Planned Development Staff Report

Planning & Zoning Commission Public Hearing Date: November 8, 2021
City Council Public Hearing Date: November 15, 2021

Rezoning Case:	P21-352
Property Owner(s):	FM 2920 TC Road, LLC
Applicant(s):	Creek Road / CTC Residential
Legal Description:	TRS 1B & 2C ABST 311 C GOODRICH
Location:	Generally located at the northwest corner of FM 2920 and Tomball Cemetery Road, within the City of Tomball, Harris County, Texas (Exhibit "A")
Area:	Approximately 18 Acres
Comp Plan Designation:	Corridor Commercial (Exhibit "B")
Present Zoning and Use:	Commercial District (Exhibit "C") / Undeveloped (Exhibit "D")
Proposed Use(s):	360-unit multi-family residential community
Request:	Rezone from the Commercial District to Planned Development (PD-18) District

Adjacent Zoning & Land Uses:

North: Agricultural District

South: Commercial District, Outside the City limits / Vacant

West: Outside the City limits/Vacant

East: Commercial District / Texan Truck and Auto Sales

ANALYSIS

Description: The property is located at the northwest corner of FM 2920 and Tomball Cemetery Road and is zoned Commercial. Surrounding properties are zoned Commercial and Agricultural. Properties located south of the subject property are outside the City limits. Surrounding land uses include various commercial facilities such as Texan Truck and Auto Sales, etc. A single-family residential subdivision is located north of the property, beyond the vacant tract, that is accessed by Tomball Cemetery Road.

Project Description: According to the Planned Development Application (Exhibit "E") the proposed Planned Development will be a multi-family residential community with 360 units, and

will include efficiency units (575 square feet), one bedroom units (650 square feet), and two bedroom units (950 square feet). Other amenities include a fitness center, dog parks, pools, outside pavilion with barbeque grills, landscaped walking trail around the pond, bocce ball courts, a recreational reserve with a playground and/or picnic facilities, open spaces, and landscape buffers. These amenities are listed in the attached presentation.

The applicant is proposing a base zoning district of Multi-family zone (MF zone). The buildings are proposed to be 3 stories tall, with a maximum height of forty-five (45) feet. The proposed density is twenty (20) dwelling units per acre, that meets the requirement of a Multi-family (MF) zoning district. The applicant is proposing masonry and Hardie veneer for the residential building and all masonry facades for the Club House.

The applicant has presented two options for consideration in the PD, as shown below that pertain to the parking spaces and green space.

- Parking: The zoning code requires 2 parking spaces per dwelling unit. For the proposed 360 units, 720 spaces would be required. Option 2 meets the requirements, while Option 1 will be at a slightly lower percentage.
- Green space: The MF zone requires that a minimum of 50% of the lot area be retained as green space. Option 2 meets the requirements, while Option 1 will be at a slightly lower rate

Staff recommends that, if the PD is approved, only one option be approved as part of the PD application.

OPTION 1:

- This option currently displays parking of 2.18 stalls per dwelling unit
- Greenspace coverage of 46.7%
- Lot coverage of 31.7%

OPTION 2:

- This option currently displays parking of 1.95 stalls per dwelling unit
- Greenspace coverage of 50.83%
- Lot coverage of 31.7%

- Per our PD request - Parking at 1.75 stalls for 1-bed and 2 stalls for 2-bed
    - 70/30 mix – 1.82 stalls/unit
    - 65/35 mix – 1.84 stalls/unit
    - 60/40 mix – 1.85 stalls/unit

The applicant has provided the following information:

Parking compared to nearby markets:

- San Antonio: Minimum 1.5 stalls/unit and Max of 2 stalls/unit
  Max parking per unit to promote green space
- City of Houston: 1.7 stalls per unit minimum

Planned Development District (PD) Intent: Section 50-80(a)(1) of the Tomball Code of Ordinances (zoning regulations) outlines the general purpose and description of the Planned Development District.

According to the zoning regulations - "The PD Planned Development District is a district which accommodates planned associations of uses developed as integral land use units such as office parks, retail/commercial or service centers, shopping centers, residential developments having a mixture of housing options (e.g., Single-Family, Multifamily, Duplex (Two Family), etc.), or any

appropriate combination of uses which may be planned, developed or operated as integral land use units either by a single owner or a combination of owners. A PD Planned Development District may be used to permit new or innovative concepts in land utilization not permitted by other zoning districts in this chapter, to ensure the compatibility of land uses, and to allow for the adjustment of changing demands to meet the current needs of the community by meeting one or more of the following purposes:

a. To provide for a superior design on lots or buildings;
b. To provide for increased recreation and open space opportunities for public use and enjoyment;
c. To provide amenities or features that would be of special benefit to the property users or to the overall community;
d. To protect or preserve natural amenities and environmental assets such as trees, creeks, ponds, floodplains, slopes, viewscapes, or wildlife habitats;
e. To protect or preserve existing historical buildings, structures, features or places;
f. To provide an appropriate balance between the intensity of development and the ability to provide adequate supporting public facilities and services; and
g. To meet or exceed the standards of this chapter."

Comprehensive Plan Recommendations: The property is designated as Corridor Commercial by the Comprehensive Plan Future Land Use Map. This Corridor Commercial category "… is intended for predominantly nonresidential uses along high-traffic, regionally serving thoroughfares. The land uses are typically comprised of varying lot sizes and intensities predominantly serving the automobile. While these areas will always be auto-oriented, there is opportunity to improve bicycle/pedestrian accommodations and to create a pleasing environment which leaves a lasting impression on residents and passers-by".

The Comprehensive Plan lists uses that are appropriate for this designation as – "Land uses include regional commercial, personal service offices, multifamily, retail, entertainment, dining, hotels, and brew pubs/distilleries. Appropriate secondary uses include private gathering spaces, local utility services, government facilities, and transportation uses."

The Comprehensive Plan recommends that zoning districts of - O (Office), GR (General Retail), C (Commercial), MU (Mixed Use), MF (Multi-family), and PD (Planned Development) for this designation.

Additionally, the Comprehensive Plan states – "The following considerations should be used as guidance for regulatory modifications or as part of decision-making: Development should gain primary access from an arterial street. Pedestrian enhancements should be a focus with comfort and safety taking priority. New development should include improved standards for building form and architecture, buffering, landscaping, and signage. Multi-family in an urban architectural form should be considered in a manner complimentary to other uses."

Staff Review Comments:

Conformance to the Comprehensive Plan: While the proposed use is listed as being appropriate for this designation, the Comprehensive Plan contains guidelines for development that should be used to consider this zone change:
Improved opportunity for bicycle/pedestrian accommodations and to create a pleasing environment which leaves a lasting impression on residents and passers-by.
Pedestrian enhancements that focus on comfort and safety.

Improved standards for building form and architecture, buffering, landscaping, and signage. Multi-family in an urban architectural form in a manner complimentary to other uses.

The PD needs to include additional information to demonstrate how these guidelines have been adhered to, especially the mixed-use development and pedestrian-oriented urban architectural form, as recommended in the Comprehensive Plan.

Additional Review Comments: Based on the plans resubmitted, staff has the following comments. Upon discussion of the revised detailed plans there may be additional comments made by the Commission.

1. In general, the proposed PD meets the minimum requirements of an MF zoning district. However, it is not clear how it meets the following PD intent –
    * "to provide for a superior design on lots or buildings"
    * "to meet or exceed the standards of this chapter", or
    * "permit new or innovative concepts in land utilization not permitted by other zoning districts"
2. Green space/ recreation areas - Based on the information provided by the applicant and the standards proposed in the PD document, the PD will reflect the deviations to the areas of the MF base zone district.
3. Landscaping requirements - as presented in attached exhibit.
4. Detention –a wet detention to serve as a lake amenity. The detention pond will also serve as additional greenspace as we are proposing an aesthetically pleasing detention pond with manicured landscaping (see pgs. 2 and 4 of the attached).
5. Screening requirements –
    a. 8ft stone/masonry column and steel fence on the South and East property lines.
    b. North and West property line, we are proposing 8' tall cedar wood fence with cedar cap.

        - Galvanized steel post in lieu of treated wood and painted to match wood. And
        - water seal or stain the cedar

6. All refuse containers will be made masonry enclosures to match the materials of the buildings.
7. Setbacks to be planted with additional landscaping as shown in newly submitted landscape plan.
8. Under Permitted Uses, the PD states that any use permitted in the Multi-Family Residential District shall be permitted. Consider limiting the uses to those proposed in the PD.
9. 26' wide access easement to the water well.
10. Add a note that all Special Requirements contained in Section 50-73 Multifamily Residential District will be met, and all other requirements of the zoning code will be met.
11. Based on the recommendations provided by the City Engineer after the review of the submitted TIA through TXDOT. This will be discussed with Commission.
12. Based on the preliminary review of the conceptual drawings, the Fire Marshal has the following comments:
    a. If the vertical distance between grade plane and the highest roof surface exceeds 30' the aerial fire apparatus drive shall have a minimum unobstructed width of 26'.
    b. Fire Hydrants will be required to be placed throughout the property per IFC 2015.
    c. There must be a drive between the dog park & the apartment above it.

PUBLIC COMMENT

A Notice of Public Hearing was published in the paper on September 29, 2021 and property owners within 200 feet of the project site were mailed notification of this proposal on September 30, 2021. Any public comment forms will be provided in the Planning & Zoning Commission and City Council packets or during the public hearing.

RECOMMENDATION

City staff recommends that the above mentioned comments be considered and incorporated in the proposed PD, prior to approval.

EXHIBITS

A. Aerial Photo
B. Comprehensive Plan
C. Zoning Map
D. Site Photo
E. Applicant Submittal-Planned Development Application, Regulations, Concept Plan, PowerPoint presentation etc.

Exhibit "A"
Aerial Photo

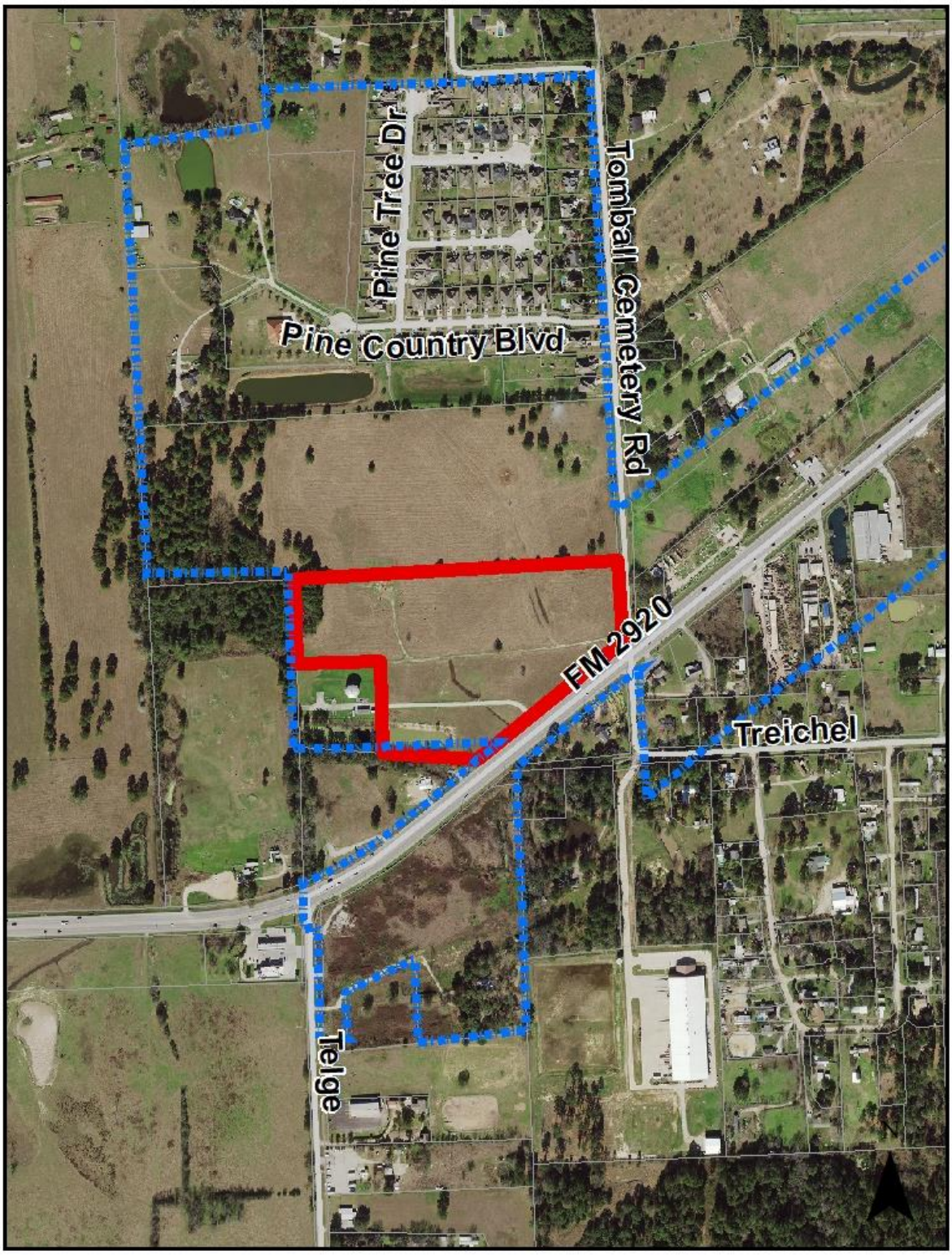


Exhibit "B"
Comprehensive Plan

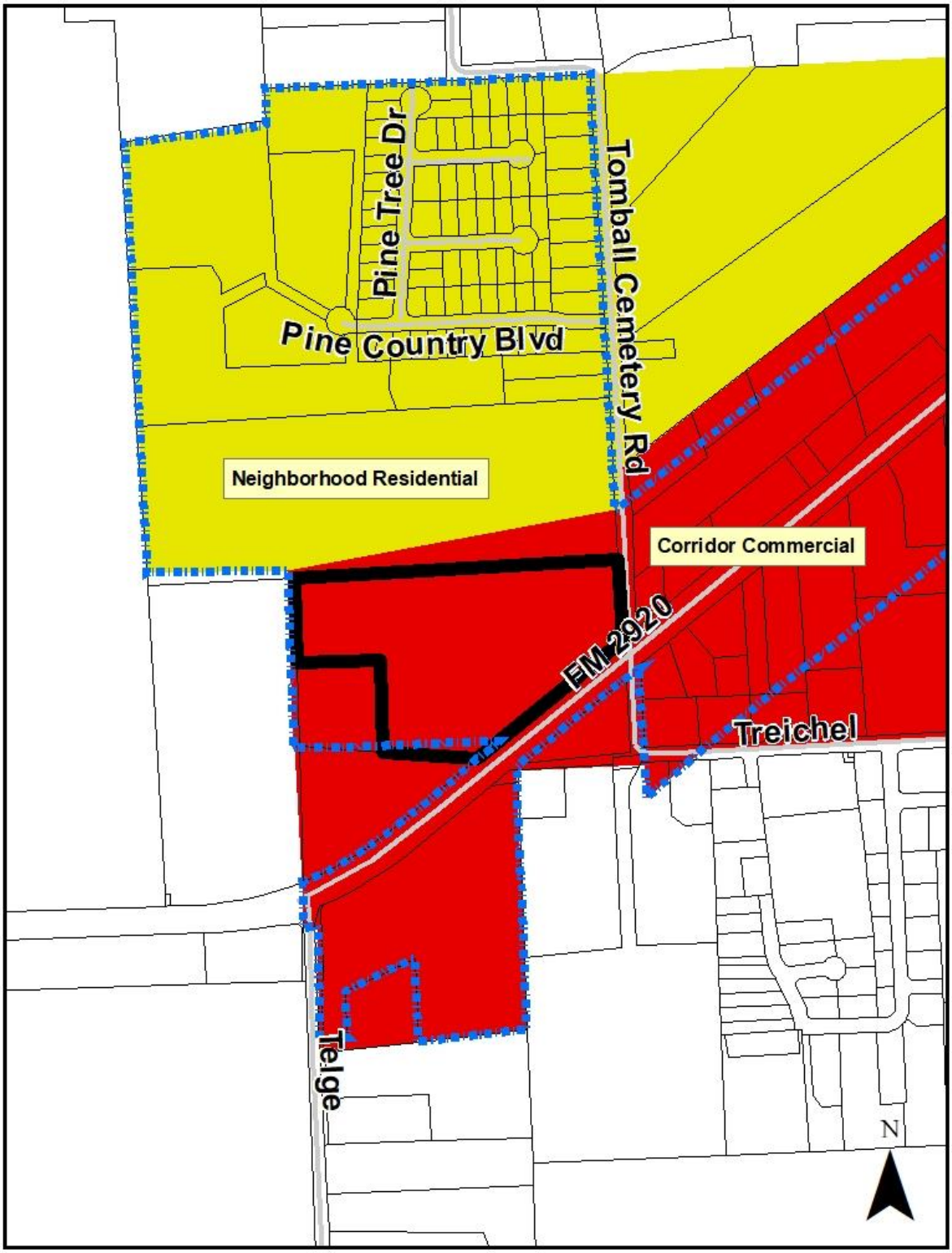


Exhibit "C"
Zoning Map

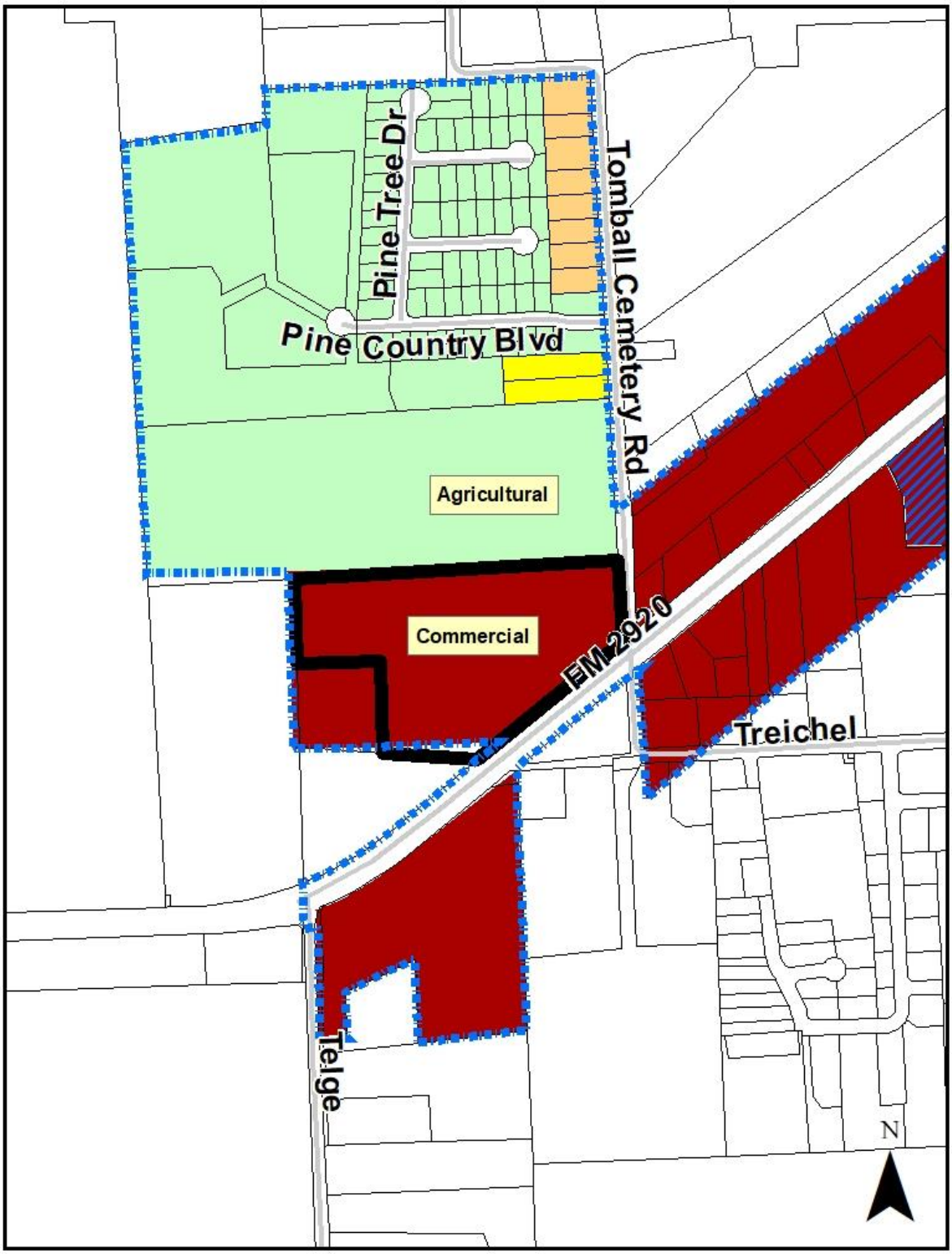


Exhibit "D"
Site Photo

Google image Sep. 2019

RECEIVED (KC)
09/14/2021

Revised 5/19/15
P&Z #21-352
$1,000 PD

APPLICATION FOR PLANNED DEVELOPMENT

Community Development Department
Planning Division

The PD, Planned Development, district is a district which accommodates planned associations of uses developed as integral land use units such as office parks, retail/commercial or service centers, shopping centers, residential developments having a mixture of housing options (e.g., single-family, multi-family, Duplex (Two Family), etc.), or any appropriate combination of uses which may be planned, developed or operated as integral land use units either by a single owner or a combination of owners. A Planned Development district may be used to permit new or innovative concepts in land utilization not permitted by other zoning districts.

No planned development shall be established and no building permit shall be issued for any use designated as a Planned Development within any zoning district until a Planned Development is approved and issued in accordance with the provisions of the Zoning Ordinance and Concept Plan.

The minimum acreage for a planned development request shall be four (4) acres.

APPLICATION SUBMITTAL: Applications will be ***conditionally*** accepted on the presumption that the information, materials and signatures are complete and accurate. If the application is incomplete or inaccurate, your project may be delayed until corrections or additions are received.

Applicant
Name: Creek Road / CTC Residential (ATTN: Tolu Akindele / Sean Ratterree) Title: Development Managers
Mailing Address: 2500 Wilcrest, Suite 300 City: Houston State: Texas
Zip: 77042
Phone: (832) 286-7829 Fax: (____) _____ Email: teakindele@creek-rd.com

Owner
Name: FM 2920 TC Road, LLC (ATTN: Shan Patel / Ford Scott) Title: Managers
Mailing Address: 3725 E. League City Parkway, Suite 250 City: League City State: Texas
Zip: 77573
Phone: (281) 816-6554 Fax: (____) _____ Email: fscott@capitalretailproperties.com

Engineer/Surveyor (if applicable)
Name: Everything In Christ Surveying Company (ATTN: Craig A. Laney) Title: Land Surveyor
Mailing Address: 12345 Jones Road, Suite 270 City: Houston State: Texas
Zip: 77070
Phone: (281) 955-2772 Fax: (281) 955-6678 Email: craig.laney@eicsurveying.com

Description of Proposed Project: market-rate, luxury multi-housing community

Physical Location of Property: north-west corner of the intersection of FM 2920 and Tomball Cemetery Road
[General Location – approximate distance to nearest existing street corner]

Legal Description of Property: TRS 1B & 2C ABST 311 C GOODRICH

[Survey/Abstract No. and Tracts; or platted Subdivision Name with Lots/Block]

HCAD Identification Number: 0421810000177 Acreage: 18.0487

Current Use of Property: Vacant Land - Ag Exempt

Proposed Use of Property: Planned Development - Market Rate, Luxury Multi-Housing Community

Please note: A courtesy notification sign will be placed on the subject property during the public hearing process and will be removed when the case has been processed.

This is to certify that the information on this form is COMPLETE, TRUE, and CORRECT and the under signed is authorized to make this application. I understand that submitting this application does not constitute approval, and incomplete applications will result in delays and possible denial.

X _____ 9/1/21

Signature of Applicant **Date**

X _____ 9/1/21

Signature of Owner **Date**

Submittal Requirements

The following summary is provided for the applicant's benefit. However, fulfilling the requirements of this summary checklist does not relieve the applicant from the responsibility of meeting the regulations in the Zoning Ordinance, subdivision regulations, and other development related ordinances of the City of Tomball.

Applications must be delivered to the City at least 40 calendar days prior to the City Planning and Zoning Commission hearing date.

- ■ **Completed application form**
- □ ***Copy of Recorded/Final Plat**
- ■ **Check for $1,000.00 (Non-Refundable)**
- ■ **Detailed letter stating reason for request and issues relating to request**
- ■ **Metes & Bounds of property**
- ■ **Detailed Concept/Site Plan**
- ■ **Payment of all indebtedness attributed to subject property must be paid with application or an arrangement in accordance with Section 50-36(a)(3) of the Code of Ordinances as cited below:**

(No person who owes delinquent taxes, delinquent paving assessments, or any other fees, delinquent debts or obligations or is otherwise indebted to the City of Tomball, and which are directly attributed to a piece of property shall be allowed to submit any application for any type of rezoning, building permit, or plan review until the taxes, assessments, debts, or obligations directly attributable to said property and owed by the owner or previous owner thereof to the City of Tomball shall have been first fully discharged by payment, or until an arrangement satisfactory to the City has been made for the payment of such debts or obligations. It shall be the applicant's responsibility to provide evidence of proof that all taxes, fees, etc.. have been paid, or that other arrangements satisfactory to the City have been made for payment of said taxes, fees, etc.)

The City's staff may require other information and data for specific required plans. Approval of a required plan may establish conditions for construction based upon such information.

***Legal Lot Information:** If property is not platted, a plat will be required to be filed with the Community Development Department unless evidence of a legal lot is provided. To be an un-platted legal lot, the applicant is required to demonstrate that the tract existed in the same shape and form (same metes and bounds description) as it currently is described prior to August 15, 1983, the date the City adopted a subdivision ordinance.

Application Process

1. The official filing date is the date the application and fee are received by the City.

2. The City will review the application for completeness and will notify the applicant in writing within 10 days if the application is deemed incomplete.

3. Property owners within two-hundred (200) feet of the project site will be notified by letter within 10 calendar days prior to the public hearing date and legal notice will appear in the official newspaper of the City before the eighth calendar day prior to the date of the hearing.

4. A public hearing will be held by the Planning and Zoning Commission at 6:00 p.m. in the City Council chambers, unless otherwise noted. The Planning and Zoning Commission meetings are scheduled on the second Monday of the month. The staff will review the request with the Commission and after staff presentations the chair will open the public hearing. The applicant will have ten (10) minutes to present the request. The chair will then allow those present in favor of the request and those in opposition to the request to speak. The Commission may then ask staff or anyone present additional questions, after which the Commission may close or table the public hearing. The Commission may then vote to recommend approval or denial to the City Council. The Commission may also table the request to a future date before a recommendation is sent to the City Council.

5. A second public hearing will be scheduled before the City Council after fifteen (15) days of legal notice. The Council meetings are held on the first (1st) and third (3rd) Mondays of the month at 6:00 p.m. in the City Council chambers (401 Market Street, Tomball, Texas, 77375).

6. The City Council will conduct a public hearing on the request in the same manner as the Planning and Zoning Commission. In the event that there has been a petition filed with the City Secretary with twenty percent (20%) of the adjoining property owners in opposition to the subject zoning request, it will require a three fourths (3/4) vote of the full Council to approve the request. Upon approval of the request by the City Council, an amended ordinance shall be prepared and adopted. The ordinance shall have two separate readings and will be effective at such time that it is adopted by City Council and signed by the Mayor and attested by the City Secretary.

FAILURE TO APPEAR: It is the applicant/property owner's responsibility to attend all Planning and Zoning Commission and City Council meetings regarding their case. Failure of the applicant or his/her authorized representative to appear before the Planning and Zoning Commission or the City Council for more than one (1) hearing without approved delay by the City Manager, or his/her designee, may constitute sufficient grounds for the Planning and Zoning Commission or the City Council to table or deny the application unless the City Manager or his/her designee is notified in writing by the applicant at least seventy-two (72) hours prior to the hearing. If the agenda item is tabled the Planning and Zoning Commission shall specify a specific date at which it will be reconsidered.

Legal Description and Metes and Bounds for 15800 FM 2920 Tomball, Tx

All that certain tract or parcel containing 18.049 acres of land out of that certain call 21.001 acre tract of land situated in the Chauncey Goodrich Survey, A-311, in Harris County, Texas, said 21.001 acre tract being that same tract as described in

STEWART TITLE

a Deed filed for record under Harris County Clerk's File No. U-682638, Real Property Records of Harris County, Texas; said 18.0487 being more particularly described by metes and bounds as follows:

BEGINNING at a 5/8" iron rod with Tony Swonke cap (found) in the West right-of-way line of Tomball Cemetery Road, (60.00 feet in width), marking the Southeast corner of that certain call 31.159 acre tract of land as described in a deed filed for record under Harris County Clerk's File No. V-256093, the Northeast corner of said 21.001 acre tract of land and the Northeast corner of the herein described 18.049 acre tract of land;

THENCE S 00°58'38" E, (call S 00°58'05" E), a distance of 340.12 feet to a 5/8" iron rod with Tony Swonke cap (found) marking the intersection of the West right-of-way line of said Tomball Cemetery Road with the Northwest right-of-way line of F. M. 2920, (120.00 feet in width), the Easterly-Southeast corner of said 21.001 acre tract of land and the Easterly-Southeast corner of the herein described 18.049 acre tract of land;

THENCE S 53°02'00" W, a distance of 783.46 feet along the Northwest right-of-way line of said F. M. 2920 and the Southeast line of said 21.001 acre tract of land to a 5/8" iron rod with EIC cap (found) marking the Southerly-Southeast corner of said 21.001 acre tract of land, the Northeast corner of that certain call 0.636 acre tract of land as described in a deed filed for record under Harris County Clerk's File No. U-761658 and the Northeast corner of that certain call 1.187 acre tract of land as described in a deed filed for record under Harris County Clerk's File No. U-620508 and the Southerly-Southeast corner of the herein described 18.049 acre tract of land;

THENCE N 83°50'17" W, a distance of 397.05 feet along the common line of said 0.636 acre, said 1.187 acre and said 21.001 acre tracts of land to a 5/8" iron rod with EIC cap (set) marking the Southeast corner of that certain call 2.952 acre tract of land known as Tract 1 as described in a deed filed for record under Harris County Clerk's File No. 20090443955 and the Southerly-Southwest corner of the herein described 18.049 acre tract of land;

THENCE N 00°30'44" E, (call N 00°31'48" E), a distance of 384.78 feet along the East line of said Tract 1 to a 5/8" iron rod with EIC cap (set) marking the Northeast corner of said Tract 1 and an interior corner of the herein described 18.049 acre tract of land;

THENCE N 89°30'47" W, (call N 89°28'12" W), a distance of 350.00 feet along the North line of said tract 1 to a 5/8" iron rod with EIC cap (set) in the West line of said Chauncey Goodrich Survey, the West line of said 21.001 acre tract of land, the East line of the John Edwards Survey, A-20 in said Harris County, Texas and the East line of that certain call 18.7500 acre residue of that certain call 130.971 acre tract of land as described in a deed filed for record under Harris County Clerk's File No. T-469927 marking the Northwest corner of said Tract 1

RP-2017-88244

and the Westerly- Southwest corner of the herein described 18.049 acre tract of land;

THENCE N 00°30'15" E, a distance of 357.09 feet along the common line of said Chauncey Goodrich Survey, said 21.001 acre tract of land, said John Edwards Survey and said 18.7500 acre residue tract of land to a 5/8" iron rod with Tony Swonke cap (found) in the South line of said 31.159 acre tract of land marking the Northwest corner of said 21.001 acre tract of land, the Northeast corner of said 18.7500 acre residue tract of land and the Northwest corner of the herein described 18.049 acre tract of land;

THENCE N 88°59'50" E, a distance of 1,358.48 feet, (call 1,358.53 feet), along the common line of said 21.001 acre and said 31.159 acre tracts of land to the POINT OF BEGINNING and containing 18.049 acres of land.

August 4, 2021

Mr. Craig Meyers, PE, CFM

Community Development Director

City of Tomball

501 James Street

Tomball, TX 77375

RE: Planned Development ("PD") Application for the property located at 15800 FM 2920 Tomball, TX 77377 ("Property" or "Site")

Dear Mr. Meyers:

Creek Road and CTC Residential (jointly "Applicants") would like to formally request the City of Tomball consider and review the attached Planned Development ("PD") Application for the 18.05-acre property located at 15800 FM 2920 Tomball, Texas - As reflected in the City of Tomball Zoning Map, the Property is zoned C – Commercial District. On October 7, 2019, the City of Tomball adopted the Final Comprehensive Report as presented by Halff Associates, Inc. In this report, on page 63, the Site is classified as "Corridor Commercial" as it pertains to Tomball Future Land Use Plan. And on page 70, under the Corridor Commercial section, appropriate uses include multifamily. The application proposes the current zoning designation be revised to a Planned Development District, consisting of market-rate, luxury multifamily land use with specified regulations. This Property will welcome both residents and visitors into Tomball, as it is situated at the west entrance of the city. Based on our analysis and review of the City of Tomball's goals as it relates to its continued growth to keep up with the demand in housing for young professionals and working population, we believe this is the highest and best use of this Property given its proximity to retail/shopping, schools and access to major throughfares.

Please feel free to contact us with any questions regarding the attached application. Thank you for your review and consideration.

Sincerely,

Tolu E. Akindele Sean C. Ratterree

PROPOSED PLANNED DEVELOPMENT MULTI FAMILY

Permitted Uses:

- Any use permitted in the Multi-Family Residential District, MF

Height Regulations:

- Maximum Height: Main Buildings -Three (3) stories, not to exceed forty-five (45) feet
- Maximum Height: Accessory Buildings - One (1) story, not to exceed fifteen (15) feet
- Maximum Height: Club House - One (1) Story

Area Regulations:

- Maximum Dwelling Units: Not to exceed three hundred sixty (360) dwelling units
- Lot Area: 18.049 acres

Setback Regulations:

- Minimum Front Building Setback: Thirty-five (35) feet
- Minimum Side Building Setback: Minimum of Fifteen (15) feet, twenty-five (25) feet when adjacent to property zoned for single family residential, twenty-five (25) feet when adjacent to an arterial street, fifteen (15) feet when adjacent to a non-arterial street
- Minimum Rear Setback: Main Building - Minimum of fifteen (15) feet, sixty (60) feet when adjacent to single family, duplex (two family), patio home or single family attached district
- Minimum Rear Setback: Accessory Building - Minimum of fifteen (15) feet, thirty (30) feet when adjacent to single family, duplex (two family), patio home or single family attached district

Building Requirements:

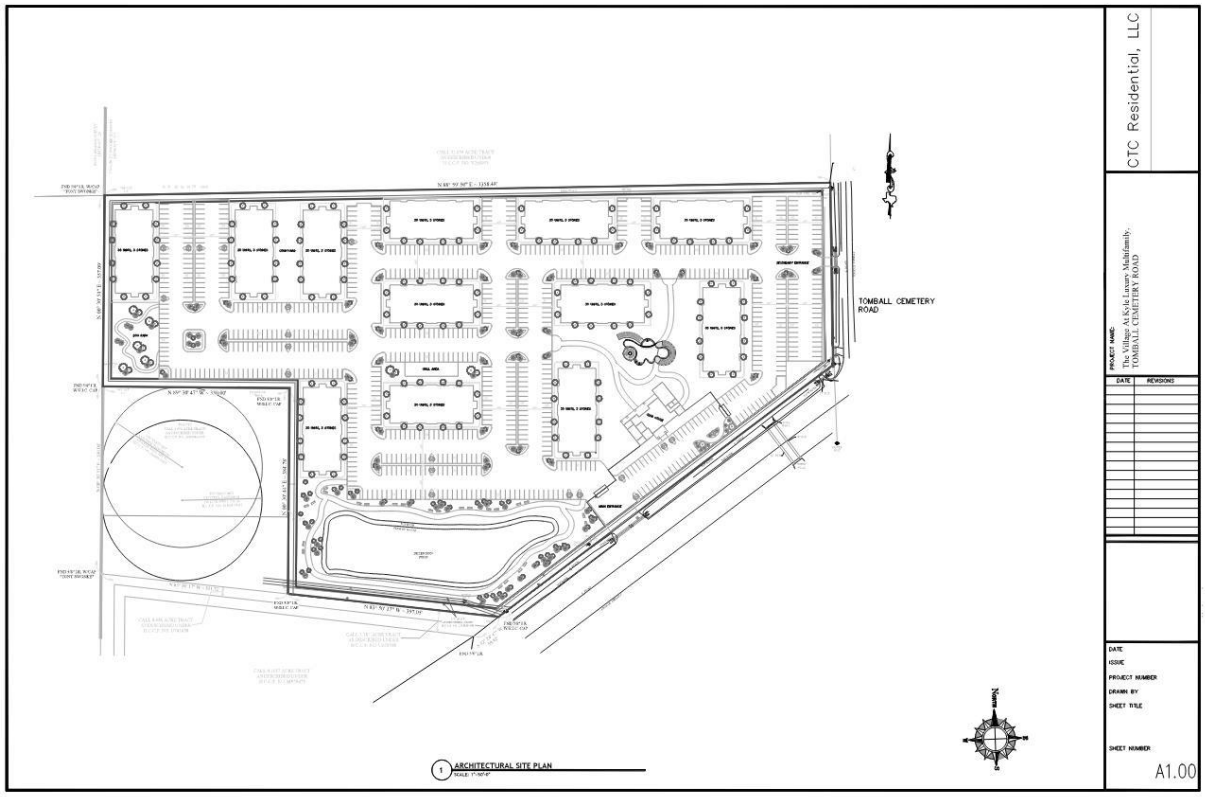
- Minimum Building Separation -1-story building: Fifteen (15) feet for buildings without openings, twenty (20) feet for building with openings
- Minimum Building Separation - 2-story building: Twenty (20) feet for building without openings, thirty (30) feet for buildings with openings
- Minimum Building Separation - Over 2-story building: Thirty-five (35) feet or as required by the adopted building code, whichever is greater
- Minimum Building Separation - Between Main Building and Accessory Building: Ten (10) feet or as required by the adopted building code, whichever is greater
- Minimum Floor Area Per Dwelling Unit – Efficiency Unit: Five hundred seventy-five (575) square feet
- Minimum Floor Area Per Dwelling Unit - One Bedroom: Six hundred fifty (650) square feet
- Minimum Floor Area Per Dwelling Unit -Two Bedroom: Nine hundred and fifty (950) square feet

Lot requirements:

- Maximum Lot Coverage: Fifty percent (50%) total, including main and accessory buildings, pools, ponds. (does not include paving or carports).
- Screening: Per section 50-115 of the Tomball Code of Ordinances. All refuse containers shall be screened, a six-foot solid fence, wall or opaque screening device is required on the side adjacent to a single-family zoned property.
- Parking:
    A. One and three-fourths (1.75) parking spaces for each one-bedroom unit
    B. Two (2) parking spaces for each two-bedroom unit
- Landscape: Per Section 50-113 of the Tomball Code of Ordinances
- Green Space/Recreational Areas – A Minimum of 20% of the gross platted area shall be open green space and common recreational areas. This area will include underground irrigation systems and continuous maintenance will be provided.

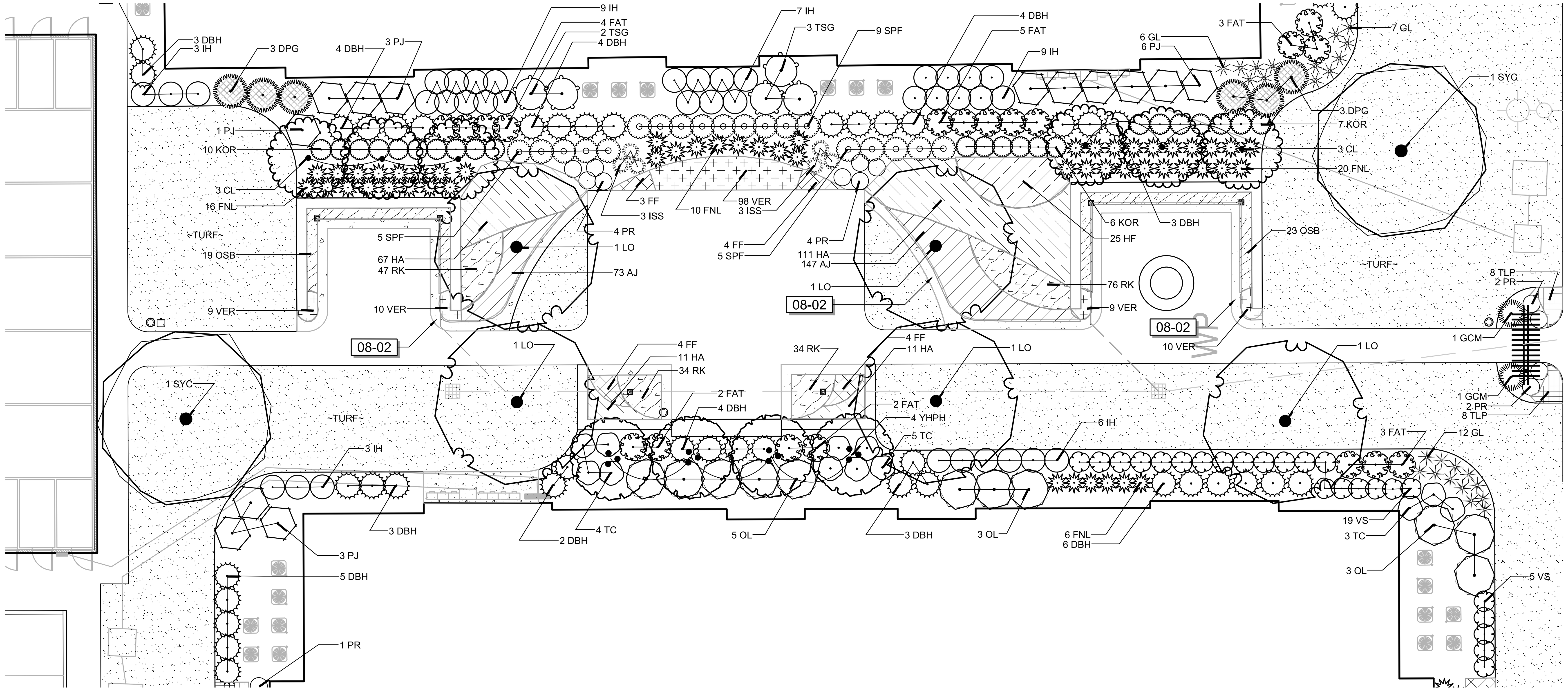
Additional Requirements:

- Fire easement accessibility, fire sprinkler system, walkways, building length, oversized parking areas, signage, lighting, gated/secured entrances, streets, or driveways per Section 50-73 of the Tomball Code of Ordinances

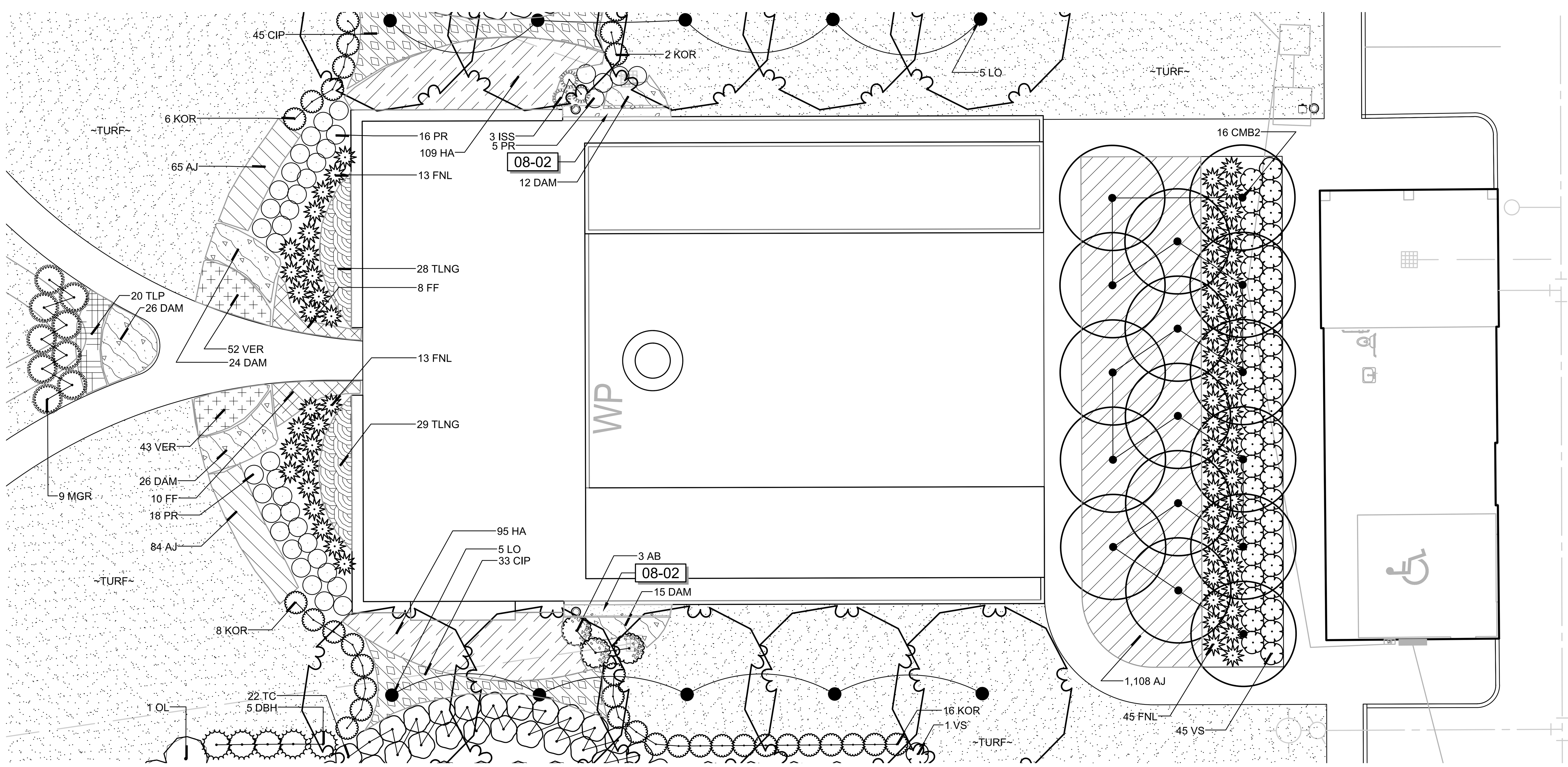

TOMBALL CEMETERY ROAD
CTC Residential, LLC
PROJECT NAME:
The Village At Kyle Luxury Multifamily
TOMBALL CEMETERY ROAD
DATE
REVISIONS
DATE
ISSUE
PROJECT NUMBER
DRAWN BY
SHEET TITLE
SHEET NUMBER
A1.00
1 ARCHITECTURAL SITE PLAN


Welcome To
TOMBALL


PRIVATE BACKYARD
space for 1st floor
tenants
COURTYARD #1
COURTYARD #2
with Hammock
Gardens
POOL AMENITIES
CLUB HOUSE
with leasing,fitness,
parcel lockers,
billiards area,etc.
Tomball
Cemetery
Road
EXIT and
EMERGENCY
ENTRANCE
Shade
tree
BOTH LARGE &
SMALL DOGPARK
F.M
2920
Gated Vehicle
Entrance with
EZ tag reader
18' wide access to
CITY WATER
WELL FACILITY
"Welcome
to Tomball"
monument
MAIN
Entrance
Walking trail
AESTHETICALLY
ENHANCED
DETENTION POND
Park Amenities



ENLARGED PLANTING PLAN A

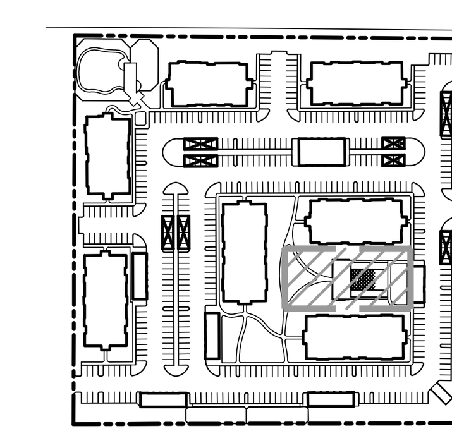


ENLARGED PLANTING PLAN B

PLANT SCHEDULE

TREES	COMMON NAME
BC	BALD CYPRESS
CE	CEDAR ELM
CL	BRIGHT `N TIGHT CAROLINA LAUREL
CMB	PINK FLOWERING CRAPE MYRTLE
CMB2	PINK FLOWERING CRAPE MYRTLE
CMM	LAVENDER CRAPE MYRTLE
CMW	WHITE CRAPE MYRTLE
CMW2	WHITE CRAPE MYRTLE
LO	LIVE OAK
LP	LOBLOLLY PINE
MP	MEXICAN PLUM
RBI	RIVER BIRCH MULTI-TRUNK
SO	SHUMARD RED OAK
SYC	MEXICAN SYCAMORE
VIT	VITEX
YH	YAUPON HOLLY
YHPH	PRIDE OF HOUSTON YAUPON
SHRUBS	**COMMON NAME**
AB	AMERICAN BEAUTYBERRY
AZ	FORMOSA AZALEA
DBH	DWARF BURFORD HOLLY
FAT	JAPANESE FATSIA
FNL	FORTNIGHT LILY
FNL2	FORTNIGHT LILY
GL	GIANT LIRIOPE
GL2	GIANT LIRIOPE
IH	INDIAN HAWTHORN
ISS	INDIGO SPIRES
KOR	KNOCKOUT ROSE
OL	OLEANDER
PA	PINK ABELIA
PJ	PRIMROSE JASMINE
PR	PROSTRATE ROSEMARY
SPF	SIZZLING PINK FRINGE FLOWER
TC	TURK`S CAP
TSC	COMPACT TEXAS RANGER
TSG	GREEN CLOUD TEXAS RANGER
VS	VIRGINIA SWEETSPIRE
GRASSES	**COMMON NAME**
DPG	DWARF PAMPAS GRASS
GCM	GULF COAST MUHLY
MGR	MAIDEN GRASS
GROUND COVERS	**COMMON NAME**
AJ	ASIAN JASMINE
CIP	CAST IRON PLANT
DAM	DAMIANITA
EI	NEEDLEPOINT ENGLISH IVY
FF	FOXTAIL FERN
HA	JAPANESE FOREST GRASS
HC	CAROLINE CORAL BELLS
HF	HOLLY FERN
LE	LAMB`S EAR
LIR	LIRIOPE `BIG BLUE`
MH	MEXICAN HEATHER
OSB	ORANGE STALKED BULBINE
PER	PERIWINKLE
PM	PEPPERMINT
RK	DWARF KATIE RUELLIA
SC	SEASONAL COLOR
SGV	VARIEGATED SHELL GINGER
TLNG	TRAILING LANTANA `NEW GOLD`
TLP	TRAILING LANTANA `PURPLE`
VER	VERBENA
SOD/SEED	**COMMON NAME**
TURF	BERMUDA GRASS

NOTE: REFER TO FULL PLANT SCHEDULE ON SHEET L5.7



KEYMAP
NTS

0 5 10 20
SCALE : 1" = 10'

INVESTWELL ARCHITECTS, LLC
Designs for Life
24275 KATY FREEWAY SUITE 400
KATY, TX 77494
346-387-7177

STUDIO AVID
LANDSCAPE ARCHITECTURE
6046 FM 2920 Rd. #260
Spring, Texas 77379
Phone: 281.796.4508

PROJECT NAME:
FRANZ RD APTS
FRANZ ROAD, KATY, TX
CLIENT:
INSITE COMMERCIAL REAL ESTATE
KATY, TX 77494

DATE	REVISIONS
06/07/19	MUD RVW REVISION

06/21/19

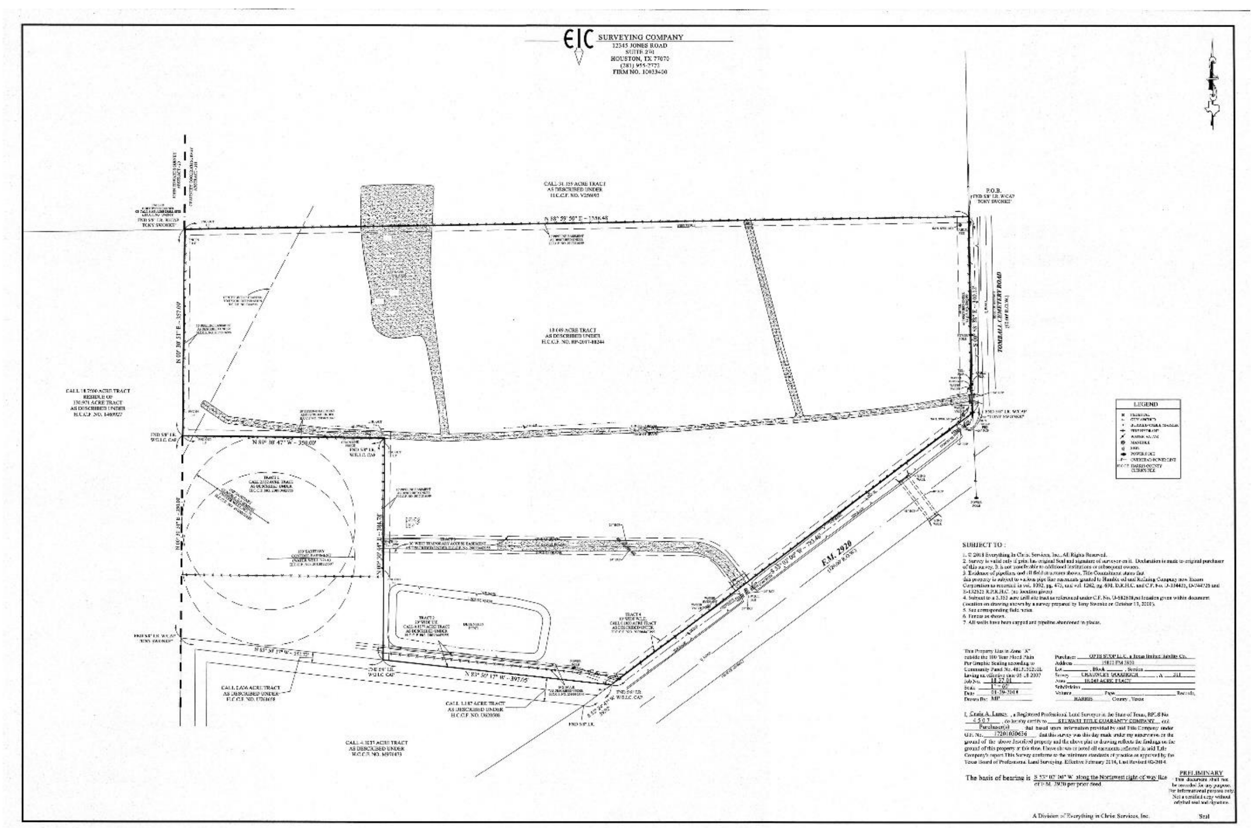
DATE	06/21/19
ISSUE	FOR CONSTRUCTION
PROJECT NUMBER	19246
DRAWN BY	KD

SHEET TITLE
ENALARGED PLANTING PLAN

SHEET NUMBER
L5.6

Copyright © 2017 INVESTWELL ARCHITECTS, LLC drawings and specifications as instruments of service and shall remain the property of the Architect. They are not to be used on other projects or extensions to this project except by agreement in writing and with appropriate compensation to the Architect.


ELATION


SURVEYING COMPANY
12345 JONES ROAD
HOUSTON, TX 77070
F.M. 1960
SUBJECT TO :
LEGEND
PRELIMINARY

Information Received on 9-24-21

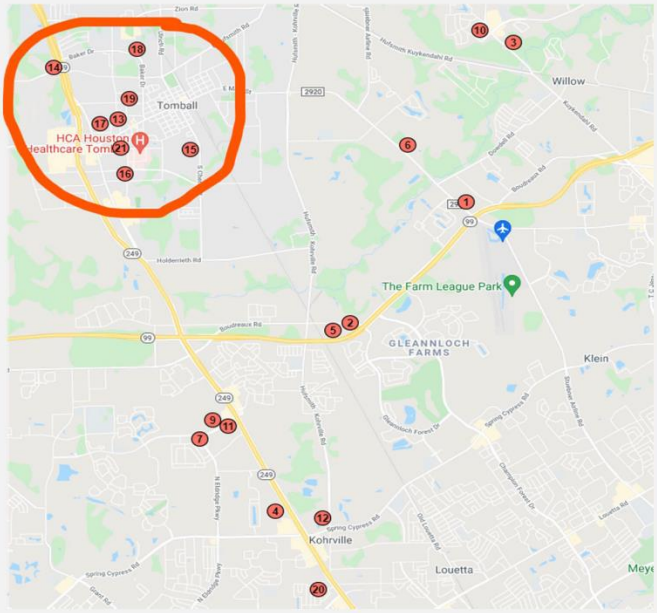
Target Market | Price Point Analysis

Property Name	Proposed Project	Stone Loch	SYNC at Spring Cypress	Avenue at Northpointe	Camden Northpointe
Address	*15800 FM 2920 Rd*	10923 Boudreaux Rd	22803 Tomball Pky	11740 Northpointe Blvd	11743 Northpointe Blvd
Yr. Built	*2023*	2020	2016	2013	2007
No. of Units	*360*	384	328	280	384
Avg. SF	*883*	1,100	1,050	1,152	940
Land Size	*18.05*	12.76	14.71	21.66	16.05
ISD Zoning	*Tomball*	Klein	Tomball	Tomball	Tomball
Avg. 1 Bed (SF)	*725*	*797*	*795*	*848*	*764*
Rent/month	*$1,175*	*$1,150*	*$1,100*	*$1,275*	*$1,150*
Rent per SF	*$1.62*	*$1.44*	*$1.38*	*$1.50*	*$1.51*
Income Requirement	*$42,300*	*$41,400*	*$39,600*	*$45,900*	*$41,400*
Avg. 2 Bed (SF)	*1,100*	*1,250*	*1,152*	*1,295*	*1,125*
Rent/month	*$1,700*	*$1,525*	*$1,440*	*$1,740*	*$1,685*
Rent per SF	*$1.55*	*$1.22*	*$1.25*	*$1.34*	*$1.50*
Income Requirement	*$61,200*	*$54,900*	*$51,840*	*$62,640*	*$60,660*

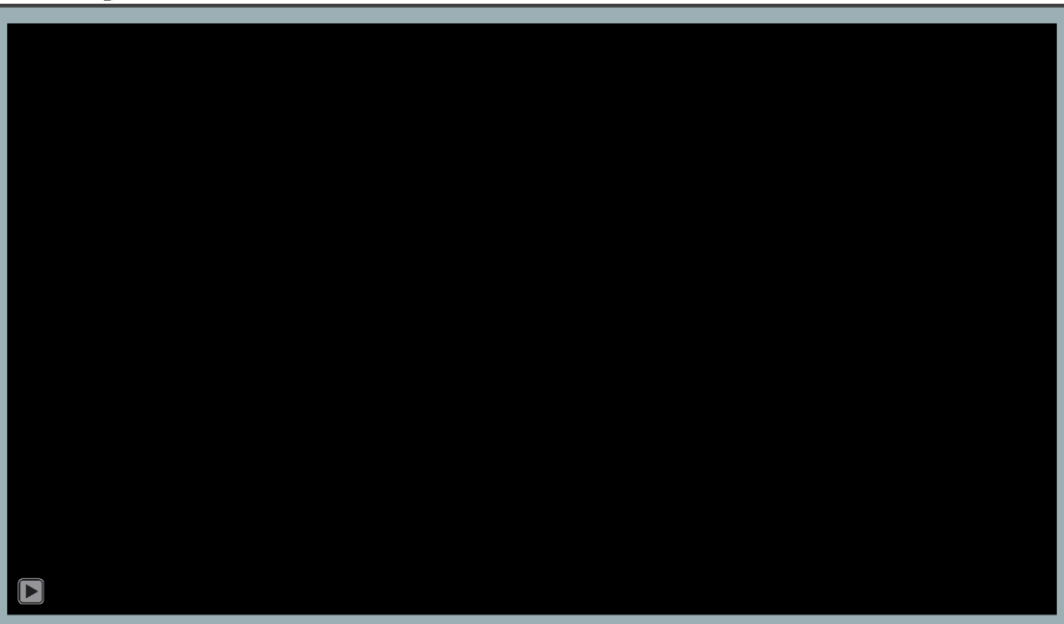
**Presented data is provided by third-pary real estate analytics firm and subject to market changes*

Colored Site Plan with Labels (Option 2)

Comparative Market Map/Designs



Rendering Visualization



Comparative Market Designs

Site Plan Summaries

OPTION 1:

- This option currently displays parking of 2.18 stalls per dwelling unit
- Greenspace coverage of 46.7%
- Lot coverage of 31.7%
  - To note, the MF **maximum** allows for 50%....we are significantly below this requirement based on the definition in the ordinance.

OPTION 2:

- This option currently displays parking of 1.95 stalls per dwelling unit
- Greenspace coverage of 50.83%
- Lot coverage of 31.7%
  - To note, the MF **maximum** allows for 50%....we are significantly below this requirement based on the definition in the ordinance.

- Per our PD request - Parking at 1.75 stalls for 1-bed and 2 stalls for 2-bed
  - 70/30 mix – 1.82 stalls/unit
  - 65/35 mix – 1.84 stalls/unit
  - 60/40 mix – 1.85 stalls/unit

Parking compared to nearby markets:

- San Antonio: Minimum 1.5 stalls/unit and Max of 2 stalls/unit
  - Max parking per unit to promote green space

- City of Houston: 1.7 stalls per unit minimum

Unit Floor Plans/Layout

QUESTIONS/FEEDBACK?

Additional Superior Interior Photos

Superior Exterior/Greenspace/Amenities

- **Masonry and Paint scheme to match the character and architecture of new homes in the area**
- **Masonry and Hardie veneer for quality and durability**
- **All masonry on the Club House**
- **Fencing around the entire property for privacy and security with enhanced designs on the frontage**
- Pool with in-water lounge chairs
- Poolside pavilion with BBQ grills
- Pergola Hammock Gardens
- Car/Dog Wash station
- Manicured and lush landscaped walking trail around pond, north and east side of the property
- Bocce Ball Courts
- 24/7 Fitness Center
- Parcel Lockers
- Valet trash and recycling services
- Eco-friendly double paned windows
- Billiards Area
- Large and small dog park
- Keyless entry
- **Controlled Access for vehicle entry/exits with EZ tag reader system**
- **Large private fenced in yards for residence living on the 1st floor**

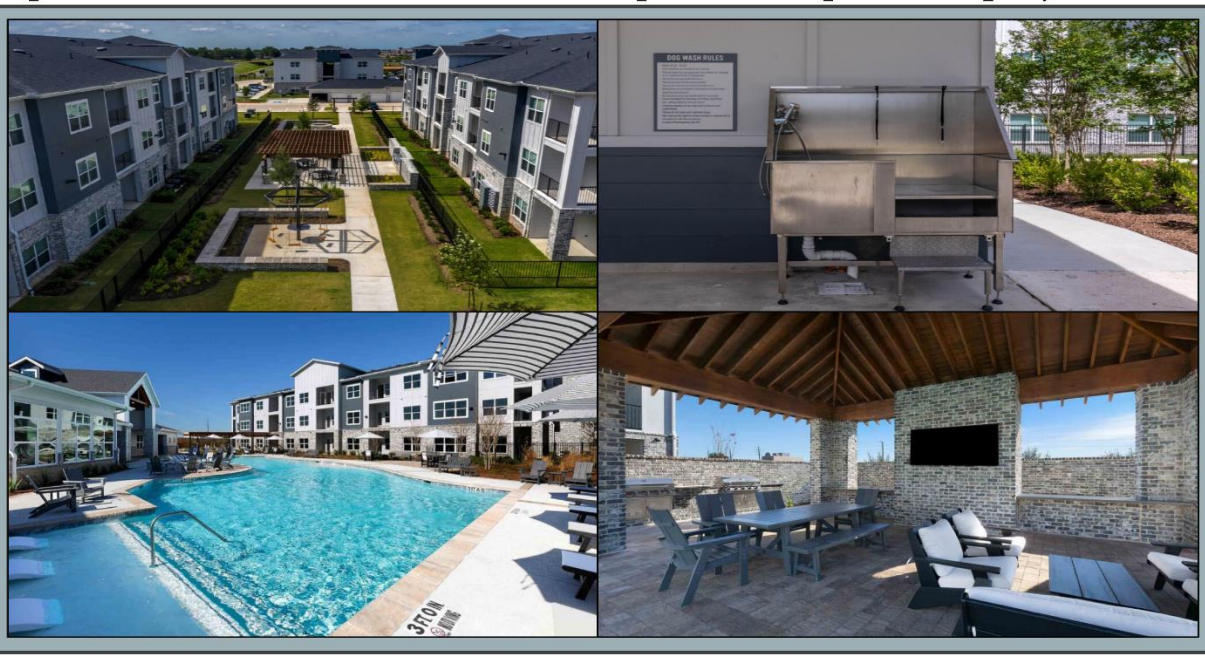
Gateway to Home Ownership

	Rent	Own
Annual Income	**$60,000**	
Purchase Price	-	$300,000
Deposit/Down Payment	$1,385	$60,000
Other Closing Costs	$100	$7,500
Living Area	883	1,800
Monthly Estimates		
Monthly Payment*	$1,385	$1,111
Taxes	-	$431
Insurance	$25	$120
Warranty	-	$100
Repair Maintenance Reserves	-	$100
Utilities	$235	$515
Electricity	90	130
Internet/Cable	80	110
Water/Sewer	40	50
Gas	25	50
Landscaping	-	75
HOA Fee	-	100
Total Monthly Cost	$1,645	$2,377
Income Requirement	$50,000	$86,000
$ Due - Lease | Buy	$1,485	$67,500

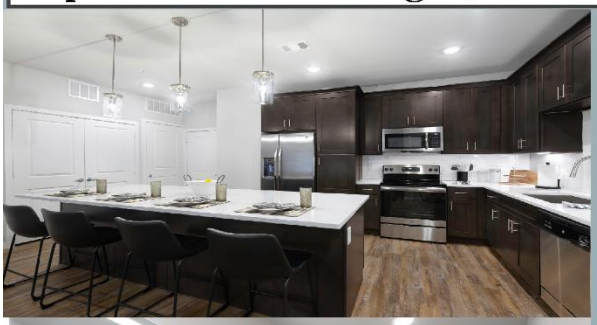
**Payment for "Own" scenario using 20% Down Payment, 3.5% Rate & 30-Year Mortgage*

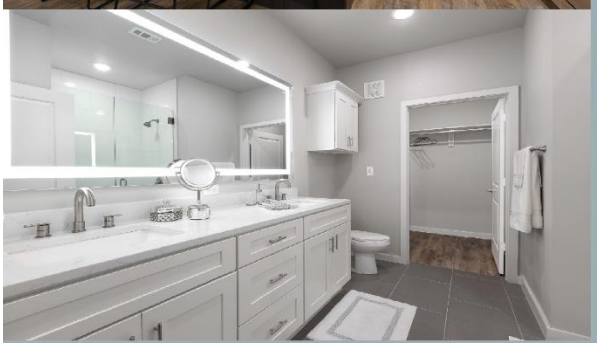
Colored Site Plan with Labels (Option 1)

Superior Exterior/Amenities/Greenspace from previous projects



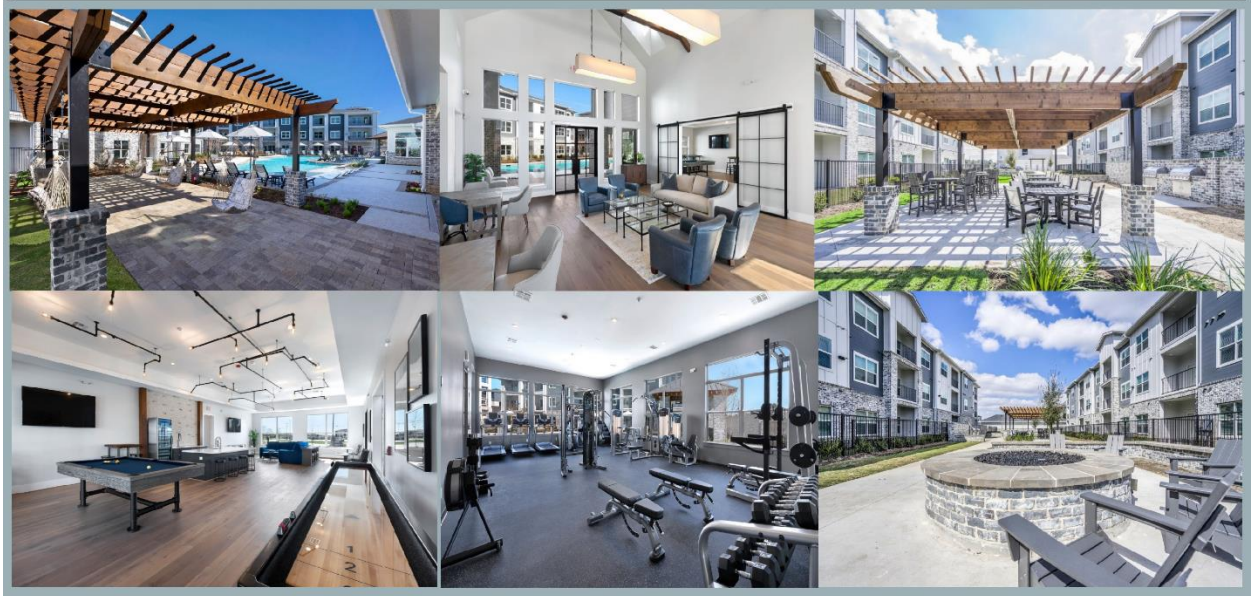
Superior Interior Designs/Features/Layouts





- Full size washer & dryer
- **Oversized patios/balconies**
- **Quartz countertops**
- **Stainless steel appliances**
- Oversized islands
- Modern tile backsplashes
- Frameless glass mirrors
- **Handmade undermount kitchen sinks**
- **Eco-friendly double paned windows**
- Large walk-in closets with metal hanging rods
- Modern 2" faux wood blinds
- Backlit LED Mirrors
- **Soft close hinges and drawer slides**
- **Built-in trash drawers in all kitchens**
- Trash valet included
- Plywood cabinets painted/stained on the inside
- Dual vanities
- Crown molding at all upper cabinets
- Stained/painted islands on the backside
- Tile floors in the bathrooms
- **Extra sound proofing in all units**

Superior Exterior/Amenities/Greenspace from previous projects



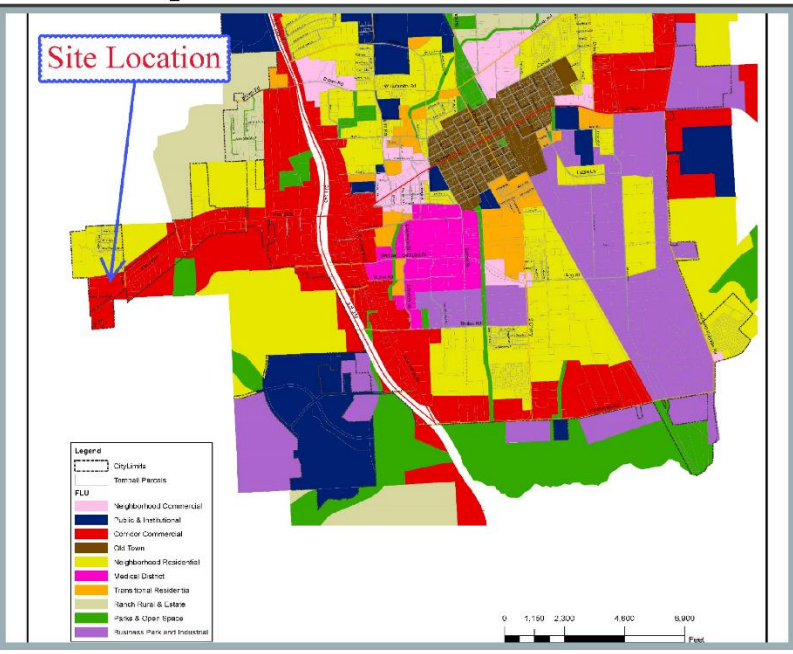
City of Tomball | Tomball ISD – Additional Revenue

Unit Count	*360*	
Tax Jurisdiction	**2020 Mill Rate**	**Tax Obligation**
Tomball ISD	1.290000	$534,060
Harris County	0.391160	$161,940
Harris County Flood Control Dist.	0.031420	$13,008
Port of Houston Authority	0.009910	$4,103
Harris County Hospital District	0.166710	$69,018
Harris County Dept. of Education	0.004993	$2,067
Lone Star College System	0.107800	$44,629
City of Tomball*	0.337862	$139,875
Emergency Service Dist #3	0.100000	$41,400

**subject to change based on recent proposal of $0.333339 per $100 VA*

Planned Development Proposal for a 360-unit fine multi-housing community

Future Land Use Map



The Ideal Location for Fine Multifamily Homes

- Site is zoned "Corridor Commercial" on the Future Land Use Map
  - Corridor Commercial includes new "multifamily"
- Western edge of Tomball city limits
  - Current owners have a 1-story self-storage development planned.
  - We are ready to work with Tomball, gather for a charette-style discussion to make sure this planned development meets the city's goals, provides best-in-class living option and makes a great first impression to people entering Tomball city limits.
- 2920 Frontage – Major thoroughfare that can handle new traffic.
- Site will serve as a buffer to heavy automobile traffic and low-density residential development to the North.
- Price point is ideal for young and mid-level professionals, including, but not limited to; teachers, health care workers, retail clerks, restaurant workers, police officers and firefighters.

Why Tomball? | Market Inventory

No.	Name	Address	City	Avg SF	ISD Zoning	Units	RBA	Bldgs. #	Yr. Built
1	Vantage at Tomball	9603 Dowdell Rd	Tomball	-	Klein	288	-	-	TBD
2	Stone Loch	10923 Boudreaux Rd	Tomball	1,107	Klein	384	425,088	12	2020
3	Everlee Apartments	23902 Kuykendahl Rd	Tomball	947	Klein	332	330,000	7	2016
4	SYNC at Spring Cypress	22803 Tomball Pky	Tomball	1,050	Tomball	328	351,343	3	2016
5	Landmark Grand Champion	11201 Boudreaux Rd	Tomball	1,026	Klein	360	222,000	15	2015
6	Willow Creek Apartments	9530 FM 2920 Rd	Tomball	881	Klein	228	207,662	11	2014
7	Oaks At Northpointe	12101 Northpointe Blvd	Tomball	963	Tomball	246	250,000	7	2014
8	The Preserve at Spring Creek	8627 Hufsmith Rd	Tomball	898	Klein	380	402,800	17	2014
9	Avenues at NorthPointe	11740 Northpointe Blvd	Tomball	1,152	Tomball	280	326,500	28	2013
10	Augusta Meadows	24215 Kuykendahl Rd	Tomball	868	Klein	264	233,293	11	2008
11	Camden Northpointe	11743 Northpointe Blvd	Tomball	941	Tomball	384	360,900	16	2007
12	The Cape	10810 Spring Cypress Rd	Tomball	769	Klein	228	177,104	11	2006
13	Fountains of Tomball	1011 Village Square Dr	Tomball	885	Tomball	160	141,584	8	1999
14	Park at Spring Creek	29807 Tomball Pky	Tomball	733	Tomball	252	199,479	17	1999
15	Crossings at Cherry	1100 S Cherry St	Tomball	1,123	Tomball	124	139,968	31	1998
16	Cobble Creek Apartments	920 Lawrence St	Tomball	781	Tomball	168	130,768	8	1984
17	Marymont Apartments	1515 Rudel Dr	Tomball	876	Tomball	128	118,004	11	1984
18	Oak Bend Place	915 Baker Dr	Tomball	890	Tomball	152	146,990	38	1984
19	Hickory Hill	1000 Hicks St	Tomball	709	Tomball	136	96,533	11	1983
20	Lakewood Apartments	11000 Gatesden Dr	Tomball	888	Tomball	256	227,216	19	1980
21	Bridgewater	1110 Graham Dr	Tomball	837	Tomball	206	287,000	17	1978
TOTAL/AVG						5,284			

Voigt Associates, Inc.
Professional Traffic Engineers
Texas Registered Firm F-5333

2631 Lakecrest Drive
Pearland, Texas 77584
832.264.0429
tony@voigtassociates.com

November 2, 2021

Mr. Sean Ratterree
CTC Residential
854 Sprucewood Lane
Houston, Texas 77024

RE: Traffic Impact Analysis: Proposed Tomball 360-Unit Multifamily Development Northwest Corner, FM 2920 at Tomball Cemetery Road, Tomball, Texas

Dear Mr. Ratterree:
This letter report presents the analysis and findings of a Traffic Impact Analysis performed by Voigt Associates, Inc. for a proposed 360-unit multifamily development located on the northwest corner of FM 2920 at Tomball Cemetery Road in Tomball, Texas. Exhibit A1 (attached in Appendix A) shows the project location. The proposed site plan is shown as Exhibit A2 (attached). Exhibit A3 shows the site layout on an aerial background, with proposed access points and access restrictions noted. This report is a brief technical memorandum of the results of the assessment and includes study findings and discussion.

Description of Development and Access

The proposed development consists of a 360-unit multifamily development. The analysis assumes the development will be completed in one phase, with construction planned to begin in late-2021 or early-2022 and ready for occupancy in late 2022 or early 2023.

The site features two proposed access driveways. The main, primary driveway is proposed to be located on FM 2920 about 470’ west of Tomball Cemetery Road. A secondary, exit only driveway is located on Tomball Cemetery Road about 210’ north of FM 2920. The site has about 780 feet of frontage on FM 2920 and 340’ of frontage on Tomball Cemetery Road.

The site plan is conceptual in nature, but the main driveway is recommended to be at least 35’ wide with 20’ radii (but if divided 50’ wide with 8’ raised median and 20’ radii). The secondary exit-only driveway is recommended to be 24’ width with 15’ radii.

There does not appear to be any sight distance restrictions at the proposed driveway locations on FM 2920 and Tomball Cemetery Road. Site engineers should ensure that sight triangles are not blocked with any signing, landscaping, or other structures at the site driveways.

Study Area and Land Use

A description of each of the major study roadways is as follows:

- Along the southern site frontage, FM 2920 is a five-lane undivided asphalt roadway with 12’ wide travel lanes and a 10’ paved shoulder. The roadway has two lanes in each direction of travel with center two-way left turn lane. The posted speed limit within the study area is 50 mph. Existing pavement condition and markings along the site frontage are in good condition. There is a TxDOT project to widen FM 2920 in the next five to ten years (CSJ 294-10-1028).

- Along the eastern site frontage, Tomball Cemetery Road is a two-lane asphalt roadway with 11' wide travel lanes. Tomball Cemetery Road is stop-controlled on approach to FM 2920.

The existing land use at the site is undeveloped land. Surrounding the site, the land use is large lot residential and agricultural in nature. Appendix E, attached, shows photographs of study area roadways near the proposed development site.

Data Collection

For this engineering study assessment, video-based turning movement counts were collected on Wednesday, October 13, 2021, from 6:00 AM to 7:00 PM at the intersection of FM 2920 at Tomball Cemetery Road/Treichel Road. A growth factor of 1% per year was used the estimate future traffic volumes for the build-out year of 2023 even though TxDOT counts on FM 2920 indicate a negative 5-year traffic growth rate of -3.1%. Exhibits A4 and A5 in Appendix A shows the existing peak hour turning movement counts at each intersection included in the study. Exhibits A6 and A7 show the projected counts without development in the build-out year.

Trip Generation Projections and Trip Distribution

The Institute of Transportation Engineers' *Trip Generation Manual* (*11th Edition*) was used to estimate trips to the site using land use #221 – Multifamily Housing (Mid-Rise). The estimated trips generated by the development are shown in Table 1. Detailed calculations are found in Table C1 in Appendix C.

Table 1. Estimated New Trips for the Proposed Development.

Development Description	Weekday, 24-Hours	AM Peak Hour of Adjacent Roadway	PM Peak Hour of Adjacent Roadway
Multifamily (Mid-Rise)	1670 vehicles (835 entering / 835 exiting)	147 vehicles (34 entering / 113 exiting)	141 vehicles (86 entering / 55 exiting)

Trip distribution percentages for the development were assumed to be:

- 50% to/from the west via FM 2920;
- 48% to/from the east via FM 2920; and
- 2% to/from the north Tomball Cemetery Road.

Trip distribution details are provided in Exhibits A8 (AM Peak Hour) and A9 (PM peak hour) in Appendix A and Table C2 in Appendix C. New site trips are presented in Exhibits A10 and A11 and the estimated build-out year turning movement counts for the study area are shown in Exhibits A12 and A13 for AM and PM peak hours, respectively.

Level of Service (LOS) Analysis and Geometric Recommendations

This traffic impact analysis employed the macroscopic traffic simulation model Synchro 11. All simulations in this study represent the peak 15-minute time periods within any peak hour. The

results from the Synchro simulation give many measures of effectiveness (MOEs), but the most meaningful for this analysis were average vehicle delay and level of service. Table 2 presents the per-vehicle delay thresholds that define each level of service.

Table 2. LOS Thresholds for Signalized and Unsignalized Intersections.

Level of Service (LOS)	Signalized Intersections Control Delay Per Vehicle (sec/veh)	Unsignalized Intersections Control Delay Per Vehicle (sec/veh)
A	≤10	0-10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

An explanation of the concept of level of service is that it is similar to grades in school – A is the best, F the worst. Level of service (LOS) is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. LOS at an intersection is directly related to the control delay value, which is the overall delay associated with traffic control at the intersection (e.g., a traffic signal or stop sign). The LOS thresholds are different for signalized intersections as compared to unsignalized intersections, primarily because drivers expect different levels of performance from distinct types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than a stop-controlled intersection. Thus, a higher level of control delay is acceptable at a signalized intersection for the same level of service. At a two-way stop-controlled intersection, LOS is defined for each minor movement, but not for the intersection as a whole. All traffic simulation output is presented in Appendix D.

The results of the simulation are shown below in Table 3. The project's driveways and study intersections are projected to experience acceptable levels of queue and delay, with LOS D or better expected in the AM and PM peak hours, which is an acceptable condition for suburban environments. No mitigation due to delays or queues appears to be required.

Table 3. Level of Service Analysis Results.

Intersection/Scenario	Analysis Method Reported	Traffic Control /Cycle Length (s)	AM Peak Hour									
			Eastbound		Westbound		Northbound		Southbound		Overall Intersection Delay (s/v)	Overall Intersection LOS
			Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS		
1. FM 2920 at Tomball Cemetery Road/Treichel Road												
2021 Existing	HCM 6TH	TWSC	--	--	--	--	21.6	C	18.3	C	21.6	C
2023 Projected w/o Development	HCM 6TH	TWSC	--	--	--	--	22.0	C	18.6	C	22.0	C
2023 Projected w/Development	HCM 6TH	TWSC	--	--	--	--	23.2	C	22.9	C	23.2	C
2. FM 2920 at Main Site Driveway												
2023 Projected w/Development	HCM 6TH	OWSC	--	--	--	--	--	--	23.7	C	23.7	C
3. Tomball Cemetery Road at Site Driveway (Exit Only)												
2023 Projected w/Development	HCM 6TH	OWSC	8.7	A	--	--	--	--	--	--	8.7	A

Intersection/Scenario	Analysis Method Reported	Traffic Control /Cycle Length (s)	PM Peak Hour									
			Eastbound		Westbound		Northbound		Southbound		Overall Intersection Delay (s/v)	Overall Intersection LOS
			Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS	Approach Delay (s/v)	LOS		
1. FM 2920 at Tomball Cemetery Road/Treichel Road												
2021 Existing	HCM 6TH	TWSC	--	--	--	--	23.7	C	28.0	D	28.0	D
2023 Projected w/o Development	HCM 6TH	TWSC	--	--	--	--	24.5	C	29.2	D	29.2	D
2023 Projected w/Development	HCM 6TH	TWSC	--	--	--	--	25.4	D	33.9	D	33.9	D
2. FM 2920 at Main Site Driveway												
2023 Projected w/Development	HCM 6TH	OWSC	--	--	--	--	--	--	29.1	D	29.1	D
3. Tomball Cemetery Road at Site Driveway (Exit Only)												
2023 Projected w/Development	HCM 6TH	OWSC	8.5	A	--	--	--	--	--	--	8.5	A

Signalized	TWSC - two-way stop control	AWSC - all-way stop control
Unsignalized	OWSC - one-way stop control	

Turn Lane Warrants

The proposed main site driveway along FM 2920 was examined for the need for a right turn lane for the development using the Texas Department of Transportation (TxDOT) *Access Management Manual* (July 2011) and *Roadway Design Manual* (July 2020) guidelines. With projected peak hour westbound right turn volumes in the main site driveway of 18 (AM peak hour) and 45 (PM peak hour), the TxDOT 50 turns per hour threshold to warrant construction of a right turn lane is not met. No right turn lane will be required at the main site driveway on FM 2920.

Since FM 2920 has a center two-way left turn lane, a dedicated left turn for the site driveway is not required.

The site driveway to Tomball Cemetery Road is an exit only driveway, so there is no consideration of northbound left turn lane or southbound right turn lane at this driveway.

Traffic Signal Warrant

As part of this assessment, traffic signal warrants were examined for the intersection of FM 2920 at Tomball Cemetery Road and at FM 2920 at the proposed apartment driveway.

For existing conditions, no warrants for signalization would be met at FM 2920 at Tomball Cemetery Road. For projected conditions with development, no warrants for signalization would be met at FM 2920 at Tomball Cemetery Road. The recommended level of traffic control at FM 2920 at Tomball Cemetery Road is to retain the existing two-way stop control.

For projected conditions with development at FM 2920 at the proposed apartment driveway, no warrants for signalization would be met. Signalization of either the Tomball Cemetery Road or apartment main driveway is recommended.

Conclusions & Discussion

The analysis investigated the site access, traffic control, and other improvements or operations issues that should be addressed as the development moves forward. The findings and overall recommendations to mitigate the impacts of the proposed multifamily development are as follows:

- Site access to FM 2920:
  - A westbound right turn lane is not warranted;
  - An eastbound left turn lane is provided by the existing two-way left turn lane;
  - The driveway should be stop-controlled on approach to FM 2920;
  - The site plan is conceptual in nature, but the main driveway is recommended to be at least 35' wide with 20' radii (but if divided 50' wide with 8' raised median and 20' radii).
- Site access to Tomball Cemetery Road:
  - This access is planned to be gated and exit-only;
  - A northbound left turn lane is not warranted;
  - A southbound right turn lane is not warranted;
  - The driveway should be stop-controlled on approach to Tomball Cemetery Road; and
  - The secondary exit-only driveway is recommended to be 24' width with 15' radii.
- The existing two-way stop control at FM 2920 and Tomball Cemetery Road is appropriate for existing and proposed conditions with development. A traffic signal is not warranted at this intersection.
- A traffic signal is not warranted at the proposed main site driveway on FM 2920.

Voigt Associates appreciates the opportunity to assist you with this project. If you have any questions about the analysis or the results of this report, please feel free to contact me at 832-264-0429.

Sincerely,

Anthony Voigt, P.E., PTOE
Principal

Attachments:

Appendix A. Exhibits
Appendix B. Traffic Data
Appendix C. Trip Generation/Distribution Calculations
Appendix D. Traffic Simulation Output
Appendix E. Roadway Photographs

Appendix A. Exhibits

Exhibit A1. Site Location Map – Regional Aerial.

North to top of page. Not to scale.

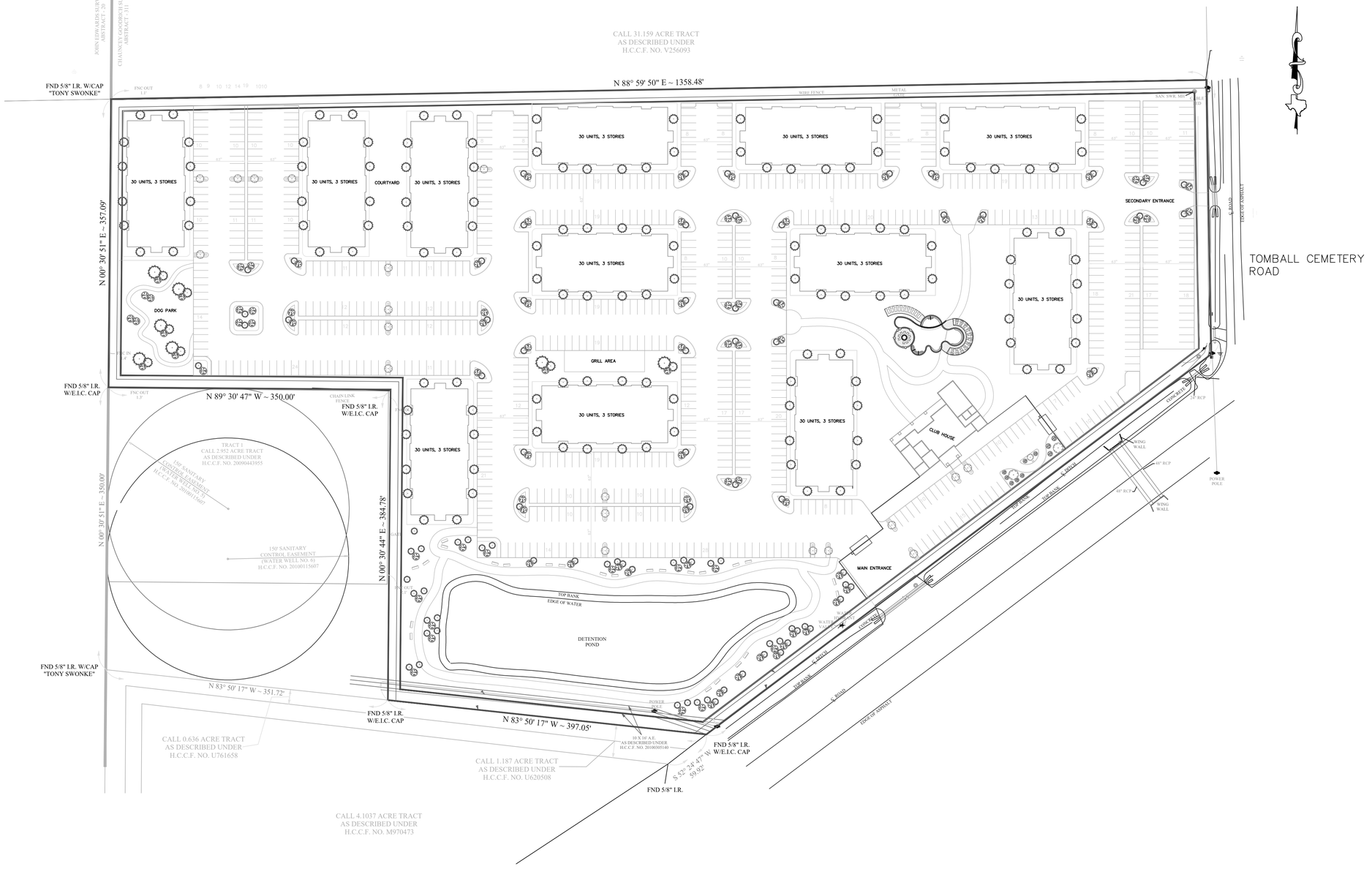


Exhibit A2. Proposed Site Plan

1 **ARCHITECTURAL SITE PLAN**
~~SCALE: 1"=50'-0"~~

North

1"=70'

CTC Residential, LLC

PROJECT NAME:
Tomball Multifamily Development,
TOMBALL CEMETERY ROAD

DATE	REVISIONS

DATE
ISSUE
PROJECT NUMBER
DRAWN BY
SHEET TITLE

SHEET NUMBER
A1.00

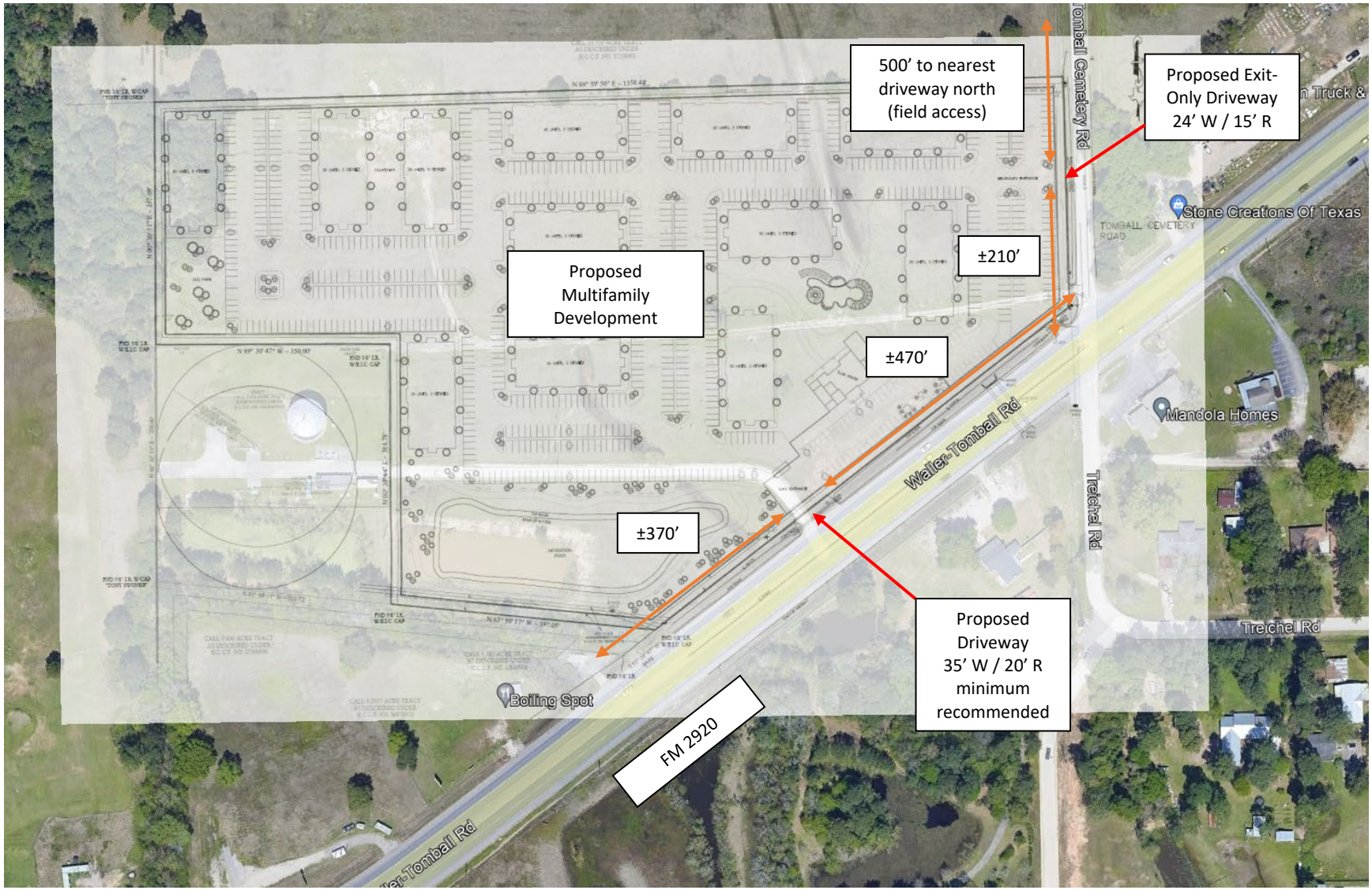


Exhibit A3. Proposed Site Layout on Aerial Background.

North to top of page. Not to scale.

Exhibit A4
Total Turning Movements

2021 AM Peak Hour
Existing Conditions

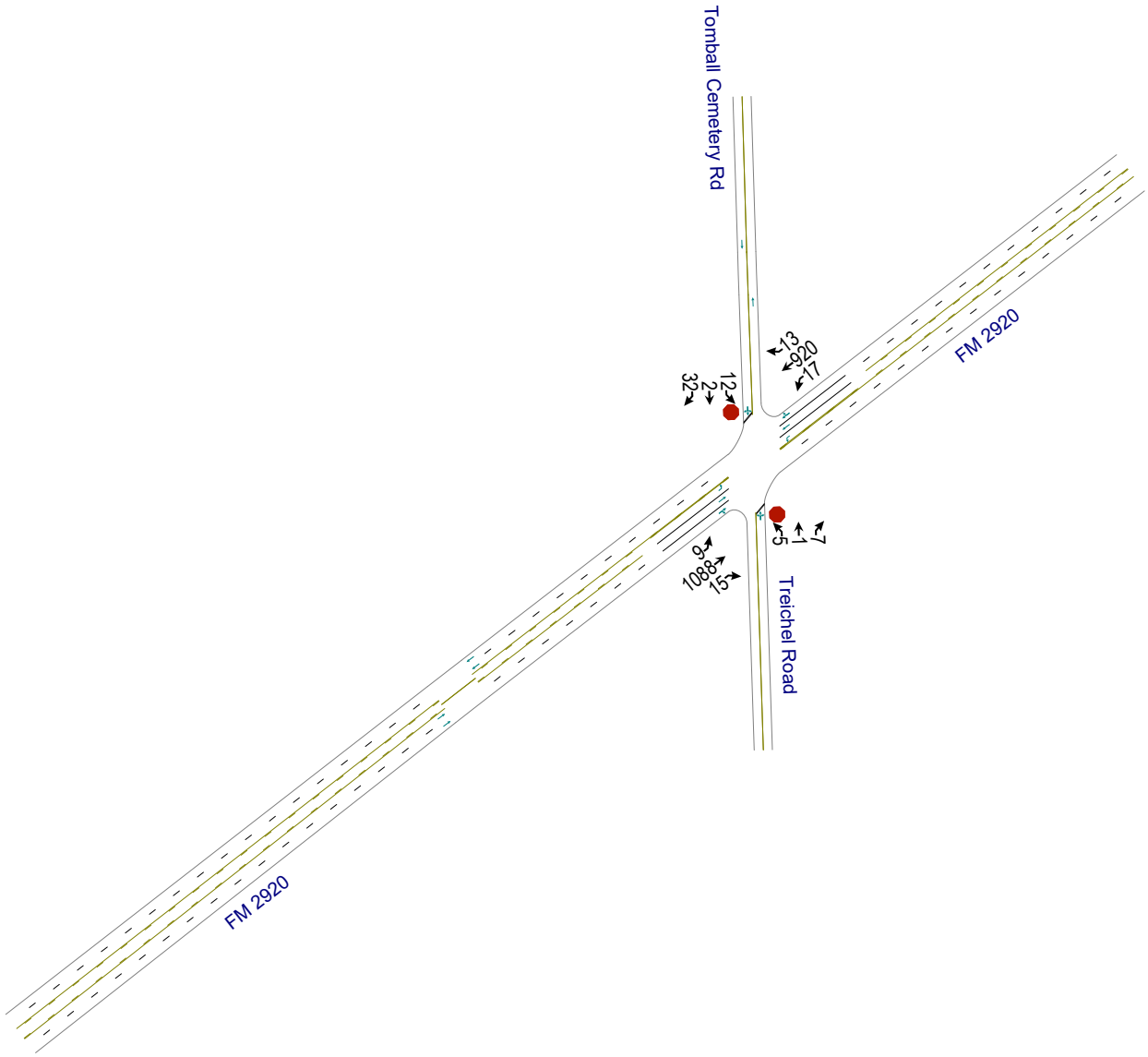


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Exhibit A5
Total Turning Movements

2021 PM Peak Hour
Existing Conditions

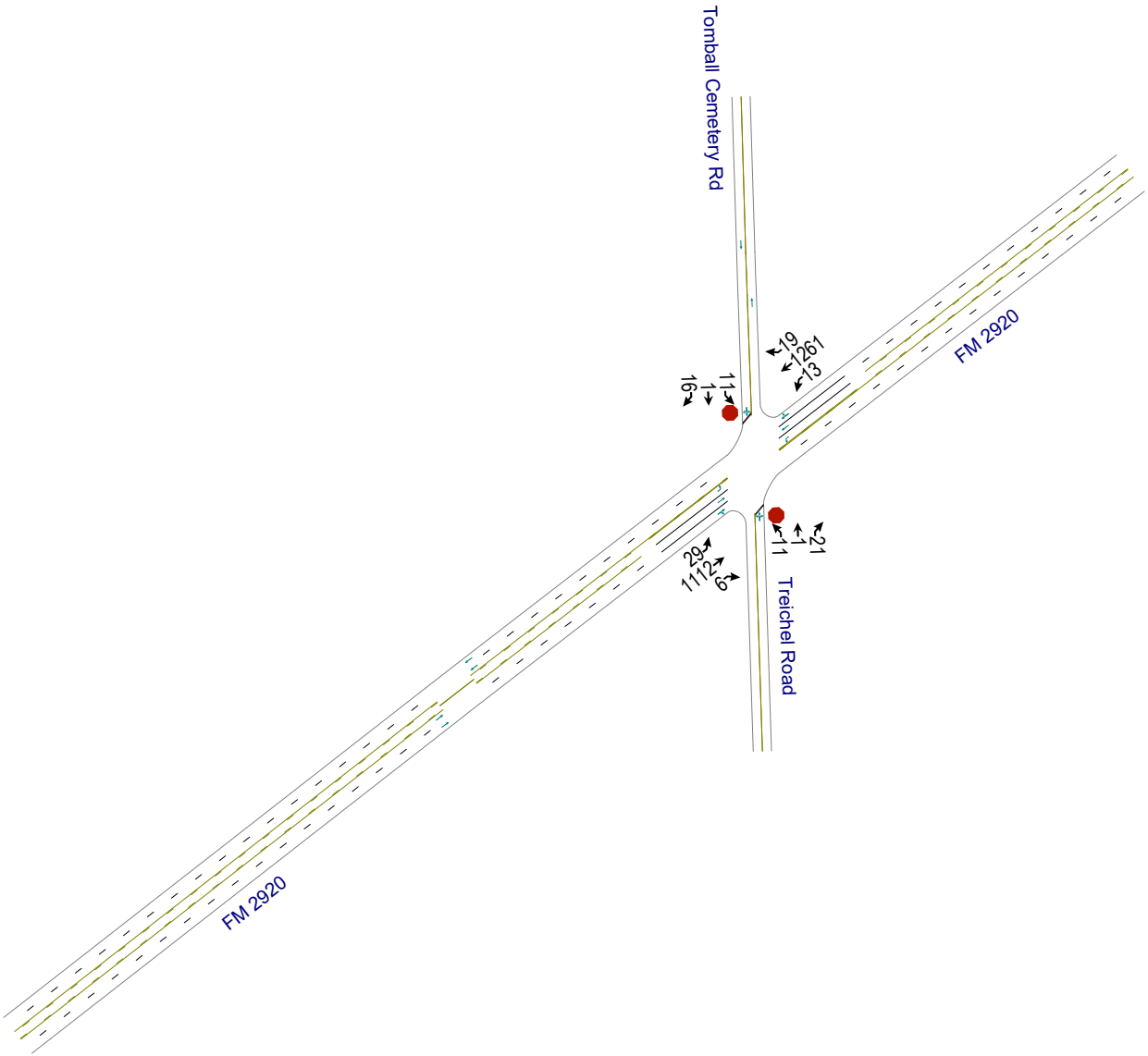

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Exhibit A6
Total Turning Movements

2023 AM Peak Hour
Build-Out Year w/o Development

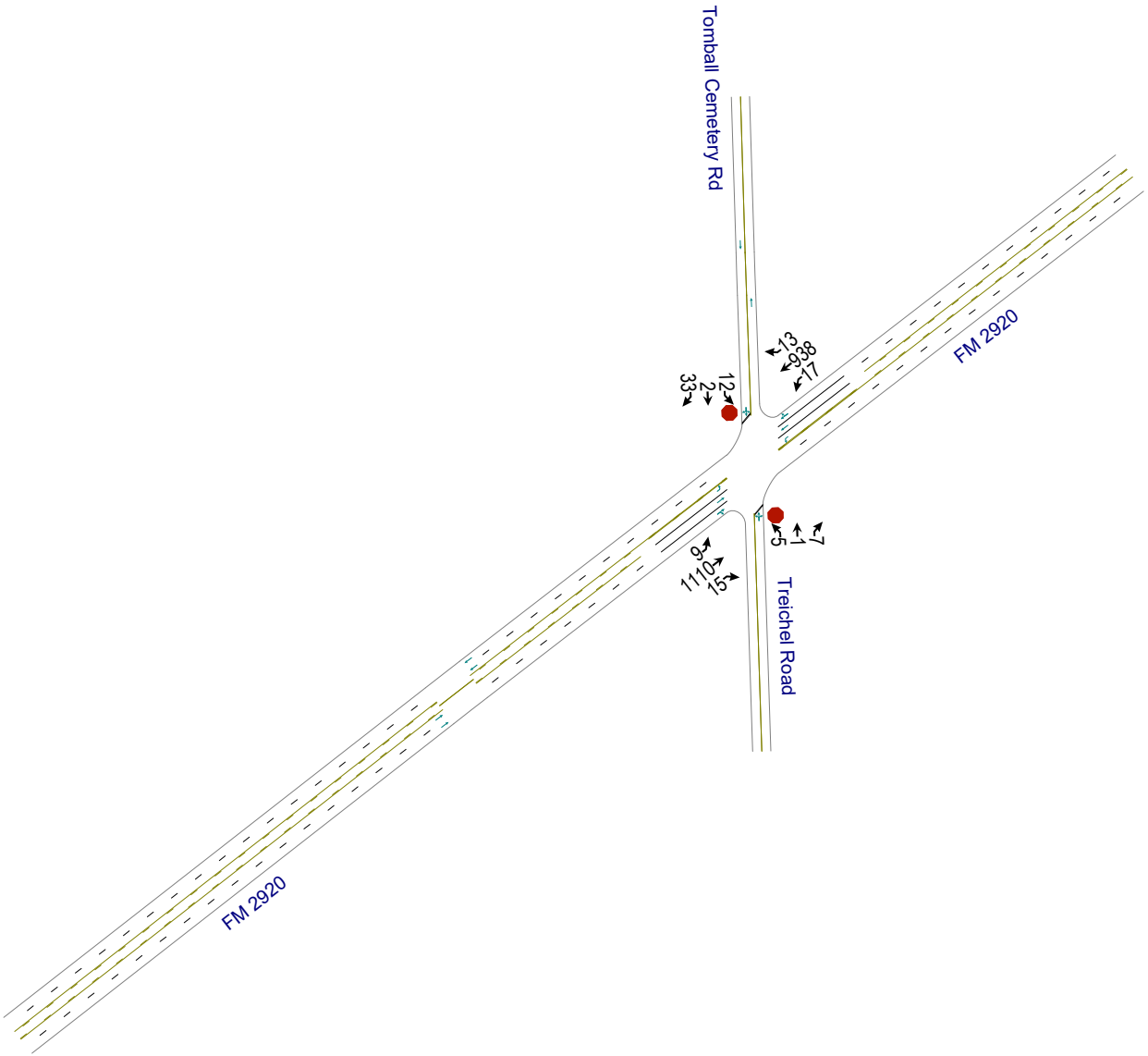

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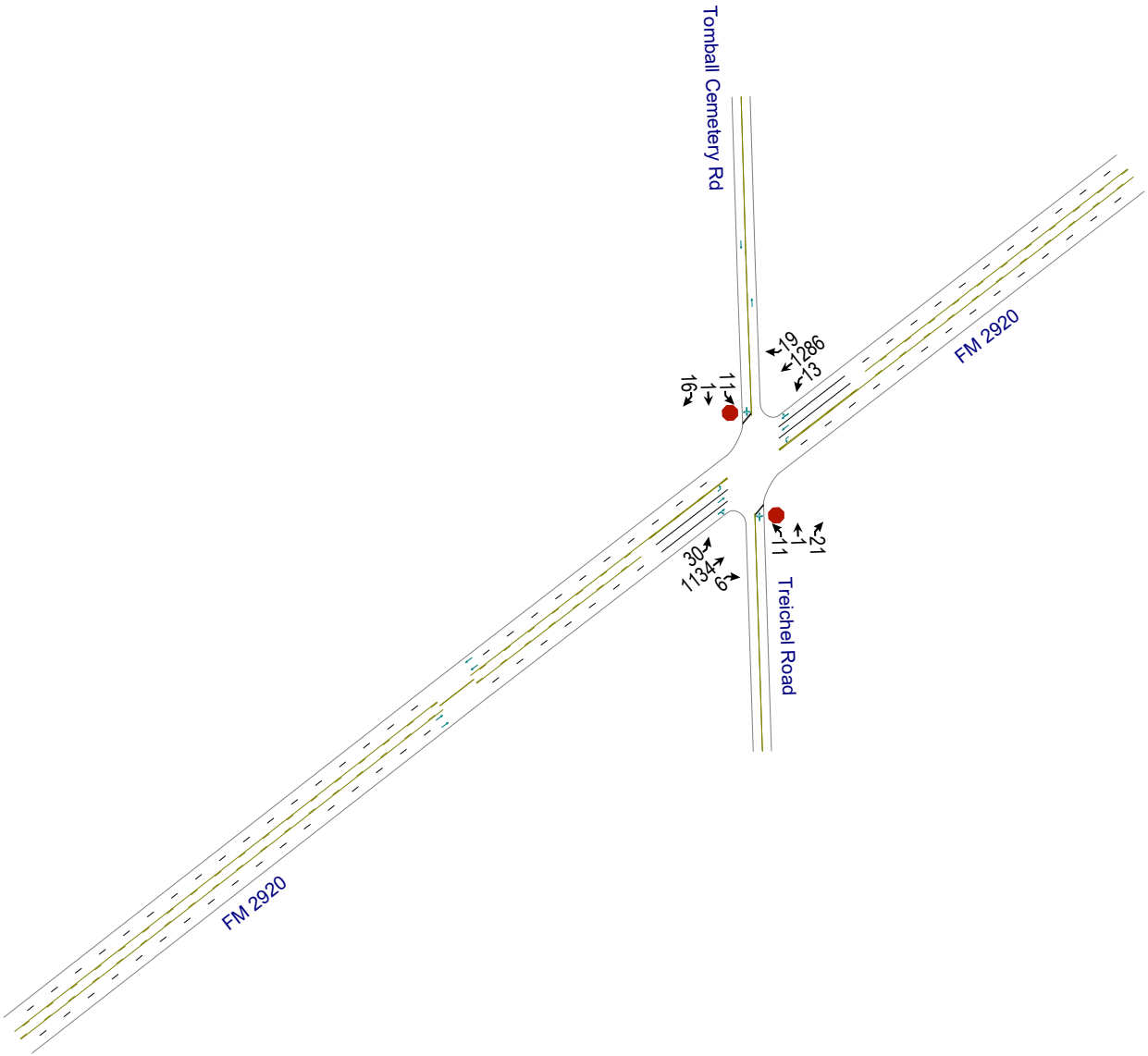
Exhibit A7
Total Turning Movements

2023 PM Peak Hour
Build-Out Year w/o Development



Not To Scale
North to Top of Page

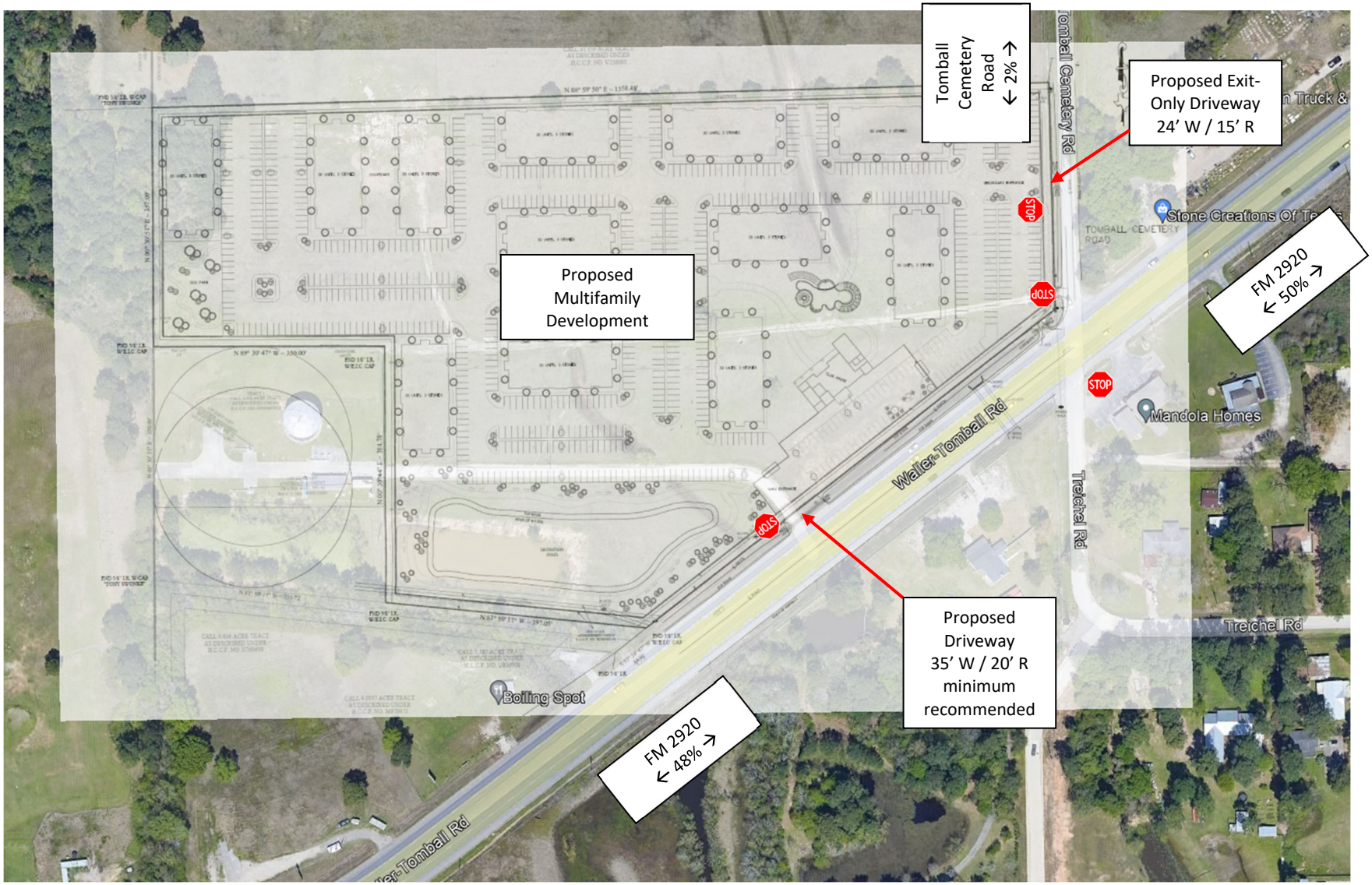


Exhibit A8. Trip Distribution Percentages – AM Peak Hour.

North to top of page. Not to scale.

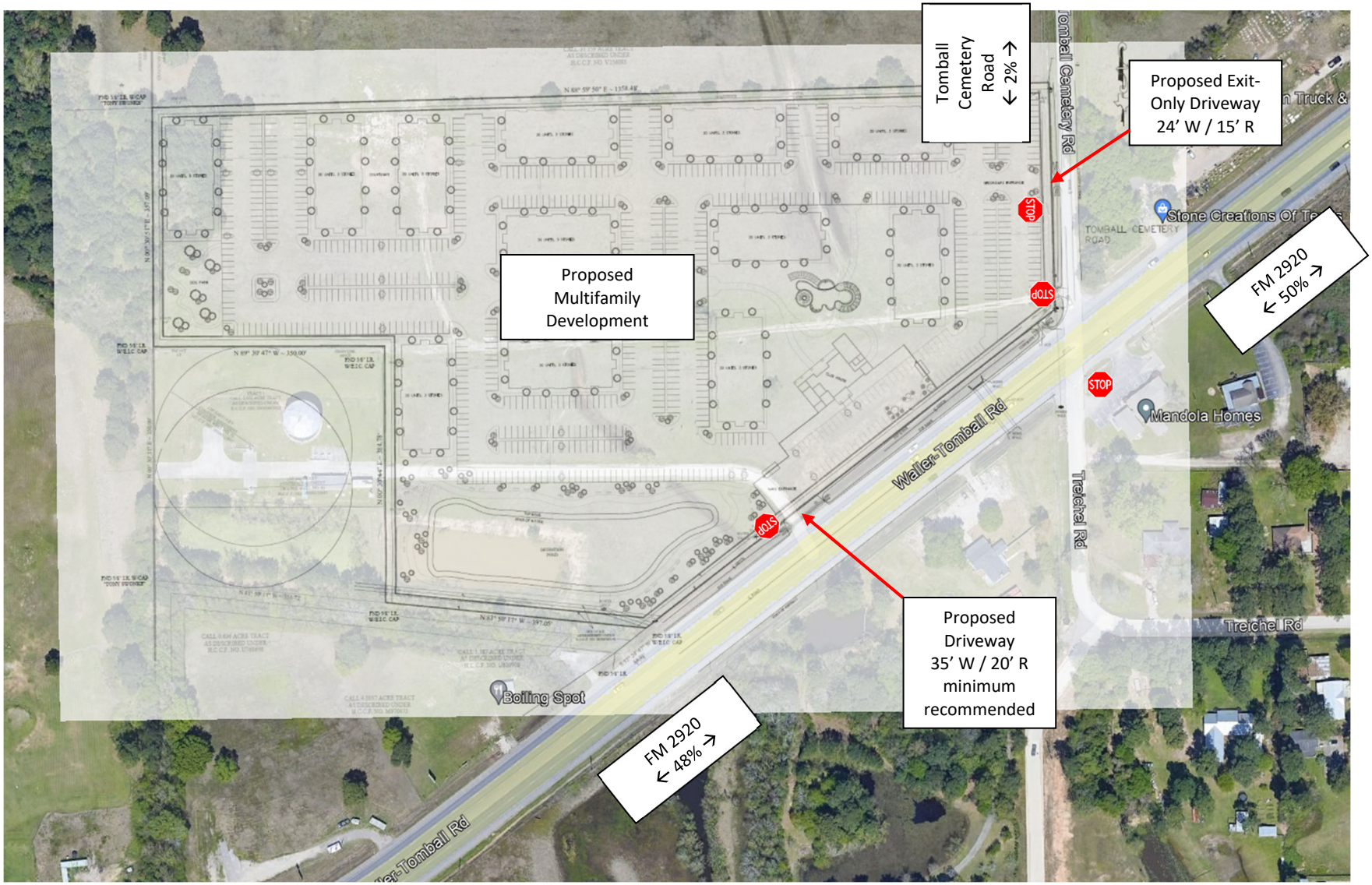


Exhibit A9. Trip Distribution Percentages – PM Peak Hour.

North to top of page. Not to scale.

Exhibit A10
Total Turning Movements

AM Peak Hour
New Site Trips

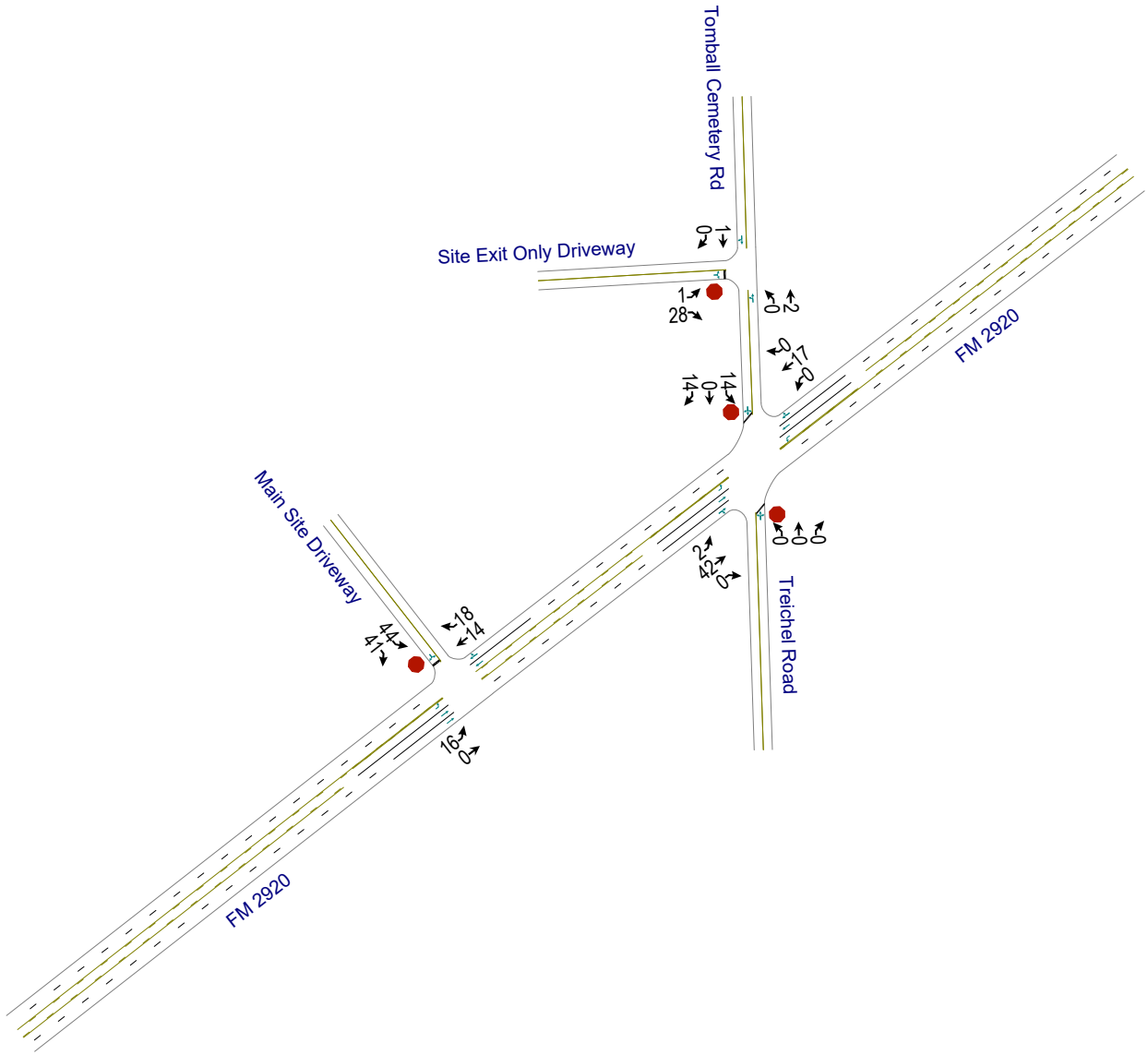


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Exhibit A11
Total Turning Movements

PM Peak Hour
New Site Trips

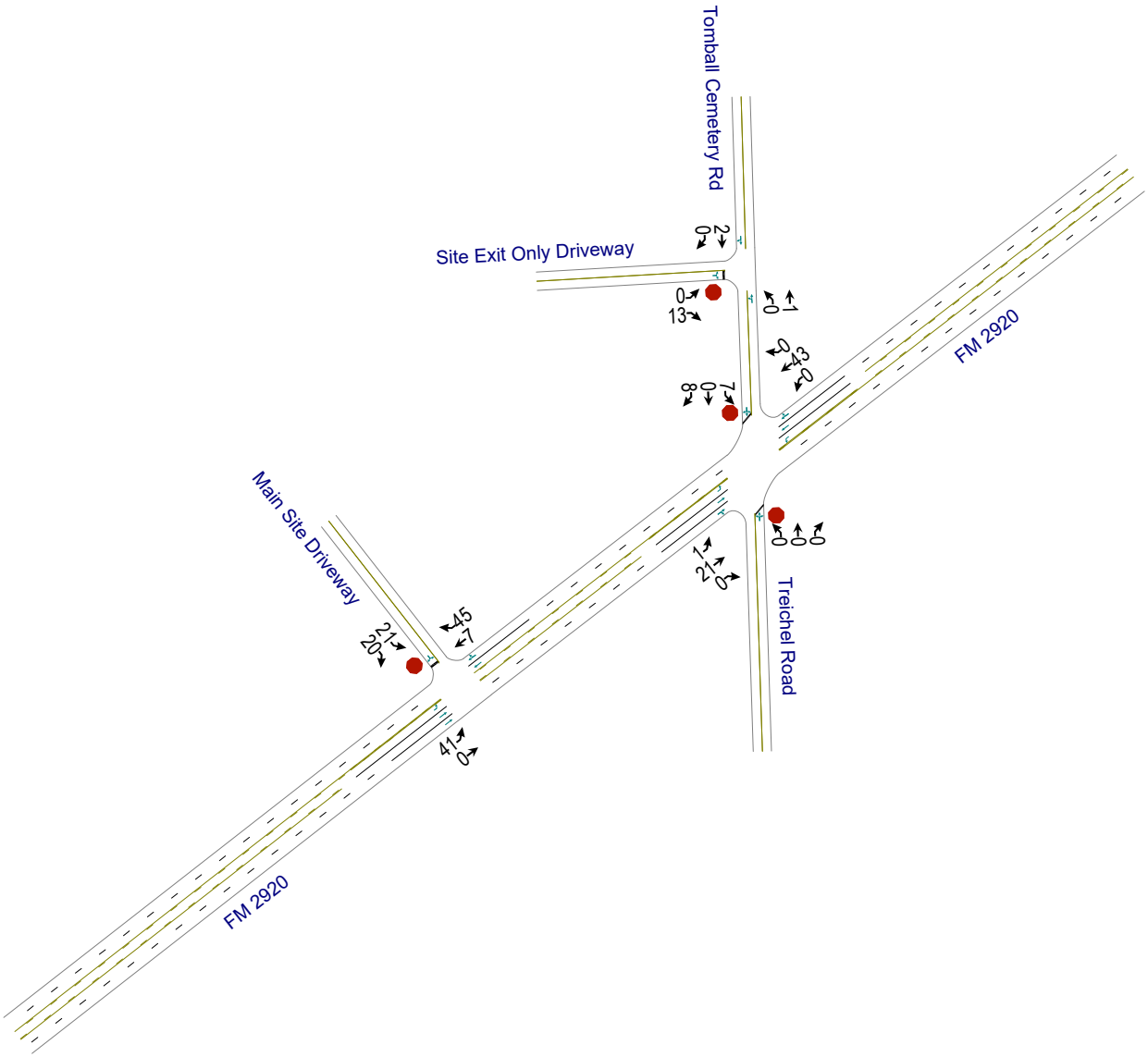

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Exhibit A12
Total Turning Movements

2023 AM Peak Hour
Build-Out Year w/Development

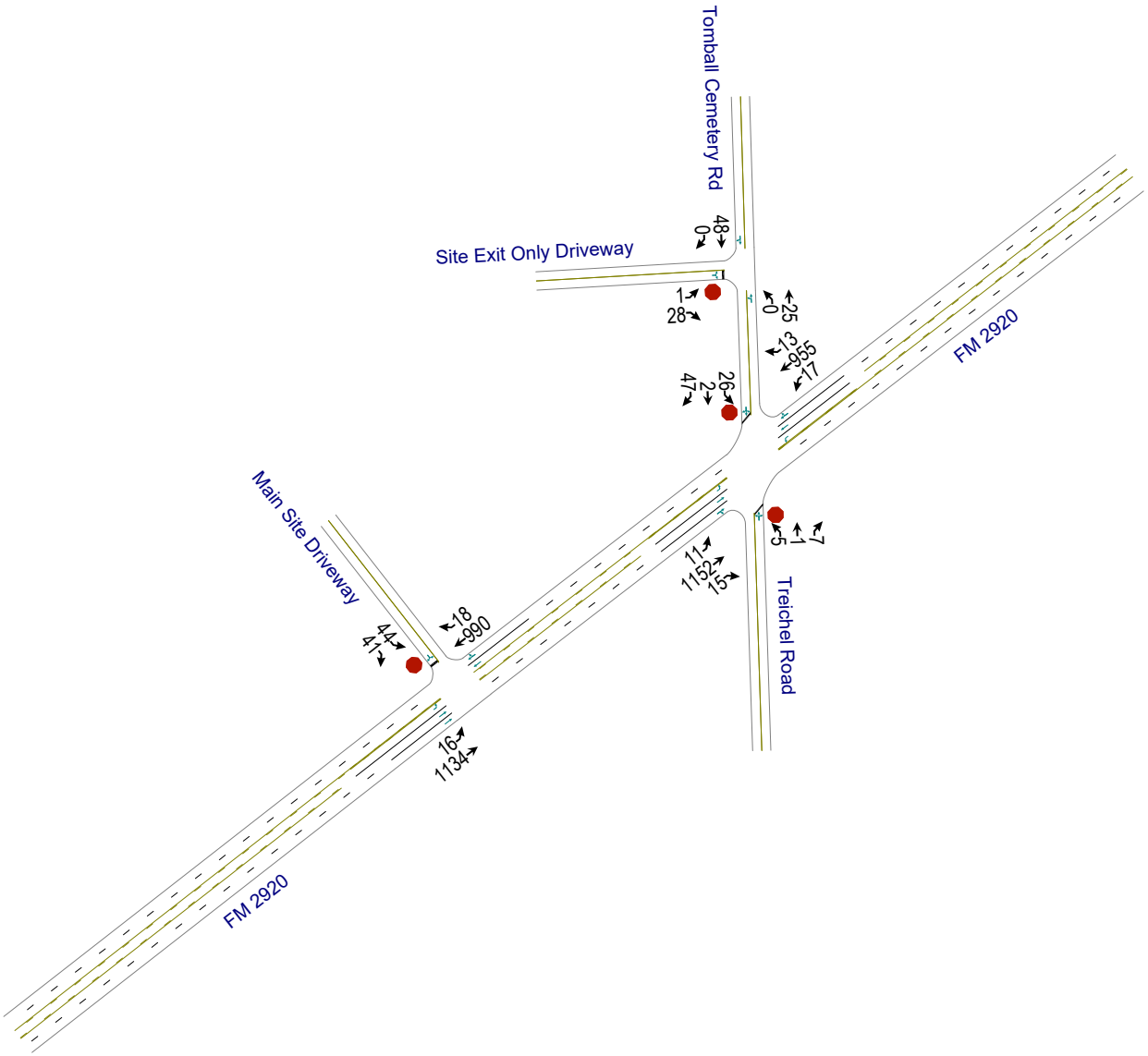

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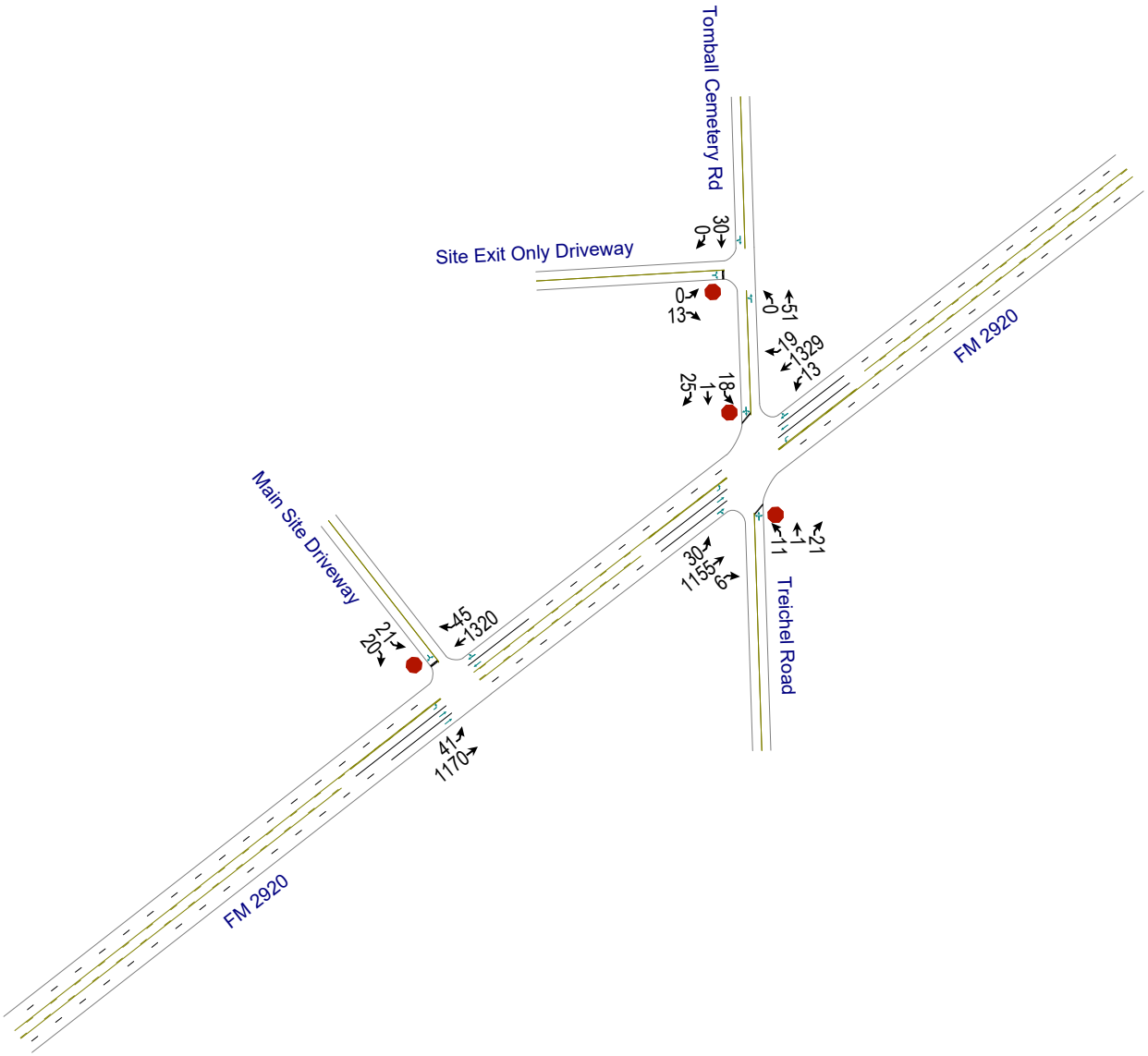
Exhibit A13
Total Turning Movements

2023 PM Peak Hour
Build-Out Year w/Development



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Appendix B. Traffic Data

Vehicle/Pedestrian Turning Movement Count

FM 2920 at Tomball Cemetery Road

Wednesday, October 13, 2021

Time Begin	Eastbound FM 2920				Westbound FM 2920				Northbound Treichel Road				Southbound Tomball Cemetery Road				15-min Vehicle Total	Peds (crossing XB approach)							
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		EB-CW	EB-CCW	WB-CW	WB-CCW	NB-CW	NB-CCW	SB-CW	SB-CCW
06:00	2	126	5	0	2	78	2	0	1	0	5	0	3	0	2	0	226	0	0	0	0	0	0	0	0
06:15	1	174	1	0	1	120	0	0	1	0	1	0	2	0	1	0	302	0	0	0	0	0	0	0	0
06:30	2	288	4	0	1	124	1	0	2	1	3	0	3	0	3	0	432	0	0	0	0	0	0	0	0
06:45	4	293	2	0	3	151	1	0	2	1	6	0	2	0	1	0	466	0	0	0	0	0	0	0	0
07:00	3	219	3	0	4	193	2	0	2	0	1	0	6	0	3	0	436	0	0	0	0	0	0	0	0
07:15	1	268	3	0	2	232	1	0	0	0	3	0	3	0	7	0	520	0	0	0	0	0	0	0	0
07:30	1	260	3	0	3	260	4	0	0	0	1	0	5	0	8	0	545	0	0	0	0	0	0	0	0
07:45	3	278	5	0	10	241	5	0	0	1	3	0	4	0	9	0	559	0	0	0	0	0	0	0	0
08:00	1	269	3	0	1	205	2	0	1	0	0	0	2	2	7	0	493	0	0	0	0	0	0	0	0
08:15	4	281	4	0	3	214	2	0	4	0	3	0	1	0	8	0	524	0	0	0	0	0	0	0	0
08:30	8	307	4	0	3	186	5	0	2	0	1	0	4	1	5	0	526	0	0	0	0	0	0	0	0
08:45	3	321	2	0	1	167	2	0	2	0	2	0	2	2	2	0	506	0	0	0	0	0	0	0	0
09:00	3	251	3	0	0	140	4	0	2	0	2	0	3	2	3	0	413	0	0	0	0	0	0	0	0
09:15	2	233	1	0	0	166	1	0	3	0	1	0	5	0	5	0	417	0	0	0	0	0	0	0	0
09:30	1	216	1	0	2	177	2	0	3	1	0	0	1	0	2	0	406	0	0	0	0	0	0	0	0
09:45	0	233	2	0	0	158	1	0	0	1	0	0	4	0	1	0	400	0	0	0	0	0	0	0	0
10:00	1	196	1	0	0	196	1	0	5	0	0	0	1	0	3	0	404	0	0	0	0	0	0	0	0
10:15	1	223	0	0	1	168	5	0	2	0	1	0	4	0	2	0	407	0	0	0	0	0	0	0	0
10:30	1	212	1	0	0	167	2	0	2	0	0	0	4	0	6	0	395	0	0	0	0	0	0	0	0
10:45	1	223	3	0	0	166	2	0	0	0	1	0	4	0	0	0	400	0	0	0	0	0	0	0	0
11:00	0	215	1	0	4	198	2	0	2	0	1	0	1	1	3	0	428	0	0	0	0	0	0	0	0
11:15	1	246	2	0	5	189	5	0	1	0	1	0	2	0	2	0	454	0	0	0	0	0	0	0	0
11:30	4	219	3	0	0	200	2	0	2	0	5	0	4	0	3	0	442	0	0	0	0	0	0	0	0
11:45	2	258	3	0	2	223	5	0	2	0	1	0	3	0	5	0	504	0	0	0	0	0	0	0	0
12:00	2	216	3	0	5	232	7	0	1	0	8	0	7	1	15	0	497	0	0	0	0	0	0	0	0
12:15	1	201	2	0	4	276	5	0	2	0	4	0	2	0	2	0	499	0	0	0	0	0	0	0	0
12:30	1	199	1	0	3	236	3	0	4	0	3	0	7	0	5	0	462	0	0	0	0	0	0	0	0
12:45	4	212	1	0	3	258	3	0	2	0	1	0	4	1	4	0	493	0	0	0	0	0	0	0	0
13:00	2	227	4	0	1	215	6	0	0	0	1	0	2	0	1	0	459	0	0	0	0	0	0	0	0
13:15	8	223	1	0	2	295	2	0	1	2	2	0	5	0	4	0	545	0	0	0	0	0	0	0	0
13:30	1	263	0	0	3	253	6	0	2	0	2	0	1	0	2	0	533	0	0	0	0	0	0	0	0
13:45	3	237	1	0	1	220	2	0	1	2	1	0	4	0	3	0	475	0	0	0	0	0	0	0	0
14:00	3	229	2	0	0	238	5	0	1	0	5	0	6	0	3	0	492	0	0	0	0	0	0	0	0
14:15	3	220	5	0	1	295	1	0	2	0	4	0	2	0	2	0	535	0	0	0	0	0	0	0	0
14:30	4	230	1	0	3	258	5	0	4	0	5	0	5	0	4	0	519	0	0	0	0	0	0	0	0
14:45	6	212	2	0	2	295	2	0	4	0	1	0	3	2	4	0	533	0	0	0	0	0	0	0	0
15:00	4	223	3	0	7	319	6	0	2	0	4	0	7	2	7	0	584	0	0	0	0	0	0	0	0
15:15	5	245	2	0	1	300	4	0	7	0	3	0	3	0	6	0	576	0	0	0	0	0	0	0	0
15:30	4	257	1	1	3	329	8	0	4	0	1	0	6	1	4	0	618	0	0	0	0	0	0	0	0
15:45	6	226	1	0	3	305	2	0	2	0	3	0	8	1	5	0	562	0	0	0	0	0	0	0	0
16:00	6	263	6	0	3	313	3	0	0	1	4	0	4	0	3	0	606	0	0	0	0	0	0	0	0
16:15	7	291	6	0	7	289	5	0	0	2	7	0	4	0	3	1	621	0	0	0	0	0	0	0	0
16:30	10	252	2	0	3	308	6	0	1	0	4	0	2	0	4	0	592	0	0	0	0	0	0	0	0
16:45	4	275	2	0	2	315	3	0	1	0	2	0	4	0	6	0	614	0	0	0	0	0	0	0	0
17:00	9	282	2	0	6	308	5	0	6	1	13	0	4	1	3	0	640	0	0	0	0	0	0	0	0
17:15	6	303	0	0	2	330	5	0	3	0	2	0	1	0	3	0	655	0	0	0	0	0	0	0	0
17:30	9	275	0	0	3	211	7	0	3	0	3	0	2	2	6	0	521	0	0	0	0	0	0	0	0
17:45	6	260	2	0	1	236	3	0	2	0	1	0	3	0	6	0	520	0	0	0	0	0	0	1	0
18:00	0	244	1	0	0	268	7	0	2	0	1	0	4	0	15	0	542	0	0	0	0	0	0	0	0
18:15	3	307	2	0	2	285	6	1	4	1	1	0	3	0	7	0	621	0	0	0	0	0	0	0	0
18:30	0	217	2	0	3	253	6	0	2	0	0	0	7	0	2	0	492	0	0	0	0	0	0	0	0
18:45	2	212	2	0	0	242	1	0	1	0	0	0	5	0	4	0	469	0	0	0	0	0	0	0	0
13-Hour Total	**169**	**12610**	**117**	**1**	**122**	**12001**	**183**	**1**	**105**	**14**	**128**	**0**	**188**	**19**	**224**	**1**	25880								

Peak Hour Total	Eastbound FM 2920				Westbound FM 2920				Northbound Treichel Road				Southbound Tomball Cemetery Road				Hour Vehicle Total	Peds							
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		EB-CW	EB-CCW	WB-CW	WB-CCW	NB-CW	NB-CCW	SB-CW	SB-CCW
7:30-8:30	**9**	**1088**	**15**	**0**	**17**	**920**	**13**	**0**	**5**	**1**	**7**	**0**	**12**	**2**	**32**	**0**	2121	0	0	0	0	0	0	0	0
16:30-17:30	**29**	**1112**	**6**	**0**	**13**	**1261**	**19**	**0**	**11**	**1**	**21**	**0**	**11**	**1**	**16**	**0**	2501	0	0	0	0	0	0	0	0

Appendix C. Trip Generation/Distribution Calculations

Table C1. Trip Generation Calculations

Trip Rates

Development Description	ITE Trip Generation Land Use Number	Trip Generation Land Use	Independent Variable	Value	Use Rate	Use Curve	Weekday			Weekday AM Peak Hour of Adjacent Roadway			Weekday PM Peak Hour of Adjacent Roadway		
							24-Hr	Percent			Percent			Percent	
							Trip Rate*	Entering	Exiting	Trip Rate*	Entering	Exiting	Trip Rate*	Entering	Exiting
The Village at Kyle	221	Multifamily Housing (Mid-Rise)	Dwelling Unit	360.000		24/AM	4.54	50%	50%	0.37	23%	77%	0.39	61%	39%

Trip End Calculations

Development Description	ITE Trip Generation Land Use Number	Trip Generation Land Use	Independent Variable	Value	Use Rate	Use Curve	Weekday			Weekday AM Peak Hour of Adjacent Roadway			Weekday PM Peak Hour of Adjacent Roadway		
							24-Hr	Trips		Peak Hour	Trips		Peak Hour	Trips	
							Trip Ends	Entering	Exiting	Trips	Entering	Exiting	Trips	Entering	Exiting
The Village at Kyle	221	Multifamily Housing (Mid-Rise)	Dwelling Unit	360.000	0	24/AM	1,671	835	835	147	34	113	141	86	55

Trip End Totals

	Weekday			Weekday AM Peak Hour of Adjacent Roadway			Weekday PM Peak Hour of Adjacent Roadway		
	24-Hr	Trips		Peak Hour	Trips		Peak Hour	Trips	
	Trip Ends	Entering	Exiting	Trips	Entering	Exiting	Trips	Entering	Exiting
Trip Totals	1,671	835	835	147	34	113	141	86	55

*trip estimates subject to roundoff error

Trip Adjustment Factors

Adjustment Factor	Time Period	Factor
Internal Capture Rates:	Weekday	0.0%
	Weekday AM Peak Hour of Adjacent Roadway	0.0%
	Weekday PM Peak Hour of Adjacent Roadway	0.0%
Pass-By Trips:	Weekday	0.0%
	Weekday AM Peak Hour of Adjacent Roadway	0.0%
	Weekday PM Peak Hour of Adjacent Roadway	0.0%
	Weekday AM Peak Hour of Adjacent Roadway	0.0%
	Weekday PM Peak Hour of Adjacent Roadway	0.0%

-			
	-		
		-	
-	-		
		-	

Trip Totals

Trip Type	Weekday			Weekday AM Peak Hour of Adjacent Roadway			Weekday PM Peak Hour of Adjacent Roadway		
	Total Trips	Trips*		Total Trips	Trips*		Total Trips	Trips*	
		Entering	Exiting		Entering	Exiting		Entering	Exiting
Total Trips, Pre-Capture/Pass-By:	1,671	835	835	147	34	113	141	86	55
Total Trips, Captured Within Development:	-	-	-	-	-	-	-	-	-
Total Trips, New & Pass-By	1,671	835	835	147	34	113	141	86	55
Total Trips, Pass-By, Existing on Roadway Network:	-	-	-	-	-	-	-	-	-
Total Trips, New on Roadway Network:	1,671	835	835	147	34	113	141	86	55

*trip estimates subject to roundoff error

Table C2. Trip Distribution

GLOBAL ORIGINS/DESTINATIONS

Origins-Peak Hour Volume	AM	PM
From FM 2920, East of Tomball Cemetery Road	950	1293
From FM 2920, West of Site	1112	1147
From Tomball Cemetery Road, North of Site	46	28
From Treichel Road, South of Site	13	33

Destinations-Peak Hour Volume	AM	PM
To FM 2920, East of Tomball Cemetery Road	1107	1144
To FM 2920, West of Site	957	1288
To Tomball Cemetery Road, North of Site	23	49
To Treichel Road, South of Site	34	20

TRIP DISTRIBUTION (NEW TRIPS)

FROM (ENTERING DEVELOPMENT)	Existing Total Volume AM Peak	Manually Estimated Trip Distribution (%)	Volume Based Trip Distribution Percentage	AM Peak Development Volume*	Existing Total Volume PM Peak	Manually Estimated Trip Distribution (%)	Volume Based Trip Distribution Percentage	PM Peak Development Volume*
From FM 2920, East of Tomball Cemetery Road	950	50.0%	44.8%	17	1293	50.0%	51.7%	43
From FM 2920, West of Site	1112	48.0%	52.4%	16	1147	48.0%	45.9%	41
From Tomball Cemetery Road, North of Site	46	2.0%	2.2%	1	28	2.0%	1.1%	2
From Treichel Road, South of Site	13	0.0%	0.6%	0	33	0.0%	1.3%	0
Total	2121	100.0%	100.0%	34	2501	100.0%	100.0%	86
TO (EXITING DEVELOPMENT)	Existing Total Volume AM Peak	Manually Estimated Trip Distribution (%)	Volume Based Trip Distribution Percentage	AM Peak Development Volume*	Existing Total Volume PM Peak	Manually Estimated Trip Distribution (%)	Volume Based Trip Distribution Percentage	PM Peak Development Volume*
To FM 2920, East of Tomball Cemetery Road	1107	50.0%	52.2%	57	1144	50.0%	45.7%	27
To FM 2920, West of Site	957	48.0%	45.1%	54	1288	48.0%	51.5%	26
To Tomball Cemetery Road, North of Site	23	2.0%	1.1%	2	49	2.0%	2.0%	1
To Treichel Road, South of Site	34	0.0%	1.6%	0	20	0.0%	0.8%	0
Total	2121	100.0%	100.0%	113	2501	100.0%	100.0%	55

*Development volumes and sum totals rounded to whole vehicles

TRIP DISTRIBUTION DETAILS - NEW TRIPS

FROM (ENTERING DEVELOPMENT)	ROUTE (ENTERING DEVELOPMENT)								AM PEAK HOUR Vehicles	PM PEAK HOUR Vehicles	AM PEAK HOUR Percent of Entering Vehicles	PM PEAK HOUR Percent of Entering Vehicles
	AM Percent Dist.	PM Percent Dist.	Int01: FM 2920 at Tomball Cemtry	Int02: FM 2920 at Site Driveway	Int03: Tomball Cmtry at Site Dwy							
From FM 2920, East of Tomball Cemetery Road												
via FM 2920 at Main Entrance (2)	100.0%	100.0%	WBT	WBR					17	43	50.00%	50.00%
via Tomball Cemetery Exit Driveway (3)	0.0%	0.0%	WBR		NBL				0	0	0.00%	0.00%
From FM 2920, West of Site												
via FM 2920 at Main Entrance (2)	100.0%	100.0%		EBL					16	41	48.00%	48.00%
via Tomball Cemetery Exit Driveway (3)	0.0%	0.0%	EBL	EBT	NBL				0	0	0.00%	0.00%
From Tomball Cemetery Road, North of Site												
via FM 2920 at Main Entrance (2)	100.0%	100.0%	SBR	WBR	SBT				1	2	2.00%	2.00%
via Tomball Cemetery Exit Driveway (3)	0.0%	0.0%			SBR				0	0	0.00%	0.00%
From Treichel Road, South of Site												
via FM 2920 at Main Entrance (2)	100.0%	100.0%	NBL	WBR					0	0	0.00%	0.00%
via Tomball Cemetery Exit Driveway (3)	0.0%	0.0%	NBT		NBL				0	0	0.00%	0.00%
TO (EXITING DEVELOPMENT)	ROUTE (EXITING DEVELOPMENT)								AM PEAK HOUR Vehicles	PM PEAK HOUR Vehicles	AM PEAK HOUR Percent of Exiting Vehicles	PM PEAK HOUR Percent of Exiting Vehicles
	AM Percent Dist.	PM Percent Dist.	Int01: FM 2920 at Tomball Cemtry	Int02: FM 2920 at Site Driveway	Int03: Tomball Cmtry at Site Dwy							
To FM 2920, East of Tomball Cemetery Road												
via FM 2920 at Main Entrance (2)	75.0%	75.0%	EBT	SBL					42	21	37.50%	37.50%
via Tomball Cemetery Exit Driveway (3)	25.0%	25.0%	SBL		EBR				14	7	12.50%	12.50%
To FM 2920, West of Site												
via FM 2920 at Main Entrance (2)	75.0%	75.0%		SBR					41	20	36.00%	36.00%
via Tomball Cemetery Exit Driveway (3)	25.0%	25.0%	SBR	WBT	EBR				14	7	12.00%	12.00%
To Tomball Cemetery Road, North of Site												
via FM 2920 at Main Entrance (2)	75.0%	75.0%	EBL	SBL	NBT				2	1	1.50%	1.50%
via Tomball Cemetery Exit Driveway (3)	25.0%	25.0%			EBL				1	0	0.50%	0.50%
To Treichel Road, South of Site												
via FM 2920 at Main Entrance (2)	75.0%	75.0%	EBR	SBL					0	0	0.00%	0.00%
via Tomball Cemetery Exit Driveway (3)	25.0%	25.0%	SBT		EBR				0	0	0.00%	0.00%

Table C3. Existing (2021) Peak Hour Turning Movement Counts

1. FM 2920 at Tomball Cemetery Road/Treichel Road

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				Treichel Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	9	1088	15	0	17	920	13	0	5	1	7	0	12	2	32	0
PM Peak	29	1112	6	0	13	1261	19	0	11	1	21	0	11	1	16	0

2. FM 2920 at Main Site Driveway

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				<<NO APPROACH>>				Main Site Driveway			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak		1112				957										
PM Peak		1147				1288										

3. Tomball Cemetery Road at Site Driveway (Exit Only)

	Eastbound				Westbound				Northbound				Southbound			
	Exit Only Site Driveway				<<NO APPROACH>>				Tomball Cemetery Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak										23				46		
PM Peak										49				28		

Table C4. Projected 2023 Peak Hour Turning Movement Counts (without development)

1. FM 2920 at Tomball Cemetery Road/Treichel Road Adjustment Factor: 1.020

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				Treichel Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	9	1110	15	0	17	938	13	0	5	1	7	0	12	2	33	0
PM Peak	30	1134	6	0	13	1286	19	0	11	1	21	0	11	1	16	0

2. FM 2920 at Main Site Driveway

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				<<NO APPROACH>>				Main Site Driveway			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	0	1134	0	0	0	976	0	0	0	0	0	0	0	0	0	0
PM Peak	0	1170	0	0	0	1314	0	0	0	0	0	0	0	0	0	0

3. Tomball Cemetery Road at Site Driveway (Exit Only)

	Eastbound				Westbound				Northbound				Southbound			
	Exit Only Site Driveway				<<NO APPROACH>>				Tomball Cemetery Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	0	0	0	0	0	0	0	0	0	23	0	0	0	47	0	0
PM Peak	0	0	0	0	0	0	0	0	0	50	0	0	0	29	0	0

Table C5-A. Projected Peak Hour New Site Trips

1. FM 2920 at Tomball Cemetery Road/Treichel Road

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				Treichel Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	2	42	0	0	0	17	0	0	0	0	0	0	14	0	14	0
PM Peak	1	21	0	0	0	43	0	0	0	0	0	0	7	0	8	0

2. FM 2920 at Main Site Driveway

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				<<NO APPROACH>>				Main Site Driveway			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	16	0	0	0	0	14	18	0	0	0	0	0	44	0	41	0
PM Peak	41	0	0	0	0	7	45	0	0	0	0	0	21	0	20	0

3. Tomball Cemetery Road at Site Driveway (Exit Only)

	Eastbound				Westbound				Northbound				Southbound			
	Exit Only Site Driveway				<<NO APPROACH>>				Tomball Cemetery Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	1	0	28	0	0	0	0	0	0	2	0	0	0	1	0	0
PM Peak	0	0	13	0	0	0	0	0	0	1	0	0	0	2	0	0

Table C6. Projected 2023 Peak Hour Turning Movement Counts (w/development)

1. FM 2920 at Tomball Cemetery Road/Treichel Road

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				Treichel Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	11	1152	15	0	17	955	13	0	5	1	7	0	26	2	47	0
PM Peak	30	1155	6	0	13	1329	19	0	11	1	21	0	18	1	25	0

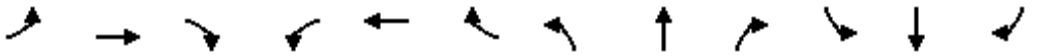
2. FM 2920 at Main Site Driveway

	Eastbound				Westbound				Northbound				Southbound			
	FM 2920				FM 2920				<<NO APPROACH>>				Main Site Driveway			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	16	1134	0	0	0	990	18	0	0	0	0	0	44	0	41	0
PM Peak	41	1170	0	0	0	1320	45	0	0	0	0	0	21	0	20	0

3. Tomball Cemetery Road at Site Driveway (Exit Only)

	Eastbound				Westbound				Northbound				Southbound			
	Exit Only Site Driveway				<<NO APPROACH>>				Tomball Cemetery Road				Tomball Cemetery Road			
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U
AM Peak	1	0	28	0	0	0	0	0	0	25	0	0	0	48	0	0
PM Peak	0	0	13	0	0	0	0	0	0	51	0	0	0	30	0	0

Appendix D. Traffic Simulation Output



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1088	15	17	920	13	5	1	7	12	2	32
Future Volume (vph)	9	1088	15	17	920	13	5	1	7	12	2	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.998			0.927			0.906	
Flt Protected	0.950			0.950				0.981			0.987	
Satd. Flow (prot)	1770	3532	0	1770	3532	0	0	1694	0	0	1666	0
Flt Permitted	0.950			0.950				0.981			0.987	
Satd. Flow (perm)	1770	3532	0	1770	3532	0	0	1694	0	0	1666	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	1145	16	18	968	14	5	1	7	13	2	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	1161	0	18	982	0	0	13	0	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

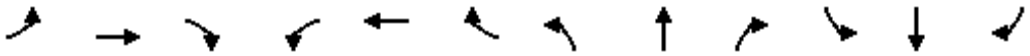
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1088	15	17	920	13	5	1	7	12	2	32
Future Vol, veh/h	9	1088	15	17	920	13	5	1	7	12	2	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	1145	16	18	968	14	5	1	7	13	2	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	982	0	0	1161	0	0	1692	2189	581	1602	2190	491
Stage 1	-	-	-	-	-	-	1171	1171	-	1011	1011	-
Stage 2	-	-	-	-	-	-	521	1018	-	591	1179	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	699	-	-	597	-	-	60	45	457	71	45	523
Stage 1	-	-	-	-	-	-	205	265	-	257	315	-
Stage 2	-	-	-	-	-	-	507	313	-	460	262	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	699	-	-	597	-	-	54	43	457	67	43	523
Mov Cap-2 Maneuver	-	-	-	-	-	-	147	146	-	173	142	-
Stage 1	-	-	-	-	-	-	202	262	-	254	306	-
Stage 2	-	-	-	-	-	-	457	304	-	445	259	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	21.6	18.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	231	699	-	-	597	-	-	318
HCM Lane V/C Ratio	0.059	0.014	-	-	0.03	-	-	0.152
HCM Control Delay (s)	21.6	10.2	-	-	11.2	-	-	18.3
HCM Lane LOS	C	B	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1112	6	13	1261	19	11	1	21	11	1	16
Future Volume (vph)	29	1112	6	13	1261	19	11	1	21	11	1	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.998			0.915			0.923	
Flt Protected	0.950			0.950				0.983			0.980	
Satd. Flow (prot)	1805	3536	0	1805	3533	0	0	1709	0	0	1719	0
Flt Permitted	0.950			0.950				0.983			0.980	
Satd. Flow (perm)	1805	3536	0	1805	3533	0	0	1709	0	0	1719	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	31	1171	6	14	1327	20	12	1	22	12	1	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	1177	0	14	1347	0	0	35	0	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.5%		ICU Level of Service A	
Analysis Period (min) 15			

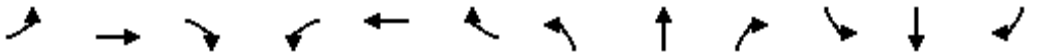
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	1112	6	13	1261	19	11	1	21	11	1	16
Future Vol, veh/h	29	1112	6	13	1261	19	11	1	21	11	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	31	1171	6	14	1327	20	12	1	22	12	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1347	0	0	1177	0	0	1928	2611	589	2013	2604	674
Stage 1	-	-	-	-	-	-	1236	1236	-	1365	1365	-
Stage 2	-	-	-	-	-	-	692	1375	-	648	1239	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	518	-	-	601	-	-	41	25	457	35	25	402
Stage 1	-	-	-	-	-	-	190	250	-	158	217	-
Stage 2	-	-	-	-	-	-	405	215	-	430	250	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	518	-	-	601	-	-	37	23	457	31	23	402
Mov Cap-2 Maneuver	-	-	-	-	-	-	123	103	-	108	109	-
Stage 1	-	-	-	-	-	-	179	235	-	149	212	-
Stage 2	-	-	-	-	-	-	377	210	-	383	235	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	23.7	28
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	227	518	-	-	601	-	-	186
HCM Lane V/C Ratio	0.153	0.059	-	-	0.023	-	-	0.158
HCM Control Delay (s)	23.7	12.4	-	-	11.1	-	-	28
HCM Lane LOS	C	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.5	0.2	-	-	0.1	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1110	15	17	938	13	5	1	7	12	2	33
Future Volume (vph)	9	1110	15	17	938	13	5	1	7	12	2	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.998			0.927			0.905	
Flt Protected	0.950			0.950				0.981			0.987	
Satd. Flow (prot)	1770	3532	0	1770	3532	0	0	1694	0	0	1664	0
Flt Permitted	0.950			0.950				0.981			0.987	
Satd. Flow (perm)	1770	3532	0	1770	3532	0	0	1694	0	0	1664	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	1168	16	18	987	14	5	1	7	13	2	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	1184	0	18	1001	0	0	13	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

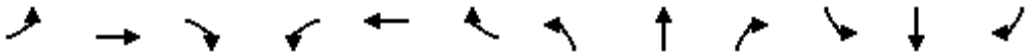
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1110	15	17	938	13	5	1	7	12	2	33
Future Vol, veh/h	9	1110	15	17	938	13	5	1	7	12	2	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	1168	16	18	987	14	5	1	7	13	2	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1001	0	0	1184	0	0	1725	2231	592	1633	2232	501
Stage 1	-	-	-	-	-	-	1194	1194	-	1030	1030	-
Stage 2	-	-	-	-	-	-	531	1037	-	603	1202	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	687	-	-	586	-	-	57	42	449	67	42	515
Stage 1	-	-	-	-	-	-	198	258	-	250	309	-
Stage 2	-	-	-	-	-	-	500	307	-	453	256	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	687	-	-	586	-	-	51	40	449	63	40	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	142	142	-	168	138	-
Stage 1	-	-	-	-	-	-	195	255	-	247	299	-
Stage 2	-	-	-	-	-	-	449	297	-	438	253	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	22	18.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	687	-	-	586	-	-	313
HCM Lane V/C Ratio	0.061	0.014	-	-	0.031	-	-	0.158
HCM Control Delay (s)	22	10.3	-	-	11.3	-	-	18.6
HCM Lane LOS	C	B	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1134	6	13	1286	19	11	1	21	11	1	16
Future Volume (vph)	30	1134	6	13	1286	19	11	1	21	11	1	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.998			0.915			0.923	
Flt Protected	0.950			0.950				0.983			0.980	
Satd. Flow (prot)	1805	3536	0	1805	3533	0	0	1709	0	0	1719	0
Flt Permitted	0.950			0.950				0.983			0.980	
Satd. Flow (perm)	1805	3536	0	1805	3533	0	0	1709	0	0	1719	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	32	1194	6	14	1354	20	12	1	22	12	1	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	1200	0	14	1374	0	0	35	0	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.2%		ICU Level of Service A	
Analysis Period (min) 15			

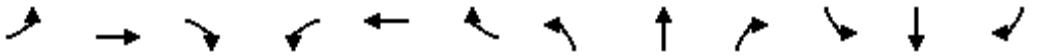
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1134	6	13	1286	19	11	1	21	11	1	16
Future Vol, veh/h	30	1134	6	13	1286	19	11	1	21	11	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	32	1194	6	14	1354	20	12	1	22	12	1	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1374	0	0	1200	0	0	1967	2663	600	2054	2656	687
Stage 1	-	-	-	-	-	-	1261	1261	-	1392	1392	-
Stage 2	-	-	-	-	-	-	706	1402	-	662	1264	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	506	-	-	589	-	-	38	23	449	33	23	394
Stage 1	-	-	-	-	-	-	183	244	-	152	211	-
Stage 2	-	-	-	-	-	-	397	209	-	422	243	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	506	-	-	589	-	-	34	21	449	29	21	394
Mov Cap-2 Maneuver	-	-	-	-	-	-	117	99	-	103	105	-
Stage 1	-	-	-	-	-	-	171	229	-	142	206	-
Stage 2	-	-	-	-	-	-	369	204	-	374	228	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	24.5	29.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	506	-	-	589	-	-	178
HCM Lane V/C Ratio	0.159	0.062	-	-	0.023	-	-	0.166
HCM Control Delay (s)	24.5	12.6	-	-	11.3	-	-	29.2
HCM Lane LOS	C	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.6	0.2	-	-	0.1	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1152	15	17	955	13	5	1	7	26	2	47
Future Volume (vph)	11	1152	15	17	955	13	5	1	7	26	2	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.998			0.927			0.915	
Flt Protected	0.950			0.950				0.981			0.983	
Satd. Flow (prot)	1770	3532	0	1770	3532	0	0	1694	0	0	1675	0
Flt Permitted	0.950			0.950				0.981			0.983	
Satd. Flow (perm)	1770	3532	0	1770	3532	0	0	1694	0	0	1675	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	12	1213	16	18	1005	14	5	1	7	27	2	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1229	0	18	1019	0	0	13	0	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			

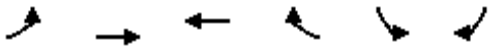
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1152	15	17	955	13	5	1	7	26	2	47
Future Vol, veh/h	11	1152	15	17	955	13	5	1	7	26	2	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	1213	16	18	1005	14	5	1	7	27	2	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1019	0	0	1229	0	0	1785	2300	615	1679	2301	510
Stage 1	-	-	-	-	-	-	1245	1245	-	1048	1048	-
Stage 2	-	-	-	-	-	-	540	1055	-	631	1253	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	677	-	-	563	-	-	51	38	434	62	38	509
Stage 1	-	-	-	-	-	-	184	244	-	244	303	-
Stage 2	-	-	-	-	-	-	494	301	-	436	242	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	677	-	-	563	-	-	44	36	434	58	36	509
Mov Cap-2 Maneuver	-	-	-	-	-	-	132	134	-	161	131	-
Stage 1	-	-	-	-	-	-	181	240	-	240	293	-
Stage 2	-	-	-	-	-	-	429	291	-	419	238	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	23.2	22.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	211	677	-	-	563	-	-	279
HCM Lane V/C Ratio	0.065	0.017	-	-	0.032	-	-	0.283
HCM Control Delay (s)	23.2	10.4	-	-	11.6	-	-	22.9
HCM Lane LOS	C	B	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	1.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	1134	990	18	44	41
Future Volume (vph)	16	1134	990	18	44	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997		0.935	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1770	3539	3529	0	1698	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1770	3539	3529	0	1698	0
Link Speed (mph)		50	50		30	
Link Distance (ft)		731	491		281	
Travel Time (s)		10.0	6.7		6.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	1194	1042	19	46	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	1194	1061	0	89	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

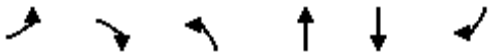
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	1134	990	18	44	41
Future Vol, veh/h	16	1134	990	18	44	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1194	1042	19	46	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1061	0	-	0	1683	531
Stage 1	-	-	-	-	1052	-
Stage 2	-	-	-	-	631	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	652	-	-	-	85	493
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	492	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	652	-	-	-	83	493
Mov Cap-2 Maneuver	-	-	-	-	201	-
Stage 1	-	-	-	-	289	-
Stage 2	-	-	-	-	492	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	23.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	652	-	-	-	281
HCM Lane V/C Ratio	0.026	-	-	-	0.318
HCM Control Delay (s)	10.7	-	-	-	23.7
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	28	0	25	48	0
Future Volume (vph)	1	28	0	25	48	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869					
Flt Protected	0.998					
Satd. Flow (prot)	1615	0	0	1863	1863	0
Flt Permitted	0.998					
Satd. Flow (perm)	1615	0	0	1863	1863	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	275			250	232	
Travel Time (s)	6.3			4.9	4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	29	0	26	51	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	0	0	26	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

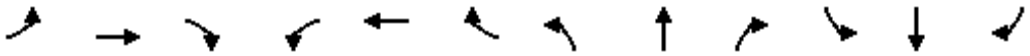
Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	28	0	25	48	0
Future Vol, veh/h	1	28	0	25	48	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	29	0	26	51	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	77	51	51	0	-	0
Stage 1	51	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	926	1017	1555	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	926	1017	1555	-	-	-
Mov Cap-2 Maneuver	926	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	997	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1555	-	1014	-	-
HCM Lane V/C Ratio	-	-	0.03	-	-
HCM Control Delay (s)	0	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1155	6	13	1329	19	11	1	21	18	1	25
Future Volume (vph)	30	1155	6	13	1329	19	11	1	21	18	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.998			0.915			0.924	
Flt Protected	0.950			0.950				0.983			0.980	
Satd. Flow (prot)	1805	3536	0	1805	3533	0	0	1709	0	0	1720	0
Flt Permitted	0.950			0.950				0.983			0.980	
Satd. Flow (perm)	1805	3536	0	1805	3533	0	0	1709	0	0	1720	0
Link Speed (mph)		50			50			35			35	
Link Distance (ft)		491			625			377			250	
Travel Time (s)		6.7			8.5			7.3			4.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	32	1216	6	14	1399	20	12	1	22	19	1	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	1222	0	14	1419	0	0	35	0	0	46	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

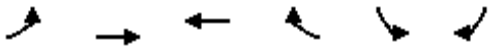
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1155	6	13	1329	19	11	1	21	18	1	25
Future Vol, veh/h	30	1155	6	13	1329	19	11	1	21	18	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	32	1216	6	14	1399	20	12	1	22	19	1	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1419	0	0	1222	0	0	2011	2730	611	2110	2723	710
Stage 1	-	-	-	-	-	-	1283	1283	-	1437	1437	-
Stage 2	-	-	-	-	-	-	728	1447	-	673	1286	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	486	-	-	578	-	-	35	21	442	30	21	381
Stage 1	-	-	-	-	-	-	178	238	-	143	201	-
Stage 2	-	-	-	-	-	-	386	198	-	416	237	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	486	-	-	578	-	-	30	19	442	26	19	381
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	94	-	98	101	-
Stage 1	-	-	-	-	-	-	166	222	-	134	196	-
Stage 2	-	-	-	-	-	-	349	193	-	367	221	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	25.4	33.9
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	211	486	-	-	578	-	-	170
HCM Lane V/C Ratio	0.165	0.065	-	-	0.024	-	-	0.272
HCM Control Delay (s)	25.4	12.9	-	-	11.4	-	-	33.9
HCM Lane LOS	D	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.6	0.2	-	-	0.1	-	-	1.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	41	1170	1320	45	21	20
Future Volume (vph)	41	1170	1320	45	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.995		0.934	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1805	3539	3524	0	1730	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1805	3539	3524	0	1730	0
Link Speed (mph)		50	50		30	
Link Distance (ft)		731	491		281	
Travel Time (s)		10.0	6.7		6.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Adj. Flow (vph)	43	1232	1389	47	22	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	1232	1436	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

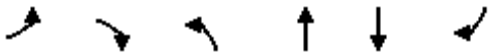
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	41	1170	1320	45	21	20
Future Vol, veh/h	41	1170	1320	45	21	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	43	1232	1389	47	22	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1436	0	-	0	2115	718
Stage 1	-	-	-	-	1413	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	479	-	-	-	45	376
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	479	-	-	-	41	376
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	458	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	29.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	479	-	-	-	192
HCM Lane V/C Ratio	0.09	-	-	-	0.225
HCM Control Delay (s)	13.3	-	-	-	29.1
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.3	-	-	-	0.8



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	13	0	51	30	0
Future Volume (vph)	0	13	0	51	30	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	1644	0	0	1900	1900	0
Flt Permitted						
Satd. Flow (perm)	1644	0	0	1900	1900	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	275			250	232	
Travel Time (s)	6.3			4.9	4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	14	0	54	32	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	0	54	32	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	13	0	51	30	0
Future Vol, veh/h	0	13	0	51	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	14	0	54	32	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	86	32	32	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	54	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	920	1048	1593	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1048	1593	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1048	-	-
HCM Lane V/C Ratio	-	-	0.013	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Appendix E. Roadway Photographs

Photograph Date: 10/16/2021

Photograph 1. Tomball Cemetery Road, Looking North, North of FM 2920. Proposed exit-only site driveway to left.

Photograph Date: 10/16/2021

Photograph 2. Tomball Cemetery Road, Looking South, North of FM 2920. Proposed exit-only site driveway to right.

Photograph Date: 10/16/2021

Photograph 3. FM 2920, Looking East, West of Tomball Cemetery Road. Proposed full access driveway to left.