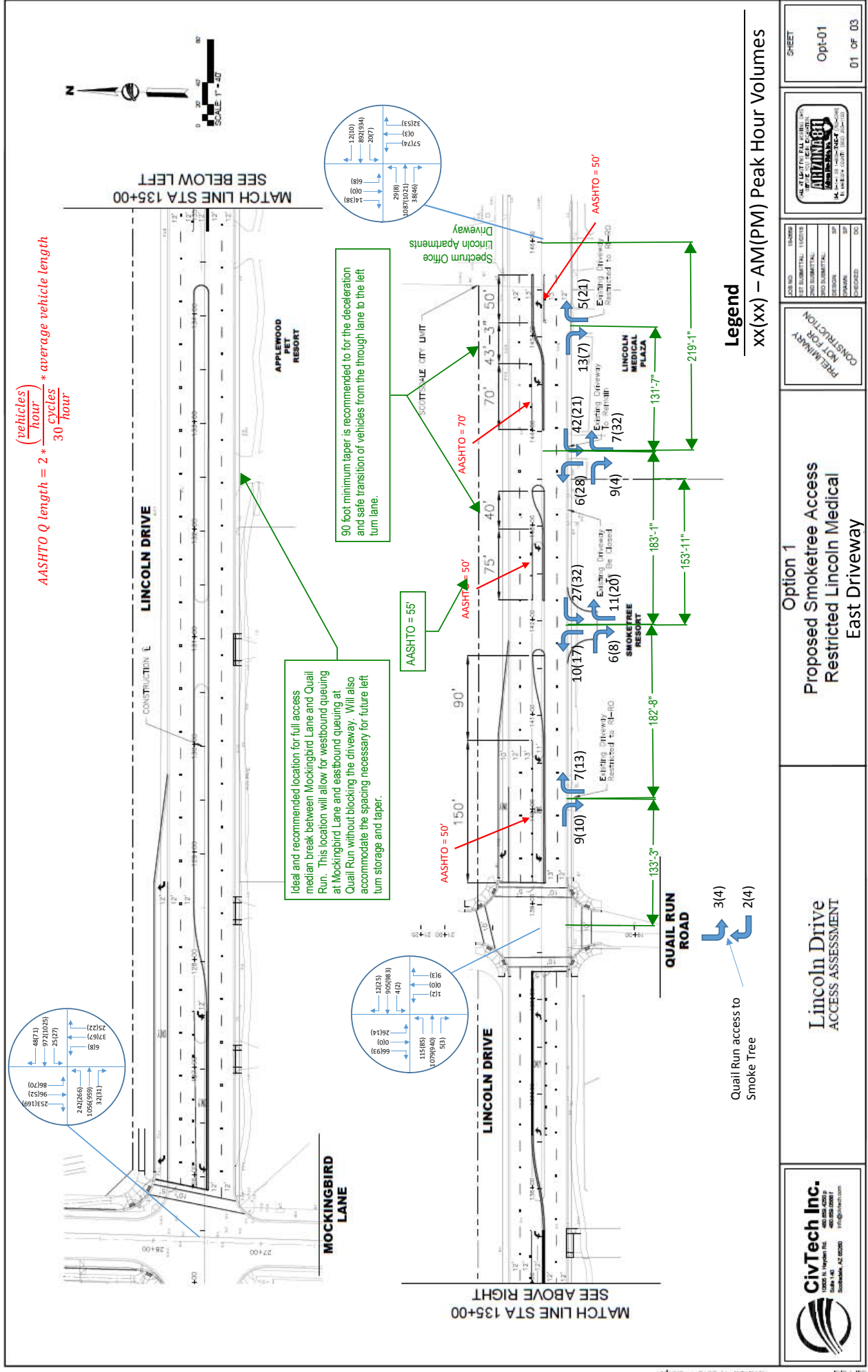
#### Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				(not used)
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
Medical, dental or health office buildings and clinics	50%	583	583	1,166	78%	64	18	82	28%	32	81	113	
<b>Totals</b>		<b>583</b>	<b>583</b>	<b>1,166</b>		<b>64</b>	<b>18</b>	<b>82</b>		<b>32</b>	<b>81</b>	<b>113</b>	

## **APPENDIX 3**

Kimley-Horn Comments on  
CivTech Access Assessment Option 1 through 3

$$\text{AASHTO } Q \text{ length} = 2 * \frac{\left(\frac{\text{vehicles}}{\text{hour}}\right)}{30 \text{ cycles per hour}} * \text{average vehicle length}$$



# Legend

xx(xx) – AM(PM) Peak Hour Volumes

**CivTech Inc.**  
1000 N. Hayden Rd.  
Suite 100  
Tempe, AZ 85280  
480.885.6000  
info@civtech.com

Lincoln Drive  
ACCESS ASSESSMENT

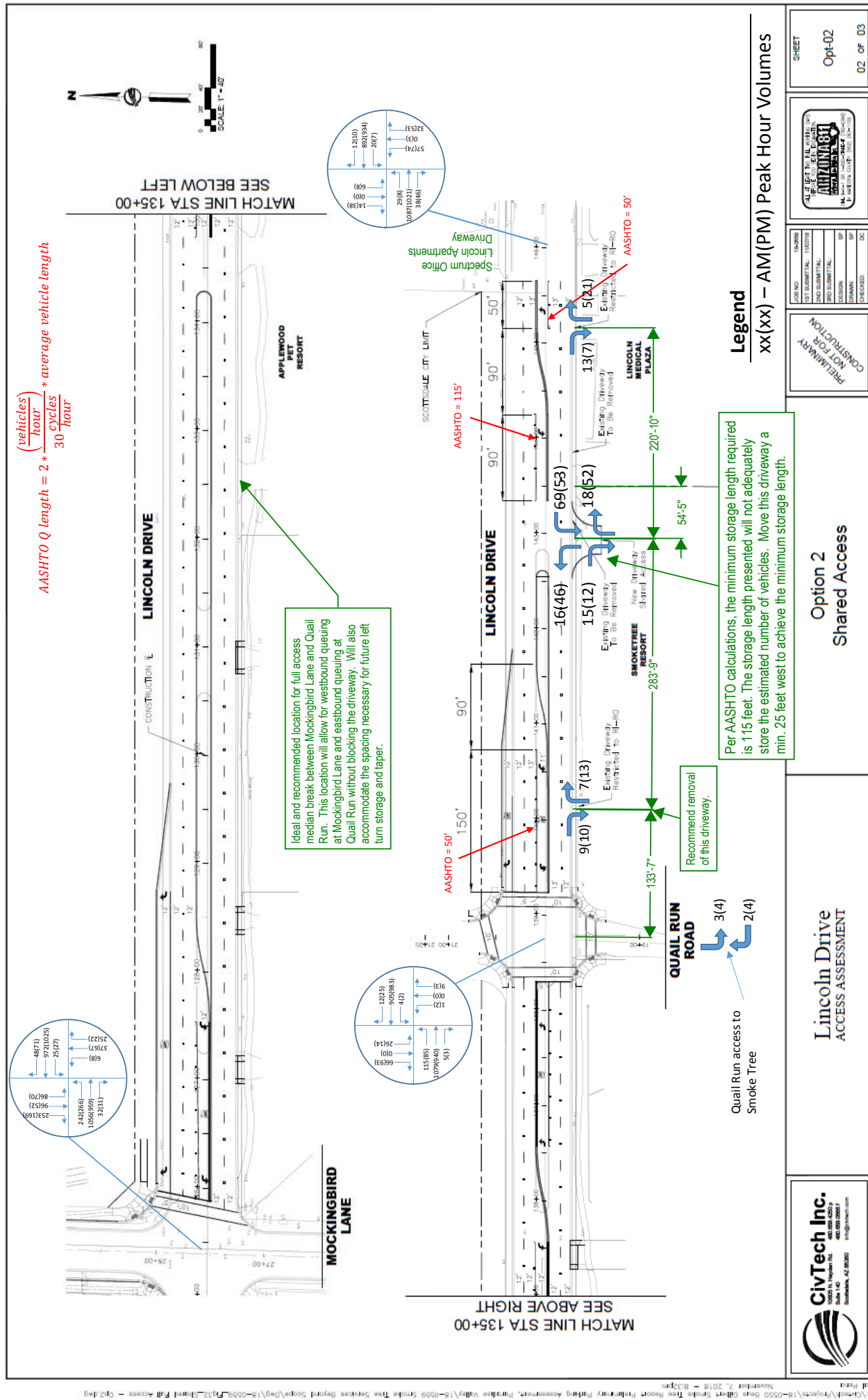
Option 1  
Proposed Smoke Tree Access  
Restricted Lincoln Medical  
East Driveway

PRELIMINARY  
NOT FOR  
CONSTRUCTION

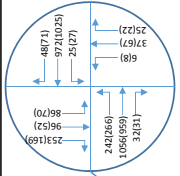
JOB NO.	100000	DATE	01/01/2018
BY	100000	DATE	01/01/2018
DESIGN	100000	DATE	01/01/2018
CHECKED	100000	DATE	01/01/2018

SHEET  
Opt-01  
01 OF 03



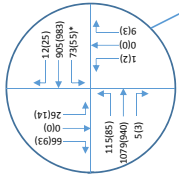


$$AASHTO\ Q\ length = 2 * \frac{\left(\frac{vehicles}{hour}\right)}{30\ cycles\ per\ hour} * average\ vehicle\ length$$



**MOCKINGBIRD LANE**

\*Note: 69(53) are trips from LMC turning to head east



SEE ABOVE RIGHT  
MATCH LINE STA 135+00

**LINCOLN DRIVE**

Ideal and recommended location for full access median break between Mockingbird Lane and Quail Run. This location will allow for westbound queuing at Mockingbird Lane and eastbound queuing at Quail Run without blocking the driveway. Will also accommodate the spacing necessary for future left turn storage and taper.

AASHTO = 50'

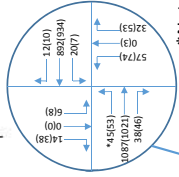
**QUAIL RUN ROAD**

Quail Run access to Smoke Tree



Recommend driveway be moved west to increase the spacing from Lincoln Medical Plaza western driveway. We further recommend that the western driveway be removed to increase the spacing from Quail Run.

AASHTO = 50'



\*Note: 16(45) are trips from LMC turning to head west

**LINCOLN DRIVE**

AASHTO = 50'

## Legend

xx(xx) – AM(PM) Peak Hour Volumes



**Lincoln Drive  
ACCESS ASSESSMENT**

**Option 3  
Restricted Access**

**PRELIMINARY  
NOT FOR  
CONSTRUCTION**

DATE	10/10/2018
BY	10/10/2018
FOR	10/10/2018
PROJECT	10/10/2018
DESIGN	10/10/2018
CONSTRUCTION	10/10/2018
DATE	10/10/2018
BY	10/10/2018
FOR	10/10/2018
PROJECT	10/10/2018
DESIGN	10/10/2018
CONSTRUCTION	10/10/2018



SHEET  
Opt-03  
03 OF 03

# LINCOLN PLAZA MEDICAL CENTER TRAFFIC IMPACT ANALYSIS

**7125 E Lincoln Drive  
Town of Paradise Valley, Arizona**

**Prepared for:**  
Withey Morris, PLC  
2525 East Arizona Biltmore Circle, Suite A-212  
Phoenix, Arizona 85016

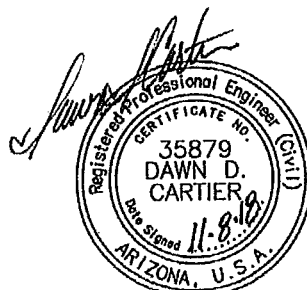
**For Submittal to:**  
Town of Paradise Valley

---

**Prepared By:**



CivTech, Inc.  
10605 North Hayden Road  
Suite 140  
Scottsdale, Arizona 85260  
(480) 659-4250



Expires 3-31-2019

---

**November 2018**

CivTech Project No. 18-0940

✓ FULL STUDY,  
ON FILE WITH  
TOWN ENGINEER



## EXECUTIVE SUMMARY

This report documents a traffic impact analysis performed for the proposed Lincoln Plaza Medical Center south of Lincoln Road between Mockingbird Lane and Scottsdale Road in the Town of Paradise Valley. The proposed development will consist of 32,639 square feet (SF) of gross leasable floor area (GLA). The redevelopment will reconstruct an existing medical office building of 28,952 SF of GLA. This new development adds just 3,687 SF of GLA which minimizes the impact of new traffic.

CivTech, Inc. has been retained by Withey Morris, PLC to perform the traffic impact study for the proposed redevelopment. The purpose of this assessment is to address the traffic and transportation impacts of the proposed development on the surrounding streets and intersections.

The following conclusions have been documented in this study.

### Existing Conditions

- The results of the existing conditions analysis indicates that all intersections currently operate at an overall acceptable level of service (LOS D or better), with the exception of the intersections of Apartment Driveway & Lincoln Drive and AJ's Driveway & Lincoln Drive under the existing lane configurations depicted in **Figure 2**.
  - The intersections of **Apartment Driveway & Lincoln Drive** and **AJ's Driveway & Lincoln Drive** experience delays in the northbound left turn approach and southbound left turn. Both of these approaches and driveways are driveways for AJ's Fine Foods and existing Apartments. It is possible that a raised median will be installed along the length of Lincoln Drive.

### Opening Year 2020 and Horizon Year 2025

- The results of the Synchro analysis indicates that all study intersections are anticipated to experience an acceptable level of service during the 2020 and 2025 horizon years, with the exception of the intersections of Apartment Driveway & Lincoln Drive and AJ's Driveway & Lincoln Drive.
  - The intersections of **Apartment Driveway & Lincoln Drive** and **AJ's Driveway & Lincoln Drive** experience delays in the northbound left turn approach and southbound left turn. Both of these approaches and driveways are driveways for AJ's Fine Foods and the existing Lincoln Apartments. The addition of Lincoln Medical Center is not the cause of these delays, which remains consistent with the existing condition. It is possible that a raised median will be installed along the length of Lincoln Drive. If this is true, then these movements would be restricted and no longer cause delay.

Queue Storage and Sight Distance

- According to the CivTech study done for the Ritz Carlton, the newly signalized intersection of Quail Run Road and Lincoln Drive will have eastbound/westbound left turn lanes and a westbound right turn lane striped with 150 feet of storage each. The recommended storage lengths are provided for horizon year 2025 using the total traffic projections.
- There are no existing obstructions to sight distance within the project intersections or along the included corners of the proposed intersection. Adequate site distance must be provided at the intersections to allow safe left and right turning movements from the development
  - The contractor should ensure that sight visibility is provided at all proposed intersections according to the distances shown in **Table 9** and that sight triangles at public intersections are maintained according to the Town Code. All vegetation and trees should be maintained according to Town of Paradise Valley regulations.
- The Lincoln Medical Center is requesting a full access at its western most entrance anticipating that the addition of a median will restrict the eastern most driveway to a right in/right out.
  - The required westbound left turn storage requirement for this movement is 25 feet, which is the minimum requirement based on AASHTO standards.
  - The design would require an exception to the standard 90 foot taper length in order to provide the required queue for the back to back left turns.
  - An option to retain the existing two-way left turn lane along the frontage of Lincoln Medical Center has been discussed. If desired, the easternmost driveway should be modified to allow right in and right out movements only.
  - Should all driveways for Lincoln Medical Center be restricted to right in/right out only, people egressing westbound would be required to turn eastbound and then use a driveway (likely the existing Lincoln Apartment driveway) to turn around and head west. Lincoln Drive is not wide enough to permit U-turn movements for all vehicles. This same condition would exist for westbound ingress movements.

## INTRODUCTION

The proposed site is currently the location of Endocrinology Associates PA. The redevelopment will consist of 32,639 square feet (SF) of medical office. The site is located on the south side of Lincoln Drive between Mockingbird Lane and Scottsdale Road.

### Study Requirements

This study analyzes the traffic impact due to the proposed development on the surrounding street network. The study will be prepared in conformance with the Town of Paradise Valley's Traffic Impact Analysis (TIA) Criteria and Traffic Impact Statement (TIS) Criteria, May 2015. The specific objectives of the study are:

- ◆ To determine whether the planned street system in the vicinity of the site is adequate to accommodate the increased traffic that results from the proposed development.
- ◆ To recommend additional street improvements or traffic control devices, where necessary, and to mitigate the additional site-generated traffic

### Study Area

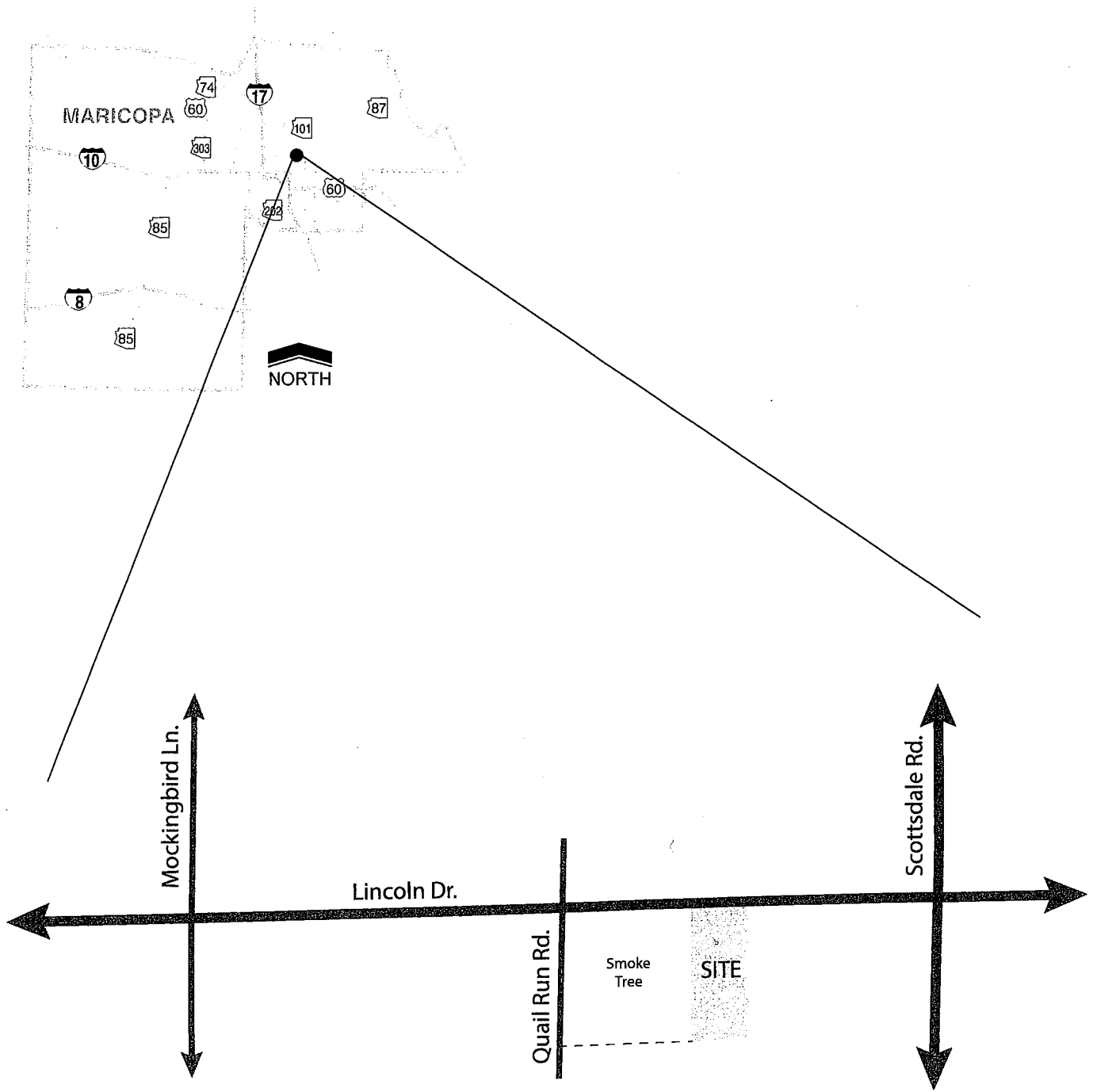
This study is classified as a Category 1 TIA meaning the study area is defined as all signalized and major unsignalized intersections within a ¼ -mile radius of the site. The following study area intersections have been evaluated:

- Mockingbird Lane & Lincoln Drive
- Quail Run Road & Lincoln Drive
- Smoke Tree Driveway West & Lincoln Drive
- Smoke Tree Driveway East & Lincoln Drive
- Medical Office Driveway West & Lincoln Drive
- Medical Office Driveway East & Lincoln Drive
- Apartment Driveway & Lincoln Drive
- AJ's Driveway & Lincoln Drive
- Scottsdale Road & Lincoln Drive

### Horizon Years

Per the study requirements, a Category 1 Traffic Impact and Mitigation Analysis is required. Analysis will be conducted on the current conditions, the opening year and opening plus five years.

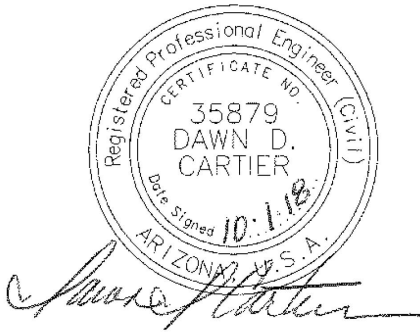
It is assumed that development will open in October 2020. For purposes of this study, the development will be assumed fully built out by 2020. Therefore, the analysis years to be analyzed for this study include opening year 2020 and horizon year 2025. A location map of the study area is provided in **Figure 1**.



**Figure 1:** Vicinity Map

# **LINCOLN MEDICAL CENTER REDEVELOPMENT PARKING ANALYSIS**

**7125 E. Lincoln Drive  
Town of Paradise Valley**



**Prepared for:**

Withey Morris, PLC  
2525 East Arizona Biltmore Circle, Suite 212  
Phoenix, AZ 85016

**By:**

CivTech, Inc.  
8590 East Shea Boulevard, Suite 130  
Scottsdale, Arizona 85350  
(480) 659-4250

**October 2018  
CivTech Project # 18-0940**

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The Lincoln Medical Center (LMC) redevelopment is located at 7125 E. Lincoln Drive. The existing LMC site encompasses approximately 2.14 acres and consists of approximately 25,000 square feet of medical office land uses. The proposed redevelopment consists of approximately 31,000 square feet of medical office land use.

CivTech has prepared a parking study that addresses the number of spaces for the proposed medical offices considering parking ratios calculated for another medical center located in the Town of Paradise Valley as well as the future characteristics of the development. The parking analysis will be completed to meet the requirements of the Town of Paradise Valley.

## EXISTING CONDITIONS

Currently, LMC is approximately 25,000 square feet (SF) of gross leasable area (GLA) with 153 existing parking spaces (147 traditional parking spaces and 6 ADA parking spaces). The existing medical center is being redeveloped to provide an updated facility that will support similar uses to those currently located at the facility. Many of the tenants are no longer located in the building since leases are not being renewed prior to redevelopment of the building. Therefore existing parking counts could not be conducted to determine the existing parking rate.

## PARKING COUNTS AT A SIMILAR MEDICAL FACILITY IN THE TOWN OF PV

The MVMC, located at 10555 North Tatum Boulevard, consists of 6 existing buildings located on the southeast corner of Tatum Boulevard and Shea Boulevard. It currently consists of 59,969 gross square feet of medical office. Approximately 9,447 SF were vacant at the time of the parking count was conducted. There are a total of 331 existing parking spaces on site including 305 regular spaces and 26 ADA spaces. The existing site plan and unit information can be found in **Appendix B**.

Existing parking counts were conducted every 30 minutes on June 7<sup>th</sup> (Thursday) from 6:00AM to 10:00 PM. The existing conditions parking counts and resulting parking rate calculations are included in **Appendix B**. The results for the weekday count are summarized in **Table 1**.

**Table 1 – Existing Parking Summary**

Day	Time at Peak Use	Regular	ADA	Total
Existing Total Spaces	-	305	26	331
June 7 <sup>th</sup> (Thursday)	10:30AM	194	7	201
Max Spaces Occupied				201
Excess (Deficit) No. of Spaces				130
Excess (Deficit) Pct. of Spaces				39%

The results of the existing parking counts concluded that the parking peak occupancy on June 7<sup>th</sup> was 201 parking spaces at 10:30AM with 194 regular spaces and 7 ADA spaces occupied. There are 130 excess parking spaces (39%) on the weekday of the total 331 existing parking spaces. With the current vacancies, the existing medical office has 50,522 SF in use with a maximum of 201 spaces occupied resulting in a parking rate of approximately 0.8 parking spaces for every 200 SF.

The parking spaces and ratio were determined for the summer months. Information provided by the existing owner/tenants suggested that summer parking utilization was 90% of the winter utilization. To determine the maximum parking for the winter months an adjustment was applied

to the summer maximum parking space utilization. The calculated winter maximum parking space utilization is approximately 222 parking spaces resulting in a parking rate of approximately 0.88 parking spaces per 200 square feet.

### PROPOSED DEVELOPMENT

The proposed redevelopment at buildout consists of approximately 31,000 square feet of medical center and a proposed 146 parking spaces, including 6 accessible parking spaces. The proposed parking rate is 0.88 parking spaces per 200 square feet or 4.4 parking spaces for every 1000 SF. It is customary to consider an increase in parking of five percent to account for circulation and ease of locating a parking space. With this considered, the parking rate is increased to 4.62 spaces for every 1000 SF.

The Special Use Permit (SUP) Guidelines for Paradise Valley provides the Town's Code for on-site parking requirements for medical office. The SUP Guidelines suggest that 1 parking space for every 200 SF of interior floor area should be provided. The parking information shown in the SUP Guidelines for the proposed medical office are summarized in **Table 3**.

**Table 2 – Summary of SUP Guidelines Parking Requirements**

Land Use	Size	Requirements Per SUP Guidelines	Required Parking Spaces
Medical Office	31,000 SF	1 Parking Space Per 200 SF	155

The Code required parking results using the SUP Guidelines for the LMC redevelopment of 31,000 SF of medical center will require 155 parking spaces.

The existing parking ratio calculations from actual field observations results in fewer parking spaces per SF of the building than the SUP Guidelines require. The count conducted at a similar facility yielded a rate of 4.62 spaces per 1000 SF when considering vacancies, an increase in usage by 10 percent in the winter months, and a 5% circulation factor. The comparison between the actual parking rate calculated from the MVMC and the SUP guideline parking rate are provided in **Table 3** for the proposed 31,000 square foot medical facility.

**Table 3 – Summary of Parking**

Land Use	Size	Requirements	Required Parking Spaces
Medical Office	31,000 SF	SUP Guidelines: 1 Parking Space Per 200 SF	155
		Existing Calculations: 4.4 Parking Spaces Per 200 SF	137
		Existing Adjusted Calculations: 4.62 Parking Spaces Per 1000 SF	144

The medical office requires approximately 155 parking spaces to meet requirements shown in the SUP Guidelines. A total of 144 parking spaces are needed at the LMC redevelopment to provide an adequate supply to support the proposed use. The development proposes to provide 146 parking spaces which exceeds the expected demand.

The Town of Paradise Valley parking rates include different requirements for specific types of medical offices such as pharmacy (1 space per 300 SF), outpatient surgical facilities (1 space per 2 employees plus 1 space per surgical room), medical laboratories (1 space per 2 employees) and physical therapy facilities (1 space per 1.5 employees) which can result in lower parking needs. The City of Scottsdale, in comparison, requires 1 space per 250 SF of



medical office which the proposed redevelopment meets and exceeds. Furthermore, the growth in prominence of passenger transport services may have some effect in parking needs, though this analysis does not evaluate this mode individually.

The parking supply proposed by the LMC redevelopment will continue to facilitate acceptable operations at the facility.

## CONCLUSIONS

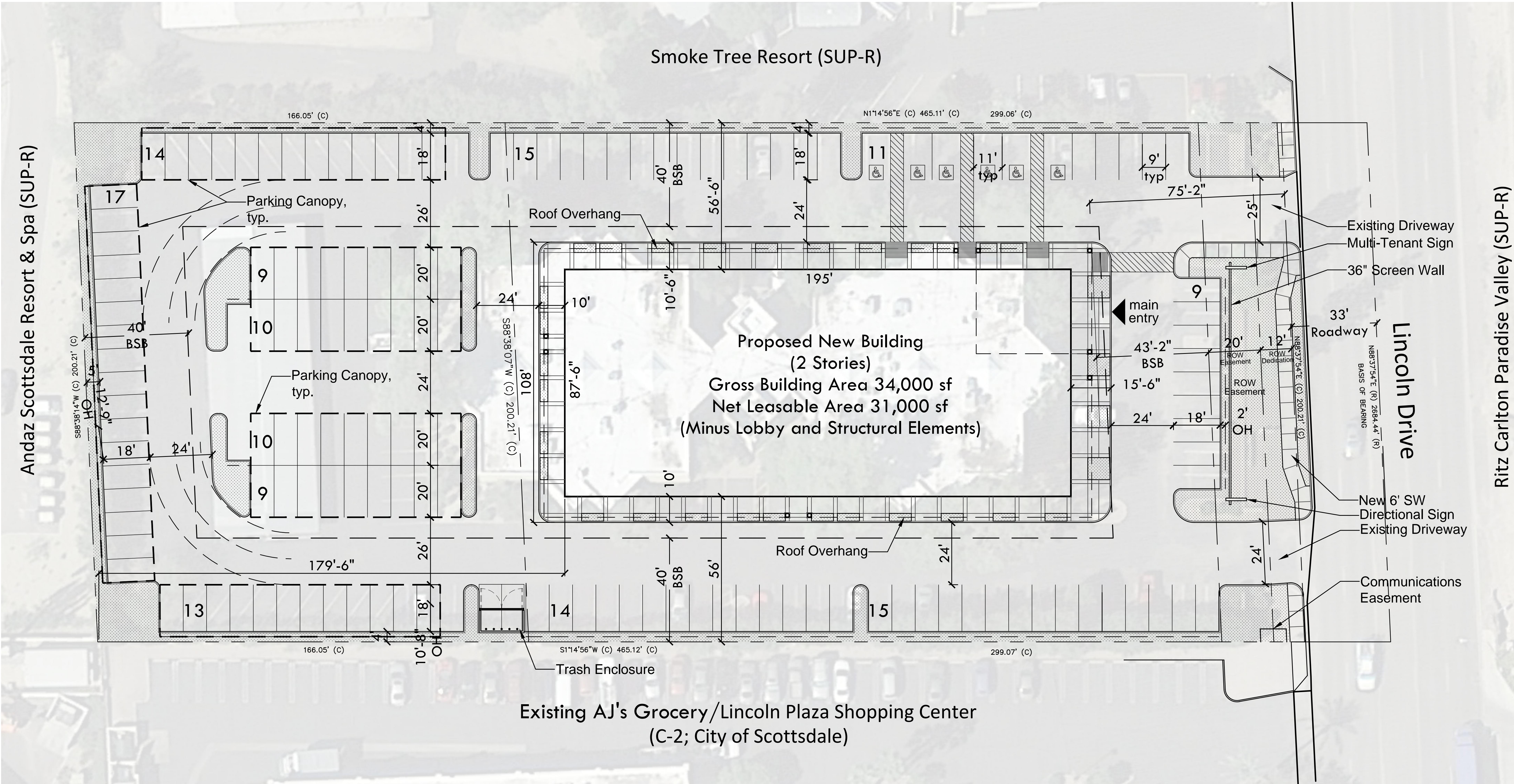
The LMC redevelopment parking evaluation findings are summarized below:

- The proposed redevelopment at buildout consists of approximately 31,000 square feet of medical center. A total of 144 parking spaces are needed at the LMC redevelopment to provide an adequate supply to support the proposed use. The development proposes to provide 146 parking spaces which exceeds the expected demand.
  - The medical office requires approximately 155 parking spaces per the SUP Guidelines.
  - Using the actual rate calculated for a similar medical facility and applying that rate to the proposed redevelopment, a total of 144 parking space would be required.
  - The Town of Paradise Valley parking rates include different requirements for specific types of medical offices such as pharmacy (1 space per 300 SF), outpatient surgical facilities (1 space per 2 employees plus 1 space per surgical room), medical laboratories (1 space per 2 employees) and physical therapy facilities (1 space per 1.5 employees) which can result in lower parking needs.
  - The City of Scottsdale, in comparison, requires 1 space per 250 SF of medical office which the proposed redevelopment meets and exceeds
- The parking supply proposed by the LMC redevelopment will continue to facilitate acceptable operations at the facility.

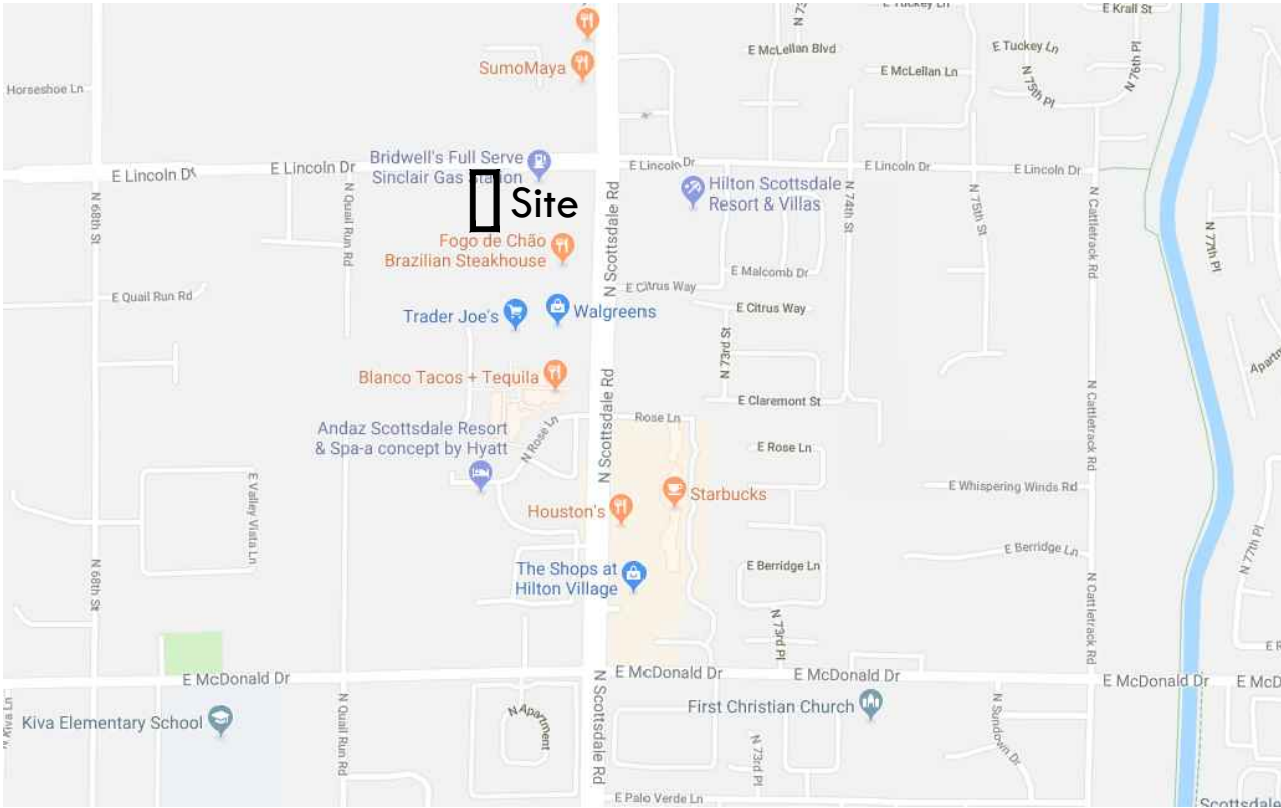
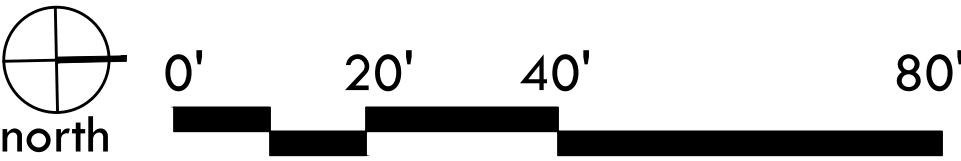
## APPENDIX

## **APPENDIX A SITE PLAN AND UNIT INFORMATION**





Master Site Plan



Vicinity Map N.T.S.

Legal Description

THE EAST 200 FEET OF THE NORTH HALF OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER; AND THE EAST 200 FEET OF THE NORTH HALF OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 10, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

Project Information

Project Name	Lincoln Medical Plaza
Project Address	7125 E. Lincoln Drive Paradise Valley, AZ 85253
Owner	Jamel Greenway, LLC 4771 N. 20th Street, Suite B22 Phoenix, AZ 85016 Contact: Lynn Evans Tel: 602-710-2122 Email: Lynn@tandcshops.com
Architect	suite6 architecture + planning 6111 N. Cattletrack Road Scottsdale, AZ 85250 Tel: 480-348-7800 Email: dean@suite6.net

Project Data

Net Site Area	± 93,023 sf ± 2.13 ac	
Lot Coverage		
Building	17,060 sf	18.3 %
Roof Overhang	4,560 sf	4.9 %
Covered Parking	14,040 sf	15.1 %
Total	35,660 sf	38.3 %
Net Leasable	existing	proposed
FAR	25,444 sf ± 0.27	31,000 sf ± 0.33
Building Height	30'	36'
Parking Std.	147 sp	140 sp
Parking ADA	6 sp	6 sp
Parking Total	153 sp	146 sp
Parking Ratio	6.0/1000	4.7/1000



Jamel Greenway, LLC  
4771 N. 20th Street,  
Suite B22  
Phoenix, AZ 85016

Ownership:

7125 Lincoln  
Medical Office  
Paradise Valley, Arizona

- ▲ Development Review Set
- △ Bid Set
- △ City Submittal
- △ Construction Set

Revisions:

Ownership of Instruments of Service:

This drawing is not to be used or reproduced without the consent of Suite 6 Architecture + Planning, Inc. The designs, images, and concepts on this drawing are the property of Suite 6 Architecture + Planning, Inc.

Seal  
Date: October 1, 2018  
Project Number: 598  
Drawn by: dm/rdb  
Sheet Number

A1.0  
Master Site Plan



## **APPENDIX B EXISTING COUNTS AND CALCULATIONS**

PVMC PARKING COUNT DATA COLLECTION  
THURSDAY JUNE 7, 2018

Location		A		B		C		D		E		F	
BEGIN	END	Regular	Handicap	Regular	Handicap	Regular	Handicap	Regular	Handicap	Regular	Handicap	Regular	Handicap
Spaces from aerial		19	3	25	1	120	9	40	6	69	4	25	3
Verified Spaces		19	3	25	1	120	9	40	6	69	4	25	3
7:00	7:30	3	0	8	0	13	0	8	1	5	0	0	0
7:30	8:00	6	0	11	0	16	0	11	1	9	0	1	0
8:00	8:30	9	0	15	0	21	0	14	1	12	0	1	0
8:30	9:00	16	1	20	0	41	2	26	2	35	1	6	0
9:00	9:30	17	2	21	0	44	4	33	1	41	3	10	0
9:30	10:00	18	2	20	0	68	4	32	2	38	3	11	0
10:00	10:30	17	2	22	0	60	3	34	1	40	2	11	0
10:30	11:00	17	1	22	0	65	3	33	1	44	2	13	0
11:00	11:30	16	1	21	0	65	4	33	1	45	2	12	0
11:30	12:00	18	0	14	1	61	5	25	2	42	1	12	0
12:00	12:30	12	0	16	1	63	4	17	4	37	1	15	0
12:30	1:00	11	2	12	1	51	4	17	4	36	0	15	0
1:00	1:30	13	2	9	0	44	3	16	3	27	0	20	1
1:30	2:00	12	1	8	0	44	3	18	3	26	0	22	1
2:00	2:30	16	0	16	0	50	2	24	4	29	1	20	0
2:30	3:00	16	0	20	0	53	1	31	2	31	1	20	0
3:00	3:30	17	0	22	0	51	3	32	2	35	0	10	0
3:30	4:00	16	1	23	0	53	2	32	1	34	0	7	0
4:00	4:30	16	0	20	0	40	1	28	0	25	0	6	0
4:30	5:00	12	0	17	0	32	0	20	0	14	1	6	0
5:00	5:30	9	0	12	0	14	0	18	0	11	0	6	0
5:30	6:00	7	0	10	0	12	0	12	0	10	0	6	0
6:00	6:30	5	0	6	0	9	0	4	0	8	0	3	0

Time	A		B		C		D		E		F		Total Regular	Total ADA	Total
	Regular	ADA	Regular	ADA	Regular	ADA	Regular	ADA	Regular	ADA	Regular	ADA			
Existing Total Spaces	19	3	25	1	120	9	40	6	69	4	25	3	298	26	324
7:00 AM	3	0	8	0	13	0	8	1	5	0	0	0	37	1	38
7:30 AM	6	0	11	0	16	0	11	1	9	0	1	0	54	1	55
8:00 AM	9	0	15	0	21	0	19	1	12	0	1	0	77	1	78
8:30 AM	16	1	20	0	41	2	26	2	35	1	6	0	144	6	150
9:00 AM	17	2	21	0	44	4	30	1	41	3	10	0	163	10	173
9:30 AM	18	2	20	0	68	4	32	2	39	3	11	0	188	11	199
10:00 AM	17	2	22	0	60	3	34	1	40	2	11	0	184	8	192
10:30 AM	17	1	22	0	65	3	33	1	44	2	13	0	194	7	201
11:00 AM	16	1	21	0	65	4	33	1	45	2	12	0	192	8	200
11:30 AM	18	0	19	1	61	5	25	2	42	1	12	0	177	9	186
12:00 PM	12	0	16	1	63	4	17	4	37	1	15	0	160	10	170
12:30 PM	11	2	12	1	51	4	17	4	36	0	18	0	145	11	156
1:00 PM	13	2	9	0	44	3	16	3	27	0	20	1	129	9	138
1:30 PM	12	1	9	0	44	3	18	3	28	0	22	1	133	8	141
2:00 PM	16	0	16	0	50	2	29	4	29	1	20	0	160	7	167
2:30 PM	18	0	20	0	53	1	31	2	31	1	20	0	173	4	177
3:00 PM	17	0	22	0	51	3	32	2	35	0	10	0	167	5	172
3:30 PM	16	1	23	0	55	2	32	1	34	0	7	0	167	4	171
4:00 PM	16	0	20	0	40	1	28	0	25	0	6	0	135	1	136
4:30 PM	12	0	17	0	32	0	20	0	14	1	6	0	101	1	102
5:00 PM	9	0	12	0	19	0	18	0	11	0	6	0	75	0	75
5:30 PM	7	0	10	0	12	0	12	0	10	0	6	0	57	0	57
6:00 PM	5	0	6	0	9	0	4	0	8	0	3	0	35	0	35
Max Spaces Occupied														201	
Existing Spaces														324	
Excess (Deficit) No. of Spaces														123	
Excess (Deficit) Pct. of Spaces														38%	





September 5, 2018

Mr. Benjamin L. Tate  
 Withey Morris, PLC  
 2525 East Arizona Biltmore Circle, Suite A-212  
 Phoenix, Arizona 85016



**Subject: Trip Generation Comparison Statement for Lincoln Plaza Medical Center, 7125 East Lincoln Drive, Town of Paradise Valley, Arizona**

Dear Mr. Tate:

CivTech Inc. has been retained by Withey Morris, PLC to prepare a Trip Generation Comparison Statement for a proposed redevelopment of a single-tenant medical office in the Town of Paradise Valley, Arizona.

Currently, Lincoln Medical Center is approximately 25,000 square feet (SF) of gross leasable area (GLA), the proposed redevelopment will be a two-story medical center with 31,000 SF of GLA. CivTech was asked to compare the trip generation from the existing medical building to the proposed medical building.

### TRIP GENERATION

A generally accepted method of calculating trip generation rates for a proposed development is to use regression equations and/or average rates developed by the Institute of Transportation Engineers (ITE) through the compilation of the field data collected at sites throughout the United States. The 10<sup>th</sup> edition of ITE's *Trip Generation Manual* was used to calculate trip generation rates for the proposed development.

Table 1 presents the trip generation rates for the existing and proposed uses.

**Table 1. Trip Generation**

Proposed Use	ITE LUC	Size	Units	Weekday Trips						
				Daily	AM			PM		
				Total	In	Out	Total	In	Out	Total
Existing										
Medical, dental or health office buildings and clinics	720	25	1,000 square feet	872	51	14	65	24	63	87
Proposed										
Medical, dental or health office buildings and clinics	720	31	1,000 square feet	1,104	62	17	79	30	77	107
Difference				232	11	3	14	6	14	20

Based on the results summarized in **Table 1**, the difference in daily trips is approximately 232 daily trips, with 14 more in the AM peak hour (11 in/3 out) and 20 more in the PM peak hour (6 in/14 out).

## **CONCLUSIONS**

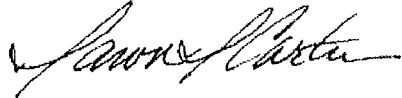
From the foregoing, the following could be concluded:

- The existing land use generated approximately 872 total daily trips with 65 in the AM peak hour (51 in/14 out) and 87 in the PM peak hour (24 in/63 out).
- The proposed redevelopment is expected to generate approximately 1,104 total daily trips with 79 in the AM peak hour (62 in/17 out) and 107 in the PM peak hour (30 in/77 out).
- The difference daily in trips between the existing development and the proposed development is approximately 232 daily trips, with 14 more in the AM peak hour (11 in/3 out) and 20 more in the PM peak hour (6 in/14 out).

Should you wish to discuss this information further, please contact me at (480) 659-4250.

Sincerely,

**CivTech**



Dawn Cartier, PE, PTOE  
President