To: Teresa Bowyer  
Herman & Kittles Properties, Inc.

From: Ronnie Harris, PE LEED AP

Date: February 23, 2018

Subject: The Vireo  
Feasibility Technical Memorandum

1.1 Introduction

This technical memorandum represents the findings of our preliminary investigation for a 6.56 acre-tract out of 14.31-acres located along the south side of Tidwell and west of C.E. King Parkway. The proposed development is known as “The Vireo” and will contain 84 multi-family apartment units, swimming pool, and a park amenity. The proposed development was originally contemplated as a 264-unit development utilizing 14.31 acres, however the plans have been updated to include only the 6.56 acres of the property for an 84-unit development with two residential buildings and one common area building with leasing office. The information provided below is provided based on information obtained from Harris County, City of Houston, and Greenwood Utility District.

1.2 General Project Information

The project is a 6.56-acre tract located approximately 550-feet west of C.E. King and along the south side of Tidwell Road. The site is also located outside the City limits of Houston and within the Extraterritorial Jurisdiction (ETJ) of the City of Houston. The site is also located within Greenwood Utility, Harris County; Key Map 456C. Exhibit 1 shows the project location.

1.3 Building Lines and Easements

The boundary survey has been updated by BGE, Inc. and dated February 22, 2018. According to the commitment for title insurance issued by First American Title Insurance Company under G.F. Number NCS-806921-INDY issued on February 09, 2018 and a proposed subdivision plat, the 14.31-acre tract is or will be encumbered by the following:

Building and Parking Setbacks

- A 25-foot building setback line is required along Tidwell Road and any property frontage along CE King Parkway.
• A 10-foot R.O.W. dedication is required along the south side of Tidwell Road adjacent to the property frontage.

• There is an existing sanitary sewer easement located along the south side of Tidwell Road.

• There is an existing water line easement along the south side of Tidwell Road.

• There is an existing 10-foot wide drainage easement located along portions of the south property line.

• There is a proposed 130-foot HCFCD easement required to be dedicated for channel P122-01-00 that flows north/south within the property.

• There is a proposed 20-foot HCFCD easement required to be dedicated along channel P122-00-00 flows east/west along the south side of the property.

1.4 Other Pertinent Information

As shown in Exhibit 2, the proposed site is located in Harris County Precinct 1. Rodney Ellis is the commissioner for this county.

Commissioner Precinct 1
Rodney Ellis
713-755-6111

The proposed development is located within Greenwood Utility District. Refer to Exhibit 3 for all of Greenwood Utility District information. Contact information listed below:

Greenwood Utility District Attorney:
Ross J. Radcliffe
713-237-1221

Greenwood Utility District Engineer:
Jim Ainsworth
713-942-2700

The project is currently listed on the Harris County Appraisal District (HCAD) website as Account Number 042-193-000-0017. The listed owner is Parkway/Briar Ridge Properties, LP. The current tax rates for this area are as follows:

- Sheldon ISD 1.470000
- Harris County 0.418010
- HCFCDC 0.028310
1.5  Site Boundary Survey

An updated Boundary Survey has been issued by BGE, Inc., dated February 22, 2018 (see Exhibit 4).

1.6  Subdivision Plat

The proposed development is required to be platted to comply with the governing City of Houston Subdivision Ordinance. A plat has been submitted and received approval from the City of Houston (see Exhibit 5). The subject 6.56-acre site is part of a larger 14.31-acre tract that is an Unrestricted Reserve “A. The subdivision of the 14.31-acre tract will not impact plat approval. The plat approval expires on March 30, 2018 and will require a one-year extension request be submitted by March 19, 2018. The extension request is typically approved as a formality if the initial plat received approval. The developer intends to submit a request to formally extend the plat approval to the city of Houston. Approved construction plans by Harris County are required in order to record the plat.

Summary of Subdivision Platting Process:

1. Submit request for extension of approval to City of Houston (no later than March 19, 2018).
2. Submit final owner and lien holder signed and notarized plat along with supporting documents to City of Houston for plat recording.
3. The supporting documents include providing a copy of the approved construction plans by Harris County, updated title report, and recording fees. Reference section 1.7 for plan approval process.
4. The final plat is then signed by City of Houston and transferred to Harris County
5. Harris County reviews plat and required plat documents.
6. The Plat is then placed on the agenda and considered for approval by Harris County Commissioner’s Court.
7. Upon receipt of Commissioner’s Court approval, the plat is recorded at the Harris County Clerk’s Office.

Estimated Platting Fees:
Extension of approval fee: $400.00
Houston recording meeting fee: $350.00
Harris County plat review fee: $600.00
Harris County Administrative fee: $160.00
Harris County Clerk recording fee: $170.00
Total Recording Fees: $1,680.00

1.7 Construction Plan Approval/Permitting Process

The proposed development is required to be designed in accordance to the regulations of Harris County Engineering, Harris County Flood Control District, Harris County Fire Marshal, Greenwood Utility District requirements. The civil engineer is responsible for submitting plans to the agencies for review and approval. The civil construction plans will be required to be approved by the District Engineer in order to obtain Harris County engineering approval. Additionally, the subdivision plat is required to be approved (not recorded) prior to Harris County civil plan approval. The project architect is responsible for submitting information to the Harris County fire marshal’s office for review and approval as described in section 1.8.10 below. Once the civil engineering and architectural items are approved, then the project is ready for permitting. The plan review and approval process typically takes approximately 60 to 90 days after initial plan submittal.

Generally, the General Contractor obtains permits from Harris County online by completing application and payment of the permit fees. The permit fees are based upon valuation of construction. Permits can be obtained within two to three weeks upon approval of the plans.

The District Engineer is responsible for approving the water and sewer tap to the District facilities. The General Contractor will be responsible for payment of the impact fees and the subdivision plat will need to be recorded in order for the District to approve construction efforts to move forward for connection into their facilities. This effort typically takes place after permits are obtained from Harris County.

1.7.1 Water

Water service will be provided by Greenwood Utility District and based upon the received capacity letter dated May 1, 2017, the District has available capacity to service the proposed 84 apartment units, which is fewer than the total of 264 apartment units that were originally proposed (see Exhibit 6). The District will charge an approximate total impact fee in the amount of $30,000.00 to make connection to its facilities. The service unit for The Vireo is 47.885 service unit. The impact fee is rated per service unit basis, at a rate of $626.50 per service unit.

The existing 16-inch water line along the south side of Tidwell Road will provide service to the development.

1.7.2 Sanitary Sewer

Sanitary sewer service will be provided by Greenwood Utility District and the District has capacity to serve the development. The capacity letter has been received, dated May 1, 2017 (see Exhibit 6).
There is an existing 24-inch sanitary sewer line along the south side of Tidwell Road and will provide service to the development.

1.7.3 Private Utilities Information

Electric, telephone, and cable services have been contacted for Will Serve Letters and currently waiting for their responses. CenterPoint Energy have provided maps for both electric and gas (see Exhibit 7). Based on the information provided, electric services run near the proposed development.

Gas:
Gas service will be provided by CenterPoint Energy Gas. See Will Serve Letter in Exhibit 8. The representative from CenterPoint Energy Gas is:

Mr. Eisen Scherwitz
CenterPoint Energy Gas
713-207-5470

1.7.4 Estimated Development Fees

<table>
<thead>
<tr>
<th>Fee</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Review Fee:</td>
<td>$400.00</td>
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<tr>
<td>HC Building Permit Fees:</td>
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<tr>
<td>HC Site Permit Fees:</td>
<td>$2,000.00</td>
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<tr>
<td>HC Site Inspection Fees:</td>
<td>$2,000.00</td>
</tr>
<tr>
<td>HC Fire Code Fees:</td>
<td>$20,000.00</td>
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<tr>
<td>Utility Impact Fee:</td>
<td>$30,000.00</td>
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<tr>
<td>Utility Tap Fee:</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Subdivision Platting Fees:</td>
<td>$1,680.00</td>
</tr>
<tr>
<td>SWQ Fee:</td>
<td>$500.00</td>
</tr>
</tbody>
</table>

Estimated Total Fees: $115,580.00

All fees listed are approximate and are to be determined by General Contractor during initial permit application submittal. Permit fees are based upon square footage of buildings and valuation of site improvements. Harris County site and building inspection fees are based on a per visit charge imposed by Harris County. The ultimate fees are determined by the number of trips required to inspect the various aspects of construction. See Exhibit 9 for HC permit fees.

It is our understanding the developer has sufficient funds to cover these required fees.
1.8 Harris County Standards and Fire Department Regulations

1.8.1 Storm Drainage

An internal drainage system will be required to provide drainage for the proposed development. There is an existing Harris County Flood Control District (HCFCD) channel located within the tract which bisects the property. There is also a HCFCD channel located along the south property line. The proposed development will require separate detention and drainage outfalls on each side of the existing channel. The proposed detention 6.56-acre parcel will be served by expanding the existing Greenwood Utility District maintained detention basin located on the southeast corner of the site. (See Exhibit 10 for Channel numbers).

In addition, HCFCD is requiring the dedication of new easements to be provided for the existing channels as there is currently no existing drainage easement along the north/south channel within the property. There is a proposed 130-foot drainage easement to be dedicated to HCFCD for the north/south channel number P122-01-00 and a 20-foot drainage easement to be dedicated to HCFCD along P122-00-00, located adjacent to the south property line.

1.8.2 Flood Plain

The site lies in unshaded zone “X” (areas determined to be outside the 0.2% annual chance floodplain), according to the Flood Insurance Rate Map for Harris County, Texas and incorporated areas, map number 48201C0705M, revised January 6, 2017 (see Exhibit 11).

1.8.3 Detention

The proposed development will require onsite detention at a rate of 0.55 ac-ft/ac. The proposed development is bisected by an existing flood control channel. The proposed 6.56-acre development will require a detention basin to be constructed on the land area east of the flood control channel. The development will require 3.61 ac-ft of detention volume. The proposed detention will be provided by expanding the existing detention basin maintained by the Greenwood Utility District located on the southeast corner of the site. The expanded basin will be maintained by the District.

Since the detention is proposed to be provided by expanding an existing MUD maintained facility, the process for completing plans for the detention are a bit different. A separate set of construction documents will be prepared for the detention basin expansion. The documents will be reviewed and approved by the District, the plans will be publicly bid, and then contracts will be awarded separately for construction of the detention expansion.

1.8.4 Traffic Impact Study

Harris County requires a Traffic Impact Analysis (TIA) to be performed for this development. BGE, Inc. has performed the TIA report (see Exhibit 12), dated for June 12, 2017.
1.8.5 Future Roadway Plans

There are plans by Harris County for roadway improvements along Tidwell Road. The roadway improvements will consist of widening Tidwell Road to four lane boulevard with raised median (see Exhibit 13). There will be a proposed left turn lane along westbound of Tidwell Road aligned with the proposed driveway. Additionally, there are plans to install an 8-foot wide sidewalk along both sides of Tidwell Road. Lastly, the proposed development plans will comply with the required Tidwell Road expansion.

1.8.6 Ingress/Egress Requirements Review

The proposed development contains two proposed driveways accessing Tidwell Road. There are two proposed points of connection to Tidwell Road for the proposed development, one on site and one off-site.

1.8.7 Zoning and Parking Requirements

There is no zoning within the City of Houston and Harris County (see Exhibit 14). Harris County has no specific parking requirements.

1.8.8 Sediment Control Requirements

During Construction: National Pollution Discharge Elimination System (NPDES) rules are administered by the U.S. Environmental Protection Agency (EPA). These rules provide federal guidelines for storm water management. For property development, the main objective of the NPDES is to control sediment conveyance and subsequent siltation during construction through the use of erosion/sedimentation controls. Since the site is more than 1 acre, a Stormwater Pollution Prevention Plan addressing sediment controls must be prepared and remain active on the site during construction. The EPA must be notified before the start of construction and after project completion.

After Construction: Permanent storm water quality facilities are required on all new development projects disturbing five acres or more, and on all re-development projects where one or more acres of impervious surface are added.

The owner will be responsible for entering into an agreement with Harris County to maintain the Stormwater quality feature and to re-permit the facility on an annual basis. There is a small charge for the permit. It is recommended the developer hire a consultant to assist in the maintenance of the facility and re-permitting the facility on an annual basis after construction of the facility and initial acceptance by Harris County.

Since the site is greater than five acres, a Storm Water Quality Permit will be required for this site.
1.8.9  Tree Compliance

Harris County has a Tree and Shrub Ordinance, refer to Exhibit 15. A Landscape Architect has already prepared a landscape plan that adheres to this ordinance (see Exhibit 16). The landscape plan will be adjusted accordingly for the reduced site and number of buildings.

1.8.10 Fire Department Regulations

Harris County requires projects to comply with the Harris County Fire Code with amendments effective March 1, 2015. The code is a 52 page document available online (see link below). In general the code requires compliance with 2012 International Fire Code and the 2012 International Building Code with certain sections modified by the Harris County version. It is recommended the project architect review and read through the ordinance to ensure compliance.

http://www.eng.hctx.net/permits/Fire/Fire-Code/Fire-Code-Review
Exhibit 1

Project Location
Exhibit 2
Commissioner Precincts Map
Harris Co., TX
Exhibit 3

Greenwood Utility District Information
District: 3418000  GREENWOOD UTILITY DISTRICT  
CCN RegNum: P0173 2929 ALLEN PKWY STE 3450 
RADCLIFFE BOBBITT ADAMS POLLEY PLLC  
HOUSTON , TX 77019-7120  

Business Phone: (713) 237-1221  
Activity Status: ACTIVE  
Financial Status: AUDIT FILED  
Date Created: 06/11/1969  
Date Ended:  
Registration Received: 02/09/2018  
Way Created: LEGISLATURE  
Number of Directors: 5  
Way Chosen: Elected  
Main County: HARRIS  
Other Counties:  

District Size in Acres: 851.707  
Boundry Change: 04/19/2006  
Date Confirmed:  

**Section 49.455 Information**  
Date Received: 02/06/2018  
Actual Date of Notice: 01/30/2018  
Total District Tax Rate: $ 0.75000000  
Total Voter Amount Approved: $86,525,000.00  

**From the District's Audit Report Dated:**  
Debt Service Tax Rate:  
Operating/Main Tax Rate:  
Contract/Other Tax Rate:  
Amount Approved as Tax Bonds:  
Amount Issued as Tax Bonds:  
Amount Approved as Tax & Rev Bonds:  
Amount Issued as Tax & Rev Bonds:  
Refunding Bonds Authorized:  
Refunding Bonds Issued:  

**Officials and Consultants:**  
**AT**  
ROSS J. RADCLIFFE, ATTORNEY  
RADCLIFFE BOBBITT ADAMS POLLEY PLLC  
2929 ALLEN PKWY STE 3450  
HOUSTON , TX 77019-7120  
Business Phone: (713) 237-1221  
Fax: Unknown  

**DE**  
JIM AINSWORTH, DISTRICT ENGINEER  
A & S ENGINEERS INC  
10377 STELLA LINK RD  
HOUSTON , TX 77025-5445  
Business Phone: (713) 942-2700  
Fax: Unknown  

**DFA**  
BILL BLITCH, FINANCIAL ADVISOR  
BLITCH ASSOCIATES INC  
11111 KATY FWY STE 725
HP 72118
Business Phone: (713) 467-7344
Fax: Unknown

DB MARY ANN. MIHILLS, DISTRICT BOOKKEEPER
ORG FSG INFORMATION SYSTEMS LP
1281 BRITTMORE RD
HOUSTON, TX 77043-4001
Business Phone: (713) 623-4539
Fax: Unknown

DT THOMAS W. LEE, TAX ASSESSOR/COLLECTOR
ORG ASSESSMENTS OF THE SOUTHWEST INC
PO BOX 1368
FRIENDSWOOD, TX 77546-1368
Business Phone: (281) 482-0216
Fax: Unknown

DT DELIA M. YANEZ, TAX COLLECTOR
ORG ASSESSMENTS OF THE SOUTHWEST INC
PO BOX 1368
FRIENDSWOOD, TX 77549-1368
Business Phone: (281) 482-0216
Fax: Unknown

RP BILLY ONEILL, PRESIDENT
ORG GREENWOOD UTILITY DISTRICT
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown
Term Expires: 05/01/2019
Way Chosen: Elected

BVP GARY FLIGHT, VICE PRESIDENT
ORG GREENWOOD UTILITY DISTRICT
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown
Term Expires: 05/01/2021
Way Chosen: Elected

BS J DEAN. TANKERSLY, SECRETARY
ORG GREENWOOD UTILITY DISTRICT
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown
Term Expires: 05/01/2021
Way Chosen: Elected

BD ROBERT PRIMEAUX, ASSISTANT SECRETARY
ORG GREENWOOD UTILITY DISTRICT
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown
Term Expires: 05/01/2019
Way Chosen: Elected

DAN ROSS J. RADCLIFFE, DISTRICT AGENT FOR NOTICE
RADCLIFFE BOBBITT ADAMS POLLEY PLLC
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown

BD JOHN WISENER, DIRECTOR
GREENWOOD UTILITY DISTRICT
2929 ALLEN PKWY STE 3450
HOUSTON, TX 77019-7120
Business Phone: (713) 237-1221
Fax: Unknown
Term Expires: 05/01/2021
Way Chosen: Elected

OP JOHNNY BELLAMY, OPERATOR
MUNICIPAL DISTRICT SERVICES LLC
406 W GRAND PKWY S STE 260
KATY, TX 77494-8360
Business Phone: (281) 290-6500
Fax: Unknown

DT DAVID PATTERSON, TAX ASSESSOR/COLLECTOR
ASSESSMENTS OF THE SOUTHWEST INC
PO BOX 1368
FRIENDSWOOD, TX 77549-1368
Business Phone: (281) 498-0216
Fax: Unknown

The Texas Commission on Environmental Quality is pleased to provide this information to you free of charge. Please understand that we cannot guarantee the accuracy or completeness of the information being supplied. At the time of your query this data was the most current information available from our database, which is updated weekly. Every effort was made to retrieve it according to your query. Thank you for using WDD.
Exhibit 4
Boundary Survey
Exhibit 5

Plat
Exhibit 6

Capacity Letter from Greenwood Utility District
May 1, 2017

Loan Tran
BGE, Inc.
10777 Westheimer, Suite 400
Houston, TX 77042

Re: Greenwood Utility District
    The Vireo
    Capacity Available to Serve
    Project No. 162183

Dear Ms. Tran,

This letter serves as notice that Greenwood Utility District has water and wastewater capacity to serve the proposed The Vireo Apartments located south of Tidwell Road near the intersection of Tidwell Road and C.E. King Parkway.

The District is in the process of amending its surface water contract with the City of Houston in order to secure additional water capacity. This increase in water capacity will include the capacity needed to serve the proposed Vireo Apartments. The developer will need to provide the impact fees associated with their portion of the capacity increase before water service can be provided to the development. The City of Houston determines the impact fee on a per service unit basis and the current rate is $626.50 per service unit. Based on the current rate, the total impact fees associated with the proposed development is $80,192.00. However, this rate is subject to change. The total impact fee owed by the developer will be based on the current rate at the time the fee is due.

Sincerely,

[Signature]

James R. Ainsworth, P.E.
Engineer for the District

cc: Greenwood Utility District Board of Directors
    Ronnie D. Harris, BGE, Inc.
    Ross J. Radcliffe – Radcliffe, Bobbitt, Adams, Polley PLLC
    Johnny Bellamy – Municipal District Services, LLC
Exhibit 7

CenterPoint Energy Gas and Electric Maps
Our maps are not to scale. Please use dimensions as noted on map.

**LEGEND**

**REFERENCE ONLY LEGEND**
Not necessary to show these items on plans.

**METER**

**PRESSURE CONTROL FITTING**

**HIGH VOLUME TEE**

**INLINE TEE**

**BURIED VALVE**

**STACKED VALVE**

**STOP COCK**

**INSULATED DRESSER COUPLING**

**BONDED DRESSER COUPLING**

**DRESSER COUPLING**

**REDUCER**

**TRANSITION FITTING**

**OFFSET UP**

**OFFSET DOWN**

**SADDLE**
POWER POLE SYMBOLS
- ForeignPole
- SteelTower
- FiberGlassPole
- ConcretePole
- SteelPole
- WoodPole

OH Secondary

OH Primary

SUBSTATION SYMBOL

FIBER OPTIC SYMBOLS (OH & UG)
- Overhead Fiber
- Underground Fiber
- OH_BPLCommCable
- UG_BPLCommCable

TRANSMISSION SYMBOLS
- Tower Down Guy
- Tower Strut Guy
- Tower Horizontal Guy
- Tower Push Brace

STREET LIGHT SYMBOLS
- DirectBuriedStreetLightSec
- DirectBuriedStreetLightSec
- InconduitStreetLightSec
- InconduitStreetLightSec

- HPS_100
- HPS_100
- HPS_150
- HPS_150
- HPS_250
- HPS_250
- HPS_400
- HPS_400
- HPS_70
- HPS_70
- MH_100
- MH_100
- MH_250
- MH_250
- MH_400
- MH_400
- MV_1000
- MV_1000
- MV_100
- MV_175
- MV_175
- MV_400
- MV_400
MAJOR UNDERGROUND SYMBOLS

A. Vault_Auto
B. Vault_Street
C. Vault_Street_Empty
S. Vault_Spot
D. Vault_Sec_Net
E. Vault_Manual
2. 2 Way Man Hole
3. 3 Way Man Hole
4. 4 Way Man Hole
H. Hand Hole
M. Manway
P. Pullhole
S. Special
U. Subway
N. vault

DUCT/MANHOLE

12KV OH 1Ph
12KV OH Parallel
12KV OH ODT
12KV OH WYE
12KV OH CDT
StreetLight R.CT
35KV OH 1Ph
35KV OH Parallel
35KV OH ODT
35KV OH CDT
35KV OH WYE
35KV OH Parallel ODT
Exhibit 8

Will Serve Letter
February 19, 2018

BGE Inc. 
Loan Tran 
10777 Westheimer, Suite 400 
Houston, TX 77098

The Vireo 
Tidwell and C.E. King Parkway 
Houston, TX 77044

Re: Natural Gas Availability for proposed 84-unit multifamily development located at Key Map 456C (Tidwell and C.E. King Parkway, Houston, TX)

CenterPoint Energy has natural gas available in the vicinity of the above referenced location adequate to supply natural gas to your proposed development.

We are very interested in working with you to introduce the many advantages of natural gas in multi-family properties here in the Houston Metro area. The affordability of natural gas appliances and amenities help a development stand out in the crowded and highly competitive multi-family market.

To help promote the use of natural gas in multi-family properties, CenterPoint Energy is providing incentives for the installation of year round gas appliances in the residences and individual meters for each condo unit. Incentives are determined on a case by case basis dependent upon such factors as our cost to serve the development, gas load and number of metered residences. The incentives are based upon current availability of promotional funds. Please give me a call at 713-207-5470 to discuss the possibilities at your development.

Cost to serve (if applicable) and location of service line(s) will be determined after the following is received:

- Copy of “recorded” site plan
- Site plan showing meter location
- List of gas equipment and BTU input rating of each gas appliance
- Required delivery pressure

CenterPoint Energy appreciates your interest in natural gas and looks forward to working with you on this and future projects.

Sincerely,

Eisen Scherwitz 
Sales Rep. - Texas Region, Natural Gas
Exhibit 9

Harris County Permit Fee Schedules
<table>
<thead>
<tr>
<th>PERMIT OR ACTIVITY</th>
<th>PERMIT FEE</th>
<th>INSPECTION FEE</th>
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</thead>
<tbody>
<tr>
<td>Development Residential – Class I (single family dwellings, manufactured homes, etc.)</td>
<td>$130</td>
<td>None</td>
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<tr>
<td>Development Residential – Class II</td>
<td>$325</td>
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<tr>
<td>Development Commercial Application - Phase I Permit (Required Payment at Plan Submittal)</td>
<td>$200</td>
<td>Requires two $100 inspection fee for dedicated infrastructure</td>
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<td>Development Commercial Application - Phase I Permit– Revision</td>
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<td>Development Commercial Phase II Permit Class I (Single Permit includes Paving, Utilities, Cut/Fill, Detention Pond, and other non-enclosed structural development that does not require an EC, connection to ROW, or SWQ)</td>
<td>$10 per $10,000 Value</td>
<td>MIN - $150</td>
</tr>
<tr>
<td>Class II Development Residential Subdivision Infrastructure Phase II</td>
<td>$20 per $10,000 Value</td>
<td>MIN - $150</td>
</tr>
<tr>
<td></td>
<td>$1000 flat fee, plus 20 per lot</td>
<td>Single Permit – Includes Paving, Utilities, Detention Pond, Cut/Fill</td>
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<td>Development Commercial Phase II – Class I</td>
<td>$0.07 per square foot $30.00 Minimum</td>
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<td>Development Commercial Phase II – Class II</td>
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<td>Manufactured Home Park – Class I</td>
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<td>Manufactured Home Park – Class II</td>
<td>$14 per space</td>
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<td>Earthen Fill on Subdivision Lots – Class I</td>
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<td>Earthen Fill on Subdivision Lots – Class II</td>
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<td>Requires one $40 Inspection Fee</td>
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<td>Earthen Fill on Acreage Tracts - Class I</td>
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<td>Earthen Fill on Acreage Tracts - Class II</td>
<td>$28 per acre</td>
<td>Requires one $40 Inspection Fee</td>
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<td>All Other Development Permits (paving, storage sheds, pools, etc.) Class I</td>
<td>$7 Per $10,000 Value</td>
<td>MIN-$30</td>
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<tr>
<td>Class II</td>
<td>$14 Per $10,000 Value</td>
<td>MIN-$30</td>
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<tr>
<td>Driveway (Residential) - existing culvert</td>
<td>$100</td>
<td>Includes one $40 Inspection Fee</td>
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<tr>
<td>Driveway (Residential) - new culvert</td>
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<td>Includes one $40 Inspection Fee</td>
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<td>Driveway (Residential) - curb cut</td>
<td>$140</td>
<td>Includes two $40 Inspection Fees</td>
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<td>Driveway (Commercial) - existing culvert or curb cut</td>
<td>$170</td>
<td>Includes two $40 Inspection Fees</td>
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<td>Driveway (Commercial) - without existing culvert</td>
<td>$240</td>
<td>Includes two $40 Inspection Fees</td>
</tr>
<tr>
<td>On-site Sewage Facility (Residential)</td>
<td>$260</td>
<td>Includes two $75 Inspection Fees (minimum) and $10 TOWTRC surcharge</td>
</tr>
<tr>
<td>(Does not include $16 affidavit filing fee)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site Sewage Facility (Commercial)</td>
<td>$410.00</td>
<td>Includes two $75 Inspection Fees (minimum) and $10 TOWTRC surcharge</td>
</tr>
<tr>
<td>(Does not include $16 affidavit filing fee)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site Sewage Facility (Residential) – Amended Permit</td>
<td>$150</td>
<td>Permits may be amended if the location of the disposal area is changed, but there is no change in: (1) maximum disposal flow rate, (2) disposal method, and (3) equipment (other than equipment changes necessitated by the change in disposal area location). All other changes require a new permit be issued.</td>
</tr>
<tr>
<td>On-site Sewage Facility (Commercial) – Amended Permit</td>
<td>$300</td>
<td></td>
</tr>
<tr>
<td>Holding Tank/Port-O-Can</td>
<td>$210</td>
<td>Includes one $75.00 Inspection Fee (Minimum) And $10.00 State Surcharge</td>
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<tr>
<td>Minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll Road Signs</td>
<td>$160</td>
<td>Includes one $40 Inspection Fee</td>
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### PERMIT OR ACTIVITY

<table>
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<th>PERMIT FEE</th>
<th>INSPECTION FEE</th>
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</thead>
<tbody>
<tr>
<td>Extraterritorial Jurisdiction (ETJ) Signs</td>
<td>$130</td>
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### PERMIT OR SERVICES

<table>
<thead>
<tr>
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<th>COST</th>
</tr>
</thead>
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<tr>
<td>Returned Check Fee</td>
<td>$30.00</td>
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<tr>
<td>Affidavit Filing Fee</td>
<td>$16.00</td>
</tr>
<tr>
<td>OSSF Maintenance Reports (per page)</td>
<td>$10.00</td>
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### INSPECTIONS/RE-INSPECTIONS

<table>
<thead>
<tr>
<th>INSPECTIONS/RE-INSPECTIONS</th>
<th>COST</th>
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<tbody>
<tr>
<td>Subdivision Re-inspection Fee</td>
<td>$1,000.00 each</td>
</tr>
<tr>
<td>Subdivision Inspection Fee</td>
<td>$100.00 each</td>
</tr>
<tr>
<td>Driveway</td>
<td>$40.00 each</td>
</tr>
<tr>
<td>On-site Sewage Facility</td>
<td>$75.00 each</td>
</tr>
<tr>
<td>Sign (ETJ)</td>
<td>$40.00 each</td>
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<tr>
<td>Sidewalk</td>
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<tr>
<td>Any Other Inspections Requiring a Visit to Site</td>
<td>$40.00 each</td>
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### FIRE CODE FEES AND INSPECTIONS

<table>
<thead>
<tr>
<th>Application Fee Code</th>
<th>Fee</th>
<th>Inspection Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCL1A</td>
<td>$100</td>
<td>CFCL1</td>
</tr>
<tr>
<td>FCL2A</td>
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<tr>
<td>FCL5A</td>
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<td>FCL6A</td>
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<td>FCL7A</td>
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<td>FCL9A</td>
<td>$5,000</td>
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<tr>
<td>*FCLXA</td>
<td>$100</td>
<td>CFCLX (1-9)</td>
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</table>

*Shell Building Application Fee

| Fee is based on the cost of the project. The larger of $75 per sq. ft. or stated cost for complete new construction. |
| Construction Cost: | Inspection Fee: | Shell Insp. Fee: |
| $0 - $200K | $500 | $260 |
| $200K +1 - $300K | $875 | $260 |
| $300K +1 - $500K | $1,100 | $260 |
| $500K +1 - $1M | $1,700 | $340 |
| $1M +1 - $2.5M | $4,000 | $800 |
| $2.5M +1 - $5M | $8,500 | $1,700 |
| $5M +1 - $25M | $9,300 | $1,900 |
| $25M +1 - $30M | $15,000 | $3,000 |
| $50M +1-up | $20,000 | $4,000 |

Certificate of Compliance for Shell Bldgs issued as “Occupancy Not Authorized” Build-out permit required before occupancy

### FIRE PROTECTION INSPECTION FEES

<table>
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<tr>
<th>FIRE PROTECTION INSPECTION FEES</th>
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</thead>
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<tr>
<td>Fixed Pipe System</td>
<td>Per kitchen $200.00</td>
</tr>
<tr>
<td>Fire Alarm System includes Remodels Additions and Relocations</td>
<td>$200.00 200 or fewer initiating devices $200.00 Plus .50 per device over 200 Max fee $2000.00</td>
</tr>
<tr>
<td>Fire Suppression System includes Remodels Additions and Relocations</td>
<td>$200.00 200 or fewer sprinkler heads $200.00 Plus .50 for each head in excess of 200 Maximum fee $2000.00</td>
</tr>
<tr>
<td>Smoke Control, Elevator Recall, Standpipes, Dry Pipe Hose Connections and Wall hydrants</td>
<td>$200.00</td>
</tr>
<tr>
<td>Door access control First 20 doors Add. doors $20 per door Max $2000.00</td>
<td>$200.00</td>
</tr>
<tr>
<td>Sprinkler Alarm Monitoring Station</td>
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<tr>
<td>Certificate of Non-Compliance (Floodplain)</td>
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<tr>
<td>Certificate of Compliance (Floodplain)</td>
<td>$20.00</td>
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<tr>
<td>PERMIT OR ACTIVITY</td>
<td>PERMIT FEE</td>
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<td>----------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Inspection of Property for Compliance</td>
<td>$50.00</td>
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<tr>
<td>Other charges incurred by the County Engineer in enforcing the Flood Plain Management Regulations</td>
<td>$0.403 Per Mile</td>
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<td><strong>STORM WATER QUALITY FEES</strong></td>
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<tr>
<td>SWQ Permit – Initial or Expired</td>
<td>$500.00</td>
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<tr>
<td>SWQ Annual Permit Renewal</td>
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<tr>
<td>SWQ Initial or Expired Master Permit</td>
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</tr>
<tr>
<td>SWQ Annual Master Permit Renewal</td>
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</tr>
<tr>
<td>SWQ Plan/Permit Amendment – Structural Control</td>
<td>$150.00</td>
</tr>
<tr>
<td>SWQ Transfer of Permit</td>
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</tr>
<tr>
<td>SWQ Inspection / Re-inspection Fee – Residential Lot</td>
<td>$75.00</td>
</tr>
<tr>
<td>SWQ Inspection / Re-inspection Fee – Commercial, Industrial, Subdivision</td>
<td>$300.00</td>
</tr>
<tr>
<td>SWQ Certificate of Compliance</td>
<td>$20.00</td>
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<tr>
<td>SWQ Certificate of Non-Compliance</td>
<td>$500.00</td>
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<tr>
<td><strong>ADMINISTRATIVE FEES</strong></td>
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<tr>
<td>Plats</td>
<td>$600.00</td>
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<tr>
<td>Residential Lots (each)</td>
<td>$10.00</td>
</tr>
<tr>
<td>Reserves (per 100 feet of road frontage)</td>
<td>$20.00</td>
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</table>

**NOTES**

- All permit fees are to be doubled for all construction starting prior to obtaining a permit including minimum and maximum fees.
- Charge per square foot shall also include the floors of attached and detached garages and all building floors of multiple story buildings.
- Permit fees are **not refundable**. Inspection fees are charged for each visit to the jobsite.
- *Fee schedule supersedes all other same fees annotated within other regulations approved prior to this schedule.*
Exhibit 10

Channel Numbers
Exhibit 11

FEMA Map
The Vireo Location (in Green outline)
Exhibit 12

Traffic Impact Analysis (TIA) Report
A traffic engineering analysis was conducted to evaluate the need for turn lanes for the proposed driveways into the proposed Vireo Apartments located in the southwest quadrant of the intersection of C.E. King Parkway at Tidwell Road in Harris County. The proposed development consists of 264 apartment units and generates 133 AM peak trips, 163 PM peak trips, and 1,723 weekday trips. The two proposed driveways are located along Tidwell Road. Both driveways will serve ingress and egress traffic operations. The proposed development full build out year is Year 2022. The proposed development is shown in Figure 1.

**Intersection Conditions**

Under existing conditions, Tidwell Road is an undivided two-lane roadway with 12-foot lanes in each direction. Tidwell Road will be reconstructed as part of Harris County reconstruction along the major thoroughfare as shown in Appendix A. Tidwell Road will be constructed to a four lane boulevard with a median opening at Barker Road. The median opening for the Southlake Villas, approximately 200 feet east of the intersection of C.E. King Parkway at Tidwell Road, will be closed to extend the left-turn lane at the intersection. A left-turn lane will be constructed to enter the Southlake Villas driveway located approximately 300 feet east of Barker Road.

It is expected that the reconstruction of Tidwell Road will be in place for the proposed development full build out. The intersection of Tidwell Road at Proposed Driveway 1 will be a full access driveway that will align with the proposed median and Baker Drive. The second driveway, Proposed Driveway 2, will be located approximately 345 feet to the west of Proposed Driveway 1. The proposed driveway will only allow right-in and right-out traffic movements as a result of the Tidwell Road reconstruction.

**Traffic Data**

An eastbound and westbound 24-hour count was recorded along Tidwell Road, west of C.E. King Parkway. Counts show a daily total of 6,028 vehicles traveling in the eastbound direction and 5,793 vehicles traveling in the westbound direction. During the AM peak period from 7:00-8:00AM, there
are 440 vehicles traveling in the eastbound direction and 460 vehicles traveling in the westbound
direction. During the PM peak period from 5:00-6:00PM, there are 471 vehicles traveling in the
eastbound direction and 398 vehicles traveling in the westbound direction. The peak hour traffic is
shown in Figure 2. The complete count data is included in Appendix B.

**Background Traffic**

After reviewing historical counts for the area as well as the surrounding area, a one percent growth
was applied to the existing counts for the projected growth in the area over a five year period. A one
percent growth rate for five years equates to a growth factor of 1.051. During the Year 2022
Background AM peak period, there are expected to be 462 vehicles traveling in the eastbound
direction and 483 vehicles traveling in the westbound direction. During the Year 2022 Background
PM peak period, there are expected to be 495 vehicles traveling in the eastbound direction and 418
vehicles traveling in the westbound direction. The Year 2022 Background traffic is shown in Figure
3.

**Trip Distribution and Generation**

It is expected that the development will be built by Year 2022. The projected trip distribution, as
shown in Figure 4, for the proposed development is estimated as follows:

- 50% to/from the east
- 50% to/from the west

The projected trip distribution was estimated based on the existing 24-hour counts that were taken
along Tidwell Road. Based on the existing counts, there is approximately a 50/50 distribution for
the eastbound and westbound movements. This is expected due to access to US 90 and Beltway 8 to
the east and access to IH 69, Hardy Toll Road, and IH 45 to the west of the proposed development.

For the 264 unit apartments, the Institute of Transportation Engineers (ITE) *Trip Generation
Manual, 9th Edition* was used to estimate the generated daily, weekday AM peak, and weekday PM
peak trips for the project. The trip generation for the proposed development is summarized in Table
1. The projected traffic volumes did not account for traffic reductions or pass-by trips. The trip
generation is shown in Appendix C.

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Weekday Total Daily</th>
<th>Weekday AM Peak Hour Trips</th>
<th>Weekday PM Peak Hour Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total Entering</td>
<td>Exiting</td>
</tr>
<tr>
<td>Apartments-264 Units</td>
<td>1,723</td>
<td>133</td>
<td>27</td>
</tr>
</tbody>
</table>

The site generated volumes and the Year 2022 Background plus Project volumes are shown in
Figure 5 and Figure 6.
Left-Turn Lane Analysis

A westbound left-turn analysis was conducted for Tidwell Road at Proposed Driveway 1 using the left-turn lane guidelines according to the NCHRP Report 457 based on a four lane boulevard. The projected advancing and opposing volumes are 471 vehicles per hour (vph) and 538 vph during the PM peak period, respectively. The projected left-turn movement 53 vph. Based on the left-turn volume and the advancing and opposing volumes, an eastbound left-turn lane is warranted. The left-turn lane warrant analysis is included in Appendix D.

Preliminary Synchro Analysis

A preliminary modeling analysis was conducted using Synchro 9 to determine the level of service for the northbound approach for Proposed Driveway 1. The southbound approach movements and eastbound left-turn movements were estimated using the trip generation software OTISS based on the anticipated number of homes accessing the roadway. According to the model, the northbound left-turn lane is expected to operate at a LOS C with a delay of 22.8 seconds in the AM peak and LOS D with a delay 26.0 seconds in the PM peak.

Conclusions and Recommendations

According to the left-turn lane analysis, a westbound left-turn lane is recommended for Tidwell Road at Proposed Driveway 1 with 100 feet of storage and a 100-foot taper.
YEAR 2022
BACKGROUND
VIREO APARTMENTS
HARRIS COUNTY, TX

JUNE 2017

PROJECT LOCATION

LEGEND

XX(XX) WEEKDAY AM PEAK HOUR (WEEKDAY PM PEAK HOUR)
TRIP DISTRIBUTION

VIREO APARTMENTS
HARRIS COUNTY, TX

DATE: JUNE 2017
FIGURE: 4
PAGE: 7

LEGEND

XX(XX) INGRESS AND EGRESS TRIPS
LEGEND

XX(XX) 7:00AM-8:00 WEEKDAY AM PEAK (5:00PM-6:00 WEEKDAY PM PEAK HOUR)
Appendix B
Existing 24-hour Traffic Counts
<table>
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<tr>
<th>TIME</th>
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<th>0:30</th>
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<td>49</td>
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<td>8</td>
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<tr>
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<td>1</td>
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<tr>
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</table>

**TOTAL:** 6028

The A.M. peak hour from 6:45 to 7:45 is 443
The P.M. peak hour from 16:45 to 17:45 is 478
The A.M. peak hour from 7:00 to 8:00 is 460
The P.M. peak hour from 15:30 to 16:30 is 498

### Westbound Tidwell Rd west of C E King Pkw

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<th>0:45</th>
<th>TOTAL</th>
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Appendix D
Left-Turn Lane Analysis
Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

### 4-lane roadway

**INPUT**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
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<tbody>
<tr>
<td>Left-turning volume ($V_L$), veh/h:</td>
<td>53</td>
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<tr>
<td>Advancing volume ($V_A$), veh/h:</td>
<td>471</td>
</tr>
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<td>Opposing volume ($V_O$), veh/h:</td>
<td>538</td>
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</tbody>
</table>

**OUTPUT**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Message</th>
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</thead>
<tbody>
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<td>Opposing volume ($V_O$) check:</td>
<td>O.K.</td>
</tr>
<tr>
<td>Combined volume ($V_A$ and $V_O$) check:</td>
<td>O.K.</td>
</tr>
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**Guidance for determining the need for a major-road left-turn bay:**

- Left-turn treatment warranted.

**CALIBRATION CONSTANTS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Average time for making left-turn, s:</td>
<td>4.0</td>
</tr>
<tr>
<td>Critical headway, s:</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume ($V_A$) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).
Exhibit 13

Harris County

Roadway Improvement Exhibit
Exhibit 14
No Zoning Letter
January 1, 2018

To Whom It May Concern:

SUBJECT: Zoning, Building Codes, and Certificates of Occupancy in Unincorporated Harris County

Zoning:

There is no zoning regulation promulgated or administered by Harris County in the unincorporated area. Harris County does administer regulations pertaining to floodplain management, on-site sewage facilities, driveways, and signs. All development regulations may be viewed on our website: www.eng.hctx.net/permits

Building Codes and Certificates of Occupancy:

Effective 1 January 2006, multi-family dwellings consisting of four (4) or more units became subject to the requirements of the Harris County Fire Code. A Certificate of Compliance is issued prior to occupancy. Commercial and public buildings permitted prior to 1 January 2005 were not subject to any building code; however, after that date, construction of commercial and public buildings became subject to the Harris County Fire Code. A Certificate of Compliance is issued prior to occupancy. The Harris County Fire Code may be viewed on our website.

All residential construction (single family homes and duplexes) permitted in unincorporated Harris County after September 1, 2009 is required to comply with our inspection notification process. The provisions of Subchapter F of Chapter 233 of the Texas Local Government Code, as enacted by the 81st Texas Legislature, require the builder of a residential structure to provide a notice to the County of the date of certain inspections. This notice indicates whether the inspections showed compliance with the version of the International Residential Code that will be used to construct the new residence at the time the permit was obtained. No certificate of occupancy is issued for these residential structures.

You may present this letter to your lender. It is updated annually or as regulations and requirements are amended. If additional information is required beyond the scope of this letter, please contact the Records Section of the Harris County Permits Office at 713-274-3900, fax 713-956-3050 or e-mail records@hcpid.org. A fee will be assessed for additional information.

Sincerely,

Jesse Morales, CFM
Manager of Permits
Exhibit 15

Harris County

Tree and Shrub Ordinance
Landscape Regulations for Development
Tree & Shrub Regulations
County of Harris Planning & Development Department

The Harris County Regulations for Approval and Acceptance of Infrastructure provides standards for planting trees and shrubs and installing landscaping buffers. The Regulations further protects Harris County greenery by offering incentives to property owners who preserve and care for existing trees on private properties.

Based on a property’s size, the Regulation establishes minimum planting requirements for street trees, parking lot trees, and shrubs. These minimum requirements ensure that the County will have aesthetically pleasing developments and enhanced greenspace, making it a better place to live.

The Regulations’ planting requirements apply to all new commercial and public buildings. The Regulations also apply to all new single family construction.

Landscape design and compliance review sheets are available at the County Permit Office, 10000 Northwest Fwy, Suite 102, Houston, Texas 77092 and online at www.eng.hctx.net.

Who Must Plant
Those who are building:
- All new commercial and public buildings
- New single family residential buildings

Landscape Plans
A landscape plan is a drawing that identifies the locations of existing and proposed utility lines, roadways, sidewalks, street lights, trees, shrubs, groundcovers, natural features, landscape buffers, other landscape elements, and planting or construction details.

Make certain that the plant species and planting size of all trees and shrubs are noted on the plan. All preserved trees on the plan must be identified. Applicants must submit a landscape plan for review when applying for plan approval.
Planting Requirements for Commercial & Public Building Developments

Applicants must incorporate a landscape plan and landscape design and compliance review sheet. Both items must be included with an application for a plan approval.

- **Street trees** – must be planted adjacent to public rights-of-way; one tree for every 30 feet of road frontage. The formula for calculating the required number of street trees will be applied separately to each block face when a property fronts on more than one street and there are minimum spacing requirements. Street trees must be planted at least 20 feet apart without extreme variation in the spacing excluding site conditions and driveways. An existing street tree may count toward the requirement of a required tree.

- **Parking lot trees** – each parking space must be within 120 feet of a parking lot or street tree. One tree for every 10 spaces is required.

- **Shrubs** – at least 75% must be planted along the perimeter of parking lots with the remainder planted along or within the perimeter; 10 shrubs for each required street tree.

- **Landscape buffers** – screening fence, with a minimum height of six feet, located along the property line between two adjacent properties; must be constructed with building materials or planted with evergreen trees or shrubs that will be 6 feet tall within 3 years.

Protected Trees

The Regulations protect certain trees from removal. Trees located within public rights-of-way are protected.

Removing Protected Trees

Individuals who want to remove a protected tree must complete the following steps:

**Specimen Trees Twelve (12) Inch Caliper and Larger:**

- The engineer will provide a tree removal and replacement plan with the construction plans. Auger or tunnel construction methods under selected specimen trees must be used to the extent practicable.

- Replacement trees should generally have a minimum diameter of three (3) inch caliper as established by the American Association of Nurserymen. Trees twelve (12) inches and larger should be replaced with smaller trees being no less than three (3) inch caliper and totaling the equivalent caliper diameter of the removed tree.

- Replacement of trees should generally be the same type as the removed tree, unless directed otherwise by the County Engineer or appropriate Precinct designee during the plan review.

- Specimen trees located in the right-of-way and adjacent to the contractor’s work area are to be fenced with four (4)-foot high orange safety fencing. The limits of
the fencing will be coordinated with a landscape professional and the appropriate Precinct designee and approved during plan review.

**Specimen Trees Smaller than Twelve (12) Inches:**
- Specimen trees smaller than twelve (12) inches will be transplanted within the County’s right-of-way as directed by the County Engineer or the appropriate Precinct designee during the plan review.

**Landscape Professional:**
- The engineer will utilize a Landscape Professional when necessary for the preparation of the tree removal and replacement plan. A Landscape Professional is considered to be an Urban Forester, licensed Landscape Architect, Certified Arborist or similar qualified professional.

**Exceptions to the Regulations**
Applicants may request a variance in accordance with Section 14 of these regulations. The County Engineer may grant a variance when compliance with the regulations would result in damage to existing utilities or create unsafe conditions for the public.

**Planting Requirements for Single Family New Construction**
- Lots less than 5,000 square feet will require one tree – new or preserved. A preserved tree may be on the building site or in the abutting street right-of-way. A new tree should be planted in the front yard unless the building official authorizes it to be planted elsewhere on the building site.
- Lots 5,000 square feet or greater will require two trees – new and/or preserved of which one should be in the front yard.
- Trees must be of a species listed on the street tree or parking lot tree list.
- A final building inspection may not be approved until the required trees are planted or preserved.

**Tree Protection**
Construction projects can be strenuous and cause irrevocable damage to existing trees. The following information describes methods that help mitigate impact and save trees:
Before Construction: Design for Tree Survival

1. Pick the trees to save and design the structure to accommodate them. Look for healthy trees of desirable species. Pay special attention to shade potential for the house and nearby cement/asphalt areas.

2. Determine the Critical Root Zone (CRZ) for each tree, which is roughly a circle with a radius equal to the average dripline (see Figure 1). Realize that most tree roots are in the top two feet of the soil, and that feeding roots are in the top few inches (see Figure 2). Roots require non-compacted soil for both air and moisture.

3. Protect at least 75 percent of the CRZ. Fence the area to prevent traffic or storage of materials (see Figure 3). If fencing is not possible, cover the CRZ with 6-8 inches of wood-chip mulch and 3/4-inch plywood or road boards to prevent soil compaction (see Figure 4).

4. Route underground utilities to avoid the CRZ. If digging is unavoidable, bore under the roots or hand dig to avoid severing them.

5. Design paving away from the CRZ. If this is not possible, use a porous material for driveways, such as crushed granite, pavestone, etc.

6. Save trees that are very close to buildings by using pier-and-beam construction techniques that allow air and moisture to reach the root zone.

Figure 1: Critical Root Zone (CRZ)  
Figure 2: Root Growth  
Figure 3: Fence the Area  
Figure 4: Cover with mulch
**During Construction: Save the Roots, Save the Trees**

1. Set up tree protection guidelines and monitor compliance — from initial grading of the lot to final landscaping and irrigation.
2. Maintain CRZ fencing. Mark access routes, storage areas and refuse sites.
3. Keep backhoes and other root destroying equipment away from roots, especially in the CRZ.
4. Avoid soil compaction. Park on the street- not under shade trees!
5. Use boring or tunneling methods when utilities are in the CRZ, since most roots are close to the surface, or hand dig trenches to avoid cutting roots.
6. Do not allow disposal of paints, oils, unused mortar or other potentially toxic materials any place on the site.
7. If pruning is required, use National Arborist Association specifications.
8. Do not expect pruning or fertilizing to compensate fully for destroyed roots.
9. Keep the CRZ well watered during construction to avoid extra stress on trees. Saturate the top 4-6 inches of soil.

**After Construction: Remediate and Monitor**

1. Remove contaminated soil, and aerate compacted soil. Make sure to maintain the same grade as before construction — more than two additional inches of soil or sod can ultimately kill an otherwise healthy tree.
2. Monitor trees for up to five years, checking for insects or disease that can strike a weakened tree.
3. Water trees during dry periods to help them recover from construction stress. Fertilize annually with a slow release non-burning complete fertilizer.

**Check with an Expert**

There are so many species of trees and site possibilities that we can only offer general guidelines in this brochure. You’ll get the best advice about preserving trees from a qualified urban forester.
Exhibit 16

Landscape Plan