

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING  
OFFICE OF CITY ENGINEER  
TRAFFIC AND TRANSPORTATION SECTION  
WASTEWATER OPERATIONS SECTION  
WATER ENGINEERING SECTION  
FINANCE SECTION

SUMMARY OF  
TECHNICAL REVIEW COMMITTEE MEETING  
AND RECORD OF DECISIONS AND ACTION ITEMS

DATE PREPARED: January 7, 2015  
PROJECT TITLE: TIRZ 17  
Memorial Drive West Mobility and Drainage Improvements Project  
WBS NO.: WBS No. T-17000-0031B-7  
DESIGN CONSULTANT: Lockwood, Andrews & Newnam, Inc.  
SUPERVISING ENGINEER: Thomas Artz, PE  
TRC DATE: December 1, 2015

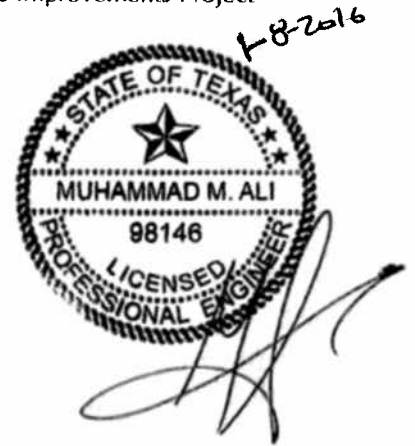
Attendees:

City of Houston:

Tommy Artz	Joaquin Lopez	Mazen Abdulrazzak
T. Rebagay	JoAnne Kamman	Kent Wu
Mitchell Ramon	Gary Hill	Mohd Warrad

Lockwood, Andrews & Newnam, Inc.:

Muhammad Ali	Derek St. John	Ricky Gonzalez
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Lockwood, Andrews &  
Newnam, Inc.

F-2614

**I. Purpose**

To review and discuss the recommendations provided by the engineering consultant, make decisions and provide directives. The recommendations are detailed in the Preliminary Engineering Report (PER) titled, "Memorial Drive Mobility and Drainage Improvements Project Preliminary Engineering Report", dated October 2015, prepared by Lockwood, Andrews & Newnam, Inc.

The purpose of the Memorial Drive Project is to Improve Mobility, Safety, Drainage Deficiencies, and Quality of Life.

The project proposes to improve the Mobility and Safety by converting the existing 4-lane asphalt open ditch roadway to a 4-lane concrete curb and gutter section with a raised median. The project will require full roadway reconstruction of Memorial Drive, from the northbound Beltway 8 frontage road to Tallowood Rd. As part of the roadway reconstruction, the aging or deficient public utilities shall be replaced and private utilities shall be evaluated and relocated or replaced as necessary.

The project proposes to improve Drainage Deficiencies with the installation of reinforced concrete storm sewer boxes; ranging from 10'x5' to 10'x10', which will result in increased conveyance and storage, an increase in storm level protection, reduction in overland flow leaving the project area, reduction in roadway ponding and reduction in surrounding area residential flooding.

The project proposes to improve Quality of Life by installing 8-foot wide shared use paths along both sides of the Memorial Drive project corridor, replacing existing traffic signals, providing ADA compliant sidewalks and wheel chair ramps, and installing hardscape and softscape features along the project.

## **II. Project Background**

### **A. Introduction**

Lockwood, Andrews & Newnam, Inc. (LAN) was retained by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to perform a Preliminary Engineering Study for Memorial Drive Mobility and Drainage Improvements Project. In addition to the general mobility improvement, another important objective is to address documented drainage issues in the immediate area. The Memorial Drive Mobility and Drainage project was identified in the City of Houston (City) approved TIRZ17 Project Plan and Capital Improvement Plan (CIP No. T-1717).

### **B. October 2015 PER Findings & Recommendations**

Three main roadway improvement alternatives were considered and analyzed. The impacts of each alternative to existing right-of-way, access management, pedestrian amenities, tree inventories, and underground utilities were considered. The alternative selected is the most optimal solution based on benefit, cost and constructability. It will involve complete reconstruction of Memorial Drive, within the existing ROW, with the addition of sub-surface, in-line detention. The recommended proposed improvement will improve overall mobility and safety, drainage deficiencies, and quality of life.

The following recommendations are based on the results from the preliminary geometric evaluation and condition assessment, and drainage analysis:

#### **Roadway:**

##### **Existing:**

Centered within an existing 100' right-of-way, Memorial Drive is an existing, undivided 44-foot asphalt roadway with a combination of shallow open ditches and curb and gutter sections; with two 11-foot lanes in each direction, from the northbound Beltway 8 intersection, east to Tallowood Rd. Memorial Drive is currently classified as a major thoroughfare per the 2014 City Major Thoroughfare and Freeway Plan (MTFP). The posted speed limit along Memorial Drive is 35 mph within the project limits. Existing sidewalks are 4-feet wide and discontinuous along the project alignment.

There are two (2) existing signalized intersections along the project limits; Beltway 8 frontage road and W. Bough/Broken Bough intersections. There are also eight (8) unsignalized intersection along the project limits. The City Pavement Condition Rating (PCR) scores along the project alignment vary from the mid 60's to the mid 70's.

##### **Proposed:**

The Recommended Alternate 1 proposes a 4-11-foot wide lanes, two way concrete curb and gutter roadway divided by a 24-foot wide raised median with left turn lanes at each median opening. Per the 2015 COH IDM the pavement will be 11-inches thick concrete. The median opening locations were based on an access management study and feedback from the public.

Proposed 8-foot wide Shared Use Paths will be constructed along both sides of Memorial Drive. The proposed Shared Use Path, along the south side of Memorial Drive, is intended to tie into the future TxDOT shared use path project from Terry Hershey Park to the southeast corner of the Beltway 8 northbound frontage road and Memorial Drive. There will be minimum 4-foot buffer space separating the roadway from the shared use paths. ADA compliant wheel chair ramps will also be constructed at both signalized intersections.

Both signalized intersections will up replaced to meet current City of Houston criteria.

No additional ROW is required for the proposed Memorial Drive project with the exception of a 25'x25' corner clip at the northeast corner of Memorial Drive and Beltway 8 northbound frontage road, and a 20'x20' corner clip at the northwest corner of Memorial Drive and W. Bough Lane. These corner clips are required for proposed sidewalk continuity, ADA compliant pedestrian ramps, and proposed traffic signal improvements.



**Drainage:**

**Existing:**

The entire study area is part of the W153-00-00 watershed and is generally drained by roadside ditches and storm sewers existing along the project alignment, ultimately out-falling to W153-00-00. The western limits of the project from W. Bough Lane/Broken Bough Drive to Beltway 8 drain to the Beltway 8 storm sewer trunkline before continuing downstream to Buffalo Bayou. A Regional Drainage Study performed in 2012, then updated in 2014, documented significant deficiencies within the watershed. Significant structural flood damage was reported in the April 2009 rain event as well as the more recent May 2015 rain event. The existing Memorial Drive Drainage System does not currently meet the City's 2-yr or 100-yr drainage criteria. Flooding is partially due to the limited capacity of the Memorial Drive drainage infrastructure and overflow from W153 itself. At the peak of a major rain event, W153 becomes overwhelmed and overland flows into Memorial Drive ROW from W153 via adjacent properties, thus putting adjacent properties at risk of structural flooding. The capacity of the Memorial Drive crossing at W153 is further reduced by the significant tailwater in Buffalo Bayou. Additionally, the area south of Memorial Drive is inundated due to the Buffalo Bayou 100yr floodplain. Neither of these issues can be resolved by the local drainage improvements proposed as part of the roadway project.

**Proposed:**

Five (5) drainage improvements options were evaluated for the project. The recommended Option I is designed to meet the City's 2-year criteria and maximize the benefit of the drainage improvements, while minimizing impacts to W153 and adjacent properties. The proposed drainage option does not change the existing drainage patterns of the current Memorial Drive system. A proposed single 10'x10' RCB will be installed from W.Bough/Broken Bough to Beltway 8. Dual 10'x5' RCB's will be installed from W.Bough/Broken Bough to Boheme. A smaller 10'x5' box is required at the Boheme intersection, so as to not impact an existing 48-inch sanitary sewer crossing. Dual 10'x10' RCB's will continue from east of Boheme to W153. Restrictors are proposed at the Beltway 8 and W153 outfalls to maintain or reduce existing flow rates and water surface elevations. Throughout the dual RCB's, equalizers will be installed to properly convey flows.

Option I results in a net sub-surface detention volume of approximately 12(+) acre-feet. The project will match or lower flow rates to the receiving storm sewer. This option will also provide a 10-year level of protection.

**Public Utilities**

**A. Water lines:**

The project area is serviced by a 16-inch ductile iron waterline that runs primarily along the southern ROW of Memorial Drive, from east of Beltway 8, for the extent of the project. This line was installed in 1995 and is not recommended to be replaced.

A 12-inch asbestos concrete (AC) water line located at Beltway 8 and continues east to tie into the 16-inch ductile iron water line was installed in 1969 and is recommend to be replaced due to its age and material.

There are seven (7) water line crossings that run perpendicular to Memorial Drive, ranging in size from 8-inch, 12-inch and 16-inch. All water line crossings are recommended to be replaced due to pipe material, conflicts with proposed improvements, and to eliminate any future water line projects that may impact the proposed future roadway.

New fire hydrants will be installed per City spacing requirements. The existing fire hydrants will be removed and salvaged, whenever possible, to reduce costs.

**B. Sanitary Sewer:**

There are four (4) sanitary sewer lines that run parallel to Memorial Drive: A 48-inch gravity line, a 15-inch gravity line, a 12-inch gravity line and a 10-inch gravity line. The existing 48-inch line, installed in 1997 crosses Memorial Drive at Boheme and traverses east along the northern side of Memorial Drive to W153. It is not recommended to replace this line. The 15-inch polyethylene line is located in back lot sanitary sewer easements between Beltway 8 and Boheme. It is not recommended this line be replaced. The 12-inch line runs along the north/east ROW from approximately Old Oaks Drive and Boheme Drive. For the first 290 feet, the pipe was replaced in 1999 using polyethylene pipe. The remaining 285 feet is made of unreinforced concrete that was

installed in 1960. It is recommended that only the older 285 feet of the sanitary sewer line be replaced. The 10-inch line runs along the north/east ROW between Huntingwick Drive and Boheme Drive. This extra strength concrete line runs parallel to the 12-inch line and was installed in 1966. It is recommended that this line be replaced due to its age and pipe material. During detailed design, LAN will study the option of combining the 12-inch and 10-inch lines into one single line.

There are ten (10) sanitary sewer line crossings that run perpendicular to Memorial Drive. They range in size from 8-inch to 24-inch. Seven (7) lines were installed in the 1950's and 1960's and CCTV footage depicted irregularities in the lines. Therefore, it is recommended that these seven (7) sanitary sewer crossings be replaced. The remaining three (3) lines are 1~6-inch ductile iron force main; 1~6-inch cast iron force main, and 1~10-inch ductile iron force main, installed in the 1970's and 1980's. The 6-inch cast iron line is in conflict with proposed improvements and is recommended to be replaced. The 6-inch ductile iron line is also recommended to be replaced due to its age and pipe material.

#### **Traffic Signals**

The two existing traffic signals at Beltway 8 and West Bough/Broken Bough will be replaced to meet current City standards.

#### **Private Utilities**

CenterPoint Energy has underground gas lines, underground conduits and overhead electric lines. Southwestern Bell Company (SBC or AT&T) has underground cables fiber optic cables, and duct banks. and PVC conduits in the project limits. Coordination with private utility entities will be conducted early in the design process as needed.

#### **Existing Trees:**

Approximately 293 existing trees are located within the construction area of the project. 75 trees will be impacted by the project resulting in 393 replacement inches. Landscaping plans and tree protection plans will be necessary in Phase II to comply with City Tree Ordinance.

#### **Geotechnical Study:**

The geotechnical report by Aviles Engineering recommends a rigid concrete pavement thickness of 11-inches with an 8-inch lime stabilized subgrade, consistent with the latest City IDM requirements for a 50-year life span pavement.

#### **Environmental Site Assessment:**

The Phase I ESA conducted by Aviles Engineering identified seven (7) Recognized Environmental Concerns (REC). Research found a fault line along the project limits, but Aviles' site reconnaissance found no evidence of a fault line. A detailed Phase II ESA is recommended during detailed design along with a fault study to confirm if a fault line exists.

#### **Right-of-way/Easement Acquisition:**

No additional ROW is required for the proposed Memorial Drive project with the exception of a 25'x25' corner clip at the northeast corner of Memorial Drive and Beltway 8 northbound frontage road, and a 20'x20' corner clip at the northwest corner of Memorial Drive and W. Bough Lane. These corner clips are required for proposed sidewalk continuity, ADA compliant wheel chair ramps and proposed traffic signal improvements.

#### **Project Coordination:**

Project coordination will continue throughout the final design with the City of Houston, TIRZ 17, TxDOT, METRO, Harris County Toll Road Authority, Harris County Flood Control District, adjacent property owners, and several private utility entities. Coordination meetings will be scheduled with the City of Houston as needed throughout the design phase to coordinate design. Upon completion of 60% and 90% design, drawings will be submitted to the City Engineer's Office for review and approval. Early coordination with private utility entities will also be conducted in design.

#### **Traffic Control:**

The traffic control plan and construction sequencing will require two main phases to minimize disruption to the traveling public, pedestrians, and adjacent properties. During the first construction phase, the south half of the project will be constructed including storm sewer boxes, and concrete pavement. Temporary pavement along the north side of Memorial Drive will need to be installed to accommodate one lane in each direction, along with a continuous two way left turn lane. The

second phase of construction will move traffic to the newly constructed pavement and maintain the same three lane configuration, then complete the construction of the remaining items along the north side of the project.

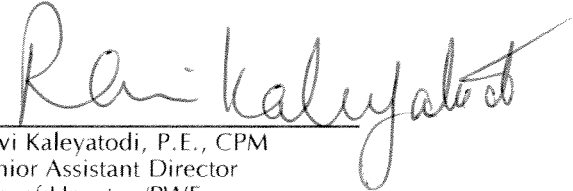
**Lighting/Landscaping:**

Standard City Street lighting will be installed along the project. A detailed landscaping and pedestrian lighting plan will also be developed during construction. These improvements are meant to promote a pedestrian friendly environment along the proposed project corridor.

**C. TRC Decisions and Directives**

1. LAN will provide 11-foot lanes during construction to accommodate bus traffic.
2. LAN to revise design to reflect 8-foot wide shared-use paths on both sides of Memorial Drive due to the long distances between legal street crossing locations. This will provide the north and south side neighborhoods an equal opportunity to utilize these amenities.
3. Use High Early strength concrete at all intersections.
4. The 100-year storm event City Criteria cannot be met due to W153's limited capacity and back water from Buffalo Bayou. A regional solution is needed for the area but this is beyond the project's scope.
5. TIRZ 17 will handle the ROW acquisition for corner clips.
6. LAN will work with planning department to determine if there is a need for utility stub-outs for the Rebuild Houston project at Memorial Bend subdivision.
7. LAN will do a sight distance analysis at each intersection to evaluate if there are sign distance issues.

Based on the above directives and conclusions, the engineering consultant on behalf of TIRZ 17, will proceed with final design of the Memorial Drive Mobility and Drainage Improvements Project. Please contact Muhammad Ali at 713-266-6900, should this summary be inconsistent with the TRC findings and decisions.

  
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MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS  
PRELIMINARY ENGINEERING REPORT  
WBS NO. N-T17000-031B-7  
CIP NO. T-1717

Prepared for



MEMORIAL CITY REDEVELOPMENT AUTHORITY  
TAX INCREMENT REINVESTMENT ZONE NO. 17  
(TIRZ No. 17)

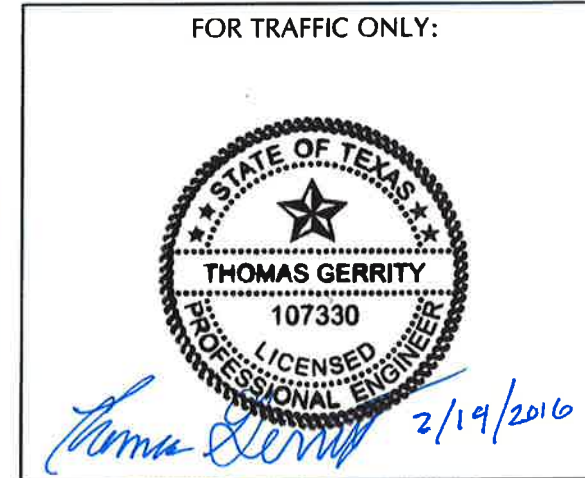
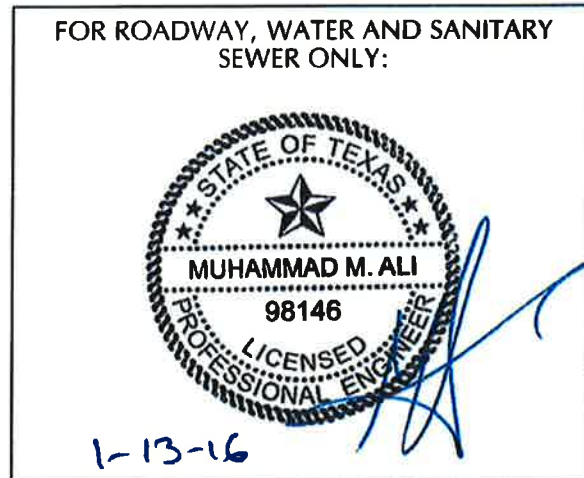
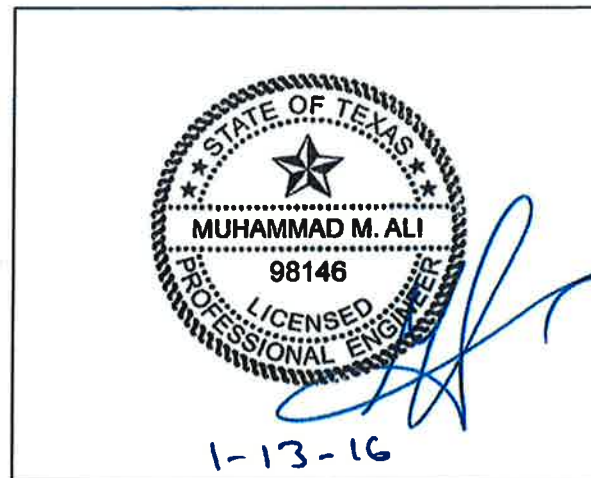
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FIRM NO. 2614

JANUARY 2016



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## 1.0 Executive Summary

### 1.1 Project Authorization

Lockwood, Andrews & Newnam, Inc. (LAN) was retained by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to perform a Preliminary Engineering Report (PER) for Memorial Drive, between Beltway 8 Frontage Road and Tallowood Road. Memorial Drive is identified in the City of Houston (City) approved TIRZ17 Project Plan and Capital Improvement Plan (CIP No.T17000-031B-7).

### 1.2 Statement of the Problem

The objectives of the Memorial Drive Improvement project are as follows:

#### 1. Improve Safety & Mobility

- Upgrade roadway to a curb and gutter concrete section with raised medians to improve safety, mobility and access management along the project corridor.
- Reconstruct roadway to meet current roadway geometric requirements to improve safety.
- Add left-turn bays at median openings for safe queuing.
- Upgrade traffic signals at BW 8 Frontage Road and West Bough Lane/Broken Bough Drive to meet current City of Houston standards.

#### 2. Improve Drainage

- Install oversized reinforced concrete box storm sewers to reduce overland flows to neighboring areas and reduce area flooding.

#### 3. Improve Quality of Life

- Promote a pedestrian-friendly environment by incorporating:
  - Continuous, wider sidewalks
  - Multi-use/shared-use paths
  - Landscaping/trees within median and along curb
  - Pedestrian lighting

The PER is Phase I of the overall project development and will identify potential impacts associated with the implementation of the roadway reconstruction, pedestrian, traffic, drainage and utility improvements recommendations.

### 1.3 Project Location

The study limits include Memorial Drive, between Beltway 8 northbound Frontage Road and Tallowood Road. The project is located in west Houston, Texas, just south east of the interchange of IH-10 (Katy Freeway) and the Sam Houston Tollway (Beltway 8) at the south-western limits of the TIRZ 17 boundary. See **Exhibit 1.1** Project Location Map for more information.

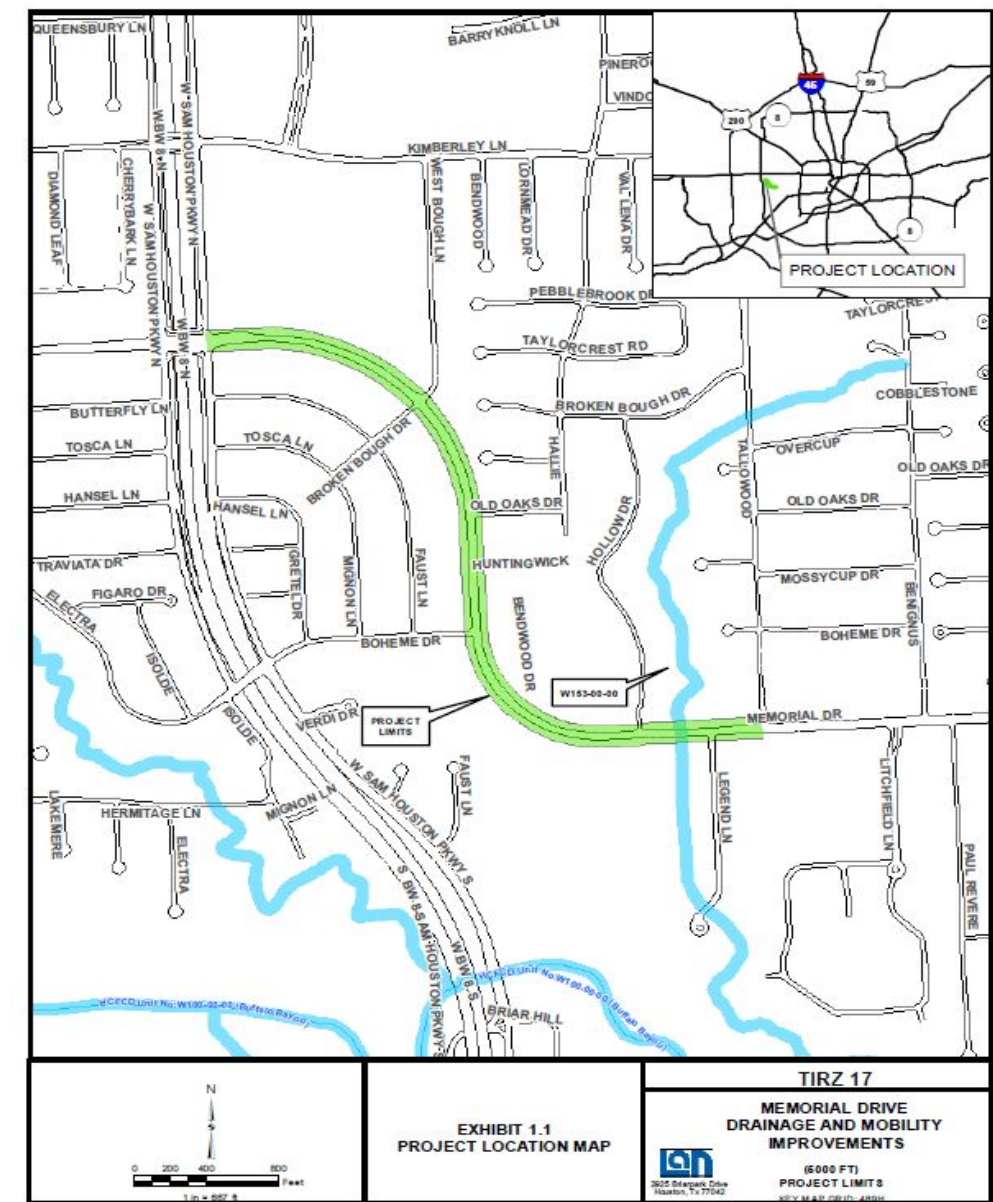


Exhibit 1.1 – Project Location Map

#### 1.4 Scope of Work

The project scope includes the following tasks: address the engineering components associated with the roadway reconstruction, perform an initial existing conditions assessment (vehicular and pedestrian), evaluate and develop recommended solutions for improving drainage and roadway conditions along Memorial Drive, between Beltway 8 Frontage Road and Tallowood Road.

Upon completion of this PER, and approval of the recommended project by the City and TIRZ 17, the Phase II detailed design project may commence. Phase II detailed design of the project will provide engineering services required to provide the necessary construction documents for the approved improvements of Memorial Drive based on recommendations in the PER.

#### 1.5 Existing Conditions

##### **ROADWAY & TRAFFIC:**

Centered within an existing 100' right-of-way, existing Memorial Drive is generally an undivided 44-foot asphalt roadway with a combination of open ditches and inconsistent concrete curb and gutter sections. The roadway cross section consists of two 11-foot lanes in each direction, divided by a solid double yellow line. Discontinuous and inadequate 4-foot wide sidewalks exist along Memorial Drive, within the project limits. Memorial Drive has two signalized intersections; at Beltway 8 Frontage Road and at Broken Bough Drive/West Bough Lane which do not meet current City standards. There are also eight un-signalized intersections at Old Oak Drive, Huntingwick Drive, Boheme Drive, Memorial Bend, Hollow Drive, Somerset Place, Legend Lane and Tallowood Road. The Pavement Condition Ratings (PCR) scores within the project limits vary mid-60's to mid-70's which means the existing pavement is in fair condition. The existing pavement markings appear to be in poor to fair condition.

Memorial Drive is currently classified in the 2014 City Major Thoroughfare and Freeway Plan (MTFP), as a major thoroughfare with adequate ROW width. The posted speed limit on Memorial Drive is 35 mph within the project limits.

##### **LANDUSE:**

Adjacent land use includes retail/commercial businesses, single-family homes and residential apartments. Major commercial businesses surround Memorial Drive from Beltway 8 Frontage Road to Broken Bough Drive/West Bough Lane including: Randall's grocery store, Walgreens, Chase Bank and several clothing retail stores and dining locations along the northern ROW between Beltway 8 Frontage

Road and Broken Bough Drive/West Bough Lane. Although Memorial Drive is centered within a 100-foot wide ROW, there is evidence of commercial and residential ROW encroachment that has occurred over the years.



**Exhibit 1.2 Memorial Drive between Beltway 8 and West Bough lane (looking west)**

##### **DRAINAGE:**

The Memorial Drive Drainage System is primarily part of the W153-00-00 watershed and is generally drained by road side ditches and storm sewers extending along the project alignment draining to W153-00-00. The western limits of the project from Broken Bough Drive/West Bough Lane to Beltway 8 drain to the Beltway 8 storm sewer trunkline before continuing downstream to Buffalo Bayou. A Regional Drainage Study performed in 2012, and then updated in 2014, documented significant drainage deficiencies within the TIRZ 17 boundaries. Significant structural flood damage was reported during the April 2009 rain event as well as the recent May 2015 rain event.

The existing Memorial Drive Drainage System does not meet the minimum City 2-year or 100-year drainage criteria. Even though the 2-year HGL does not get above the inlets/edge of pavement (EOP), the lateral systems on West Bough Lane and the northern commercial areas cannot drain effectively



causing overland flow to enter the Memorial Drive ROW, which in turn cause additional ponding problems. The 100-year WSEL gets above inlet/EOP elevation for the entire length of Memorial Drive between Broken Bough Drive/West Bough Lane and W153. This flooding is partially due to the limited capacity of the Memorial Drive drainage infrastructure and partially due to overflow from W153 itself. Early in the event, the roadside ditches and associated storm sewers and culverts become surcharged and overtop the EOP causing overland flow to leave the ROW. Furthermore, at the peak of the 100 year event, W153 becomes overwhelmed and overland flow enters the Memorial Drive ROW from W153 via the adjacent properties. This is exacerbated by the lack of capacity of the roadway drainage infrastructure and of a clear overland flow path, which puts the adjacent properties at risk of structural flooding

#### **WATER LINES:**

As for public utilities, there is a 12-inch asbestos concrete (AC) water line, running west to east, along the southern ROW of Memorial Drive, from Beltway 8 northbound Frontage Road and ties into a 16-inch ductile iron water line located along Memorial Drive south ROW, for the extent of the project. The 12-inch AC water line was installed approximately 40 years ago, while the 16-inch ductile iron pipe was installed approximately 20 years ago. The City does not have plans to upgrade the 16-inch water line. Fire hydrants also exist along the project alignment.

#### **SANITARY SEWER LINES:**

There are several different diameter sizes for existing sanitary sewer lines located along the project limits. The City provided CCTV for the sanitary sewers along the majority of the Memorial Drive project limits. The following is a list of existing sanitary sewer lines located along the project:

- 15-inch gravity sanitary sewer line: Located along back-lot easements (outside TIRZ boundary)
- Parallel 10-inch and 12-inch gravity sewer lines: Located along the northern ROW of Memorial Drive, from Old Oaks Drive to Boheme Drive.
- 24-inch gravity sewer line: Crosses Memorial Drive into Boheme Drive.
- 48-inch gravity sewer line: Located along the northern ROW of Memorial Drive, from Boheme Drive, to the east side of Tallowood Road.

The City does not have plans to upgrade or replace any sanitary sewer line along the project limits. The CCTV footage revealed some serious damage to existing 8-inch service laterals that cross Memorial Drive at several locations. The CCTV also revealed severe joint cracks, joint offsets, breaks in PVC and

corrosive buildup in the 24" sanitary sewer crossing Memorial Drive at Boheme Drive. The majority of these lines were installed in the 1960-1970's with random spot repairs or portions of pipe replacement throughout the years. The CCTV also revealed the connecting manholes along the project limits to be in poor condition.

#### **1.6 Town Hall Meeting**

On April 14, 2015 a town hall meeting was held to present the proposed key roadway and drainage alternatives for the Memorial Drive project. The public was also given the opportunity to provide feedback, comments, and concerns. The comments with corresponding responses can be found in **Appendix I**. The comments were also posted on the TIRZ 17 website. In preparation of this PER, the public's comments were taken into careful consideration and every effort was made to accommodate the public's concerns.

#### **1.7 Findings from Phase I Preliminary Engineering & Analysis**

##### **1.7.1 Evaluation of Roadway Improvement Alternatives**

Three roadway alignment alternatives were studied for the project. Alternative I was deemed to be the most reasonable and feasible alternative.

Alternative I proposes a 4-lane two-way traffic concrete curb and gutter roadway divided by a 20-foot to 24-foot raised median with left turn bays and 11-foot lane widths. Median openings with left turn bays are also proposed at street intersections and key commercial/residential complex entrances. Standard 6-foot wide concrete sidewalks are proposed along the northern ROW and a 10-foot wide concrete shared use path is proposed along the southern ROW. This shared use path will connect to the future 8-foot wide path project currently being proposed by TxDOT, from the Hershey Park Parking lot to Memorial Drive. See **Exhibit 1.3** for Typical Section. Refer to the Roadway Section of report for details on all three alternatives studied.

##### **1.7.1.1 Sidewalks**

The existing 4' sidewalks do not meet currently City criteria. The sidewalks are discontinuous along the project alignment and are in need of replacement. To provide a more pedestrian friendly environment, 6-foot wide sidewalks be installed along the northern Memorial Drive alignment. The sidewalks will be placed 4-feet from the face of curb to allow for landscaping, lighting, and as a pedestrian buffer from vehicles. Along the southern Memorial Drive alignment, a 10-foot wide concrete shared use path will connect to the future TXDOT Shared Use Path

along the beltway 8 northbound frontage road, from Terry Hershey Park to Memorial Drive. The path will be installed 5-feet from the curb to allow for landscaping, lighting and as a buffer between the vehicles and the path users. ADA compliant wheel chair ramps will be installed both at signalized intersections and throughout the Memorial Drive alignment.

#### **1.7.1.2 Traffic signals**

The existing traffic signals at the intersections of Memorial Drive at Broken Bough Drive/West Bough Lane and at northbound and southbound Beltway 8 Frontage Road will be replaced and upgraded to meet current City of Houston standards.

#### **1.7.1.3 Right-of-way Acquisition**

No major additional right-of-way will be required with the exception of a 25-foot X 25-foot corner clip at the northeast corner of Memorial Drive and Beltway 8 northbound Frontage Road and a 20 foot X 20-foot corner clip at the northwest corner of Memorial Drive and West Bough Lane. A total of 1,025 square feet of right-of-way acquisition is needed. A preliminary proposed right-of-way exhibit can be found in **Appendix E**.

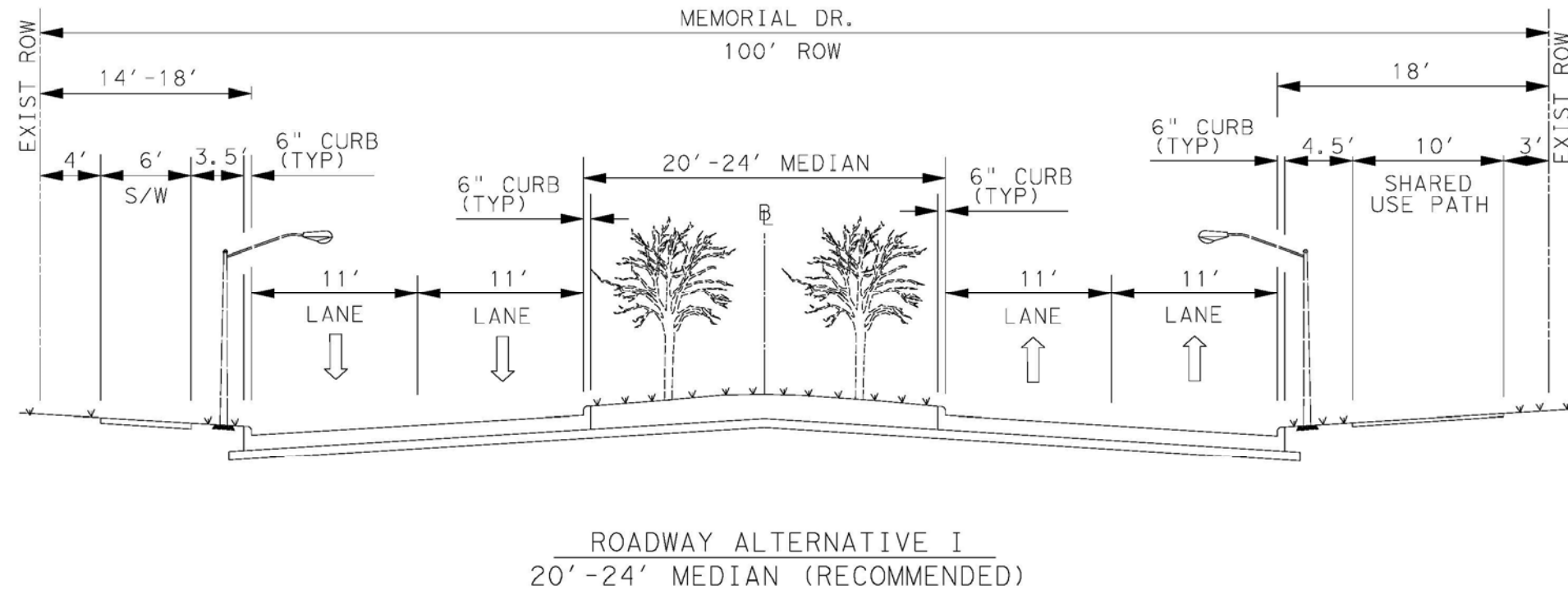


Exhibit 1.3 Alternative I

Typical Section

#### 1.7.1.4 Traffic Control Plans

Traffic control plans for the project will require two main phases during construction to minimize disruption to the adjacent residents and businesses along Memorial Drive. Phase I will include the installation of storm sewer boxes and pavement. One lane in each direction will be maintained at all times, along with a continuous left turn lane to allow for continuous driveway access to all of the businesses and residences. Temporary asphalt will be required along the north side of Memorial Drive to achieve the three lane configuration. Phase II will include the construction of the northern half of Memorial Drive. The same three lane configuration will also be maintained at all times. The proposed median curbs will be installed after Phase II is completed to allow for the three lane configuration. Per City of Houston, the contractor's work zone will have to adhere to the 800-foot rolling closure rule. The conceptual construction phasing can be found in **Appendix E**.

#### 1.7.2 Evaluation of Drainage Improvements

The existing Memorial Drive drainage system does not meet the minimum City's 2-year and 100-year drainage criteria. The flooding outside the roadway right-of-way puts the adjacent properties at risk of structural flooding, as already seen in the 2009 and 2015 rain events.

In considering the optimal drainage alternative for the project, one must also consider the effect any design decisions have upon the hydraulic impacts to the receiving systems; either in terms of increased flows downstream or increased Water Surface Elevations (WSEL's) upstream.

Two primary drivers were considered in the development of the proposed design. Firstly, it should meet or exceed, as best as is possible, the basic roadway drainage design criteria for the City of Houston. Secondly, there was a directive by TIRZ 17 to explore the possibility of maximizing storm water detention within the project limits.

Based on constructability, available ROW, conflicts with other utilities, future maintenance and overall project cost, it was determined that dual 10'x10' Reinforced Concrete Boxes (RCB's) were the largest practical sub-surface storm sewers that could be used.

There are additional goals of maximizing benefit to the adjacent community and to reduce overland flows to neighboring areas. Finally, improvements to Memorial Drive are recommended to be designed such as to accommodate future regional solutions to the challenging stormwater problems within the W151 and W153 watersheds

Considering all of the potential design constraints, five drainage improvement options were developed. Note that all of these options assume the basic 2–10'x10' RCB's are utilized as the largest practical sub-surface storm sewers that can be provided:

1. **Option I (Memorial Drive Improvements Only):** Maintain the existing roadway elevation and the existing single 9'x9' RCB of the enclosed W153. Improve roadway drainage and attempt to pick up as much off-site drainage as possible. Detain increased runoff in the 2-10x10 RCB's using restrictors and allow the relief realized at the enclosed W153 to improve the open section upstream.
2. **Option II (Add 9'x9' RCB):** Similar to Option I but attempt to meet roadway ponding depth criteria by upsizing the enclosed W153 to reduce upstream WSEL's.
3. **Option III (Raise Roadway Profile):** Similar to Option II but increase the Memorial Drive roadway elevation to meet roadway ponding depth criteria and maintain the existing W153 WSEL by conveying the flow that used to overtop Memorial by upsizing the enclosed W153.
4. **Option IV (Regional Detention):** Explore the possibility of adding sub-regional detention south of IH-10 that can reduce the peak flow in W153 and therefore reduce the depth of the flow overtopping Memorial.
5. **Option V (Regional Detention Add 9'x9' RCB):** Similar to Option IV but include additional conveyance under Memorial.

Option I is designed to meet the City's 2-year criteria and maximize the benefit of the drainage improvements while minimizing impacts to W153 and the adjacent properties. Installing dual 10-FTx10-FT RCB's under the roadway, and keeping the existing vertical profile of proposed Memorial Drive at or near the existing elevation proved to be the best option for the project. Restrictors are

proposed at the Beltway 8 outfall and the W153 outfall to maintain existing flow rates into these adjacent systems. The existing drainage patterns along Memorial Drive will not change. Storm water that currently flows west to the Beltway 8 drainage system will continue to do so. Storm water that currently flows east toward W153 will also continue to flow to W153. No additional storm water from the Beltway 8 system will be conveyed to W153. This option will also provide a 10-year level of protection. The amount of total storage provided is approximately 12+ ac-ft.

The storm sewer infrastructure proposed for Option I include the following:

1. Memorial Drive from Beltway 8 northbound Frontage Road to West Bough Lane: 1,285LF of 1-10'x10' RCB
2. Underneath West Bough Lane: 100 LF 48" RCP
3. Memorial Drive from West Bough Lane to Boheme Drive.: 543LF of 2-10'x10' RCB, 122LF of 4-24" RCP
4. Memorial Drive from Boheme Dr. to W153-00-00: 1,349LF of 2-10'x10' RCB
5. Memorial Drive from W153-00-00 to Tallowood Rd.: 480.5LF of 2-10'x10' RCB
6. 3 Large Junction Boxes.
7. 32 Type B-B, 2 Type AZ2G and 1 Type C inlets to capture the runoff and associated 24" leaders to convey flows to the trunkline.
8. Approximately 4 ditch tie-in pipes to accept runoff from roadside ditches

### 1.7.3 Evaluation of Public Utilities Improvements

#### 1.7.3.1 Water Lines

It is recommended that the existing 16-inch ductile iron water line water line not be replaced. However, it is recommended to replace the existing 12-inch AC water line, due to its age and pipe material. All existing water line crossings are also recommended to be replaced due to the existing pipe material, depth of cover and conflicts with other proposed improvements. New fire hydrants will also be added to comply with City of Houston fire hydrant spacing requirements. Trenchless construction methods are anticipated for the proposed improvements. See **Appendix B** for additional details on existing and proposed water lines.

### 1.7.3.2 Sanitary Sewer Lines

It is recommended that approximately 285 feet of the unreinforced concrete section of the existing 12-inch sanitary sewer line, located between Huntingwick Drive and Boheme Road, be replaced due to the age and the existing pipe material. It is also recommended that approximately 381 feet of 10-inch gravity sanitary sewer, located between Huntingwick Drive and Boheme Road be replaced due to the age and the existing pipe material. The 48-inch gravity sewer line located along the northern ROW of Memorial Drive from Boheme Drive to east of Tallowood Road is not recommended to be replaced at this time.

CCTV of all of the eight (8) lateral crossings depicted evidence of severe joint cracks, joint offsets, breaks in pipe and corrosive buildup. It is recommended that all eight sanitary sewer lateral lines be replaced due to their ages, varying from 30 to 60 years old, and condition of pipe.

There are three sanitary sewer force mains within the project limits. One 10-inch and one 6-inch ductile iron pipe force mains were installed in the 1984. One 6-inch cast iron pipe force main was installed in the 1970's. The 6-inch ductile iron force main will need to be relocated to accommodate the proposed drainage improvements. The 6-inch cast iron force is recommended to be replaced due to pipe material and age of line. Refer to **Appendix B** for additional details.

### 1.7.4 Evaluation of Landscaping Alternatives

High Level Amenities is proposed for the landscaping improvements to provide a pleasing aesthetic value to the area. The proposed improvements consist of the following:

- 10-foot multi use path and 6-foot wide sidewalks with decorative pavers alternating with broom finished concrete;
- Additional tree and shrub plantings;
- Enhanced Pedestrian lighting along entire project limits.

### 1.7.5 Street Lighting

Existing standard City street lights exist along Memorial Drive on both sides of ROW from Beltway 8 Frontage Road to Broken Bough Drive/West Bough Lane. Existing lighting also exists for the remainder of the project, however, streets lights are mounted on existing electric wood poles.

Proposed street lighting shall be provided in areas that do not meet current City street light spacing, during the detailed design phase along the proposed Memorial Drive.

### 1.7.6 Existing Tree Impacts

Approximately 293 existing trees are located within the construction area of the project. Approximately 75 trees will need to be removed for the proposed improvements. 31 of the 75 trees are protected by the City of Houston's Street Tree Ordinance for a total of 359 replacement inches. Landscaping plans and tree protection plans will be necessary in Phase II to comply with the City Tree Ordinance. For additional information, a detailed tree inventory was performed by C.N. Koehl Urban Forestry and can be found in **Appendix F**.

### 1.7.7 Geotechnical Study

Aviles Engineering Corporation (AEC) performed the geotechnical investigation for the project. Aviles drilled 9 soil borings at the project site, each 25-feet to 35-feet in depth. Groundwater was encountered at one bore location, at a depth of 23-feet. The existing pavement encountered was 1.5-inches to 4-inches of asphalt, on top of 8-inches to 14-inches of stabilized sand and crushed shell. The report recommends a rigid concrete pavement thickness of 11-inches with an 8-inch lime stabilized subgrade consisting of 7% lime by dry weight for Memorial Drive. The findings and recommendations are presented in the report entitled G178-14. A copy of this report can be found in **Appendix G**.

### 1.7.8 Environmental Site Assessment

A Phase I Environment Site Assessment (ESA) was conducted for the project area by Aviles Engineering Corporation (AEC). The findings are presented in the report entitled Phase I-Environmental Site Assessment TIRZ 17 Reconstruction of Memorial Drive between West Sam Houston Parkway and Tallowood Road. Seven (7) RECs were identified which warrant further investigation. See **Appendix H** for the full Phase I ESA report. A fault line was also found during the ESA I research but no evidence of a fault was found during AEC's site reconnaissance. It is recommended that a Phase II ESA be performed to further investigate the seven (7) REC's. A detailed fault study, by a qualified firm is also recommended for the project.

### 1.7.9 Agency Coordination

Contact with different entities will be required throughout the final design phase prior to the final design submittal. Coordination meetings will be scheduled with the City of Houston, City of Bunker



Hill Village, Harris County Toll Road Authority & TxDOT, Harris County Flood Control District, and METRO, as needed throughout the design phase to coordinate design. Upon 60% and 90% completion, drawings will be submitted to the City of Houston for review and approval. Early coordination with private utility entities will also be conducted in design.

The total preliminary estimated construction cost for Alternative I is \$17,391,000; including a 15% contingency. (These costs do not include any right-of-way acquisition or private utility relocation costs). The detailed preliminary estimated construction costs can be found in **Appendix A**.

### 1.8 Recommended Project

The recommended improvements include the following:

- A 4-lane two-way traffic concrete curb and gutter roadway divided by a 20-foot to 24-foot raised median with left turn bays and 11-foot lane widths.
- Median openings with left turn bays at all street intersections and key commercial/residential complex entrances.
- 6-foot wide concrete sidewalks along the northern ROW and a 10-foot wide concrete shared use path is proposed along the southern ROW.
- Dual 10'x10' RCB's
- 3 Large Junction Boxes.
- 32 Type B-B, 2 Type A and 1 Type C inlets
- 12-inch Water Line Replacement
- Installation of new Fire Hydrants
- Replacement of 6-inch through 12-inch gravity sanitary sewer lines
- Replacement of 6-inch sanitary sewer force main.
- Landscaping Amenities
- Proposed Standard City of Houston Street Lighting
- Approximately 359 inches of Tree Replacement

See **Appendix B** for Proposed Design Drawings.

### 1.9 Estimated Construction Cost



- Add Left-turn bays at median openings for safe queuing
- Upgrade traffic signals at BW 8 Frontage Road and West Bough Lane/Broken Bough Drive will to meet current City standards

### **2. Improve Drainage**

- Install oversized reinforced concrete box storm sewers to reduce overland flows to neighboring areas and reduce area flooding

### **3. Improve Quality of Life**

- Provide pedestrian-friendly environment by incorporating the following:
  - Continuous, wider sidewalks
  - Multi-use/shared-use paths
  - Landscaping/trees within median
  - Pedestrian lighting

## **2.0 Introduction**

### **2.1 Project Authorization**

Lockwood, Andrews & Newnam, Inc. (LAN) was retained by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to perform a Preliminary Engineering Study for Memorial Drive from Beltway 8 northbound Frontage Road and Tallowood Road. In addition to the general mobility improvement, a second primary objective is to address drainage issues along Memorial Drive and neighboring areas. Memorial Drive Drainage and Mobility Improvements project was identified in the City of Houston (City) approved TIRZ17 Project Plan and Capital Improvement Plan (CIP No. N- T17000-031B-7).

### **2.2 Statement of the Problem**

The primary purpose of the Memorial Drive Drainage and Mobility Improvements project is to improve safety and mobility, drainage and quality of life, within the project limits of Beltway 8 Frontage Road and Tallowood Road. The existing asphalt roadway is in fair to poor condition and has exceeded its service life. Furthermore, Memorial Drive, within the project limits, lacks proper access management and adequate pedestrian facilities. Memorial Drive, within our project limits, does not meet the City of Houston's 2-year and 100-year storm event criteria. Neighboring areas experience overland flows and localized flooding.

The PER is Phase I of the overall project development and will identify the impacts associated with the implementation of the Roadway, pedestrian, drainage and utility recommendations.

The project objectives of the Memorial Drive Improvement project are as follows:

#### **1. Improve Safety & Mobility**

- Upgrade roadway to a curb and gutter concrete section with raised medians to improve safety, mobility and access management along the project corridor.
- Reconstruct roadway to meet current roadway geometric requirements to improve safety

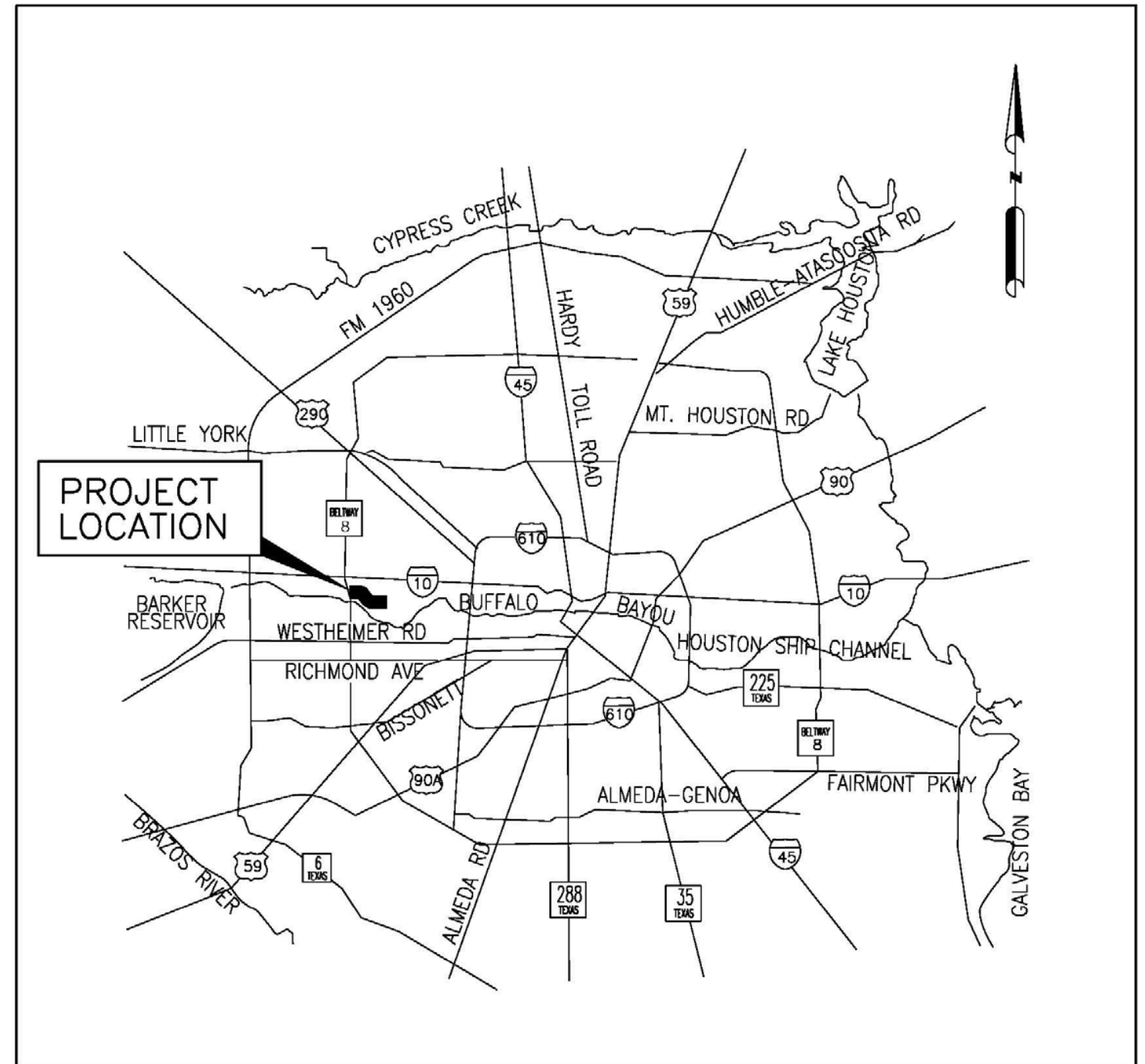
### 2.3 Project Location

The study limits include Memorial Drive from Beltway 8 northbound Frontage Road, east to Tallowood Road. The study limits are located in West Houston, Texas, approximately .75 miles south of the interchange of West Sam Houston Parkway (Beltway 8), and Interstate Highway 10 Katy at the southern limits of the TIRZ 17 boundary. The project is located within Council District G and Buffalo Bayou Watershed. The project location can be found on Key Map page 489G and 489H. See **Exhibit 2.1** Project Vicinity Map for more information.

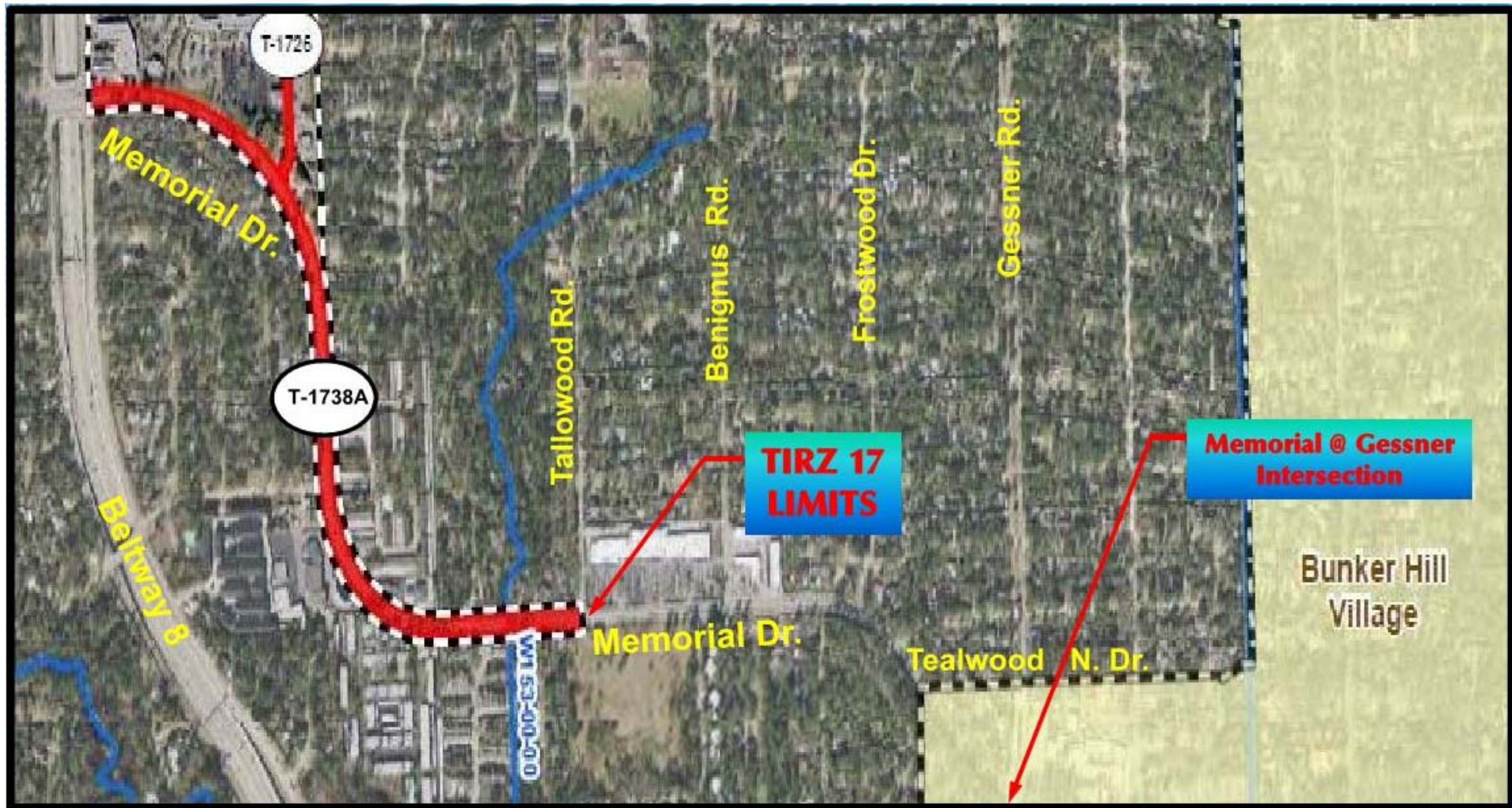
It is important to note the TIRZ 17 boundaries and the limits of the Memorial Drive improvements project. See **Exhibit 2.2** for TIRZ 17 Boundaries.

### EXHIBIT 2.1 Project Vicinity Map

EXHIBIT 2.2 TIRZ 17 Boundary Limits







2.4 Scope of Work

The project scope includes the following tasks: address the engineering components associated with roadway reconstruction, perform an initial existing conditions assessment (vehicular and pedestrian),



evaluate and develop recommended solutions for improving the roadway, drainage and utilities existing conditions along Memorial Drive from Beltway 8 northbound Frontage Road to Tallowood Road.

A summary of the major tasks performed for the study are listed below:

- Perform Site Visits & Data Collection
- Perform Topographic Survey
- Prepare a Geotechnical Study
- Prepare an Environmental Study
- Perform a Tree Inventory
- Investigation of Existing Public and Private Utilities
- Traffic Engineering and Planning
- Evaluation of Geometric Conditions
- Establish Roadway Baseline/Project Control
- Develop Existing and Proposed Roadway Sections
- Perform Project Drainage Analysis
- Develop 30% Plan and Profile Sheets
- Roadway Impact Assessment and Develop Right-of-Way Exhibits
- Develop Conceptual Traffic Control Plan
- Prepare Cost Estimates

Upon completion of this PER Study, and approval of the recommended project by both the City of Houston and TIRZ 17, the Phase II detail design project development may commence. Phase II of the project will provide engineering services required to provide the necessary construction documents for the approved improvements of Memorial Drive from Beltway 8 northbound Frontage Road to Tallowood Road, based on recommendations in the PER. The scope of services for the Phase II detailed design includes the following tasks:

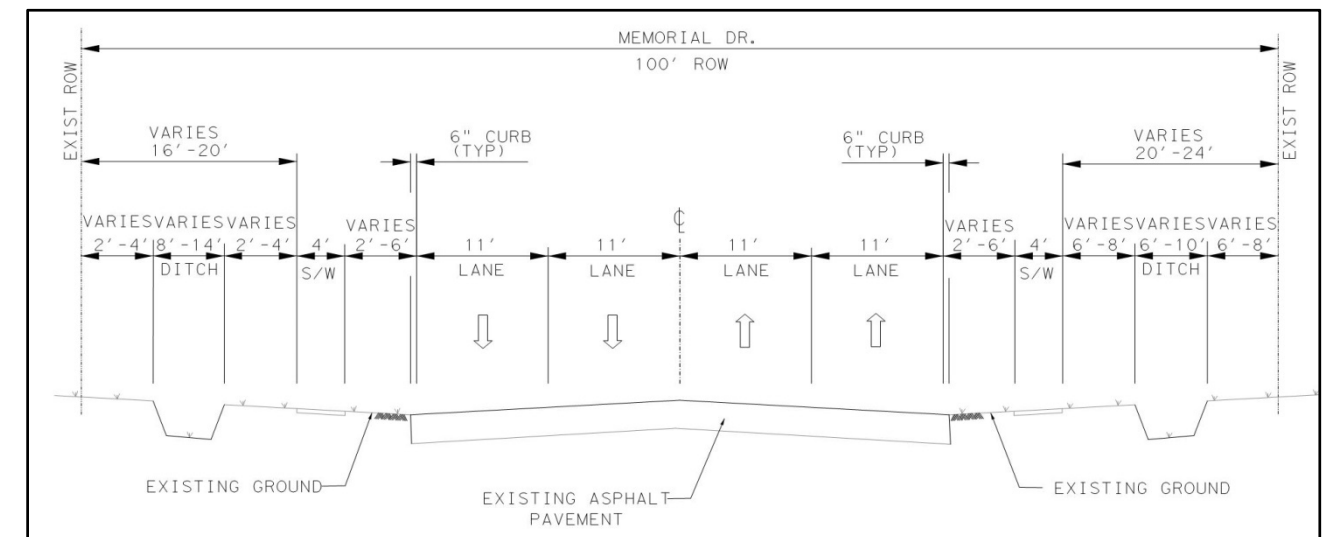
- Prepare plans, specifications and estimates construction documents
- Obtain approval from government agencies
- Coordinate with public and private utility owners
- Provide cost estimates

- Assist the Memorial City Redevelopment Authority (MCRA) in the bidding process

## 2.5 Existing Conditions

### 2.5.1 Roadway

Memorial Drive between Beltway 8 northbound Frontage Road and Tallowood Road is an existing undivided 44-foot wide asphalt roadway section with two 11-foot lanes in each direction and a combination of open ditch and curb and gutter sections. There are discontinuous 4-wide concrete sidewalks along both sides of Memorial Drive. The roadway is primarily centered within an existing 100-foot right of way. Memorial Drive is located approximately 3/4 of a mile south of the Sam Houston Tollway and IH-10 intersection, within the southern-most TIRZ 17 boundary. Memorial Drive traverses primarily east-west and is classified as a major thoroughfare by the City. The posted speed limit along Memorial Drive is 35 mph. There are two significant alignment curves along Memorial Drive. Approximately 200-feet east of the Beltway 8 intersection the roadway curves to the southeast along an 1146-foot radius curve. Memorial Drive then runs north-south for approximately 650-feet then curves east along a 674-foot radius. See **Figure 2.1 – Existing Memorial Drive Typical Section** for additional information.



**Figure 2.1 – Memorial Drive Existing Typical Section**

Constructed in the early-1970's, the existing asphalt pavement ranges in thickness from 4.5 to 12-inches of asphaltic stabilized on top of 6 to 8-inches of stabilized sand and crushed shell. Per the City GIMS data, the Pavement Condition Ratings (PCR) ranges from approximately 65 to 78.

However during the site visits there was evidence of significant cracking of the 1-inch to 4-inch asphalt overlay along the entire alignment. Also, the pavement has exceeded the typical useful service life of 20-years. Four-foot wide, discontinuous sidewalks exist along Memorial Drive within the project limits.

Memorial Drive serves an average of approximately 16,230 vehicles per day per City Geographic Information System (GIMS).



**Exhibit 2.3 Memorial Drive North of Huntingwick (Looking Northwest)**

### 2.5.2 Land Use

Adjacent land use includes retail, commercial businesses, single-family and residential apartments. Major commercial businesses surround Memorial Drive from Beltway 8 Frontage Road to West Bough Lane including: Randall's grocery store, Walgreens, Chase Bank and several clothing retailers stores and dining places on the northern ROW between Beltway 8 Frontage Road and West Bough Lane. Although Memorial Drive is centered within a 100-foot wide ROW, there is evidence of commercial and residential ROW encroachment that has occurred over the years due to the large amount of available real estate between the existing edge of pavement and ROW.

### 2.5.3 Drainage

The Memorial Drive System is primarily part of the W153-00-00 watershed and is generally drained by storm sewers and road side ditches extending along the project alignment draining to W153-00-00. The western limits of the project from Broken Bough Lane/West Bough Lane to Beltway 8 drain to the Beltway 8 storm sewer trunkline before continuing downstream to Buffalo Bayou. The project area was documented as having significant drainage deficiencies in the TIRZ 17 Regional Drainage Study (RDS) with reported flooding during the April 2009 and the more recent May 2015 rain event.

The existing Memorial Drive system does not meet the City's 2-year or 100-year capacity criteria. The HGL of the storm sewer system does not get above inlet/EOP elevations within the Memorial Drive ROW, however, the lateral systems on West Bough and in commercial areas north of Memorial Drive cannot drain effectively causing overland flow to enter the Memorial Drive ROW. Due to the fact that Memorial Drive generally slopes away from the Beltway to W153, the excess flow in the system west of West Bough flows in a southeasterly direction towards W153. The 100-year WSEL gets above inlet/EOP elevation for the entire length of Memorial Drive between West Bough and W153. This flooding is partially due to the limited capacity of the Memorial Drive drainage infrastructure and partially due to overflow from W153 itself. The flooding outside the roadway ROW and overland flows puts the adjacent properties at risk of structural flooding.

### 2.5.4 Existing Water Lines

There are two water lines within the project limits. An existing 12-inch AC water line that runs west to east is located along the southern ROW of Memorial Drive, from Beltway 8 northbound Frontage Road and was placed in service in 1976, approximately 40 years ago. The existing 12-inch water line connects to an existing 16-inch water line which continues east along the project limits. The existing 16-inch ductile iron water line located along the southern ROW of Memorial Drive was placed in service in 1995, approximately 20 years ago. Fire hydrants also exist along the alignment.

### 2.5.5 Existing Sanitary Sewer Lines

Several different diameter sizes for existing sanitary sewers lines located within the project limits. A 15-inch in diameter gravity sanitary sewer line is located along back-lot easements south of Memorial Drive from Beltway 8 northbound Frontage Road to Boheme Drive. The existing 15-inch gravity sewer line was slipped line in 1995 using polyethylene pipe. A 10 & 12-inch gravity sewer



lines are located along Memorial Drive northern ROW from Huntingwick Drive to Boheme Drive and from 150-feet south of Old Oaks Drive to Boheme Drive. Half of the 12-inch gravity sanitary sewer is made of polyethylene pipe due to the rehabilitation in 1999; however the other half is made of unreinforced concrete and was placed in service in 1960. The 10-inch gravity sanitary sewer is made of extra strength concrete and was placed in service in 1966, nearly 40 years ago. CCTV data was not available on this line and service connections are unknown.

A 48-inch gravity sewer line is located along Memorial Drive northern ROW from Boheme Drive to east of Tallowood Road. The 48-inch gravity sanitary sewer is made of plastic-lined pipe in some sections while other sections are made of concrete. The entire line was placed in service in 1997 and multiple service connections are present throughout the line.

There are three sanitary sewer force mains within the project limits. One 10-inch and one 6-inch ductile iron pipe force mains were installed in the 1984. One 6-inch cast iron pipe force main was installed in the 1970's. Refer to **Appendix B** for additional details and 30% plan and profile sheets.

**2.5.6 Existing Private Utilities**

A number of private utility companies were contacted to identify what utilities exist within the project limits. See **Table 2.1** for all private utility companies that were contacted.

**Table 2.1 - Existing Private Utility Contacts**

AT&T	Logix Communications LP
CenterPoint Energy Gas & Electric	Netco Pipeline
Comcast	Phonoscope
Extenet Systems	TW Telecom
Level 3 Communications	Verizon Business

CenterPoint Energy (CPE) Electric/Gas and Southwestern Bell Company SBC, (also known as AT&T) have existing private utilities located within the project right-of-way. Utility information was requested and obtained from both companies. CPE has underground gas lines, overhead electric lines and underground conduits extending within the project's right-of-way. AT&T facilities include both underground cables, fiber optic cables, and duct banks. Texas One Call should be contacted at least 48 hours prior to excavation to locate all underground utilities. See **Table 2.2** –Existing Private Utilities for additional information.

**Table 2.2 - Existing Private Utilities for Memorial Drive**

Owner	Type	Approximate Location	From	To
CPE	Underground Electric	North/South Side	Beltway 8 Frontage Rd	W. Bough/Broken Bough Lanes
CPE	2" Gas Line	South Side	W. Bough/Broken Bough Lanes	200-ft South
CPE	2" Gas Line	South Side	Boheme Drive	100-ft North of Rip Van Winkle
CPE	4" Gas Line	South/West Side & East bound lanes	200-ft north of Old Oaks Road	Tallowood Road
CPE	4" Gas Line	South/West Side & West bound lanes	Boheme Drive	Rip Van Winkle
AT&T	2-4" G.I.P Conduits	South Side	Beltway 8 Frontage Rd	100-ft west
AT&T	2-4" G.I.P Conduits	South/East Side	Boheme Drive	80-ft North
AT&T	4-4" G.I.P Conduits	South Side	Beltway 8 Frontage Rd	100-ft west
AT&T	4-4" G.I.P Conduits & Fiber Optic	South Side	W. Bough/Broken Bough Lanes	350-ft East
AT&T	14/12/10/8-4" Conduits	South Side	W. Bough/Broken Bough Lanes	Tallowood Road
AT&T	Buried Cable	South Side & Southbound Lanes	W. Bough/Broken Bough Lanes	Tallowood Road

**2.5.6.1 Existing CenterPoint Energy Gas Facilities**

At approximately 200 feet north of Old Oaks Drive, a 4-inch CenterPoint Energy (CPE) gas line runs parallel to Memorial Drive, the gas line continues to east of Tallowood Road. The 4-inch gas line is under existing and proposed pavement from Huntingwick Drive to Rip Van Winkle Drive. An existing 4-inch CPE gas line connects to the 4-inch gas line in the middle of the roadway at Rip Van Winkle Drive and continues along Memorial Drive southern/western ROW to Boheme Drive. At the northeast corner of Hollow Drive and Memorial Drive, a 2-inch & 4/3-inch CPE

gas line connects to the 4-inch, the 2-inch gas line continues north along Hollow Drive and the 4/3-inch continues south along easements. A 4-inch gas line connects to the 4-inch gas line at Legend Lane and continues south along Legend Lane. A 4-inch CPE gas line exist perpendicular to Memorial Drive at Beltway 8 Frontage Road. A 2-inch CPE gas line exist perpendicular to Memorial Drive at West Bough Lane/Broken Bough lane and continues southeast along Memorial Drive for approximately 125-feet, then continues northwest along Broken Bough Lane. An existing 2-inch CPE gas line exists along Memorial Drive western ROW at Boheme Drive and continues south along Memorial Drive for approximately 300 feet.

#### **2.5.6.2 Existing CenterPoint Energy Electric Facilities and Lighting**

Overhead electrical power lines exist along Memorial Drive. Limited lighting exists on the south side within the same street limits. Existing lighting mounted on utility wood poles primarily exist along the south/east of Memorial Drive, from Broken Bough Drive/West Bough Lane to Tallowood Road. The City's spacing requirements for street lighting is from 150-feet to 200-feet. The existing lighting spacing generally does not meet this standard. There are existing underground CPE electrical street lighting lines to support the existing street lighting.

#### **2.5.6.3 Existing ATT Facilities**

AT&T has 4-4 inch G.I.P conduits and 2-4 inch conduits crossing perpendicular to Memorial Drive at Beltway 8 Frontage Road and continues east for approximately 300 feet connecting to an existing manhole. The AT&T lines continue west of Memorial from the manhole. An existing AT&T manhole exists at the south west corner of Memorial Drive and Broken Bough lane with several AT&T conduits connecting at this location; existing 4-4 inch PVC conduits and fiber optics continue west along Memorial Drive for approximately 180 feet, existing 2-4 inch PVC and 4-4 inch PVC conduits & fiber optic crossing north along West Bough lane, and existing 8-4 inch conduits running south along Memorial Drive southern/western ROW. AT&T's existing 8-4 inch conduits continue south/east along Memorial Drive to a manhole approximately 100 feet north of Boheme Drive. At this manhole the three different conduits branch out; 2-4 inch G.I.P conduits crosses Memorial Drive and continues east, 2-4 inch PVC conduit continues south and then west along Boheme Drive and 10-4 inch PVC conduits continue south along Memorial Drive southern/western ROW. The existing 10-4 inch PVC conduits continue to approximately 780 feet where conduits increase to a 12-4 inch PVC conduit. Two 2-4 inch G.I.P conduits branch out of the 10-4 inch conduits. The 12-4 inch conduit continue south along Memorial Drive for

approximately 120 feet which two sets of 2-4" G.I.P conduits branch out and reduce the 12-4 inch conduits to 8-4" conduits. The 8-4" conduits continue east along Memorial Drive for approximately 600 feet and the conduits increase to 14-4 inch conduits. The 14-4 inch conduits continue east for approximately 200 feet and reduced to 8-4 inch conduits by two sets of 2-4 G.I.P conduits branching out. The 8-4 inch conduits continue passed Tallowood Drive.

#### **2.6 Existing Tree Impacts**

Approximately 293 existing trees are located within the construction area of the project. 75 trees will be impacted by the proposed improvements resulting in 393 inches to be replaced along the project. For additional information, a detailed tree inventory was performed by C.N. Koehl Urban Forestry and can be found in **Appendix F**. Tree protection plans will be required during the Phase II detailed design.

#### **2.7 Geotechnical Study**

Aviles Engineering Corporation performed the geotechnical investigation for the project. Aviles drilled 9 soil borings at the project site, each 25-feet to 35-feet in depth. Groundwater was encountered at a depth of 27-feet. Groundwater was encountered at one bore location, at a depth of 23-feet. The existing pavement encountered was 1.5-inches to 4-inches of asphalt, on top of 8-inches to 14-inches of stabilized sand and crushed shell. The report recommends a rigid concrete pavement thickness of 11-inches with an 8-inch lime stabilized subgrade consisting of 7% lime by dry weight for Memorial Drive. The findings and recommendations are presented in the report entitled G178-14. A copy of this report can be found in **Appendix G**.

#### **2.8 Environmental Site Assessment**

A Phase I Environment Site Assessment (ESA) was conducted for the project area by Aviles Engineering Corporation (AEC). The findings are presented in the report entitled Phase I-Environmental Site Assessment TIRZ 17 Reconstruction of Memorial Drive between West Sam Houston Parkway and Tallowood Road. Seven (7) RECs were identified which warrant further investigation. See **Appendix H** for the full Phase I ESA report. A fault line was found during the ESA I research but no evidence of a fault was found during AEC's sire reconnaissance. Based on ASTM E 1527-05 criteria, Phase II sampling is recommended to quantify possible contamination for the seven (7) REC's in the vicinity of the subject alignment, along with a fault study by a qualified firm.

#### **2.9 Agency Coordination**



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Contact with different entities will be required throughout the final design phase prior to the final design submittal. Coordination meetings will be scheduled with the City of Houston, METRO, City of Bunker Hill Village, Harris County Toll Road Authority, TXDOT, and Harris County Flood Control District as needed to coordinate design. Upon 60% and 90% completion, drawings will be submitted to the City of Houston for review and approval. Early coordination with private utility entities will also be conducted in design.

### 3.0 Roadway Assessment and Recommendations

#### 3.1 Design Criteria

The following publications were referenced for determining key design criteria in developing improvement alternatives for Memorial Drive from Beltway 8 frontage road to Tallowood Drive:

- City of Houston Department of Public Works and Engineering Infrastructure Design Manual, July 2015.
- City of Houston Department of Public Works and Engineering Standard Construction Details for Wastewater Collections Systems, Water Lines, Storm Drainage and Street Paving.
- City of Houston Department of Public Works and Engineering Standard Construction Specifications for Wastewater Collections Systems, Water Lines, Storm Drainage, Street Paving and Traffic, dated 2014.
- American Association of State Highway and Transportation Officials (AASHTO): AASHTO Guide for Design of Pavement Structures.
- American Association of State Highway and Transportation Officials (AASHTO): A Policy on Geometric Design of Highways and Streets, 2011 (Green Book).
- Texas Manual on Uniform Traffic Control Devices, 2011.
- U.S. Department of Transportation Federal Highway Administration: *Roundabouts: An Informational Guide*, June 2000.

The geometric design criteria was established based upon the City Infrastructure Design Manual. The following is a summary of the geometric design parameters that will be incorporated in this project:

- Design Speed – 35 mph
- Vertical curves will be introduced when the algebraic difference in grades exceeds 1 percent
- Crest and sag vertical curves will be designed according to the guidelines in A Policy on Geometric Design of Highways and Streets by AASHTO
- Minimum grade along the outside gutter will be 0.30 percent.
- Minimum gradient around intersection turnouts will be 1 percent.
- Pavement headers will be used at the end of all concrete pavements.
- Horizontal dowel bars shall be used when meeting existing concrete pavement that has no exposed steel.

- Minimum cross slope of pavement will be ¼ inch per foot.
- Sidewalks will conform to the latest requirements of the American with Disabilities Act.
- Expansion joints will be placed at a maximum of 80 feet.
- Construction joints will be used when pavement is wider than 24 feet in accordance with City requirements.

#### 3.2 Potential Improvement and Recommended Alternatives

Initial evaluations involved several alignment alternatives that included three different roadway cross sections options. Each Alternative includes the same cross section behind the curb, but with varying sized medians for each alternative.

Typical behind the curb amenities included:

- 10-foot wide concrete shared use path, five feet from the curb, along the south side of Memorial Drive
- 6-foot wide concrete sidewalk, four feet from the curb, along the north side of Memorial Drive
- ADA compliant wheel chair ramps.

The following describes each alternative that was evaluated in this report

##### Alternative I:

Alternative I, the recommended alternative, proposes a 4-lane two-way traffic concrete curb and gutter roadway divided by a 20-foot to 24-foot raised median with left turn bays at all median openings and 11-foot wide travel lanes. Access management, field reconnaissance, the latest City of Houston Infrastructure Design Manual (COH IDM) and comments from the public meeting were used to determine the optimal median openings locations. All median openings will have a minimum 100-foot long left turn bays, to create a safe queue location for left turn vehicles while not impacting the two through lanes. The pavement will be 11-inches thick Portland cement, per the City IDM. Standard 6-foot wide concrete sidewalks are proposed along the northern ROW and a 10-foot wide concrete shared use path is proposed along the southern ROW. This shared use path will connect to the future 8-foot wide path project currently being proposed by TxDOT, from the Hershey Park Parking lot to Memorial Drive. To minimize major impacts to commercial and residential properties encroaching into City ROW, The proposed

median opening width varies from 20-feet to 24-feet. Narrower median widths were analyzed, but dismissed due to the following safety issues:

- Passenger cars having difficulty making u-turns in a single maneuver. This will lead to vehicles stopping and having to reverse in the active travel lane to complete the u-turn movement.
- Passenger cars waiting in the median opening will protrude in to the adjacent lane. (typical passenger car length is 19-feet, while pickup trucks tend to be longer). Refer to **Exhibit 3.1** for Typical Section.

#### **Alternative II:**

Alternative II is very similar to Alternative I. The only difference is the median width. Alternative II proposes a 4-lane two-way traffic concrete curb and gutter roadway divided by a 30-foot raised median with left turn bays at all median openings and 11-foot wide travel lanes. As discussed previously, over the years, property owners have encroached into the City's 100 foot ROW, by means of extended parking lots and/or decorative fencing. The larger median extends the proposed curb, sidewalk and shared use path out closer to the ROW, negatively impacting some of the property owners. Refer to **Exhibit 3.2** for Typical Section

#### **Alternative III:**

Alternative III proposes a 4-lane two-way traffic concrete curb and gutter sections with a 14-foot wide continuous center two-way left turn lane. There are numerous commercial and residential driveways, closely spaced, along the project. Due to the number of conflicting turning movements along the project, a continuous two-way left turn lane alternative is not a safe alternative. Additionally, Alternative III does not satisfy the quality of life objective. See **Exhibit 3.3** for more details.

### **3.3 Driveways and Pedestrian Facilities**

Driveways along the project alignment will be removed and replaced with standard City driveways. At some locations, the existing driveways must be replaced passed the right-of-way limits to provide a smooth transition and mitigate drainage impacts resulting from the change in grade. The final location of the driveways will be determined during detail design.

Pedestrian facilities will be added to meet ADA requirements along the entire project limits. The sidewalks will be 6-foot in width on the north/east sides and the shared path will be 10-foot in width along the south/west side, located a minimum of 4-feet behind the curb.

### **3.4 Right-of-Way Requirements**

No additional right-of-way will be required in any of the roadway alternatives. However two corner clips will be required to accommodate proposed turning radii, continuous sidewalks, and traffic signal equipment. A 25-foot x 25-foot corner clip is required at the northeast corner of Memorial Drive at northbound beltway 8 frontage road. A 20-foot x 20-foot corner clip is required at the northwest corner of Memorial Drive at West Bough Lane. Refer to **Appendix E** for ROW acquisition details.

### **3.5 Traffic Control Plan and Construction Sequencing**

The traffic control plan and construction sequencing for the recommended Alternate I will require two phases during construction to reduce impacts to adjacent properties and minimize construction time. The conceptual construction phasing plan can be found in **Appendix E**. Phase I will include the construction of the storm sewer, along the south side of Memorial Drive. There will be one 10-foot lane in each direction with a continuous two way left turn lane so that access to commercial and residential properties are maintained. This will require approximately 10-feet of temporary asphalt to be installed along the northern side of Memorial Drive.

Phase II will include the construction northern side of Memorial Drive including service connections. To maintain the same 3 lane configuration as Phase I, the proposed median curbs cannot be constructed until Phase II is completed, at which time one lane in each direction can be maintained on the newly constructed pavement. According to City's rolling closure rule, the contractor's work zone cannot exceed more than 800 feet at one time.

During detailed design, METRO will be contacted to coordinate the traffic control phases with their bus routes/bus stops.

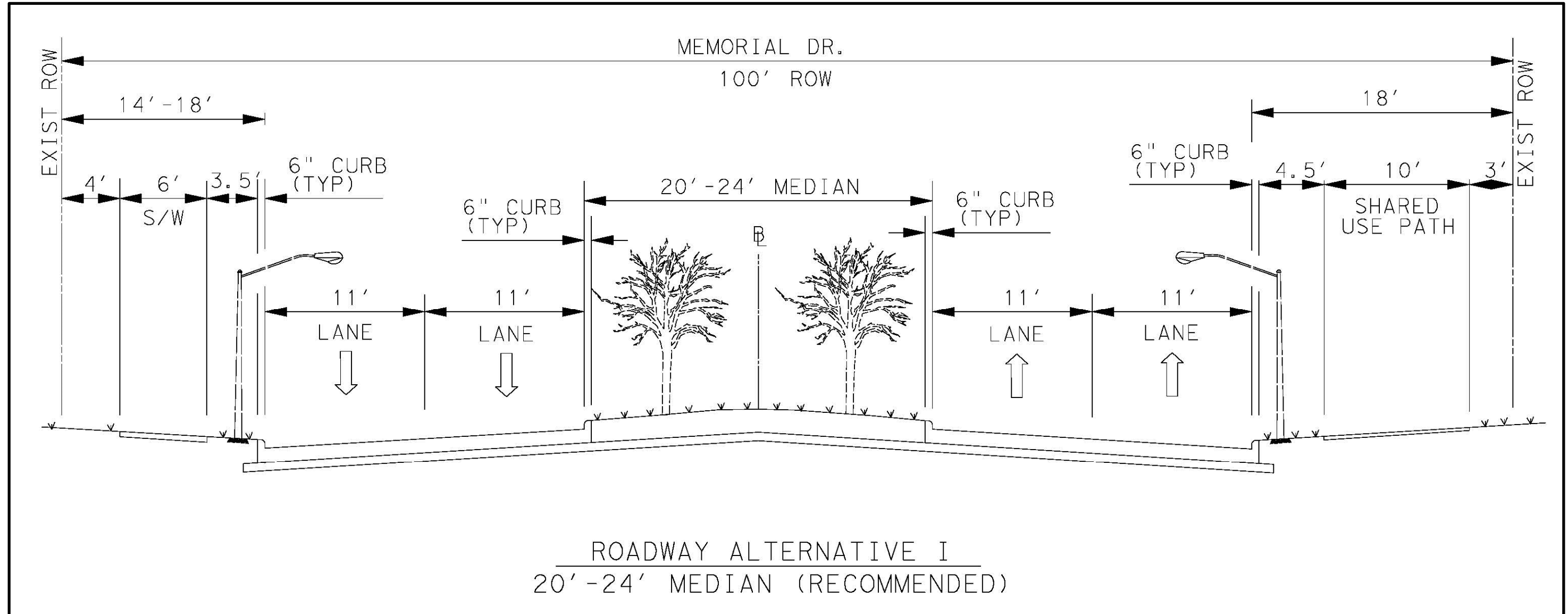


Exhibit 3.1 Alternative I Typical Section

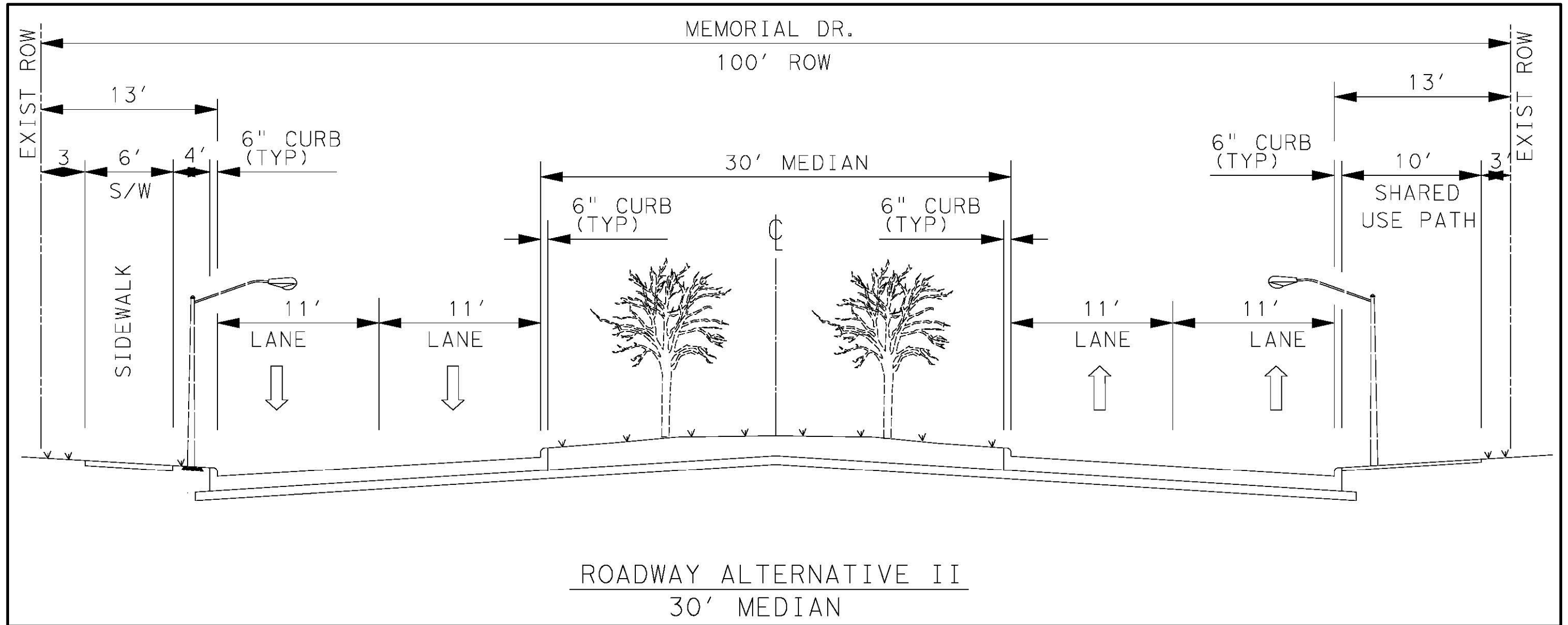
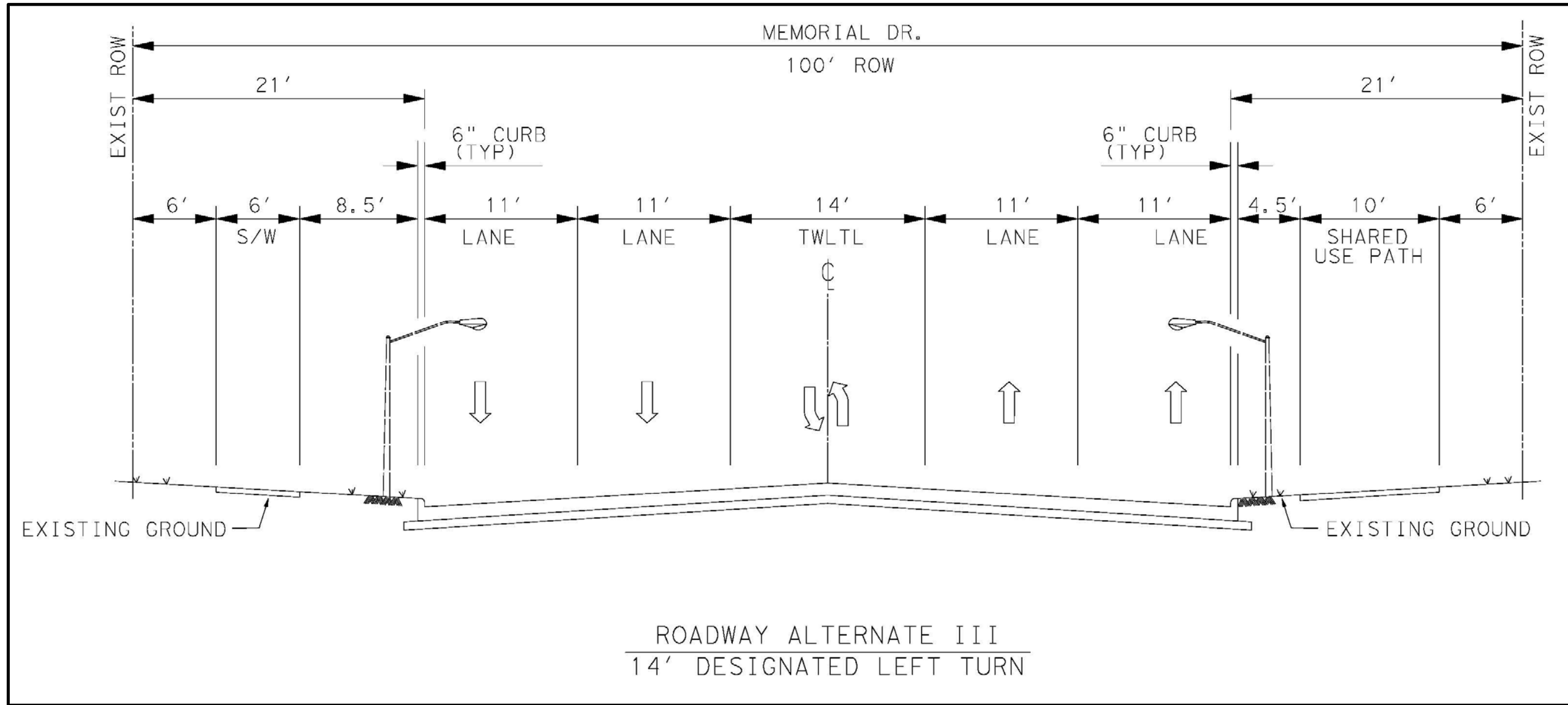


Exhibit 3.2 Alternative II Typical Section



Exhibit

3.3 Alternative III Typical Section



### 3.6 Landscaping Alternative

Three alternatives for landscaping improvements were considered. The three levels of proposed improvements are as follows:

#### Level 1 – (High Level of Amenities)

- 6-foot wide sidewalks with decorative pavers alternating with broom finished concrete;
- 10-foot wide shared use path with broom finished concrete,
- Additional tree and shrub plantings;
- Enhanced Pedestrian lighting along entire project limits.

#### Level 2 – (Medium Level of Amenities)

- 6-foot wide sidewalks with decorative pavers alternating with broom finished concrete;
- Limited tree or shrub plantings
- No pedestrian lighting

#### Level 3 – (Low Level of Amenities, Minimum City Standard)

- City standard 5-foot wide broom finished concrete sidewalks
- No additional tree or shrub plantings
- No pedestrian lighting

To satisfy the quality of life objective, Level 1 – High Level Landscaping Amenities are recommended along Memorial Drive. This will provide a pleasing aesthetic value to the area.

### 3.7 Street Lighting

Existing standard City of Houston street lights exist along Memorial Drive. Proposed street lighting will be included during the detailed design phase along Memorial Drive from Beltway 8 Frontage Road to Tallowood Road.

### 3.8 Recommended Roadway Improvements

Roadway recommendations are based on Roadway geometrics, pedestrian facilities and recommendations from the drainage and traffic portions of this report. The impacts to right-of-way, trees, and underground utilities have also been considered. Alternative I, is the most reasonable and feasible alternative. It will provide improved mobility, safety and efficiency along the project alignment.

The recommended 6-foot wide sidewalks and 10-foot wide shared path will further satisfy the quality of life objective. Alternative I also coincides with the comments and concerns expressed by the public in the April 2015 Public Town Hall Meeting. Refer to **Appendix B** for 30% Plan and Profile sheets depicting Alternative I.

## 4.0 Traffic Analysis and Recommendations

### 4.1 Background

This study analyzes the proposed improvements for Memorial Drive between the Beltway 8 Southbound (SB) frontage road and Tallowood Road. Proposed improvements along Memorial Drive include:

- Adding a 20ft-24ft median in the center of Memorial Drive
- Installing left turn bays with a minimum of 100 feet of storage capacity at most median openings
- Improving turn-radii at driveways and intersections
- Reconstructing traffic signals at Beltway 8 frontage roads and West Bough Lane
- Upgrading pedestrian ramps to meet Americans with Disabilities Act (ADA) requirements

### 4.2 Field Investigation and Data Collection

LAN collected data with respect to intersection geometry, striping, signage, land use, access management, and traffic control features during a field visit on February 5, 2015. Twenty-four-hour traffic volumes and turning movement counts (TMCs) were collected from January 13-21, 2015.

#### 4.2.1 Existing Roadway Geometry

Memorial Drive is a four-lane undivided road with a posted speed of 35 mph and is designated as a four-lane major thoroughfare in the 2013 City of Houston (COH) Major Thoroughfare and Freeway Plan (MFTP).

overpass separate the U-turn only lanes from Memorial Drive traffic. Nearby mainline access from the Beltway 8 frontage roads is located approximately 800 feet south of Memorial Drive.

**Table 4.1: Existing Roadway Geometry for Memorial Drive Cross-Streets**

Cross-Street	Lanes	Intersection Type	Posted Speed Limit
Beltway 8 FR (SB)	3	4-leg	40 mph
Beltway 8 FR (NB)	3	4-leg	40 mph
West Bough Lane	2	4-leg	Not posted
Old Oaks Drive*	2	T-intersection	Not posted
Huntingwick Drive*	2	T-intersection	Not posted
Boheme Drive*	2	T-intersection	30 mph
Memorial Bend*	2	T-intersection	Not posted
Hollow Drive*	2	T-intersection	Not posted
Somerset Place*	2	T-intersection	Not posted
Legend Lane*	2	T-intersection	Not posted
Tallowood Road*	2	T-intersection	Not posted

\* Unsignalized intersection

provides the existing roadway geometry for Memorial Drive cross-streets and driveways. A summary of lane configuration and turning movements by approach along Memorial Drive is shown in **Appendix D**

No designated on-street parking areas were observed along any portion of Memorial Drive. Pedestrian and bicycle facilities are limited to the discontinuous, inadequate sidewalks in both directions from the Beltway 8 to Tallowood Road. Bicycle traffic in the street shares the lane with vehicular traffic due to the absence of bicycle lanes.

The Beltway 8 northbound and southbound frontage roads run parallel to the Sam Houston Tollway mainlanes. Both of the Beltway 8 frontage roads are three lanes with a posted speed of 40 mph. These frontage roads intersect Memorial Drive and are separated by a 200-ft at grade overpass over the Sam Houston Tollway mainlanes. Medians on each side of the



#### 4.2.2 Existing Adjacent Land Use and Accessibility

Adjacent land use includes Town & Country Village, an upscale retail plaza located north of Memorial Drive between Beltway 8 and Broken Bough Drive/West Bough Lane. Major attractors in the plaza include Randall's, upscale restaurants, and Barnes & Noble. Shared retail and dining buildings extend from Memorial Drive to as far north as City Centre. Primary access to Town & Country Village is off Memorial Drive to the south, Beltway 8 to the west, Kimberley Lane to the north, and Broken Bough Drive/West Bough Lane to the east. Primary truck access to the loading docks north of Randall's is off of West Bough Lane.

Many drivers continue along the Beltway 8 northbound frontage road to access City Centre or IH-10, each of which is located approximately half a mile north of Memorial Drive. Bendwood Park and Wildcat Way School are located on Kimberley Lane, north of Memorial Drive, and can be accessed from Memorial Drive via West Bough Lane. Bendwood Park contains playgrounds, basketball courts, a soccer field, picnic areas, and two tennis courts.

Boheme Drive serves as a cut-through street for vehicles to access the Beltway 8 frontage roads. A small shopping and dining plaza is located on the south side of Boheme Drive, while local streets leading to residences are located on the north side of Boheme Drive. Both Hollow Drive and Frostwood Drive are two-lane local streets that serve residential areas. Single-family homes are located to the northeast and south of the area, with townhouses to the west of Boheme Drive.

Three major traffic generators are located about one mile north of the intersection of Memorial Drive and Gessner Road: Memorial City Mall, Memorial Hermann Medical Center, and IH-10. The intersection experiences lengthy vehicular queues heading southbound during the A.M. peak hour and northbound during the P.M. peak hour.

#### 4.2.3 Existing Traffic Signals

There are two existing signalized intersections with Memorial Drive in the study area:

1. Beltway 8 FR (southbound) and Beltway 8 FR (northbound)
2. Broken Bough Drive//West Bough Lane

The intersection of Memorial Drive with the Beltway 8 frontage roads are controlled by one controller located in the southwest corner of Beltway 8 SB frontage road and Memorial Drive and uses VIVDS for vehicle detection for all approaches. Field observations confirmed three-phase signal timing with a 120-second cycle length, as signal timing plans were not available from TranStar.

Traffic signal timings were provided by Houston TranStar for Broken Bough/West Bough Lane and Memorial Drive. No offset is used for the intersection with a 120-second cycle length, and a video image vehicle detection system (VIVDS) is used for vehicle detection on all approaches. Left turns both northbound and southbound from Broken Bough Drive/West Bough Lane were permitted, while left turns on Memorial Drive eastbound and westbound were protected.

Existing traffic signal layouts can be found in **Appendix D**. Vegetation on the northwest corner of the intersection of Memorial Drive at the southbound Beltway 8 frontage road provides a visibility issue for pedestrians looking to cross the street at that corner. Additionally, an existing conduit is exposed atop the median separating the northbound U-turn lane and eastbound Memorial Drive through lanes, as seen in **Figure 4.1**.



Figure 4.1: Above-ground Conduit on Memorial Drive Overpass

#### 4.2.4 Existing Traffic Volumes

24-hour tube counts and turning movement counts (TMCs) were collected for this study from on weekdays from Tuesday, January 13, 2015 and Wednesday, January 21, 2015. Data from the 24-hour counts turning movement count data is provided in **Appendix D**. TMCs were used to determine the weekday A.M. and P.M. peak hour periods, which were 7:30 A.M. – 8:30 A.M and 5:00 P.M. – 6:00 P.M, respectively. Turning movement counts for the AM and PM peak are depicted in **Appendix D**.

#### 4.2.2 Existing Pedestrian Volumes

Pedestrian volumes were collected as part of the TMCs recorded between January 13, 2015 and January 21, 2015 and can be found in **Appendix D**. At the Beltway 8 frontage roads, Broken Bough Drive/West Bough Lane, and Boheme Dive intersections, there was very little pedestrian activity. At each of these intersections, a maximum of 4 pedestrians were recorded

at each intersection during the AM and PM peak periods. At Hollow Drive intersection 5 pedestrians were recorded in the AM peak period and 9 pedestrians in the PM peak period.

#### 4.2.3 Existing Transit Service

METRO’s new Reimagine Houston transit service plan was launched in August 2015. Transit service routes 161(Wilcrest Express) and 162 (Memorial Express) travel within the study area limits and make several stops along the corridor. There are seven bus stops heading westbound on Memorial Drive and six bus stops heading eastbound on Memorial Drive. There are no existing bus shelters along Memorial Drive within the project limits. METRO will be contacted during the final design stage to coordinate new bus stop locations and routes in accordance with changes in roadway geometry on Memorial Drive.

#### 4.3 Methodology

Methodology used for this traffic study is as follows:

- Site investigation and observation
- Collecting Average Daily Trips (ADTs) and TMCs at the study intersections
- Analyze existing and future conditions for access management and Level-of-Service (LOS)
- Mitigate substandard conditions
- Document analysis and findings and provide recommendations

#### 4.4 Existing Condition Assessment

Existing condition assessment for intersection delays, crash analysis, and access management is presented in this section of the report. Highway Capacity Manual (HCM) Intersection Control Delays and HCM Intersection Level-of-Service (LOS) were determined for all intersections within the study area. Crash analysis and access management techniques were evaluated at locations with relatively high crash incidents.

##### 4.4.1 Intersection Delays

Traffic simulation was completed using Synchro 9.0 and SimTraffic 9.0. Synchro is a macroscopic and traffic signal optimization program, and SimTraffic is a micro-simulation program.

Intersection and approach Level of Service (LOS) are based off control delay, measured in seconds per vehicle (sec/veh). Control delay is the portion of total delay attributed to the traffic control used at an intersection. Components of control delay are initial deceleration delay, queue move-up time, stopped delay, and final acceleration. The concept of Level of Service (LOS), as explained in the Highway Capacity Manual (HCM 2010), is similar to the

grading system in school – A is the best, F is the worst. **Table 4.2** provides the LOS criteria for both unsignalized and signalized intersections.

**Table 4.2: LOS Criteria for Signalized and Unsignalized Intersections**

LOS	Control Delay (sec/veh)		LOS Description
	Signalized Intersection	Unsignalized Intersection	
A	≤ 10	≤ 10	Good progression and short cycle lengths, most vehicles do not stop
B	> 10 and ≤ 20	> 10 and ≤ 15	Good progression and / or short cycle length, more vehicles stop
C	> 20 and ≤ 35	> 15 and ≤ 25	Fair progression and / or longer cycle lengths, some cycle failures
D	> 35 and ≤ 55	> 25 and ≤ 35	Congestion becomes noticeable, high volume to capacity ratio
E	> 55 and ≤ 80	> 35 and ≤ 50	Limit of acceptable delay, poor progression, long cycles, and / or high volume to capacity ratio
F	> 80	> 50	Unacceptable to drivers, oversaturated conditions, volume greater than capacity, poor progression and long cycle lengths

LOS breakpoints and methodology for stop-controlled intersections are different than signalized intersections, as drivers expect different levels of performance from different kinds of transportation facilities. Drivers expect higher traffic volumes and delays at signalized intersections than at unsignalized intersections. The control delay threshold for any given LOS is less for an unsignalized intersection than it is for a signalized intersection. Additionally, service measures for two-way stop controlled intersections are only reported for minor-street approaches and major-street left turns. In this report, the worst of the minor street approaches and major street left turns is reported in the results.

The City’s *Infrastructure Design Manual* states that, “The need for mitigation is determined by using the qualitative measure Level-of-Service (LOS). The threshold of significance for transportation facilities on the area street systems is LOS D.” **LOS D is considered acceptable for this study.**

Existing Conditions A.M. and P.M. peak hour traffic models were developed using Synchro 9.0 for current year 2015. Existing Conditions models served as a calibration point to provide a baseline for comparing models for future years that evaluate no-build Conditions and proposed improvement alternatives. Intersection analysis results were quantified using two measures of effectiveness (MOEs): 95<sup>th</sup>-percentile queue lengths and LOS.



#### 4.4.2 Crash Analysis

A crash analysis was completed with 2014 accident data from the Houston Police Department. Detailed crash type data (i.e., high-speed, left-turn, involving pedestrians/cyclists, etc.) was not available. Crashes were identified in the following categories:

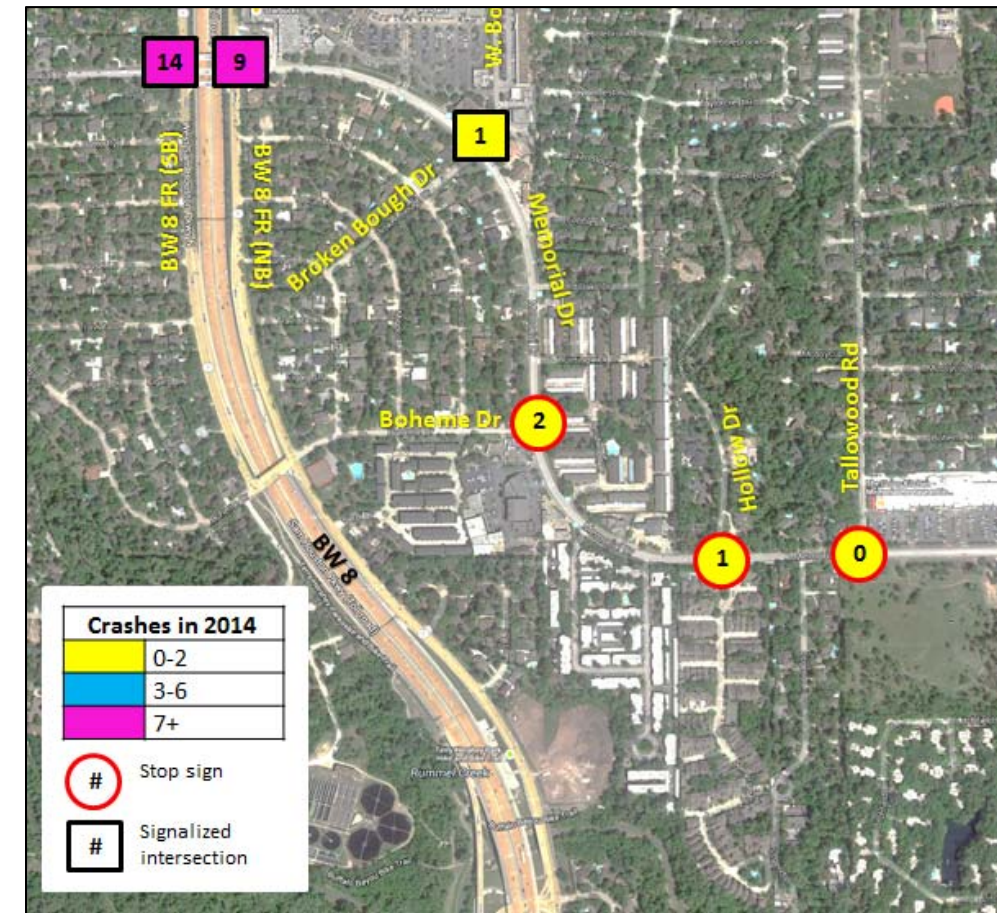
- Fatal
- Incapacitating
- Non-incapacitating
- Possible injury
- Non-injury
- Unknown severity

There were 27 total crashes at intersections along Memorial Drive in 2014, none of which were fatal. Three crashes occurred at unsignalized intersections (Boheme Drive and Hollow Drive), while the remainder occurred at signalized intersections.

Over half of the total crashes occurred at the northbound and southbound Beltway 8 frontage roads, with 9 and 14 crashes, respectively. Of the 27 crashes, 16 resulted in no injury to the driver or passengers, six involved non-capacitating injuries, and one was classified as non-fatal incapacitating. See **Table 4.3** for a summary of total crashes at Memorial Drive intersections by crash type in 2014, the most recently available year of data, as well as a graphical depiction in **Figure 4.2**.

**Table 4.3: Number of Crashes at Memorial Drive Intersections by Crash Type in 2014**

Cross-Street	Fatal	Incapacitating	Non-Incapacitating	Possible Injury	Non-Injury	Unknown Severity	Total
Beltway 8 FR (SB)	0	1	2	3	8	0	14
Beltway 8 FR (NB)	0	0	1	2	6	0	9
West Bough Lane	0	0	0	0	1	0	1
Boheme Drive	0	0	1	1	0	0	2
Hollow Drive	0	0	0	0	1	0	1
Tallowood Road	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>16</b>	<b>0</b>	<b>27</b>



**Figure 4.2: Crashes at Signalized/Unsignalized Intersections on Memorial Drive in 2014**

Crash data obtained for this study was used to identify locations where access management may reduce opportunities for crashes in the future. Access management techniques are used in roadway design to preserve roadway efficiency and enhance traffic safety, including:

- Closing or modifying median openings to restrict turning movements
- Restricting turning movements by closing or modifying minor street or private driveways
- Adding or extending left-turn lanes
- Improving turn radii
- Constructing shared access between property owners
- Consolidating driveways where multiple driveways access the same property

Access management is the systematic control of location, spacing, design, and operation of driveways, medians, interchanges, and street connections to a roadway. Among the benefits associated with corridor access management are:

- Improved safety and operations on conflicting movements
- Reduced crash rates
- Reduced delay and congestion
- Improved aesthetics
- Opportunities to improve pedestrian and bicycle travel

#### 4.5 Public Meetings

TIRZ 17 identified Memorial Drive as one of its key capital improvement projects to focus on in FY 2015, as it would make an immediate significant impact to the community. A part of the TIRZ 17's ongoing efforts to keep the community informed, a public meeting was held on April 14, 2015 to present the plans for Memorial Drive. The event's objective was to update the public on the project and solicit input from the public. The event included a Powerpoint presentation, followed by a Questions & Answers session and multiple informational stations on the project's drainage and roadway recommendations. The informational stations were interactive to allow the participants to provide input and ask engineers questions. Information gathered from these meetings was invaluable to the understanding of day-to-day operations and traffic flow throughout the study area. See **Appendix D** for a list of public questions and responses.

#### 4.6 Analyzed Alternatives and Traffic Growth

##### 4.6.1 No-Build Condition

No Build conditions consisted of the existing roadway network modeled with design year traffic volumes for the A.M. and P.M. weekday peak hour conditions (using Year 2015 volumes from the recorded TMCs and growth rates from H-GAC travel demand forecasts to reflect future year conditions with no changes to roadway geometry).

The only pending or authorized building permit in the area provided by the City was Memorial Green, a future commercial/residential site just east of Legend Lane. Construction for the 83,041 ft<sup>2</sup> building and parking garage began in August 2015.

The study area from the Traffic Impact Analysis (TIA) prepared for the Memorial Green Development was from West Bough Lane to Gessner Road. Site-generated traffic volumes as listed in the TIA were applied to the opening year 2016 networks from West Bough Lane to Tallowood Drive

##### 4.6.2 Build Condition

The preferred alternative was modeled in the Build condition. All calculations and assumptions in the Build condition were made in accordance to the July 2015 update of the

City's *Infrastructure Design Manual (IDM)*. A 24-ft median was added along Memorial Drive and all mainlanes were set at 11 ft. Every median opening provided at least 100 ft of left-turn storage in both directions at all cross-streets, except for the following turning movements:

- SBL onto Memorial Drive at Town & Country Village (east driveway)
- SBL onto Memorial Drive at Town & Country Village (west driveway)
- WBL onto Memorial Drive at Huntingwick Drive

Huntingwick Drive was not provided median access to make left turns onto Memorial Drive due to the proximity to Old Oaks Drive and insufficient storage space. Existing left turning traffic will be required to turn right and make a U-turn further downstream in place of the left-turn movement. Proposed turning movements and lane configurations by approach are shown in **Appendix D**.

##### 4.6.3 Opening Year and Future Year Traffic Growth

Alternatives were analyzed for projected existing 2015 conditions, opening year 2016, and future year 2030 conditions and were compared to no build Conditions for corresponding years. All scenarios were analyzed for both A.M. and P.M. peak hour traffic conditions. Ten scenarios were analyzed:

- 2015 A.M. Peak Hour – Existing
- 2016 A.M. Peak Hour – No Build
- 2016 A.M. Peak Hour – Build
- 2030 A.M. Peak Hour – No Build
- 2030 A.M. Peak Hour – Build
- 2015 P.M. Peak Hour – Existing
- 2016 A.M. Peak Hour – No Build
- 2016 A.M. Peak Hour – Build
- 2030 P.M. Peak Hour – No Build
- 2030 P.M. Peak Hour -- Build

Projected traffic volumes for opening year 2016 and future year 2030 were calculated using growth rates based upon travel demand forecasts furnished by the Houston-Galveston Area Council (H-GAC). Opening year and future Build and No Build volumes were by applying the average annualized growth rate of 0.84 percent over a 15-year period, as seen in **Table 4.4**



**Table 4.4: Annualized Growth Rate Calculations**

Direction	Location	2011	2035	Rate
EB	W of Beltway 8	17,558.2	20,682.8	0.68%
WB	W of Beltway 8	13,629.2	19,388.8	1.48%
EB	E of Beltway 8	17,450.8	21,521.8	0.88%
WB	E of Beltway 8	12,668.6	15,940.5	0.96%
EB	NW of West Bough Lane	6,780.1	9,589.3	1.45%
WB	NW of West Bough Lane	10,630.8	12,283.7	0.60%
EB	SE of West Bough Lane	6,780.1	9,589.3	1.45%
WB	SE of West Bough Lane	10,630.8	12,283.7	0.60%
EB	E of Boheme Drive	6,780.1	9,589.3	1.45%
WB	E of Boheme Drive	10,630.8	12,283.7	0.60%
EB	W of Frostwood Drive	13,004.6	15,305.7	0.68%
WB	W of Frostwood Drive	10,993.8	12,444.4	0.52%
EB	W of Gessner Road	13,004.6	15,305.7	0.68%
WB	W of Gessner Road	10,993.8	12,444.4	0.52%
EB	E of Gessner Road	7,782.1	8,919.9	0.57%
WB	E of Gessner Road	7,604.4	8,190.4	0.31%
<b>Average Annualized Growth Rate</b>				<b>0.84%</b>

The average annual growth rate on Memorial Drive is projected to be 0.84 percent between 2011 and 2035. Using the average growth rate, growth factors were calculated for every approach and applied to the corresponding existing TMCs to calculate the A.M. and P.M. peak hour TMCs in 2030. **Appendix D** depicts future TMCs along Memorial Drive.

#### 4.7 Traffic Analysis – A.M. Peak Hour

The 2010 Highway Capacity Manual was used by Synchro 9.0 to report MOEs at all cross-streets and major driveways in the study area during the A.M. peak hour. These metrics included:

- Approach LOS
- Approach control delay (sec)
- Overall intersection LOS
- Overall intersection delay (sec)

All traffic signal timings were optimized using the City’s standard cycle length and assumed future signal maintenance. Complete Synchro 9.0 output files are found in tables in **Appendix D**. **Table 4.6 summarizes** the MOEs listed above for each intersection in the study area.

#### 4.7.1 2015 A.M Peak – Existing Condition

The intersections of Memorial Drive with the southbound and northbound Beltway 8 frontage roads operate at LOS D and LOS F, respectively, during the A.M. peak hour. This is due to a high number of vehicles using the frontage roads to access Sam Houston Tollway travelling to work each morning. Overall delay at the SB and NB frontage road intersections was 38.8 seconds and 71.0 seconds, respectively. All approaches on Beltway 8 SB frontage road operated at a LOS D or better, while the NB frontage road and WB Memorial approaches on operated at LOS F.

The intersection of Broken Bough Drive/West Bough Lane at Memorial Drive operated at LOS D overall, but both cross street approaches operated at LOS F. Through traffic on Memorial Drive operated at LOS C and LOS B for the eastbound and westbound approaches, respectively.

All stop-controlled intersections in the study area performed at LOS D or better during the existing A.M. peak hour.

#### 4.7.2 2016 A.M Peak – No Build Condition

In 2016, there is a decreased operational performance at seven of the eight unsignalized intersections along the corridor by at least one LOS letter, six of which were LOS E or worse.

#### 4.7.3 2016 A.M Peak – Build Condition

In 2016, three of the eight unsignalized intersections along the corridor will perform at LOS E or less. The presence of left-turn medians resulted in four intersections with a higher LOS than their 2016 No Build condition counterpart. Eliminating left turns from Huntingwick Drive onto Memorial Drive improved that intersection’s operational performance from LOS D to LOS B.

#### 4.7.4 2030 A.M Peak – No Build Condition

With traffic volumes projected to increase by 0.84 percent annually between 2015 and 2030, operational performance at both Beltway 8 frontage road intersections with Memorial Drive is expected to further deteriorate. Operational performance on Beltway 8 NB is expected to decrease from LOS D to LOS E during the 2030 A.M No Build peak hour. With no right-only lane, lengthy queues will also form in the southbound frontage road. The overall delay for the entire intersection was 71.3 seconds.

Traffic congestion was still unacceptable at the northbound frontage road intersection, with an overall intersection delay of 120.3 seconds and LOS F. Eastbound through traffic traveling over the Sam Houston Tollway overpass on Memorial Drive is expected to operate at LOS D with 51.9 seconds of average delay in the 2030 A.M. No Build peak hour.

Seven of the eight stop-controlled intersections decreased in operational performance to LOS E or LOS F, with only Hollow Drive performing as LOS D. The innermost lane along Memorial

Drive is a shared left-through movement along most of the corridor. Left-turning vehicles that were unable to turn left due to conflicting through movements resulted in delays and lower LOS at each of these intersections.

#### **4.7.5 2030 A.M Peak – Build Condition**

There was no traffic operational performance improvements at the intersection of Memorial and Beltway 8 frontage roads because no changes were made to the Sam Houston Tollway overpass. Intersection control delay at Beltway 8 SB and NB are expected to result in LOS E and LOS F, respectively, in the 2030 A.M. peak hour Build condition.

Due to the projected volumes, Synchro 9.0 results show that the traffic operational performance at nearly every stop-controlled intersection exceeds the City's acceptable LOS criteria. However, the Synchro 9.0 software does not consider the benefits associated with enhanced access management and safety improvements, such as adding new medians. Left-turn movements will be free to turn left from Memorial Drive onto minor streets without inhibiting through traffic as a result of the newly installed storage bays. This significantly reduces the number of potential conflict points, thus decreasing the likelihood of crashes when turning left across Memorial Drive.

Huntingwick Drive was not provided median access to make left turns onto Memorial Drive due to the proximity to the Old Oaks Drive intersection as well as insufficient storage space. Instead, drivers were required to turn right and make a U-turn further downstream in place of the left-turn movement. LOS increased from F to B at Huntingwick Drive but remained the same at other intersections when comparing No Build vs. Build conditions, suggesting the Build condition improvements were successful at this location.

Table 4.6: Summary of MOEs during A.M. Peak Hour by Alternative

Intersection	Approach	2015 A.M. Peak -- Existing				2016 A.M. Peak -- No Build				2016 A.M. Peak -- Build				2030 A.M. Peak -- No Build				2030 A.M. Peak -- Build			
		Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Memorial Drive @ Beltway 8 (Southbound)	EB	43.6	D	38.8	D	47.4	D	43.3	D	47.4	D	43.8	D	56.7	E	71.3	E	56.7	E	71.3	E
	WB	43.3	C			44.0	D			46.9	D			57.3	E			57.3	E		
	NB	---	---			---	---			---	---			---	---			---			
	SB	36.8	D			39.8	D			39.8	D			87.8	F			87.8	F		
Memorial Drive @ Beltway 8 (Northbound)	EB	36.3	D	71.0	F	37.4	D	71.9	E	37.4	D	71.7	E	51.9	D	120.3	F	51.9	D	119.5	F
	WB	102.2	F			109.0	F			103.4	F			112.3	F			106.8	F		
	NB	80.5	F			79.7	E			80.9	F			160.2	F			160.2	F		
	SB	---	---			---	---			---	---			---	---			---			
Memorial Drive @ Broken Bough Drive	EB	26.1	C	38.5	D	15.8	B	38.1	D	31.4	B	45.1	D	21.3	C	28.6	C	23.2	C	30.2	C
	WB	13.2	B			15.0	B			15.0	B			24.8	C			26.7	C		
	NB	134.9	F			159.2	F			159.2	F			56.9	E			56.9	E		
	SB	98.0	F			121.3	F			121.3	F			50.7	D			50.7	D		
Memorial Drive @ Old Oaks Drive	EB	---	---	2.4	D	---	---	3.0	E	---	---	2.3	E	---	---	6.3	F	---	---	3.9	F
	WB	32.9	D			46.7	E			39.8	E			108.7	F			72.0	F		
	NB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
	SB	1.3	---			1.4	---			0.7	---			1.9	---			0.7	---		
Memorial Drive @ Huntingwick Drive	EB	---	---	1.3	C	---	---	1.6	D	---	---	0.4	B	---	---	2.6	F	---	---	0.4	B
	WB	24.6	C			31.8	D			11.8	B			52.1	F			12.6	B		
	NB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
	SB	0.4	---			0.4	---			0.0	---			0.6	---			0.0	---		
Memorial Drive @ Boheme Drive	EB	21.9	C	3.5	C	98.8	G	17.2	F	80.7	F	13.9	F	298.2	F	50.5	F	225.5	F	38.0	F
	WB	---	---			---	---			---	---			---	---			---			
	NB	1.7	---			2.5	---			1.6	---			3.1	---			1.8	---		
	SB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
Memorial Drive @ Memorial Bend	NE	---	---	0.6	D	---	---	0.9	E	---	---	0.6	D	---	---	11.1	E	---	---	0.9	E
	SE	0.0	---			---	---			0.1	---			0.4	---			0.1	---		
	NW	0.3	---			0.4	---			0.0	---			0.0	---			0.0	---		
	SW	34.8	D			48.0	E			27.6	D			40.6	E			39.3	E		

**Table 4.6: Summary of MOEs during A.M. Peak Hour by Alternative (continued)**

Intersection	Approach	2015 A.M. Peak -- Existing				2016 A.M. Peak -- No Build				2016 A.M. Peak -- Build				2030 A.M. Peak -- No Build				2030 A.M. Peak -- Build					
		Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS		
Memorial Drive @ Hollow Drive	EB	0.1	---	0.3	C	0.2	---	0.4	C	0.1	---	0.4	C	0.3	---	0.7	D	0.1	---	0.6	D		
	WB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---			0.0	---
	NB	---	---			---	---			---	---			---	---			---	---			---	---
	SB	18.4	C			23.8	C			23.5	C			32.8	D			32.8	D				
Memorial Drive @ Somerset Place	EB	0.0	---	1.6	C	0.0	---	2.7	E	0.0	---	2.0	D	0.0	---	5.8	F	0.0	---	3.5	F		
	WB	1.0	---			2.2	---			1.0	---			3.0	---			1.1	---				
	NB	23.9	C			39.5	E			34.3	D			98.0	F			65.3	F				
	SB	---	---			---	---			---	---			---	---			---	---				
Memorial Drive @ Legend Lane	EB	0.0	---	0.9	D	0.0	---	1.2	E	0.0	---	1.0	E	0.0	---	2.3	F	0.0	---	1.7	F		
	WB	0.6	---			0.8	---			0.3	---			1.1	---			0.3	---				
	NB	30.8	D			41.9	E			39.9	E			81.1	F			72.2	F				
	SB	---	---			---	---			---	---			---	---			---	---				
Memorial Drive @ Tallowood Road	EB	2.5	---	3.3	D	3.0	---	4.9	F	1.1	---	2.5	D	4.4	---	4.7	E	1.2	---	4.8	F		
	WB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---				
	NB	---	---			---	---			---	---			---	---			---	---				
	SB	32.5	D			58.0	F			33.4	D			41.1	E			73.4	F				



#### 4.8 Traffic Analysis – P.M. Peak Hour

The 2010 Highway Capacity Manual was used by Synchro 9.0 to report Measurement of Effectiveness (MOEs) at all cross-streets and major driveways in the study area during the P.M. peak hour. These metrics included:

- Approach LOS
- Approach control delay (sec)
- Overall intersection LOS
- Overall intersection delay (sec)

All traffic signal timings were optimized using the COH's standard cycle length and assumed future signal maintenance. Complete Synchro 9.0 output files are found in tables in **Appendix D. Table 4.7** summarizes the MOEs for each intersection in the study area.

##### 4.8.1 2015 P.M. Peak – Existing Condition

Operational performance at all three signalized intersections was unacceptable in accordance with the City's *Infrastructure Design Manual*. The intersections of Memorial Drive at the northbound and southbound Beltway 8 frontage roads both operate at LOS E during the P.M. peak hour. This is due to a high number of vehicles using the frontage roads to access Sam Houston Tollway as they return from work each evening. Overall delay at the SB and NB frontage road intersections was 71.4 seconds and 79.4 seconds, respectively. The intersection of Memorial Drive at Broken Bough Drive/West Bough Lane operated at LOS E overall with an average overall intersection delay of 59.3 seconds.

Only three of the stop-controlled intersections in the study area – Huntingwick Drive, Memorial Bend Drive, and Somerset Place – performed at LOS D or better during the existing P.M. peak hour. The longest control delay for any left turning movement was 127.6 seconds for SB vehicles turning left out of Old Oaks Drive onto Memorial Drive.

##### 4.8.2 2016 P.M. Peak – No Build Condition

In 2016, the majority of the intersections operated at LOS F. Traffic operational performance decreased from LOS D to LOS E at Huntingwick Drive and LOS D to LOS F at Memorial Bend.

##### 4.8.3 2016 P.M. Peak – Build Condition

With traffic volumes projected to increase by 0.84 percent annually between 2016 and 2030, operational performance at both Beltway 8 frontage road intersections with Memorial Drive is expected to further deteriorate. Traffic congestion was still unacceptable at the northbound frontage road intersection, with an overall intersection delay of 82.3 seconds and LOS F.

Signal timing was optimized at all signalized intersections, resulting in acceptable operational performance at the intersection of Memorial Drive and Broken Bough Drive/West Bough Lane. This signalized intersection is expected to experience 38.6 seconds of control delay and operate at LOS D in the 2016 P.M. Build condition, assuming optimal signal timing.

Seven of the eight stop-controlled intersections decreased in operational performance to LOS E or LOS F, with only Huntingwick Drive performing at LOS C. The Synchro 9.0 software does not consider the benefits associated with enhanced access management and safety improvements, such as adding new medians. Left-turn movements will be free to turn left from Memorial Drive onto minor streets without inhibiting through traffic as a result of the newly installed storage bays. This significantly reduces the number of potential conflict points, thus decreasing the likelihood of crashes when turning left across Memorial Drive

##### 4.8.4 2030 P.M. Peak – No Build Condition

With traffic volumes projected to increase by 0.84 percent annually between 2015 and 2030, operational performance at both Beltway 8 frontage road intersections with Memorial Drive is expected to further deteriorate. All turning movements at the SB frontage road intersection are expected to operate at LOS E or worse and experience lengthy queues for both through and left turning movements. With no right-only lane, queues will likely reach over 1,000 ft on the southbound frontage road. The overall delay for the entire intersection was 106.7 seconds.

Traffic congestion was still unacceptable at the northbound frontage road intersection, with an overall intersection delay of 107.8 seconds and LOS F. Eastbound through traffic heading over the Sam Houston Tollway overpass on Memorial Drive managed to operate at LOS D with 51.8 seconds of average delay in the 2030 P.M. No Build peak hour. Both the northbound frontage road and westbound mainlanes operated at LOS F for the overall approach.

All of the eight stop-controlled intersections decreased in operational performance to LOS F. The innermost lane along Memorial Drive is a shared left-through movement along most of the corridor. Left-turning vehicles that were unable to turn left due to conflicting through movements resulted in delays and unacceptable LOS at each of these intersections.

##### 4.8.5 2030 P.M. Peak – Build Condition

There was no traffic operational performance improvements at the intersection of Memorial Drive and Beltway 8 frontage roads because no changes were made to the Sam Houston Tollway overpass. All approaches except westbound along Memorial Drive are expected to perform at LOS E or less in the 2030 P.M. peak hour Build condition.

Signal timing was optimized at all signalized intersections, resulting in acceptable operational performance at the intersection of Memorial Drive and West Bough Lane. This signalized intersection is expected to experience 46.7 seconds of control delay and operate at LOS D in the 2030 P.M. Build condition, assuming optimal signal timing.

Due to the projected volumes, Synchro 9.0 results show that the traffic operational performance at nearly every stop-controlled intersection exceeds the City's acceptable LOS criteria. However, the Synchro 9.0 software does not consider the benefits associated with enhanced access management and safety improvements, such as adding new medians. Left-turn movements will be free to turn left from Memorial Drive onto minor streets without inhibiting through traffic as a result of the newly installed storage bays. This significantly reduces the number of potential conflict points, thus decreasing the likelihood of crashes when turning left across Memorial Drive.

Huntingwick Drive was not provided median access to make left turns onto Memorial Drive due to insufficient storage space. Instead, drivers were required to turn right and make a U-turn further downstream in place of the left-turn movement. LOS improved from LOS F to LOS C at Huntingwick Drive but remained the same as in the 2030 No Build scenario for the remaining seven unsignalized intersections, suggesting the improvements were successful at this location.

Table 4.7: Summary of MOEs during P.M. Peak Hour by Alternative

Intersection	Approach	2015 P.M. Peak -- Existing				2016 P.M. Peak -- No Build				2016 P.M. Peak -- Build				2030 P.M. Peak -- No Build				2030 P.M. Peak -- Build			
		Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS
Memorial Drive @ Beltway 8 (Southbound)	EB	54.8	D	71.4	E	63.4	E	83.3	F	59.2	E	82.3	F	77.2	E	106.7	F	79.0	E	108.8	F
	WB	68.2	E			68.3	E			68.8	E			83.6	F			83.7	F		
	NB	---	---			---	---			---	---			---	---			---			
	SB	81.2	F			102.9	F			102.7	F			138.5	F			141.9	F		
Memorial Drive @ Beltway 8 (Northbound)	EB	35.5	D	79.4	E	34.5	C	90.3	F	34.3	C	91.0	F	43.4	D	107.8	F	48.8	D	113.8	F
	WB	101.8	F			137.4	F			139.5	F			183.1	F			192.8	F		
	NB	82.4	F			82.1	F			82.2	F			85.5	F			89.3	F		
	SB	---	---			---	---			---	---			---	---			---			
Memorial Drive @ Broken Bough Drive	EB	15.0	B	37.2	D	13.5	B	112.1	F	16.3	B	38.6	D	23.2	C	46.9	D	23.2	C	46.7	D
	WB	19.7	B			25.7	C			22.6	C			51.2	D			51.2	D		
	NB	52.5	D			370.3	F			55.9	E			38.0	D			38.0	D		
	SB	132.7	F			473.1	F			138.8	F			80.5	F			79.7	E		
Memorial Drive @ Old Oaks Drive	EB	---	---	5.1	F	---	---	5.2	F	---	---	4.3	F	---	---	17.7	F	---	---	13.0	F
	WB	127.6	F			196.6	F			110.1	F			447.1	F			340.1	F		
	NB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
	SB	1.5	---			1.7	---			0.0	---			2.3	---			0.6	---		
Memorial Drive @ Huntingwick Drive	EB	---	---	1.0	D	---	---	1.3	E	---	---	0.3	C	---	---	2.3	F	---	---	0.3	C
	WB	31.8	D			46.4	E			15.4	C			92.8	F			17.4	C		
	NB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
	SB	1.0	---			1.2	---			0.0	---			1.9	---			0.0	---		
Memorial Drive @ Boheme Drive	EB	75.8	F	8.6	F	143.2	F	12.8	F	359.3	F	24.4	F	440.9	F	32.8	F	1079.6	F	71.6	F
	WB	---	---			---	---			---	---			---	---			---			
	NB	5.4	---			5.7	---			2.0	---			6.7	---			2.4	---		
	SB	0.0	---			0.0	---			3.0	---			0.0	---			0.0	---		
Memorial Drive @ Memorial Bend	NE	---	---	0.6	D	---	---	0.9	F	---	---	0.5	F	---	---	1.9	F	---	---	0.9	F
	SE	1.0	---			1.3	---			0.4	---			2.4	---			0.4	---		
	NW	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---		
	SW	34.2	D			55.9	F			52.8	F			124.7	F			98.7	F		

**Table 4.7: Summary of MOEs during P.M. Peak Hour by Alternative (continued)**

Intersection	Approach	2015 P.M. Peak -- Existing				2016 P.M. Peak -- No Build				2016 P.M. Peak -- Build				2030 P.M. Peak -- No Build				2030 P.M. Peak -- Build					
		Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS	Approach Delay	Approach LOS	Intersection Delay	Intersection LOS		
Memorial Drive @ Hollow Drive	EB	0.6	---	0.7	E	1.1	---	6.7	F	0.2	---	1.5	F	1.5	---	4.8	F	0.3	---	3.8	F		
	WB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---			0.0	---
	NB	---	---			---	---			---	---			---	---			---	---			---	---
	SB	46.5	E			148.8	F			135.5	F			385.7	F			331.2	F				
Memorial Drive @ Somerset Place	EB	0.0	---	1.0	D	0.0	---	0.7	D	0.0	---	1.1	E	0.0	---	1.8	F	0.0	---	2.1	F		
	WB	0.6	---			0.2	---			0.3	---			0.5	---			0.5	---				
	NB	26.3	D			33.6	D			38.8	E			66.3	F			79.9	F				
	SB	---	---			---	---			---	---			---	---			---	---				
Memorial Drive @ Legend Lane	EB	0.0	---	0.9	E	0.0	---	2.2	F	0.0	---	0.6	E	0.0	---	1.0	F	0.0	---	1.0	F		
	WB	0.8	---			2.1	---			0.1	---			0.1	---			0.1	---				
	NB	38.8	E			81.6	F			48.0	E			75.2	F			77.9	F				
	SB	---	---			---	---			---	---			---	---			---	---				
Memorial Drive @ Tallowood Road	EB	3.1	---	3.7	F	4.1	---	8.8	F	1.3	---	4.9	F	7.2	---	5.1	F	1.6	---	15.6	F		
	WB	0.0	---			0.0	---			0.0	---			0.0	---			0.0	---				
	NB	---	---			---	---			---	---			---	---			---	---				
	SB	60.9	F			182.9	F			111.5	F			61.3	F			375.4	F				



#### 4.9 Conclusion and Recommendations

Recommendations are based on the traffic operations analysis of existing and future conditions, as well as industry accepted access management practices. After analyzing the existing and future conditions, it was determined that the improvements identified in the year 2030 Build condition improves traffic flow and safety along Memorial Drive. The Build condition also improves the Approach and Intersection Delays more than the No Build condition. Furthermore, adding storage bays in the 24-foot wide medians increases safety along the corridor and improves the flow of through traffic on Memorial Drive.

It was also recommended that the traffic signals at Beltway 8 northbound and southbound frontage roads and the Broken Bough Drive/West Bough Lane be replaced to meet current City criteria. The proposed signal improvements include new traffic signal poles and heads, ADA-compliant pedestrian wheel chair ramps, pedestrian push buttons and heads, and new controllers, with new conduit and wiring. Once the proposed traffic signal improvements are installed at the Broken Bough Drive/West Bough Lane intersection, it is recommended to be re-timed to improve cross street delays. Due to capacity restraints, signal optimization to improve the LOS at both Beltway 8 frontage roads is not possible. Proposed traffic signal layout improvements and an itemized list of costs associated with proposed signal design for these intersections are located in **Appendix D**.

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## 5.0 Drainage Analysis and Recommendations

### 5.1 Background

The primary drainage goal of the project is to improve the Memorial Drive conveyance system to meet City criteria. There are additional goals of maximizing benefit to the adjacent community and to reduce overland flows to neighboring areas. Finally, improvements to Memorial Drive are recommended to be designed such as to accommodate future regional solutions to the challenging stormwater problems within the W151 and W153 watersheds. To accomplish these goals, the installation of large reinforced concrete boxes was evaluated.

### 5.2 Scope

The purpose of the drainage portion of the PER is to identify the performance of the existing drainage infrastructure and document the system deficiencies, develop improvement alternatives to address the existing deficiencies and to accommodate the proposed roadway improvements, and address drainage impacts associated with the proposed improvements.

A summary of the tasks identified in the drainage scope of the PER are listed below and are described in more detail in later parts of this chapter:

- Analyze Overland Flow Patterns
- Prepare and Evaluate Existing Drainage Area Maps
- Existing Conditions Analysis
- Drainage Impact Analysis
- Proposed System Analysis
- Improvement Option Cost Estimates
- Proposed Conditions Storm Sewer Drainage Area Map Sheets
- 30% Plan and Profile Drawing Support – Drainage

### 5.3 Design Criteria

The design criteria for this project is based on City of Houston (City) standards which can be found in the City's Infrastructure Design Manual, dated July 2015. Storm Sewer design criteria can be found in Section 9.05 C of this manual.

In accordance with City design standards, the first objective in the analysis of storm drainage along Memorial Drive is to evaluate the existing drainage system to identify, understand, and document existing drainage problems. After existing conditions are understood, improvement options can be designed that address the system deficiencies and meet the City design requirements. While requirements for final design submittals are extensive and include items such as velocity and inlet ponding width, two primary requirements are considered key when evaluating systems for preliminary engineering. For the 2-year event, the WSEL or HGL must be below the inlet gutter line elevation. For the extreme event or 100-year event, runoff must be conveyed through the storm sewer system and through overland sheet flow to a designated outfall location, and WSELs are to be maintained below the ROW line. The following criteria were used to evaluate Roadway cross-sections and then calculate the flow conveyed by the existing and proposed conditions:

- Streets shall be designed so that consecutive high points in the street will provide for a gravity flow of drainage to the ultimate outlet.
- The maximum depth of ponding at high points shall be 6" above top of curb.
- The maximum depth of ponding at low points shall be 18" above top of curb.
- The maximum ponding elevation for the 100-year event at any point along the street shall not be higher than the natural ground elevation at the right-of-way line, which may supersede the ponding depth criteria above.

Finally, an optimum detention solution was evaluated to determine maximum constructible storage volume within the proposed ROW, considering constructability and utility constraints. The cost of the optimal solution will be assessed and a recommendation will be made. Development of this alternative is consistent with the established TIRZ 17 mission statement that puts a priority on addressing drainage issues.

## 5.4 Existing Conditions Analysis

### 5.4.1 Analysis Extents

For drainage analysis and description purposes the drainage study area (Memorial Drive between Beltway 8 and Tallowood Road) is herein described as the “Memorial Drive System”. The Memorial Drive System is primarily part of the W153-00-00 watershed and is generally drained by storm sewers and road side ditches extending along the project alignment draining to W153-00-00. However, the western limits of the project from West Bough Lane to Beltway 8 do not drain to W153-00-00 but rather drain to the Beltway 8 storm sewer trunkline before continuing downstream to Buffalo Bayou.

The project area was documented as having significant drainage deficiencies in the TIRZ 17 Regional Drainage Study (RDS) with reported flooding during the April 2009 and the more recent May 2015 rain events.

The analysis was done in two phases and for different purposes. The primary PER analysis discussed in this report is based on the RDS Update Infoworks Integrated Catchment Model (ICM). This model was used to gain insight into the overland flow issues and obtain a preliminary quantification of the impacts of the proposed roadway and drainage improvements. A secondary HouStorm analysis was developed in order to more accurately evaluate the inlets and smaller conveyance storm sewers per City criteria. The analysis extent can be seen in **Appendix C: Exhibit 3.1 – Project/Analysis Extent** and encompasses a sub-area of the original RDS update model extent. It contains the Memorial Drive System and the potentially impacted areas north and south of Memorial Drive and upstream and downstream of the W153 crossing. Results from the HouStorm analysis are presented in this report in subsequent sections.

### 5.4.2 Model Schematic

The existing model network was developed using City GIMS data and record drawings supplemented by survey within the project corridor, LiDAR, and information derived from field visits. The primary data source within the project corridor was from survey and available record drawings

### 5.4.3 Tailwater/Boundary Conditions

As described previously, the western limit of the Memorial Drive System west of West Bough Lane drains to the Beltway 8 storm sewer trunkline which in turn drains to Buffalo Bayou. The eastern limit of the system outfalls to the W153 system via a 48” storm sewer on the south side of Memorial. The 48” line connects to an existing 9’x9’ W153 cross culvert. The roadside ditch flow on the north side of Memorial is conveyed by a second 48” storm sewer; however, the connectivity of this line could not be verified by the surveyor or during a subsequent field visit by the engineer. For the purpose of the PER it has been assumed that the 48” line is connected to the 48” line on the south side. This assumption is supported by the lack of an additional connection to the existing 9’x9’ W153 crossing. As the RDS Update model is an integrated catchment model that covers the entire TIRZ 17 analysis extent, the tailwaters for the Memorial Drive System are essentially the backwater calculations from the ultimate RDS Update model boundary’s from Buffalo Bayou. The boundary conditions are time varying WSEL’s based on the effective HEC-RAS and HEC-HMS models. The 2-year and 100-year hydrographs for each location were extracted from the HEC-HMS model and the 2-year and 100-year WSEL’s developed using rating curves extracted from the W100-00-00 HEC-RAS model for the appropriate outfall location. As the Beltway 8 storm sewer is a 1D element, the levels are applied to the 1D outfall nodes, however, W153 is modeled in the 2D surface therefore the tailwater from W100 is modeled using a 2D Boundary Water Level Line. (see **Table 5.1: Memorial Drive System Boundary Condition Elevations**) For the rest of the 2D surface boundary condition, a free flow normal depth is assumed around the perimeter of the 2D analysis extent.

**Table 5.1: Memorial Drive System Boundary Condition Elevations**

Location	Peak WSEL	
	2 year	100 year
Beltway-8 Outfall	55.51	67.45
W153 Outfall	54.47	66.40

#### 5.4.4 Hydrology

The hydrology methodology is unchanged from the original TIRZ 17 RDS and the subsequent update. A detailed description of the hydrologic methodology is contained in the TIRZ 17 RDS and RDS Update reports and is summarized below.

##### 5.4.4.1 Rainfall

Rainfall totals for Region 2 as detailed by the Tropical Storm Alison Recovery Project (TSARP) white papers were used for all synthetic storm events.

##### 5.4.4.2 Infiltration and losses

Total subcatchment runoff volume was determined using initial abstractions for impervious surfaces and Green & Ampt infiltration for pervious surfaces. The Green & Ampt parameters were set to the Buffalo Bayou values as recommended in the TSARP white paper.

##### 5.4.4.3 Drainage Areas

Drainage area boundaries were delineated utilizing 2008 LiDAR data in combination with field visit verification. Drainage area size varies throughout the model. Drainage areas for inlet level analysis within public ROW in the primary study area are generally less than one acre in size and represent the area contributing to individual inlets. The slope for each drainage area was calculated using GIS tools and the 2008 LiDAR data. Additionally, a drainage width parameter for each drainage area was assigned based on its physical dimensions. During the HouStorm analysis, these drainage areas were broken down further to determine runoff at the inlet level. The overall drainage areas and the inlet level assignments can be seen in the accompanying plan set within the appendices.

##### 5.4.4.4 Impervious Cover

In the original RDS and RDS update model, percent impervious values were calculated for each drainage area based on aerial imagery and land use data available from the Harris County Appraisal District (HCAD) and HCFCD. Aerials dated 2014 were checked and it was determined that no notable increases in impervious cover have occurred. Consequently the RDS values were used “as-is”.

#### 5.4.5 Hydraulics

Infoworks ICM uses a combined 1-Dimensional and 2-Dimensional hydrodynamic (1D/2D) analysis to evaluate both the sub-surface storm sewer capacity and the overland sheet flow and ponding. As the HGLs derived using this software account for both sub-surface and surface hydraulics, and account for the sub-surface and surface storage, it is considered a better estimate of water surface elevations during a frequency storm event within the study area relative to those derived from the City’s HouStorm software which is based on the rational method.

#### 5.4.6 Analysis Results

##### 5.4.6.1 2-Year Event

The model of existing conditions shows that the storm sewer system west of West Bough is surcharged throughout its length. The HGL of the storm sewer does not get above inlet/EOP (Edge of Pavement) elevations within the Memorial Drive ROW, however, the lateral systems on West Bough and in commercial areas north of Memorial cannot drain effectively causing overland flow to enter the ROW. The 2-year WSEL of the roadside ditches of Memorial between Old Oaks Drive and Huntingwick Drive gets above the EOP elevation, violating the minimum City criteria. This problem is exacerbated by the high point on Memorial at Boheme Drive which causes the water to pond and then overflow beyond the roadway ROW to the west. There is more ponding between Rip Van Winkle Drive and W153. (see **Appendix C: Exhibit 3.2. - Existing System Results 2yr**). It can be surmised that the existing system does not meet the City of Houston 2-year capacity criteria.

The combined surface and sub-surface existing 2-year peak discharge on the south side of Memorial is 200.5 cfs. The combined surface and sub-surface existing 2-year peak discharge from Memorial Drive to the Beltway-8 system is 60.9 cfs. (see **Table 3.6: Memorial Drive Outfall Discharges**). The figures in this table will be referenced in future sections of this report to ensure existing conditions flows are maintained for the proposed conditions.



#### 5.4.6.2 100-Year Event

The model of existing conditions shows that the storm sewer system west of West Bough is surcharged throughout its length with the HGL above inlet/EOP elevation near the intersection with West Bough. The lateral systems on West Bough and in commercial area on the north cannot drain effectively resulting in ponding and overland flow which enters the Memorial Drive ROW. Due to the fact that Memorial generally slopes away from the Beltway to W153, the excess flow in the system west of West Bough flows in a southeasterly direction towards W153. The 100-year WSEL gets above inlet/EOP elevation for the entire length of Memorial Drive between West Bough and W153 leaving the ROW at several locations. This flooding is partially due to the limited capacity of the Memorial Drive drainage infrastructure and partially due to overflow from W153 itself. Early in the event the roadside ditches and associated storm sewers and culverts become surcharged and overtop the EOP causing overland flow to leave the ROW into Huntingwick Drive and Rip Van Winkle Drive. Due to the high point on Memorial at Boheme Drive the water ponds and then overflows beyond the ROW to the west. Flow is also conveyed beyond the ROW near the Memorial Drive Townhouses and back to Memorial Drive near the Prosperity Bank property. At the peak of the 100-year event, W153 becomes overwhelmed and overland flow enters the Memorial Drive ROW from W153 via the adjacent properties. This is exacerbated by the lack of capacity of the roadway drainage infrastructure to convey the 100-year event and of a clear overland flow path. (see **Appendix C: Exhibit 3.4 - Existing System Results 100yr**). It can be surmised that the existing system does not meet the City of Houston 100-year capacity criteria.

The combined surface and sub-surface existing 100-year peak discharge on the south side of Memorial is 1078.2 cfs. The combined surface and sub-surface existing 100-year peak discharge from Memorial Drive to the Beltway-8 system is 71.6 cfs. (see **Table 3.6: Memorial Drive Outfall Discharges**).

#### 5.4.7 Existing System Assessment

In terms of drainage, Memorial Drive needs to be assessed from two separate but complimentary standpoints. Firstly, the lateral drainage systems (storm sewer and roadside ditches) need to have adequate capacity and meet City of Houston criteria if possible. Secondly, the roadway crossing at W153 should meet HCFCFCD criteria if possible.

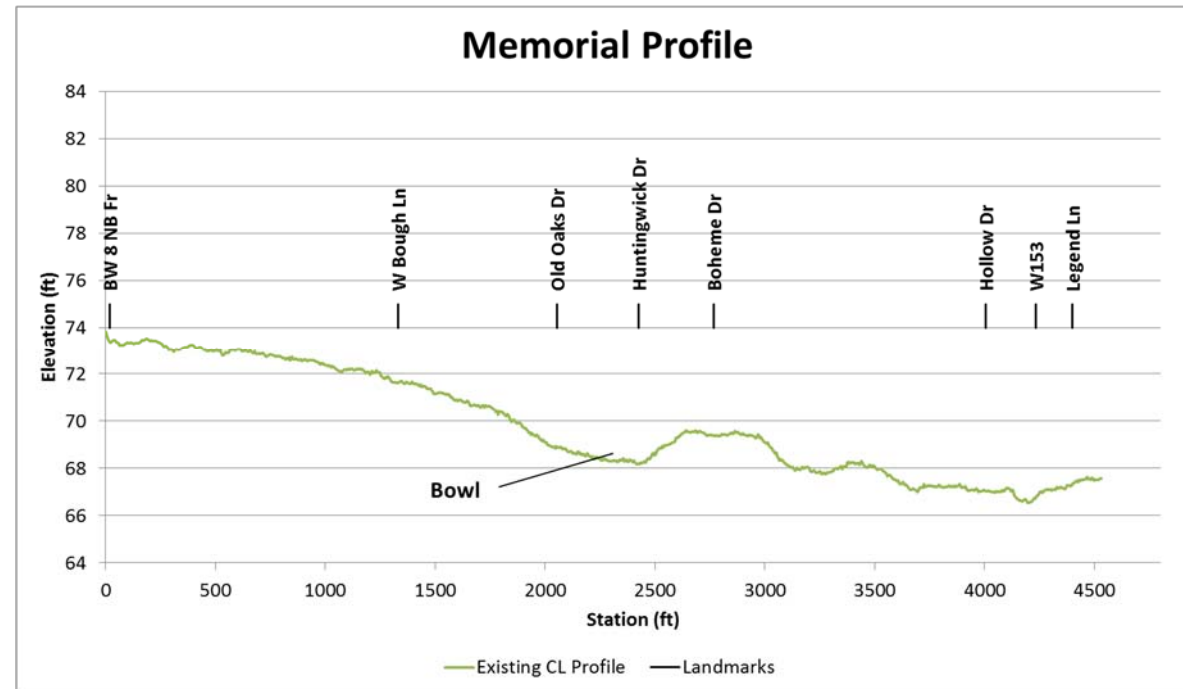
The existing lateral drainage infrastructure does not meet the current City 2-year design criteria in that the 2-year hydraulic grade line is in excess of the gutter/EOP elevations in several locations throughout the system. Additionally, the existing system does not meet the 100-year criteria; the 100-year flow leaves the road ROW throughout the system and does not have a well-defined overland flow path for flows in excess of the design capacity.

The crossing at W153 is defined by HCFCFCD as a non-flood control feature and does not meet the criteria for either Culverts or Channel Enclosures in that it does not have capacity to convey the 1% exceedance probability storm without overtopping the roadway. Roadway overtopping at this crossing was documented during the April 2009 and May 2015 event.

The causes of these drainage problems cannot exclusively be attributed to the roadway drainage infrastructure itself, as the roadside ditches and the associated culverts and stretches of storm sewer are not grossly undersized. Rather, any of the individual drainage problems on or proximate to Memorial Drive can be attributed to one or more of the following issues:

- **Memorial Drive Vertical Profile:** Memorial Drive east of the Beltway has been in its current horizontal alignment since the 1950's. The roadway is generally built up above natural ground from the Beltway to Old Oaks Drive where it starts to cut below the natural ground. The crossing at W153 is not perched but is generally flat as with the approaches on-grade with the surrounding topography. There is a notable highpoint at Boheme Drive which forms in a "bowl" in the area to the north near Old Oaks Drive and Huntingwick Drive (see **Figure 3.2: Memorial Drive Approximate Existing Roadway Profile**). The current vertical profile does not promote cascading flow to the outfall.

**Figure 5.1: Memorial Drive Approximate Existing Roadway Profile**



- Overland Flow Path for 100-year: The original open channel alignment of W153 south of Memorial Drive generally follows the current horizontal alignment of Somerset Place. The natural overland flow path of W153 has therefore been “filled-in” and consequently no longer has a clear path to follow when it becomes inundated. Flow from W153 which overtops Memorial Drive during the extreme event when the capacity of the 9’x9’ crossing is exceeded is primarily split between Somerset Place and Legend Lane.
- W153 Crossing at Memorial: W153 is currently enclosed within a 9’x9’ RCB storm sewer for a distance of approximately 1000ft and outfalls back to an open channel just east of the tennis courts on Somerset Place. The culverts do not have adequate capacity to convey the 100-year event. This constriction exacerbates any capacity issues of the open channel section upstream due to the resulting backwater effect.
- Undersized Drainage Infrastructure on Memorial Drive: The analysis demonstrates that the roadside ditches and storm sewers do not have 100-year capacity. Site visits and

communication with the City indicates that many of the culverts within the roadside ditches have become partially obstructed therefore the capacity problems could be worse than demonstrated by the analysis.

### 5.5 Potential Drainage Impacts

A number of potential impacts were investigated as part of the Memorial Drainage System analysis. These include:

- Increased Impervious Cover – In road improvement projects pervious areas can be replaced by impervious areas causing the volume of runoff to be increased. The proposed Memorial Drive is wider than existing in terms of the distance from curb to curb and includes wider sidewalks and mixed use paths. The potential for impact in terms of an increase in impervious cover was analyzed. The net change in impervious cover is an increase of 0.2 acres. (see **Appendix C: Exhibit 3.5 - Impervious Cover (Existing vs Proposed)**). The proposed 2-10’x10’ storm sewer trunkline is considerably oversized in terms of the roadway drainage in order to allow potential drainage improvements to areas outside of the project limits. Consequently there will be more than enough additional storage in order to maintain existing discharge rates.
- Impacts to W153: W153 and the associated 9’x9’ culvert under Memorial Drive serves as an outfall for the Memorial Drive drainage system east of West Bough. Any improvements to the conveyance downstream of Memorial have the potential to impact the already overburdened W153 if adequate mitigation is not provided. The proposed drainage system maintains or reduces the existing flow leaving the project limits. This will be accomplished with restrictors to the 9’x9’ box that limit the proposed discharge to the existing conditions.
- Impacts to Beltway-8 Frontage Road: The storm sewer system under the Beltway-8 Frontage Road serves as an outfall for Memorial Drive drainage west of West Bough. Any improvements to the conveyance have the potential to impact the TxDOT system if adequate mitigation is not provided. The proposed drainage system maintains or reduces the existing flow leaving the project limits including the outfall to Beltway-8.
- Changes in overland flow: Changes to the vertical profile of the proposed Memorial Drive may result in changes to any associated overland flow paths. These overland flows may impact surface drainage or be intercepted by sub-surface systems that were not impacted before. Of

specific concern are the areas upstream and downstream of the W153 crossing at Memorial. As discussed previously, Memorial Drive is overtopped by channel flows not contained by W153 upstream of Memorial or conveyed by the enclosed W153 under Memorial. With this in mind it was proposed that the proposed vertical alignment be maintained at existing as much as is possible given other geometric design constraints.

## 5.6 Proposed System Design

Three primary drivers were considered in the development of the proposed design. Firstly, it should meet or exceed, as best as is possible, the basic roadway drainage design criteria for the City of Houston. Secondly, there was a directive by TIRZ 17 to explore the possibility of efficiently and responsibly maximizing stormwater detention within the project limits. This was with a view to improving overall drainage conditions for property adjacent to Memorial Drive. Thirdly, the proposed system should be designed in such a way as to work with a future regional detention improvement.

In order to develop the design, the first undertaking was to determine how much volume can be placed within the limits of the proposed roadway ROW. The two main constraints in this regard (ignoring cost) are the available vertical depth and horizontal width. The available depth is a function of: the receiving infrastructures flowline elevation; the proposed vertical alignment of the roadway; any conflicting infrastructure; and the required cover depth for the proposed storm sewer. The available width is a function of: the available ROW; any conflicting infrastructure; constructability issues; and future maintenance access. It was determined; given all of these factors, that 2–10'x10' RCB's were the largest practical sub-surface storm sewers that could be used.

Given that there is excess hydraulic capacity being placed in the proposed drainage system for storage purposes, the proposed 2-year hydraulic design is measured by the ability of each of the storm sewer system elements being able to handle the local runoff while meeting ponding width and depth requirements. This storm inlet and pipeline analysis was done using HouStorm to size the connecting elements.

The only other consideration for the proposed design is the extreme event. It is not entirely clear as to what criteria should be used at the crossing as there are many issues to consider:

- Firstly, when considered as a crossing, the HCFCD criteria for Culverts or Channel Enclosures would seem to apply. This would require that the crossing should have capacity to convey

the 1% exceedance probability storm. The enclosed W153 extends for 1,000 ft beyond the limits of the roadway construction therefore there is no way to improve the conveyance downstream within the limits of the project itself. Extending the improvements beyond the ROW is considered in this report.

- Per the roadway drainage criteria, the maximum ponding and overland flow paths for extreme events are applicable. W153 is not a FEMA studied or mapped stream, therefore it is not technically a special flood hazard area. The City criteria therefore states that the maximum ponding depth for the 100-year event must be less than 6" at high points in the roadway and 18" at low points. Additionally the ponding elevation must be less than the natural ground elevation at the ROW. As discussed previously, the existing W153 stream flows overtop Memorial Drive therefore in order to meet the City ponding criteria the roadway elevation would need to be increased. An estimate was made of the proposed roadway elevation required in order to meet the ponding criteria at the W153 crossing. The existing 100-year WSEL is approximately 68.5' therefore the proposed roadway elevation must be 6" below at approximately 68'. This would necessitate raising the roadway vertical profile almost a foot which would potentially have a damming effect and increase WSEL's on the upstream side of the W153 crossing. Raising the profile of memorial at W153 results in multiple geometric and safety challenges that make this alternative not feasible.

In considering either or both of these criteria one must also consider the effect any design decisions have upon the hydraulic impacts to the receiving systems either in terms of increased flows downstream or increased WSEL's upstream. It is certainly possible to add increased capacity to the enclosed portion of W153 either by adding a parallel barrel down Somerset Place or perhaps creating a new conveyance route down Legend Lane to the east. Both would potentially result in increased flow in W153 downstream of Summerset Place.

Considering all of the potential design constraints, five drainage improvement options were developed:

6. **Option 1 (Memorial Drive Improvements Only):** Maintain the existing roadway elevation and the existing single 9'x9' RCB of the enclosed W153. Improve roadway drainage and attempt to pick up as much off-site drainage as possible. Detain increased runoff in the 2-10x10 RCB's

using restrictors and allow the relief realized at the enclosed W153 to improve the open section upstream.

7. **Option 2 (Add 9'x9' RCB):** Similar to Option 1 but attempt to meet roadway ponding depth criteria by upsizing the enclosed W153 to reduce upstream WSEL's.
8. **Option 3 (Raise Roadway Profile):** Similar to Option 2 but increase the Memorial Drive roadway elevation to meet roadway ponding depth criteria and maintain the existing W153 WSEL by conveying the flow that used to overtop Memorial by upsizing the enclosed W153.
9. **Option 4 (Regional Detention):** Explore the possibility of adding sub-regional detention south of IH-10 that can reduce the peak flow in W153 and therefore reduce the depth of the flow overtopping Memorial.
10. **Option 5 (Regional Detention Add 9'x9' RCB):** Similar to Option 4 but include additional conveyance under Memorial.

Note that all of these options assume the basic 2–10'x10' RCB's are utilized as the largest practical sub-surface storm sewers that can be provided.

## 5.7 Proposed Conditions Analysis

All of the proposed options were modeled by updating the existing conditions Infoworks ICM model. This 2D model was used for preliminary design and for estimation of impacts only. Further refinement of the design is anticipated after the technical review committee (TRC) meeting. Subsequently, the detailed design elements of the HouStorm analysis will be incorporated into the 2D model for a detailed impact and mitigation analysis that will finalize outfall sizes and be incorporated into an impact study that will be prepared for HCFCD and TxDOT review and approval.

### 5.7.1 Hydrology

The existing conditions model was used as the basis for the proposed conditions model. The methods used to develop the hydrologic parameters for the proposed model are outlined below:

#### 5.7.1.1 Drainage Areas

The drainage area delineations from the existing system were maintained for use in the proposed model.

#### 5.7.1.2 Impervious Cover

An analysis was done to determine how the proposed roadway affects the impervious cover within the project limits. The existing roadway, sidewalks and driveways constitute 7.9 acres of the 11.2 acres of the existing ROW resulting in a percent impervious of 71%. The proposed roadway, sidewalks and driveways constitute 8.1 acres of the same area thereby resulting in a proposed percent impervious of 72%. (see **Appendix C: Exhibit 3.5 - Impervious Cover**) Such a small increase in impervious cover will have a negligible increase in runoff volume and therefore wasn't considered in the 2D preliminary analysis model.

### 5.7.2 Hydraulics

As discussed previously, the five options were modeled in the Infoworks ICM model in order to determine feasibility and to allow the selection of a recommended option. The following discusses the general findings of each model, however, a detailed discussion of the results is provided for the recommended option only.

#### 5.7.2.1 Option 1 (Memorial Drive Improvements Only)

Option 1 is designed to maximize the benefit of the drainage improvements while eliminating impacts to W153 and the adjacent properties. As discussed previously 2-10'x10' RCB's are the largest conduits that can practically be placed within the proposed ROW. Restrictors were placed at strategic locations throughout the length of Memorial in order to maintain the HGL as high as possible for as long as possible so as to maximize the effective storage. Restrictors at the outfalls to the W153 and Beltway-8 systems were optimized to ensure the proposed outfall discharges remain at the existing flow rates. The storm sewer infrastructure proposed for Option 1 (see **Appendix C: Exhibit 3.5. - Recommended System Schematic**) includes the following:

1. Memorial Dr from Beltway 8 to West Bough Ln: 1285LF of 1-10'x10' RCB
2. Underneath West Bough Ln: 100 LF 48" RCP
3. Memorial Dr from West Bough Ln to Boheme: 543LF of 2-10'x10' RCB, Siphon: 122LF of 4-24" RCP
4. Memorial Dr from Boheme to W153-00-00: 1349LF of 2-10'x10' RCB
5. Memorial Dr from W153-00-00 to Tallowood: 480.5LF of 2-10'x10' RCB



6. 3 Large Junction Boxes.
7. 32 Type B-B, 2 Type AZ2G and 1 Type C inlets to capture the runoff and associated 24" leaders to convey flows to the trunkline.
8. Approximately 4 ditch tie-in pipes to accept runoff from roadside ditches.

#### 5.7.2.2 Option 2 (Add 9'x9' RCB)

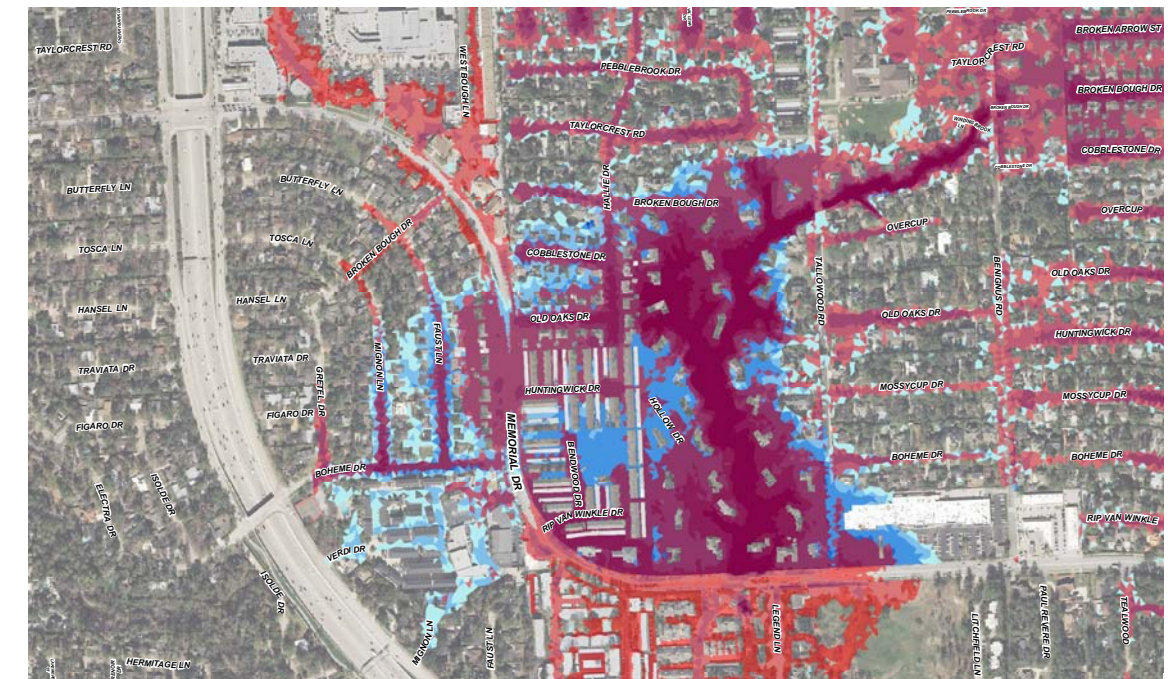
This option builds on the drainage improvements of Option 1 in order to attempt to meet City criteria for the 100-year by reducing the W153 WSEL upstream of Memorial Drive. This is done by adding additional conveyance to the enclosed portion of W153. There is a limitation on how much open area can be constructed at the headwall on north side of Memorial Drive at W153. This is due to the combined limitation of the existing ROW and the conflicting sanitary sewer. Analysis of the available headwall open area led to the conclusion that the conveyance could be doubled. The capacity of the enclosed W153 was therefore increased by adding an additional 9'x9' RCB barrel parallel to the existing one. While this did reduce the upstream WSEL, there was an increase in the flow where the W153 enclosure outfalls to the W153 open channel. Attempts were made to restrict the outfall of the Memorial Drive system to mitigate these increased flows. The model demonstrated that there is not enough storage capacity in the Memorial Drive improvements to offset the increase in flows. The depth of flow across Memorial Drive was reduced from 1.68' to 1.61', deeper than the allowed 6".

#### 5.7.2.3 Option 3 (Raise Roadway Profile)

This option builds on Option 2 and is intended to meet City criteria for the 100-year by increasing the elevation of Memorial Drive until the ponding depths are within criteria guidelines. Increasing the roadway elevation will have the effect of damming the current overland flow path across Memorial Drive which is why it was implemented with the increased W153 conveyance of Option 2. A proposed 2D hydraulic surface model was developed by updating the existing surface with a proposed increased vertical alignment which was developed based on an approximate roadway crossing elevation of 68'. The model output (Figure 3.3: Impact of Increase in Roadway Profile) shows that the increase

in the roadway elevation leads to a significant increase in the ponding (blue) upstream of Memorial Drive compared to the existing extents (red).

Figure 5.2: Impact of Increase in Roadway Profile



The additional capacity added to the enclosed portion of W153 is not sufficient to convey the flow originally conveyed across the top of Memorial. This is in spite of the fact that the outfall from the Memorial Drainage system was restricted further in order to prevent flow impacts to W153. All of this would suggest that additional subsurface capacity is required to prevent this increase in upstream flooding. Unfortunately, due to space limitations on the upstream headwall for the Memorial/W153 crossing, adding additional capacity is not possible. Moreover, even if it was possible, there is not enough excess storage capacity in the Memorial Drive drainage system to mitigate the increase in flow that would be realized downstream of W153.

#### 5.7.2.4 Option 4 (Regional Detention)

Options 1–3 are not able to achieve the desired reduction in ponding depth across Memorial Drive at W153. To further reduce the depth of ponding would take sub-regional detention measures to reduce the flows at Memorial and W153. Such detention

is being considered by TIRZ 17. Option 4 incorporates the sub-regional detention solution currently being explored by TIRZ 17 to determine how the system operates with reduced flows at W153. The analysis demonstrates a considerable reduction of between 300 to 400 cfs in the W153 flows within the vicinity of Memorial Drive. This flow reduction is accompanied by a WSEL reduction of approximately 0.25' in the ponding overtopping Memorial.

**5.7.2.5 Option 5 (Regional Detention Add 9'x9' RCB)**

Option 5 incorporates all of the improvements of option 4 but also includes additional conveyance within the enclosed portion of W153. This was done in order to attempt to maximize the benefit from the regional solution with regard to the Memorial and W153 crossing.

The model output shows a considerable reduction of between 300 to 400 cfs in the W153 flows within the vicinity of Memorial Drive. This flow reduction is accompanied by a WSEL reduction of approximately 0.25' in the ponding overtopping Memorial.

**5.7.3 Alternative Comparative Results**

The pros and cons of each of the options were discussed briefly in the previous sections. As none of the options solves all of the design goals or meets the desired criteria, the option that has the best comparative outcome should be recommended. Comparative results were analyzed (see **Table 5.2: Alternative Comparison Results**) and a matrix of pros and cons developed (see **Table 5.3: Alternative Comparison Results Matrix**). It can be seen that Options 1, 4 and 5 all have the best performance in that they meet the most of the comparative criteria (5 out of 7). All of these options use the base design of Option 1 as Options 4 and 5 were used to determine if increasing the capacity of the enclosed portion of W153 is beneficial if a sub-regional detention system is implemented. Doubling the capacity of the crossing does not give a significant increase in the conveyance downstream for the 100-year event. Option 2 which includes adding additional capacity to the enclosed portion of W153 is next best option however it has impacts to W153 downstream. Option 3 which includes raising the roadway profile is the least preferred option as it has impacts upstream and downstream of the Memorial

crossing and is not constructible in terms of geometric design criteria within the current ROW. The illogical scenario of resulting impacts both upstream and downstream is a result of additional flow obstruction upstream (unable to adequately increase sub-surface conveyance), and timing downstream.

Given that there is not significant benefit in adding additional conveyance to W153, even with a sub-regional detention solution, and that without the sub-regional detention the additional 9'x9' RCB causes impacts to W153 downstream, Option 1 is recommended. The recommended improvements in Option 1 will be fully leveraged with the construction of a regional detention project.

**Table 5.2: Alternative Comparison Results**

Option	Description	100-yr Peak Flow (cfs)				100-yr WSEL (ft)			
		W153 N	Memorial Crown	W153 S	W153 OF	W153 N	Memorial Crown	W153 S	W153 OF
Ex	Existing Conditions	932	932	1087	1133	68.82	68.67	68.42	66.41
1	Memorial Drive Improvements Only	921 (-11)	865 (-67)	1070 (-18)	1136 (3)	68.72 (-0.10)	68.57 (-0.10)	68.31 (-0.11)	66.42 (0.00)
2	Add 9'x9' RCB	952 (21)	890 (-42)	1186 (99)	1276 (143)	68.77 (-0.06)	68.60 (-0.07)	68.34 (-0.08)	66.39 (-0.02)
3	Raise Roadway Profile	573 (-358)	243 (-689)	764 (-323)	985 (-147)	70.30 (1.47)	66.98 (-1.69)	66.61 (-1.81)	66.43 (0.02)
4	Regional Detention	764 (-167)	627 (-305)	700 (-387)	1061 (-72)	68.55 (-0.28)	68.40 (-0.27)	68.40 (-0.01)	66.42 (0.01)
5	Regional Detention Add 9'x9' RCB	800 (-131)	732 (-200)	593 (-494)	1114 (-18)	68.57 (-0.26)	68.42 (-0.25)	68.18 (-0.24)	66.40 (-0.02)



**Table 5.3: Alternative Comparison Results Matrix**

Option	Description	Meets Roadway Geometric Design Criteria	Meets Roadway Drainage Criteria	Meets Roadway 2Yr 100yr Drainage Criteria	No overtopping of W153 at Memorial	WSEL Reduction at Key Locations	No Negative Impacts North of Memorial	No Negative Impacts South of Memorial
1	Memorial Drive Improvements Only 1. 2-10'x10' RCB under Memorial 2. Maintain existing roadway vertical profile	✓	✓	✗	✗	✓	✓	✓
2	Add 9'x9' RCB 1. 2-10'x10' RCB under Memorial 2. Maintain existing roadway vertical profile 3. Add additional conveyance at W153 crossing	✓	✓	✗	✗	✓	✓	✗
3	Raise Roadway Profile 1. 2-10'x10' RCB under Memorial 2. Raise roadway vertical profile at W153 3. Add additional conveyance at W153 crossing	✗	✓	✗	✓	✗	✗	✗
4	Regional Detention 1. 2-10'x10' RCB under Memorial 2. Maintain existing roadway vertical profile 3. Provide 135 ac-ft of sub-regional storage	✓	✓	✗	✗	✓	✓	✓
5	Regional Detention Add 9'x9' RCB 1. 2-10'x10' RCB under Memorial 2. Maintain existing roadway vertical profile 3. Add additional conveyance at W153 crossing 4. Provide 135 ac-ft of sub-regional storage	✓	✓	✗	✗	✓	✓	✓

**5.7.4 Recommended Drainage System – Option 1 - Analysis Results**

**5.7.4.1 2-Year Event**

The model of the recommended option shows that the 2-year WSEL of the Memorial Drive storm sewer is well below the inlet elevation for the entire length of the proposed improvements therefore it meets the City of Houston 2-year capacity criteria.

The flooding and overland flow in the 2D surface reflects the improvements to the drainage system (see **Appendix C: Exhibit 3.7 - Proposed System Results 2yr**). It can be seen that there is no flooding within the limits of the proposed improvements. A reduction in the existing flood depth and extents can be seen for a considerable distance outside these limits.

The combined surface and sub-surface proposed 2-year peak discharge on the south side of Memorial is 188.3 cfs. This is less than the existing peak discharge of 200.5 cfs therefore there is no negative impact to the W153 system. The combined surface and sub-surface proposed 2-year peak discharge from Memorial Drive to the Beltway-8 system is 45.8 cfs. This is less than the existing peak discharge of 60.9 cfs therefore there is no negative impact to the Beltway 8 system. (see **Table 3.6: Memorial Drive Outfall Discharges**).

**5.7.4.2 100-Year Event**

The model of the recommended option shows that the 100-year WSEL is generally at or below the top of curb elevation for the entire length of the proposed improvements to Memorial Drive. Due to the incapacity of the open channel upstream of Memorial Drive and of the enclosed portion downstream, W153 backs up and overflows into and across the Memorial Drive ROW. This overflow occurs significantly at the W153 crossing itself, and at Rip Van Winkle, Huntingwick and Old Oaks Drive.

As the ponding depths exceed those stated, it does not meet the City of Houston 100-year criteria. The flooding and overland flow in the 2D surface does however reflect the improvements to the overall drainage system (see **Exhibit 3.8: Proposed System Results 100yr**). It can be seen that there is significant reduction of the extent and depth of flooding to properties and streets adjacent to the proposed improvements, especially at the upper end of Memorial Drive away from W153. Other minor reductions can be seen around W153; however, complete removal of those areas from flooding will require interventions that are beyond the scope of this project.

The combined surface and sub-surface proposed 100-year peak discharge on the south side of Memorial is 1066.2 cfs. This is less than the existing peak discharge of 1078.2 cfs therefore there is no negative impact to the W153 system. The combined surface and sub-surface proposed 100-year peak discharge from Memorial Drive to the Beltway-8 system is 63.8 cfs. This is less than the existing peak discharge of 71.6 cfs therefore there is no negative impact to the Beltway 8 system. (see **Table 5.4: Memorial Drive Outfall Discharges and Appendix C: Exhibit 3.9. - No Adverse Impact**).

**Table 5.4: Memorial Drive Outfall Discharges**

Location	2 year			100 year		
	Existing	Proposed	Difference	Existing	Proposed	Difference
Beltway-8 Outfall	60.9	45.8	-15.1	71.6	63.8	-7.7
W153 Outfall	200.5	188.3	-12.2	1078.2	1066.2	-12.0

**5.7.5 Cost Estimate**

The estimated cost for the drainage elements of the recommended design is approximately \$9.0 M. This cost is driven by the significant length of the large underground storage boxes.

**5.8 Conclusion**

Five drainage options were considered in detail for the proposed Memorial roadway reconstruction, all of which attempted to optimize storage and improve the existing drainage problems. Option 1 is recommended as it brings the roadway into compliance with City criteria, and will provide a 10-year level of protection with the exception of the noted areas influenced by W153 overtopping Memorial. Existing drainage flow patterns along Memorial Drive will not change. The Beltway 8 drainage system will not be re-routed and no additional water from the Beltway 8 system will be conveyed to W153. The project will match or lower flow rates to the receiving systems and will have no adverse impact up to and including the 100-year event

The amount of total storage provided is approximately 12+ ac-ft. This estimate will be refined during detailed design.



## 6.0 Public and Private Utilities Assessment and Recommendations

### 6.1 Design Criteria

The design criteria for the water lines along Memorial Drive are based upon the following:

- City of Houston Department of Public Works and Engineering Infrastructure Design Manual, latest edition.
- City of Houston Department of Public Works and Engineering Standard Construction Details for Wastewater Collections Systems, Water Lines, Storm Drainage and Street Paving, latest edition.
- City of Houston Department of Public Works and Engineering Standard Construction Specifications for Wastewater Collections Systems, Water Lines, Storm Drainage and Street Paving, latest edition.
- Input from City of Houston Waste Water department personnel

### 6.2 Regulatory Agencies

The design of the proposed water lines will comply with the Texas Commission on Environmental Quality criteria. In all cases where the water lines parallel or cross sanitary sewer lines, appropriate separation will be maintained, or required protection will be provided. .

### 6.3 Recommended Public Utility Improvements

Information on existing water and sanitary sewer lines within the project limits were obtained from survey data, record drawings, and the City of Houston Geographic Information & Management System (GIMS). See **Appendix B** for 30% Plan and Profile sheets for more information.

#### 6.3.1 Recommended Water Line Improvements

There is one continuous waterline within the project limits that runs along the south side of Memorial Drive and seven waterlines that run perpendicular to Memorial Drive. The existing water line starts as a 12-inch diameter line at east of Beltway 8 Frontage Road, then increases and to a 16-inch diameter line approximately 80-feet east of the intersection. The 16-inch water line continues east along Memorial Drive for the extents of the project.

#### 12-Inch Water Line:

The existing 12-inch asbestos concrete (AC) water line located within the project limits was placed in service in 1969, nearly 40 years ago. It is recommended that this existing water line be replaced due to the age and the existing pipe material. Also, the 12-inch water line is located between two 16-inch water lines causing reductions in the flow (bottleneck). A new, parallel 16-inch water line will be installed, and all service connections transferred, before the existing 12-inch water line is abandoned in place. Trenchless construction methods are anticipated for the proposed 16-inch water line. See **Appendix B** for additional details on existing and proposed water lines.

#### 16-Inch Water Line:

The existing 16-inch ductile iron water line located along the southern ROW of Memorial Drive was placed in service in 1995, nearly 20 years ago. Per available record drawings, the 16-inch water line is ductile iron pipe with steel offsets. According to the City, there are currently no plans for upsizing or replacing the existing 16-inch ductile iron water line. Therefore, it is recommended that the 16-inch existing water line not be replaced.

#### Water Line Crossings:

There are seven waterlines that run perpendicular to Memorial Drive within the project limits, and are described below:

1. 16-inch diameter cast iron water line: Placed in service in 1969, just over 45 years ago, crossing at Memorial Drive at Beltway 8 Frontage Road.
2. 8-inch diameter steel water line: Placed in service in 1995. Crosses at Broken Bough Drive/W. Bough Lane.
3. 12-inch diameter polyvinyl chloride water line: Placed in service in 2010 at Old Oaks Drive.
4. 8-inch diameter polyvinyl chloride water line: Placed in service in 1995 at Huntingwick Drive.
5. 8-inch diameter polyvinyl chloride water line: Placed in service in 1995 at Rip Van Winkle Drive
6. 8-inch diameter steel water line: Placed in service in 1995 at Hollow Drive.
7. 8-inch diameter polyvinyl chloride/steel water line: Placed in service in 1992 at Tallowood Road.

It is recommended for all crossings to be replaced due to the existing pipe material, depth of cover, conflicts with proposed improvements and to eliminate any future water line replacement projects impacts the future roadway. All proposed water line connections along perpendicular streets will be installed away from the intersections to eliminate any disruption when other city projects are proposed. Trenchless construction methods are anticipated for the proposed water line crossings.

A City Capital Improvements Project (CIP) Water line Replacement project, "Water Line Replacement in Memorial Bend and Briar Forest Area (WBS No. S-000035-0212-3)", is proposed within the adjacent streets of the project limits with an anticipated CIP construction year of FY17. The project's proposed small diameter water lines are proposed to connect to the existing 16-inch water line along Memorial Drive at Broken Bough Drive, Boheme Drive and Legend Lane. Coordination will be required during design to eliminate potential conflicts. If Memorial Drive is constructed first, stub-outs will be provided to eliminate any connections within the new pavement along Memorial Drive.

The current fire hydrant spacing does not meet current City standards for commercial usage. Memorial Drive is a combination of retail, business, single and multi-family development. Furthermore, some of the existing fire hydrants will be impacted by the proposed roadway and/or sidewalks. It is recommended new fire hydrants be added to accommodate the proposed improvements as well as to comply with City's fire hydrant spacing requirements. Whenever possible, the existing fire hydrants will be salvaged and re-installed to reduce overall costs. In addition to replacing water line crossings and adding fire hydrants, it is recommended that existing unmetered water lines or fire lines be metered. The proposed meters, 3-inches and larger, will need to be located inside an easement per current City Design Manual.

### 6.3.2 Recommended Sanitary Sewer Improvements

There are four separate sanitary sewer lines within the project limits that run parallel to Memorial Drive and ten sanitary sewer lines that run perpendicular to Memorial Drive. The City's Wastewater Operations Department was contacted to request information, including CCTV, age, and condition of the line. The City provided the available data and 2014 CCTV footage.

#### **15-inch Sanitary Sewer:**

There is an existing 15-inch diameter gravity sanitary sewer made of polyethylene pipe within the project limits. This line was rehabilitated in 1999 and is located in back-lot sanitary sewer easements of properties south of the Memorial Drive right-of-way, between Beltway 8 Frontage Road and Boheme Drive. The number of service connections present throughout the line is unknown. It is recommended that the existing sanitary sewer line be not be replaced due to the age, existing pipe material and location of sanitary sewer line.

#### **12-Inch Sanitary Sewer:**

There is a 12-inch diameter gravity sanitary sewer that runs along the north/east ROW of Memorial Drive between 150 feet south of Old Oaks Drive and Boheme Drive. 290 feet is made of polyethylene pipe due to the rehabilitation in 1999; however the other 285 feet is made of unreinforced concrete (URC) pipe and was placed in service in 1960. Multiple service connections are present throughout the line. It is recommended that the only the 285 feet of unreinforced concrete section of the existing sanitary sewer line be replaced due to the age, pipe material and current condition of pipe. CCTV footage of the URC pipe identified infiltration in at least two locations, lateral protruding along with infiltration in the annular space and deterioration of pipe. It is also recommended for both manholes between the URC pipes be rehabilitated or replaced. Both manholes were made of brick and also show signs of deterioration. Based on the size, depth and location of the line), open cut method is the recommended method of replacement. Refer to **Appendix B** for additional details.

#### **10-Inch Sanitary Sewer:**

There is a 10-inch diameter gravity sanitary sewer that runs along the north/east ROW of Memorial Drive between Huntingwick Drive and Boheme Drive. This existing sanitary sewer line is parallel to the existing 12-inch sanitary sewer line. This sanitary sewer line is made of extra strength concrete and was placed in service in 1966, nearly 40 years ago. CCTV data was not available for this line and service connections are unknown due to the access manholes being buried under the existing roadway asphalt over lay. CCTV was performed in a manhole close to the downstream of the 10-inch sanitary sewer and it identified the line to be in service. It is recommended that this existing sanitary sewer line be replaced due to the age and the existing pipe material. It is also recommended to CCTV the line during detailed design, which may require an on-call contractor to locate, uncover and adjust the buried manholes. Based on the size, depth and location of the line, open cut methods is the recommended method of replacement. During detailed design, further CCTV investigation will be required and the existing 10-inch and the 12-inch line (from Huntingwick to Boheme Drive), may be combined into one single sanitary sewer. Refer to **Appendix B** for additional details.

#### **48-inch Sanitary Sewer:**

There is a 48-inch diameter gravity sanitary sewer line that runs along the east and north right-of-way of Memorial Drive between Boheme Drive and Tallowood Road. Half of the line is made of plastic-lined pipe and the other half is made of concrete. The entire line was placed in service in 1997 and multiple service connections are present throughout the line. It is not recommended that this existing sanitary sewer line be replaced due to the age and the existing pipe material. However one of its manholes (WDP04052) is currently buried and should be exposed and adjusted during construction.

#### **Sanitary Sewer Crossings:**

There are ten sanitary sewer lines that cross perpendicular to Memorial Drive within the project limits, and are described below:

1. 8-inch diameter extra strength pipe: Placed in service in the 1950's
2. 24-inch diameter concrete pipe: Placed in service in the 1968.
3. 8-inch diameter unreinforced concrete pipe: Placed in service in 1969.

Sanitary sewer lines 4 through 7 crossings are made of unreinforced concrete and other unknown materials, installed in the 1960's.

CCTV footage for three 8-inch diameter unreinforced concrete lines revealed irregularities in each of the lines. The CCTV footage of the 24-inch sanitary sewer identified deterioration of the pipe, and pipe gaskets were visible in several joints but infiltration did not appear on the CCTV footage. The entire 24-inch RCP was not able to be fully televised due to a 15-inch PVC pipe between the 24-inch sanitary creating a reducer and blocking the flow. It appears that repairs were performed on the 24-inch sanitary sewer.

In addition, the existing sanitary sewer crossings will be in conflict with proposed storm sewer improvements. It is recommended that these existing gravity sanitary sewer lines be replaced due to their ages, varying from 30 to 60 years old, existing pipe material, and potential future conflicts.

There are three sanitary sewer force mains within the project limits:

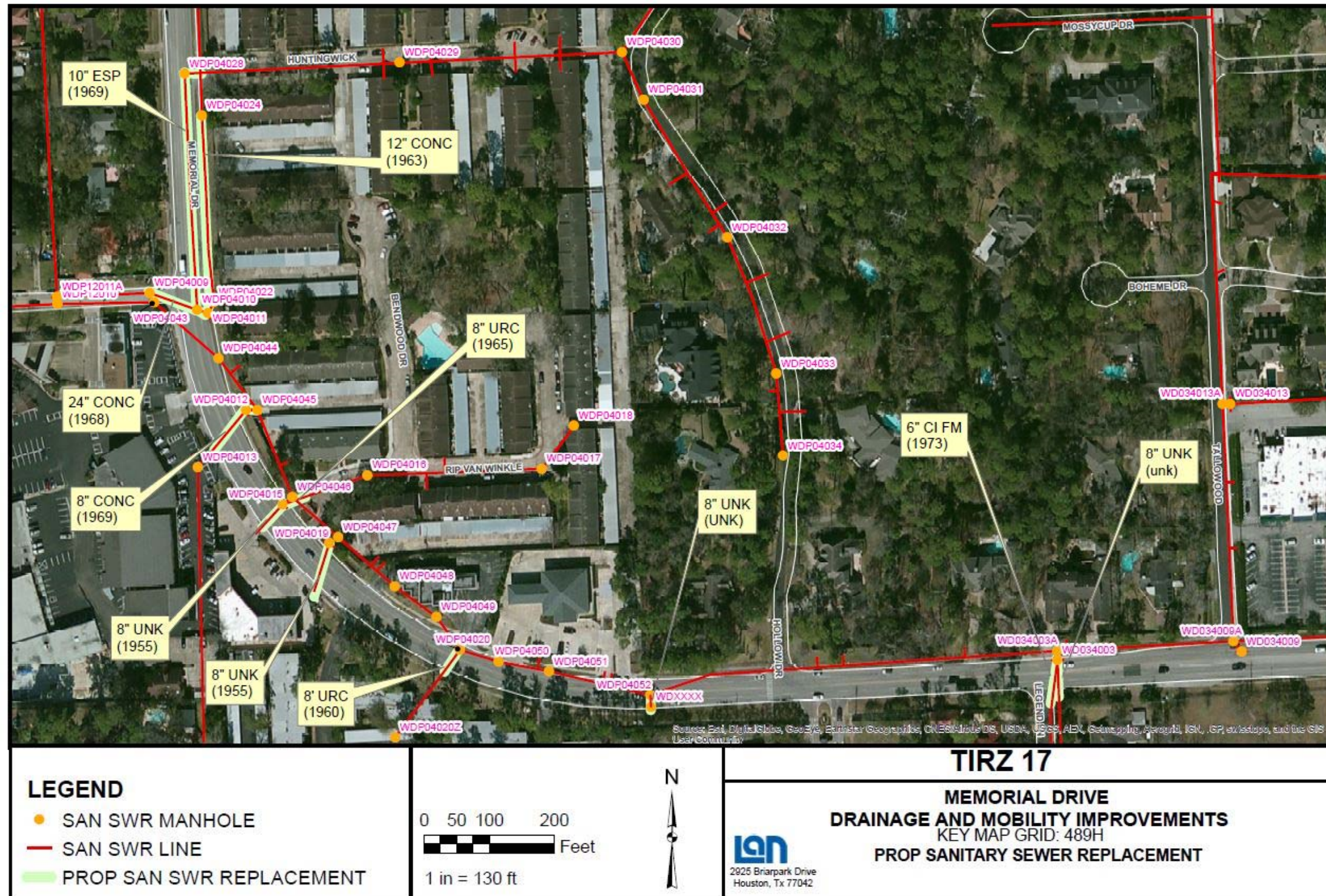
1. 10-inch ductile iron force main: Installed in 1984.
2. 6-inch ductile iron force main: Installed in 1984
3. 6-inch cast iron force main: Installed in the 1970's

The 6-inch ductile iron force main will need to be relocated to accommodate the proposed drainage improvements. The 6-inch cast iron force is recommended to be replaced due to pipe material and age of line.

All sanitary sewer line replacements will maintain full capacity with a new pipe of the same diameter installed in the same alignment using open-cut methods. It is also recommended that 10 manholes be replaced due to the age, and existing conditions seen in CCTV footage. See **Exhibit 6.1** for recommended sanitary sewer replacement and refer to **Appendix B** for additional details.

**EXHIBIT 6.1 Proposed Sanitary Sewer Replacement**







## 7.0 Conclusion

Based on the results from the preliminary roadway geometric evaluation and condition assessment, traffic analysis, drainage analysis, and utility assessments and in order to satisfy the three main project objectives: Improve safety and Mobility, Improve Drainage, and Improve Quality of Life, the following improvements are recommended: Impacts of each alternative to right-of-way, pedestrian amenities, tree inventories, and underground utilities have also been considered.

### **1. Improve Safety & Mobility**

- Upgrade roadway to a curb and gutter concrete section, including two (2) 11-foot wide lanes with a 20-foot to 24-foot wide raised median raised median from Beltway 8 Northbound Frontage road to Tallowood Road.
- Reconstruct roadway to meet City's current roadway geometric requirements.
- Add left-turn bays at median openings.
- Upgrade traffic signals at BW 8 Frontage Road and West Bough Lane/Broken Bough Drive to meet current City of Houston standards.

### **2. Improve Drainage**

- Meet the City's 2-year design criteria and eliminate frequent street flooding/ponding
- Improve the 10-year level of protection
- Install 1~10'x10' reinforced concrete box storm sewer from Broken Bough Drive/West Bough Lane
- Install 2~10'x10' reinforced concrete box storm sewers from Broken Bough Drive/West Bough Lane to W153; with restrictors at the W153 outfalls.
- Provide approximately 12+ ac-ft of total storage.

The existing drainage patterns along Memorial Drive will not change. The Beltway 8 drainage system will not be re-routed and no additional water from the Beltway 8 system will be conveyed east to W153.

This project will match or lower flow rates to the receiving systems and will have no adverse impact up to and including the 100-year event.

### **3. Improve Quality of Life**

- Install continuous, 6' wide concrete sidewalks along the northern ROW
- Install 10-foot wide concrete multi-use/shared path along the southern ROW
- Install decorative pavers within sidewalks
- Plant additional trees and shrubs within median and along curb
- Install standard street lighting and pedestrian lighting along the entire project limits

Due to the age, material, and proposed conflicts, all of the 8-inch and 10-inch water lines and water line crossings are recommended to be replaced.

Due to pipe deterioration, age, proposed conflicts, and pipe material, the majority of the existing small diameter sanitary sewers lines are recommended to be replaced.

The total preliminary estimated construction cost for the project, including a 15% contingency, is \$17,390,500. These costs do not include any right-of-way acquisition or private utility relocation costs. The detailed preliminary estimated construction costs can be found in **Appendix A**.

Phase II design will commence upon approval of the recommended project by the City and TIRZ 17.

**MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS PROJECT  
CONSTRUCTION COST ESTIMATE  
(PER)**

No.	Section	Description	Units	Quantity	Unit Cost	Total
<b>General</b>						
1	01502	Mobilization	LS	1	\$ 250,000.00	\$ 250,000.00
2	01555	Traffic Control and Regulation	LS	1	\$ 250,000.00	\$ 250,000.00
3	01270	Uniformed Police Officers	HR	6,000	\$ 42.00	\$ 252,000.00
4	01555	Portable Concrete Low Profile Traffic Barrier Installed	LF	4,000	\$ 40.00	\$ 160,000.00
5	01555	Portable Concrete Low Profile Traffic Barrier Moved & Reset	LF	4,000	\$ 7.00	\$ 28,000.00
6	01555	Portable Concrete Low Profile Traffic Barrier Removed	LF	4,000	\$ 10.00	\$ 40,000.00
7	01562	Tree Replacement	LS	1	\$ 145,000.00	\$ 145,000.00
8	01562	Tree Protection	LS	1	\$ 30,000.00	\$ 30,000.00
9	01570		LF	660	\$ 10.00	\$ 6,600.00
10	02922	Sodding	SY	6,950	\$ 6.00	\$ 41,700.00
11	01570	Filter Fabric Fence	LF	9,600	\$ 4.00	\$ 38,400.00
<b>General Items Subtotal</b>						<b>\$ 1,241,700.00</b>
<b>Storm</b>						
12	02082	Type-C Manhole on Box storm sewer-Complete in Place	EA	48	\$3,300.00	\$158,400.00
13	02082	Type-C Manhole	EA	25	\$4,500.00	\$112,500.00
14	02082	Adjust Inlet/Manhole to Grade	EA	7	\$2,000.00	\$14,000.00
15	02821	Reinforced Concrete Box Wall Penetration	EA	1	\$3,700.00	\$3,700.00
16	02221	Remove and Dispose of 4-inch Diameter Storm Sewer	LF	5	\$7.00	\$35.00
17	02221	Remove and Dispose of 12-inch Diameter Storm Sewer	LF	34	\$13.00	\$442.00
18	02221	Remove and Dispose of 15-inch Diameter Storm Sewer	LF	20	\$13.50	\$270.00
19	02223	Remove and Dispose of 18-inch Diameter Storm Sewer	LF	1,566	\$13.75	\$21,532.50
20	02221	Remove and Dispose of 24-inch Diameter Storm Sewer	LF	3,201	\$14.00	\$44,814.00
21	02221	Remove and Dispose of 30-inch Diameter Storm Sewer	LF	647	\$17.50	\$11,322.50
22	02221	Remove and Dispose of 36-inch Diameter Storm Sewer	LF	1,362	\$20.00	\$27,240.00
23	02221	Remove and Dispose of 42-inch Diameter Storm Sewer	LF	71	\$21.00	\$1,491.00
24	02221	Remove and Dispose of 48-inch Diameter Storm Sewer	LF	730	\$22.00	\$16,060.00
25	02221	Remove and Dispose of 9-foot by 9-foot Diameter Storm Sewer	LF	30	\$40.00	\$1,200.00
26	02221	Remove headwall	EA	5	\$350.00	\$1,750.00
27	02221	Remove and Dispose of existing inlets,all types	EA	94	\$350.00	\$32,900.00
28	02221	Remove and Dispose of existing manholes,all types	EA	2	\$460.00	\$920.00
29	02260	Trench Safety System	LF	8,597	\$2.00	\$17,194.00
30	02631	24-inch diameter Storm Sewer by Tunnel Boring Machine	LF	488	\$850.00	\$414,800.00
31	02631	24-inch diameter Storm Sewer by Open-Cut-Complete in Place	LF	1,924	\$100.00	\$192,400.00
32	02631	42-inch diameter Storm Sewer by Open-Cut-Complete in Place	LF	85	\$160.00	\$13,600.00
33	02631	48-inch diameter Storm Sewer by Tunnel Boring Machine	LF	100	\$1,000.00	\$100,000.00
34	02631	PreCast 8-foot x 8-foot Storm Sewer by Open-Cut-Complete in Place	LF	100	\$1,000.00	\$100,000.00
35	02631	PreCast 10-foot x 10-foot Storm Sewer by Open-Cut-Complete in Place	LF	7,475	\$1,000.00	\$7,475,000.00
36	02631	End Caps	EA	8	\$2,000.00	\$16,000.00
37	00001	Junction Box with Riser	EA	3	\$20,000.00	\$60,000.00
38	02633	Type A Inlet	EA	2	\$2,500.00	\$5,000.00
39	02633	Type BB Inlet	EA	33	\$2,750.00	\$90,750.00
40	02633	Type C Inlet w/ Ext	EA	1	\$3,000.00	\$3,000.00
41	02670	Type AZ2G Inlet	EA	1	\$4,000.00	\$4,000.00
<b>Storm Items Subtotal</b>						<b>\$8,940,321.00</b>

**MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS PROJECT**  
**CONSTRUCTION COST ESTIMATE**  
**(PER)**

<b>Water</b>						
42	02511	8" Water line by Trenchless	LF	364	\$ 120.00	\$ 43,680.00
43	02511	8-inch diameter DIP water line by trenchless construction with restrained joints	LF	283	\$ 180.00	\$ 50,940.00
44	02511	12" Water line by Trenchless	LF	88	\$ 130.00	\$ 11,440.00
45	02511	16-inch diameter water line by trenchless construction	LF	92	\$ 300.00	\$ 27,600.00
46	02511	16-inch diameter DIP water line by trenchless construction with restrained joints	LF	159	\$ 350.00	\$ 55,650.00
47	02513	8-inch Wet Connection	EA	8	\$ 2,000.00	\$ 16,000.00
48	02513	12-inch Wet Connection	EA	2	\$ 2,500.00	\$ 5,000.00
49	02513	16-inch Wet Connection	EA	3	\$ 3,400.00	\$ 10,200.00
50	02516	6-inch cut, plug and abandon	EA	4	\$ 800.00	\$ 3,200.00
51	02516	8-inch cut, plug and abandon	EA	13	\$ 1,000.00	\$ 13,000.00
52	02516	12-inch cut, plug and abandon	EA	2	\$ 1,200.00	\$ 2,400.00
53	02516	16-inch cut, plug and abandon	EA	3	\$ 1,600.00	\$ 4,800.00
54	02520	Fire hydrant assembly, all depths, including 6-inch diameter gate valve and box	EA	10	\$ 5,000.00	\$ 50,000.00
55	02520	6-inch diameter fire hydrant branch by open-cut	LF	77	\$ 80.00	\$ 6,160.00
56	02520	Remove and Salvage Existing Fire Hydrant	EA	4	\$ 450.00	\$ 1,800.00
57	02525	16-inch by 6-inch diameter tapping sleeve and valve with box	EA	7	\$ 6,000.00	\$ 42,000.00
58	02525	16-inch by 8-inch diameter tapping sleeve and valve with box	EA	6	\$ 6,500.00	\$ 39,000.00
59	01270	Water Meter Easement & Meter Station	EA	1	\$ 35,000.00	\$ 35,000.00
<b>Water Items Subtotal</b>						<b>\$ 417,870.00</b>
<b>Sanitary</b>						
60	02082	Precast Standard Sanitary Manhole	EA	9	\$ 5,200.00	\$ 46,800.00
61	02082	Precast Standard Force Main Manhole	EA	1	\$ 7,000.00	\$ 7,000.00
62	02531	4-inch Sanitary Sewer (Open Cut)	LF	10	\$ 100.00	\$ 1,000.00
63	02531	Remove & Dispose of Existing 4" Sanitary Sewer	LF	10	\$ 15.00	\$ 150.00
64	02531	6-inch Pressure Rated FM (by trenchless)	LF	235	\$ 250.00	\$ 58,750.00
65	02531	Remove & Dispose of Existing 6-inch Pressure Rated Sanitary Sewer	LF	235	\$ 15.00	\$ 3,525.00
66	02531	6-inch Sanitary Sewer (Open Cut)	LF	166	\$ 130.00	\$ 21,580.00
67	02531	Remove & Dispose of Existing 6" Sanitary Sewer	LF	166	\$ 15.00	\$ 2,490.00
68	02531	8-inch Sanitary Sewer (Open Cut)	LF	445	\$ 150.00	\$ 66,750.00
69	02531	Remove & Dispose of Existing 8" Sanitary Sewer	LF	445	\$ 15.00	\$ 6,675.00
70	02531	10-inch Sanitary Sewer (Open Cut)	LF	406	\$ 175.00	\$ 71,050.00
71	02531	Remove & Dispose of Existing 10" Sanitary Sewer	LF	406	\$ 15.00	\$ 6,090.00
72	02531	12-inch Sanitary Sewer (Open Cut)	LF	327	\$ 200.00	\$ 65,400.00
73	02531	Remove & Dispose of Existing 12" Sanitary Sewer	LF	327	\$ 15.00	\$ 4,905.00
74	02531	24-inch Sanitary Sewer (Open Cut)	LF	84	\$ 300.00	\$ 25,200.00
75	02531	Remove & Dispose of Existing 24" Sanitary Sewer	LF	84	\$ 20.00	\$ 1,680.00
76	02531	Remove and Dispose Sanitary Manhole	EA	9	\$ 500.00	\$ 4,500.00
<b>Sanitary Items Subtotal</b>						<b>\$ 393,545.00</b>



**MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS PROJECT  
CONSTRUCTION COST ESTIMATE  
(PER)**

<b>Paving</b>						
77	02741	Temporary Asphalt	SY	6,500	\$ 80.00	\$ 520,000.00
78	02221	Remove and Dispose of Reinforced Concrete Pavement with or without Asphalt Overlay	SY	28,116	\$ 6.00	\$ 168,696.00
79	02221	Remove and Dispose of Driveways (all materials,all thicknesses)	SY	4,614	\$ 5.00	\$ 23,070.00
80	02221	Remove and Dispose of Sidewalks (all materials,all thicknesses)	SY	3,344	\$ 6.00	\$ 20,064.00
81	02315	Roadway Excavation	CY	5,000	\$ 10.00	\$ 50,000.00
82	02221	Remove Concrete Curb, all heights	LF	3,706	\$ 1.50	\$ 5,559.00
83	02771	Concrete Curb 6"	LF	18,459	\$ 4.00	\$ 73,836.00
84	02337	Lime/Fly-Ash Stabilized Subgrade,8-inch	SY	38,656	\$ 4.00	\$ 154,624.00
85	02336	Lime for Lime Stabilized Subgrade	Ton	625	\$ 175.00	\$ 109,375.00
86	02754	7 inch High Early Strength concrete Driveway, including excavation and base	SF	3,351	\$ 8.50	\$ 28,483.50
87	02751	11-inch reinforced concrete pavement	SY	29,451	\$ 60.00	\$ 1,767,060.00
88	02752	Board Expansion Joint with Load Transfer Device	LF	4,000	\$ 11.00	\$ 44,000.00
89	02752	Horizontal Dowels, all lengths	EA	40	\$ 10.00	\$ 400.00
90	02752	Saw-cut concrete pavement(all depths)	LF	400	\$ 12.00	\$ 4,800.00
91	02775	ADA Accessible Wheelchair Ramps	SY	180	\$ 250.00	\$ 45,000.00
92	02775	ADA Detectable Warning Pavers	EA	18	\$ 200.00	\$ 3,600.00
93	02775	4 1/2" Thick Concrete Sidewalk (10 feet)	SF	36,407	\$ 7.00	\$ 254,849.00
94	02775	4 1/2" Thick Concrete Sidewalk (6 feet)	SF	22,131	\$ 7.00	\$ 154,917.00
95	02319	Borrow	CY	0	\$ 2.00	\$ -
<b>Paving Items Subtotal</b>						<b>\$ 3,428,333.50</b>

**MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS PROJECT**  
**CONSTRUCTION COST ESTIMATE**  
**(PER)**

<b>Traffic Signal - Beltway 8</b>						
95	416	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	66	\$130.00	\$ 8,580.00
96	416	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	24	\$160.00	\$ 3,840.00
97	416	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	42	\$250.00	\$ 10,500.00
98	618	CONDT (PVC) (SCHD 80) ( 2")	LF	120	\$10.00	\$ 1,200.00
99	618	CONDT (PVC) (SCHD 80) (2") (BORE)	LF	700	\$10.00	\$ 7,000.00
100	618	CONDT (PVC) (SCHD 80) (3")	LF	600	\$15.00	\$ 9,000.00
101	618	CONDT (PVC) (SCHD 80) (4")	LF	20	\$14.00	\$ 280.00
102	618	CONDT (PVC) (SCHD 80) (4") (BORE)	LF	1,000	\$19.00	\$ 19,000.00
103	620	ELEC CONDR (NO. 8) BARE	LF	2,500	\$0.90	\$ 2,250.00
104	620	ELEC CONDR (NO. 4) INSULATED	LF	1,600	\$1.60	\$ 2,560.00
105	624	GROUND BOX TY D (162922) W/APRON	EA	11	\$1,500.00	\$ 16,500.00
106	680	INSTALL HWY TRF SIG (SYSTEM)	EA	1	\$5,000.00	\$ 5,000.00
107		Optical Detector Unit	EA	6	\$625.00	\$ 3,750.00
108		Phase Selector	EA	1	\$2,300.00	\$ 2,300.00
109		Optical Detector Cable	LF	3,000	\$1.80	\$ 5,400.00
110		Controller Cabinet 340 ITS	EA	1	\$20,000.00	\$ 20,000.00
111		Model 2070L Controller	EA	1	\$2,700.00	\$ 2,700.00
112		Battery Backup System	EA	1	\$5,700.00	\$ 5,700.00
113		WIMAX	EA	1	\$4,500.00	\$ 4,500.00
114	6007	REMOVING TRAFFIC SIGNALS	EA	1	\$3,500.00	\$ 3,500.00
115	681	TEMP TRAF SIGNALS	EA	1	\$25,000.00	\$ 25,000.00
116	682	VEH SIG SEC (12 IN) LED (GRN)	EA	17	\$175.00	\$ 2,975.00
117	682	VEH SIG SEC (12 IN) LED (GRN ARW)	EA	4	\$175.00	\$ 700.00
118	682	VEH SIG SEC (12 IN) LED (YEL)	EA	17	\$175.00	\$ 2,975.00
119	682	VEH SIG SEC (12 IN) LED (YEL ARW)	EA	4	\$175.00	\$ 700.00
120	682	VEH SIG SEC (12 IN) LED (RED)	EA	17	\$175.00	\$ 2,975.00
121	682	VEH SIG SEC (12 IN) LED (RED ARW)	EA	4	\$175.00	\$ 700.00
122	682	PED SIG SEC (LED) (COUNTDOWN)	EA	16	\$460.00	\$ 7,360.00
123	682	BACK PLATE (12 IN) (3 SEC) ALUM	EA	21	\$76.00	\$ 1,596.00
124	684	TRF SIG CBL (TY A) (14 AWG) ( 3 CONDR)	LF	3,600	\$1.00	\$ 3,600.00
125	684	TRF SIG CBL (TY A) (14 AWG) ( 5 CONDR)	LF	3,900	\$1.40	\$ 5,460.00
126	684	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	LF	4,200	\$1.50	\$ 6,300.00
127	686	INS TRF SIG PL AM(S) 1 ARM (32')	EA	2	\$4,700.00	\$ 9,400.00
128	686	INS TRF SIG PL AM(S) 1 ARM (36')	EA	1	\$5,000.00	\$ 5,000.00
129	686	INS TRF SIG PL AM(S) 1 ARM (48')	EA	1	\$6,500.00	\$ 6,500.00
130	686	INS TRF SIG PL AM(S) 2 ARM(40-36')	EA	1	\$12,000.00	\$ 12,000.00
131	687	PED POLE ASSEMBLY	EA	11	\$900.00	\$ 9,900.00
132	6002	VIVDS PROCESSOR SYSTEM	EA	1	\$8,000.00	\$ 8,000.00
133	6002	VIVDS CAMERA ASSEMBLY	EA	6	\$1,500.00	\$ 9,000.00
134	6002	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	1,900	\$2.00	\$ 3,800.00
135	8835	PED DETECT PUSH BUTTON (APS)	EA	14	\$1,600.00	\$ 22,400.00
<b>Traffic Signal - Beltway 8 Items Subtotal</b>						<b>\$ 279,901.00</b>

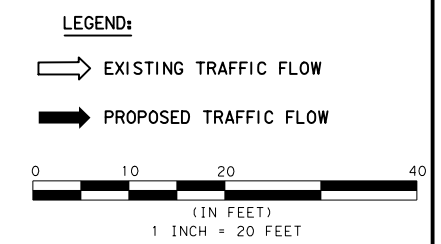
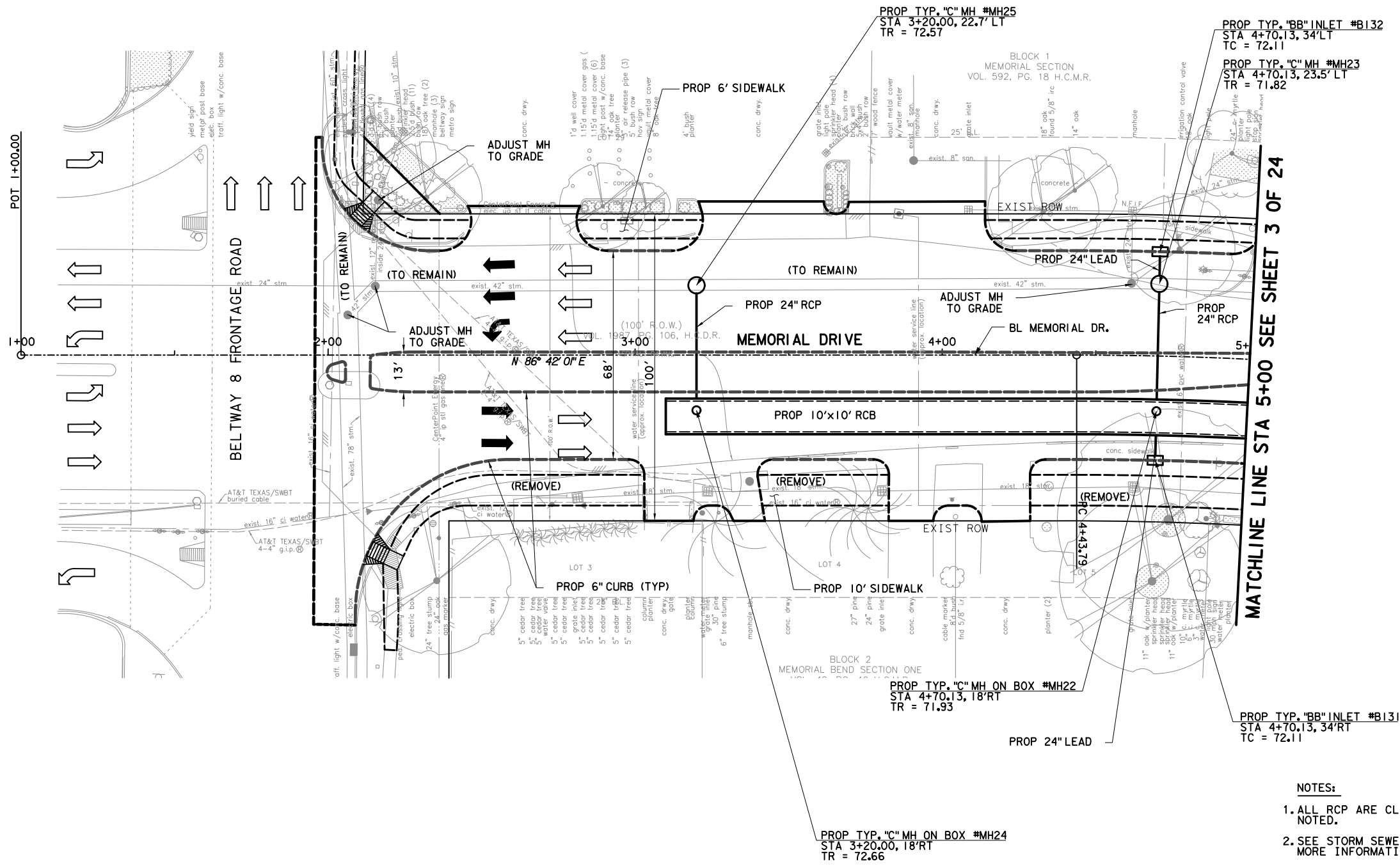
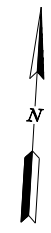
**MEMORIAL DRIVE MOBILITY AND DRAINAGE IMPROVEMENTS PROJECT  
CONSTRUCTION COST ESTIMATE  
(PER)**

<b>Traffic Signal - West Bough/Broken Bough</b>						
136	02465	Drill Shaft (TRF SIG Pole) (24 IN)	LF	24	\$130.00	\$ 3,120.00
137	02465	Drill Shaft (TRF SIG Pole) (30 IN)	LF	72	\$160.00	\$ 11,520.00
138	02582	25' Traffic Signal Pole	EA	1	\$5,000.00	\$ 5,000.00
139	02582	30' Traffic Signal Pole	EA	1	\$5,500.00	\$ 5,500.00
140	02582	35' Traffic Signal Pole	EA	1	\$6,000.00	\$ 6,000.00
141	02582	40' Traffic Signal Pole	EA	1	\$6,800.00	\$ 6,800.00
142	02582	PED Pole Assembly	EA	4	\$900.00	\$ 3,600.00
143	02893	Traffic Signal Construction	EA	1	\$2,500.00	\$ 2,500.00
144	02893	Temp Traf Signals	EA	1	\$25,000.00	\$ 25,000.00
145	02893	Removal Of Concrete Foundations	EA	4	\$500.00	\$ 2,000.00
146	02893	Remove Traffic Signal Pole Assm	EA	4	\$500.00	\$ 2,000.00
147	02893	Electrical Service (UL Type 3R)	EA	1	\$4,000.00	\$ 4,000.00
148	16710	Traffic Signal Pull Box, Type B	EA	3	\$850.00	\$ 2,550.00
149	16710	Traffic Signal Pull Box, Type C	EA	1	\$1,500.00	\$ 1,500.00
150	16711	2" (Trench) Conduit PVC (SCHD 80)	LF	200	\$10.00	\$ 2,000.00
151		2" (Bore) Conduit PVC (SCHD 80)	LF	300	\$10.00	\$ 3,000.00
152	16711	3" (Trench) Conduit PVC (SCHD 80)	LF	200	\$15.00	\$ 3,000.00
153	16711	4" (Trench) Conduit PVC (SCHD 80)	LF	100	\$14.00	\$ 1,400.00
154	16711	4" (Bore) Conduit PVC (SCHD 80)	LF	600	\$19.00	\$ 11,400.00
155	16715	Veh Sig Sec (12 IN) INC (GRN ARW) LED	EA	6	\$175.00	\$ 1,050.00
156	16715	Veh Sig Sec (12 IN) INC (YEL ARW) LED	EA	6	\$175.00	\$ 1,050.00
157	16715	Veh Sig Sec (12 IN) INC (FLASH YEL ARW) LED	EA	4	\$175.00	\$ 700.00
158	16715	Veh Sig Sec (12 IN) INC (RED ARW) LED	EA	6	\$175.00	\$ 1,050.00
159	16715	Veh Sig Sec (12 IN) INC (GRN) LED	EA	11	\$175.00	\$ 1,925.00
160	16715	Veh Sig Sec (12 IN) INC (YEL) LED	EA	11	\$175.00	\$ 1,925.00
161	16715	Veh Sig Sec (12 IN) INC (RED) LED	EA	11	\$175.00	\$ 1,925.00
162	16715	Back Plate (12 IN) (3 SEC)	EA	13	\$76.00	\$ 988.00
163	16715	Back Plate (12 IN) (4 SEC)	EA	4	\$89.00	\$ 356.00
164	16716	Ped Sig Sec (12 IN) LED (2 Indications) (COUNTDOWN)	EA	8	\$460.00	\$ 3,680.00
165	16720	Trf Sig Cbl (TY A) (14 AWG) ( 3 CONDR)	LF	800	\$1.00	\$ 800.00
166	16720	Trf Sig Cbl (TY A) (14 AWG) ( 5 CONDR)	LF	800	\$1.40	\$ 1,120.00
167	16720	Trf Sig Cbl (TY A) (14 AWG) ( 7 CONDR)	LF	1,200	\$1.50	\$ 1,800.00
168		Video Detection Cable	LF	600	\$2.00	\$ 1,200.00
169	16720	Elec Condr (NO. 8) Bare	LF	1,400	\$0.90	\$ 1,260.00
170		Video Detection System	EA	1	\$8,000.00	\$ 8,000.00
171		Video Detection Camera	EA	4	\$1,500.00	\$ 6,000.00
172	16720	Signal Power (NO. 4 THHN)	LF	100	\$2.00	\$ 200.00
173	16724	Optical Detector Unit	EA	4	\$625.00	\$ 2,500.00
174	16724	Phase Selector	EA	1	\$2,300.00	\$ 2,300.00
175	16724	Optical Detector Cable	LF	600	\$1.80	\$ 1,080.00
176	16730	Controller Cabinet 340 ITS	EA	1	\$20,000.00	\$ 20,000.00
177	16731	Model 2070L Controller	EA	1	\$2,700.00	\$ 2,700.00
178	16732	Battery Backup System	EA	1	\$5,700.00	\$ 5,700.00
179	16734	WIMAX	EA	1	\$4,500.00	\$ 4,500.00
180	16750	Audible Pedestrian Signal Units	EA	8	\$1,600.00	\$ 12,800.00
<b>Traffic Signal - West Bough/Broken Bough Items Subtotal</b>						<b>\$ 188,499.00</b>
<b>Signing and Pavement Markings</b>						
<b>Signing and Pavement Markings Items Subtotal</b>						<b>\$ 40,000.00</b>
<b>Lighting</b>						
181		Remove Exist. Pole & Light	EA	0	\$ 150.00	\$ -
182		Proposed Poles & Light	EA	48	\$ 4,000.00	\$ 192,000.00
183		Proposed Light on Existing Poles	EA	0	\$ 2,000.00	\$ -
<b>Lighting Items Subtotal</b>						<b>\$ 192,000.00</b>
<b>SUBTOTAL</b>						<b>\$ 15,122,169.50</b>
<b>15% Contingency</b>						<b>\$ 2,268,325.43</b>
<b>TOTAL</b>						<b>\$ 17,390,494.93</b>

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17,2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

Approved for AT&T Texas/SWBt underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/9/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS BEGIN PROJECT TO STA 5+00**  
**SHEET 1 OF 24**

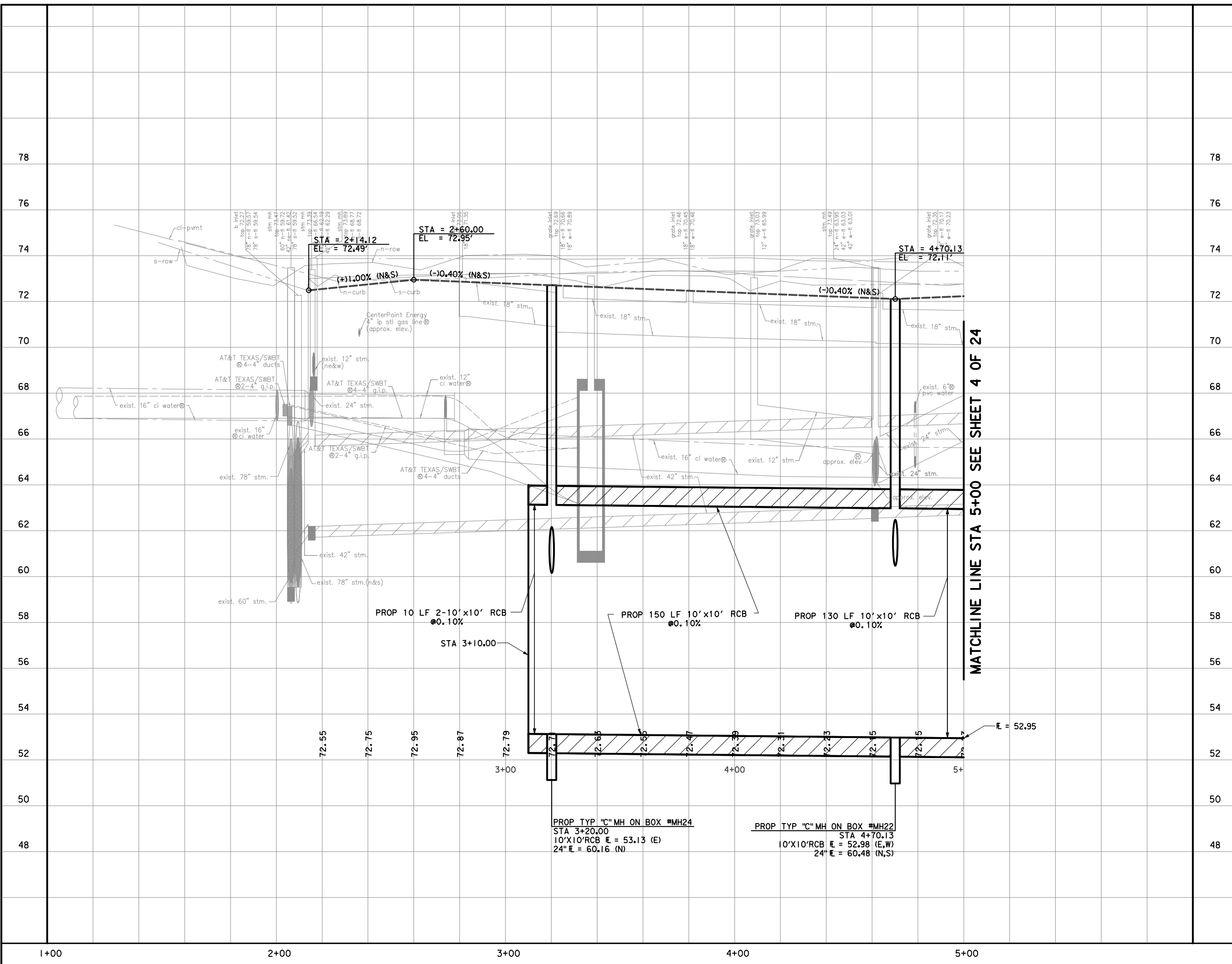
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	HORIZ: 1"=40'	
SHEET:	OF XX	

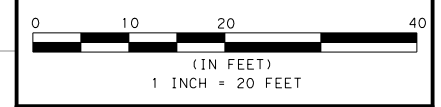
- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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MATCHLINE LINE STA 5+00 SEE SHEET 4 OF 24



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
**CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.**  
 (THE SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
**CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY.**  
 (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWB T underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/9/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



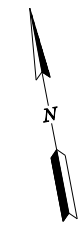
**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
**PVMT & STM SWR IMPROVEMENTS BEGIN PROJECT TO STA 5+00**  
**SHEET 2 OF 24**

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

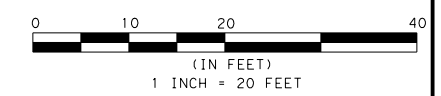
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY: \_\_\_\_\_  
 DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_  
 VERT: 1"=4'  
 HORZ: 1"=40'  
 SHEET: \_\_\_\_\_ OF XX

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.  
 ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*  
 \* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17,2014.



**LEGEND:**  
 EXISTING TRAFFIC FLOW  
 PROPOSED TRAFFIC FLOW



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBt underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR.

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591** **98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/9/2015**

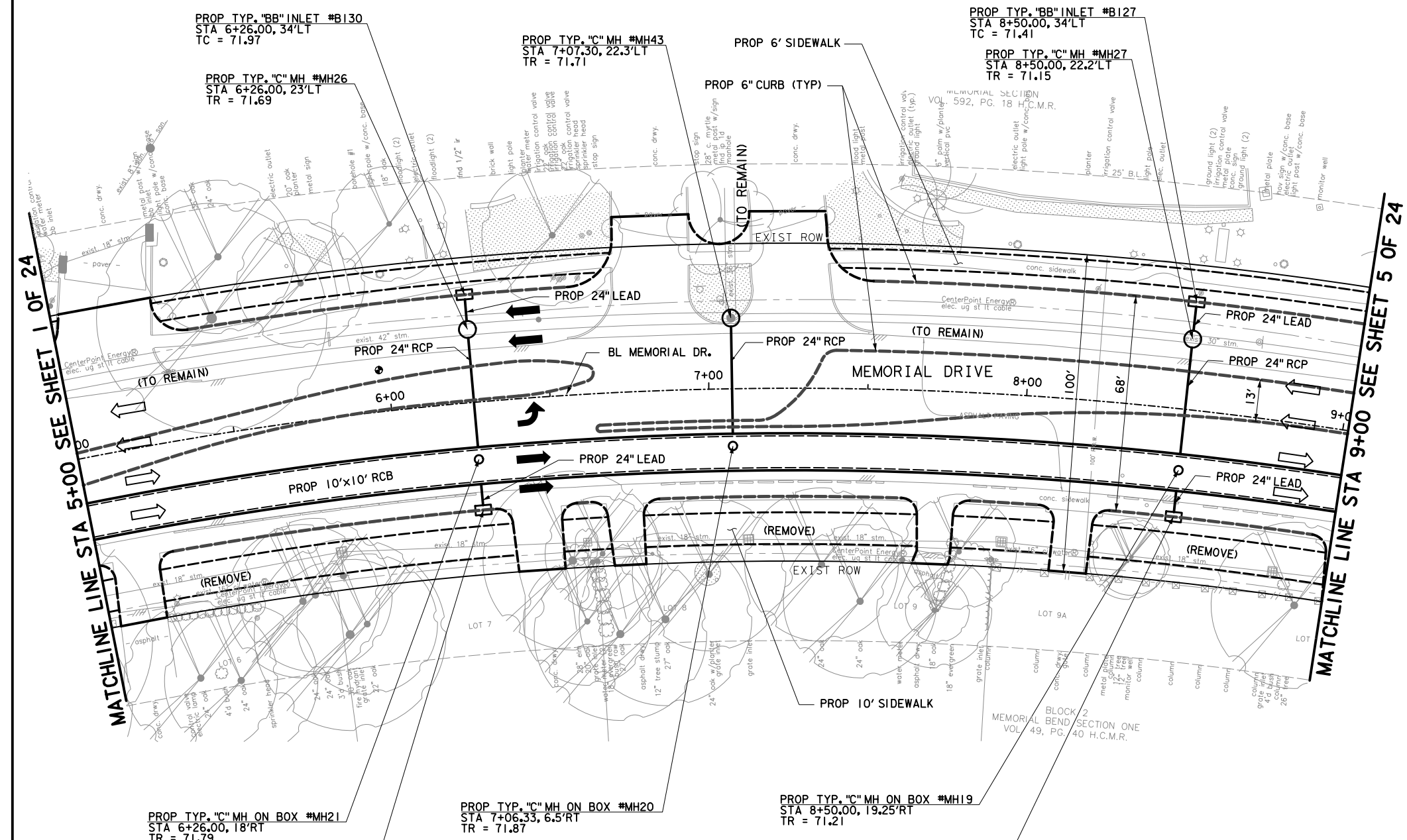
**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 5+00 TO STA 9+00**  
 SHEET 3 OF 24

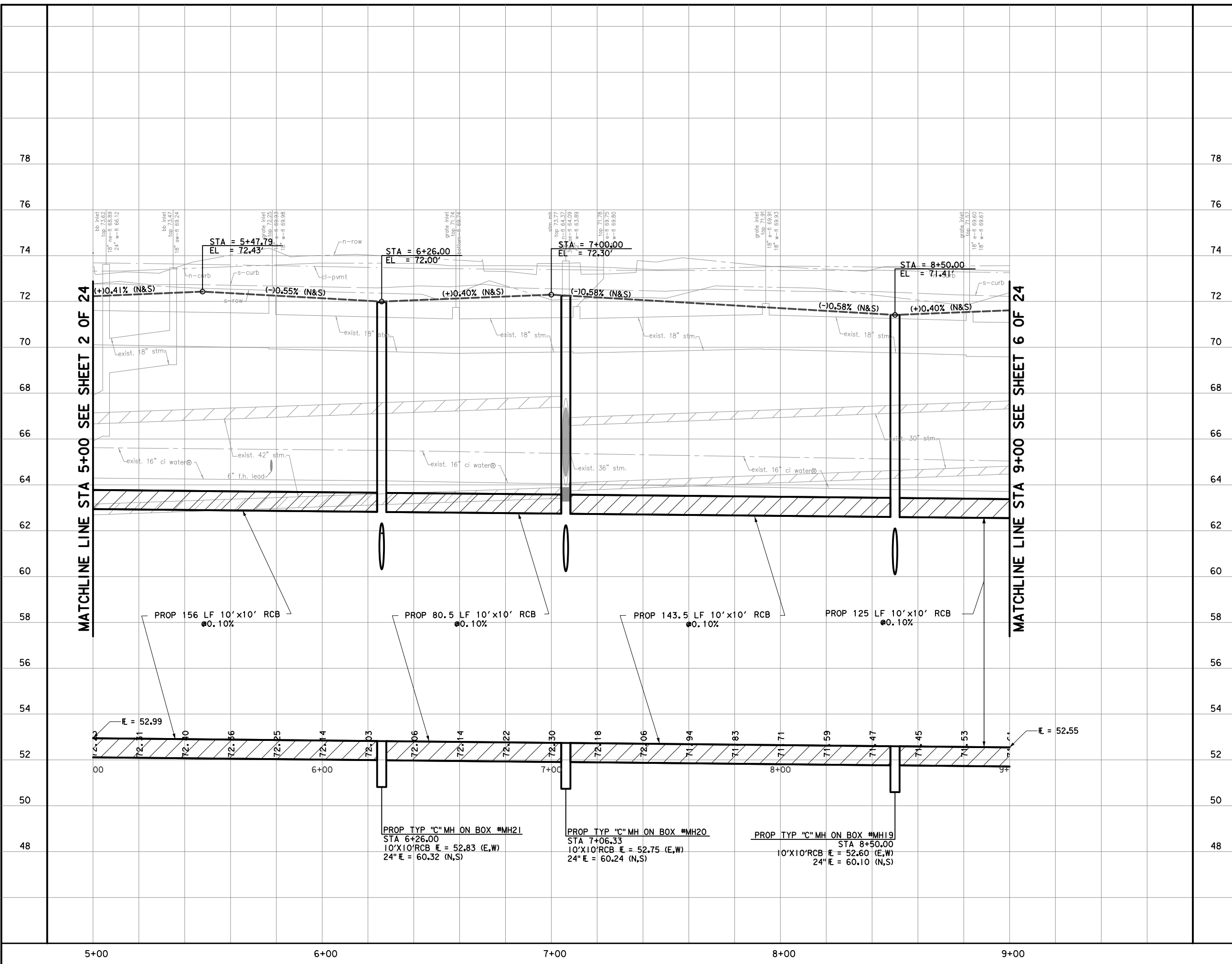
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	SHEET: OF XX	
HORZ: 1"=40'		



- NOTES:**
1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFWORKS SD.
  5. SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  6. SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  7. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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1 INCH = 20 FEET

PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND  
ELECTRICAL FACILITIES VERIFICATION ONLY.  
(THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE  
USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

CENTERPOINT ENERGY/NATURAL GAS  
FACILITIES VERIFICATION ONLY.  
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS  
LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.)  
(GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

Approved for AT&T Texas/SWBt underground  
conduit facilities only.  
SIGNATURE VALID FOR ONE YEAR

INTERIM REVIEW ONLY  
Document incomplete: not intended  
for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
P.E. Serial No. **81591 98146**  
Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
Firm No.: **F-2614**  
Date: **10/9/2015**

**MEMORIAL CITY  
REDEVELOPMENT AUTHORITY**

**LAN Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

**MEMORIAL DRIVE  
N-T17000-031B-4  
PROFILE  
PVMT & STM SWR IMPROVEMENTS  
STA 5+00 TO STA 9+00  
SHEET 4 OF 24**

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY: \_\_\_\_\_

DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_

VERT: 1"=4'  
HORZ: 1"=40'

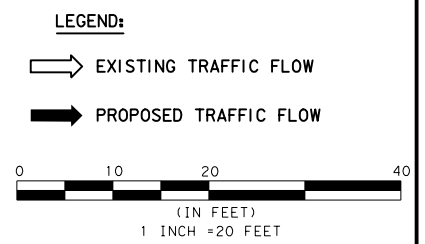
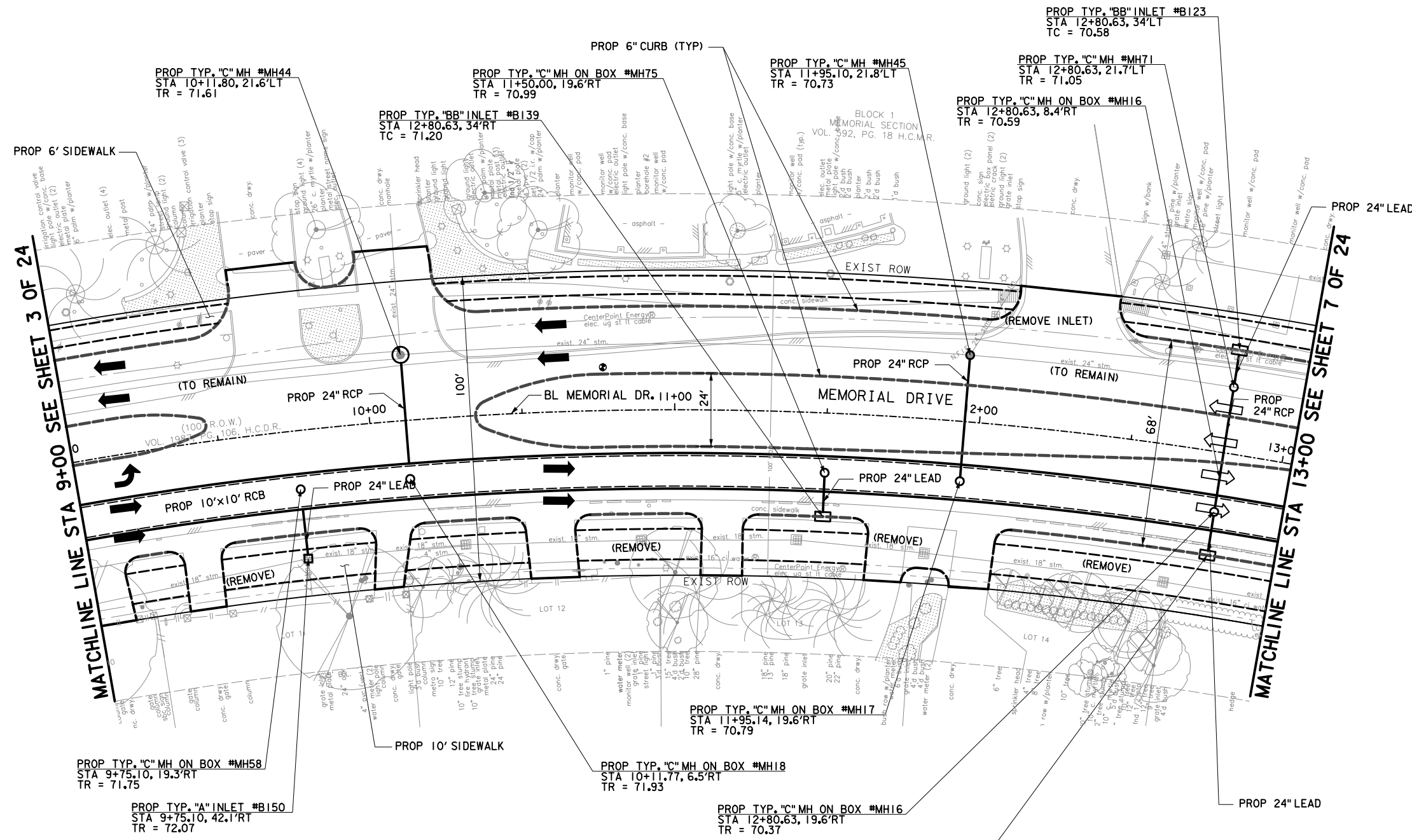
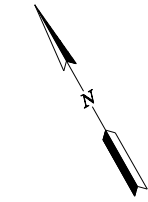
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**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBT underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/9/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 9+00 TO STA 13+00**  
 SHEET 5 OF 24

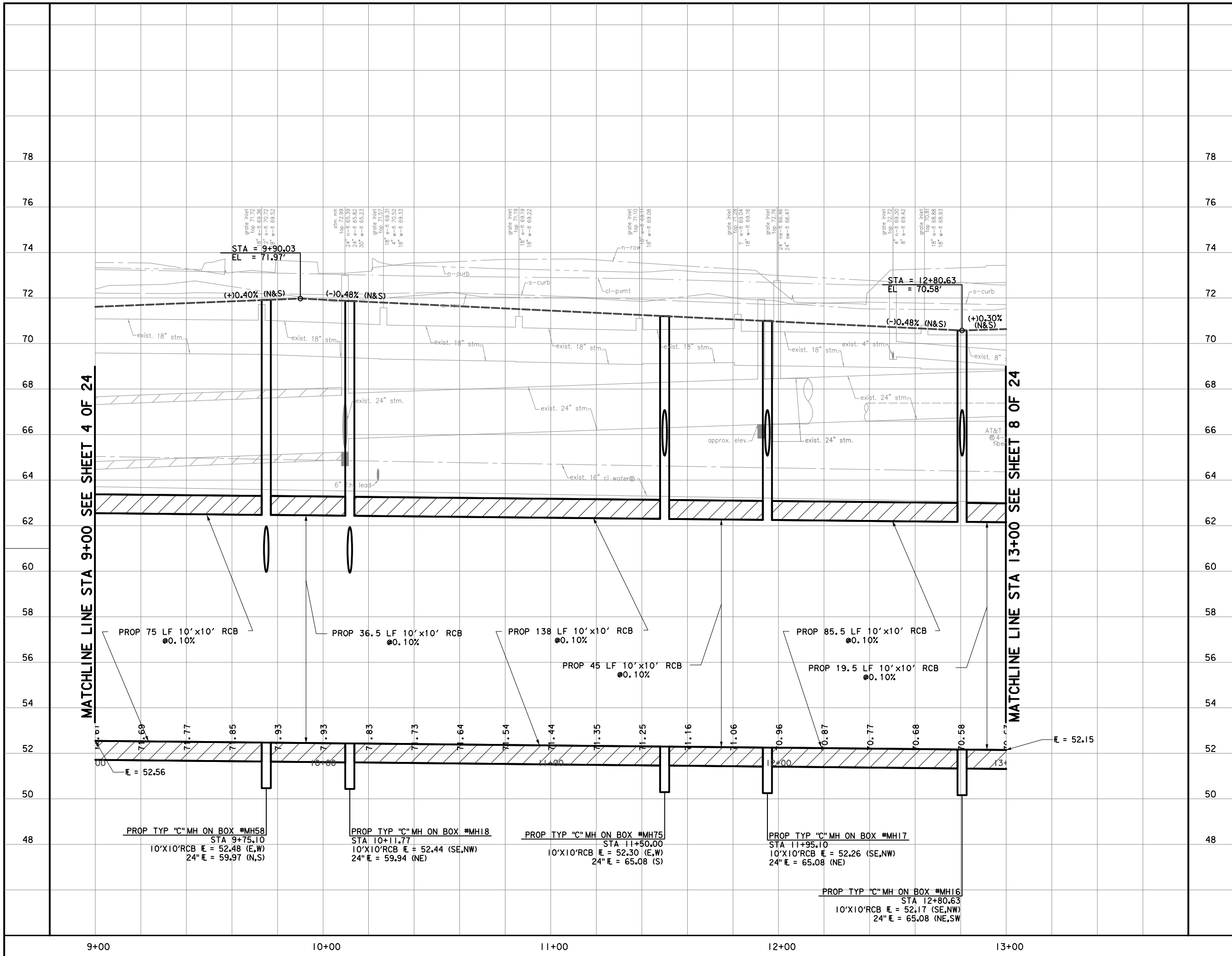
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORZ: 1"=40'		
SHEET:	OF XX	

- NOTES:**
1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  5. SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  6. SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  7. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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(IN FEET)  
1 INCH = 20 FEET

PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBt underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

INTERIM REVIEW ONLY  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: BRIAN R. WHITNEY MUHAMMAD ALI  
 P.E. Serial No. 81591 98146  
 Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.  
 Firm No.: F-2614  
 Date: 10/9/2015

MEMORIAL CITY REDEVELOPMENT AUTHORITY

**LAN** Lockwood, Andrews & Newnam, Inc.  
 A LEO A DALY COMPANY

MEMORIAL DRIVE  
 N-T17000-031B-4  
 PROFILE  
 PVMT & STM SWR IMPROVEMENTS  
 STA 9+00 TO STA 13+00  
 SHEET 6 OF 24

CITY OF HOUSTON  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY: \_\_\_\_\_  
 DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_  
 VERT: 1"=4'  
 HORZ: 1"=40'  
 SHEET: \_\_\_\_\_ OF XX

9+00 10+00 11+00 12+00 13+00

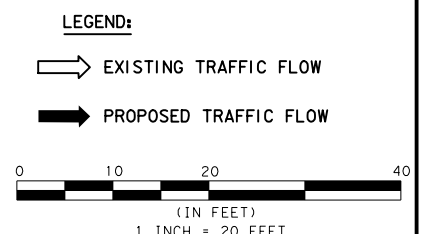
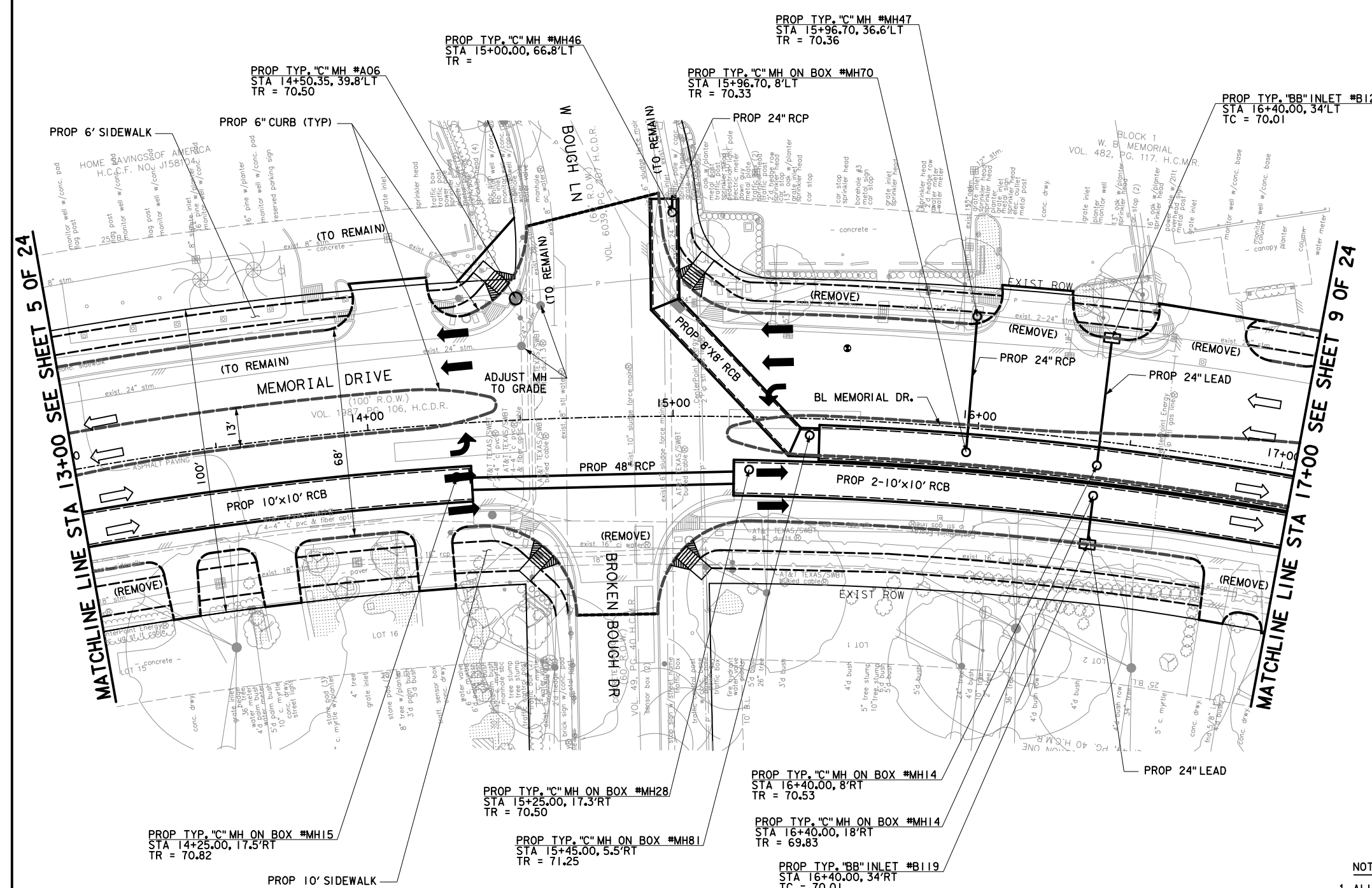
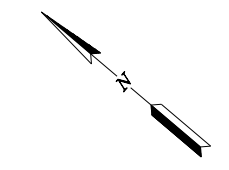
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**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWB underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/9/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**LAN Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

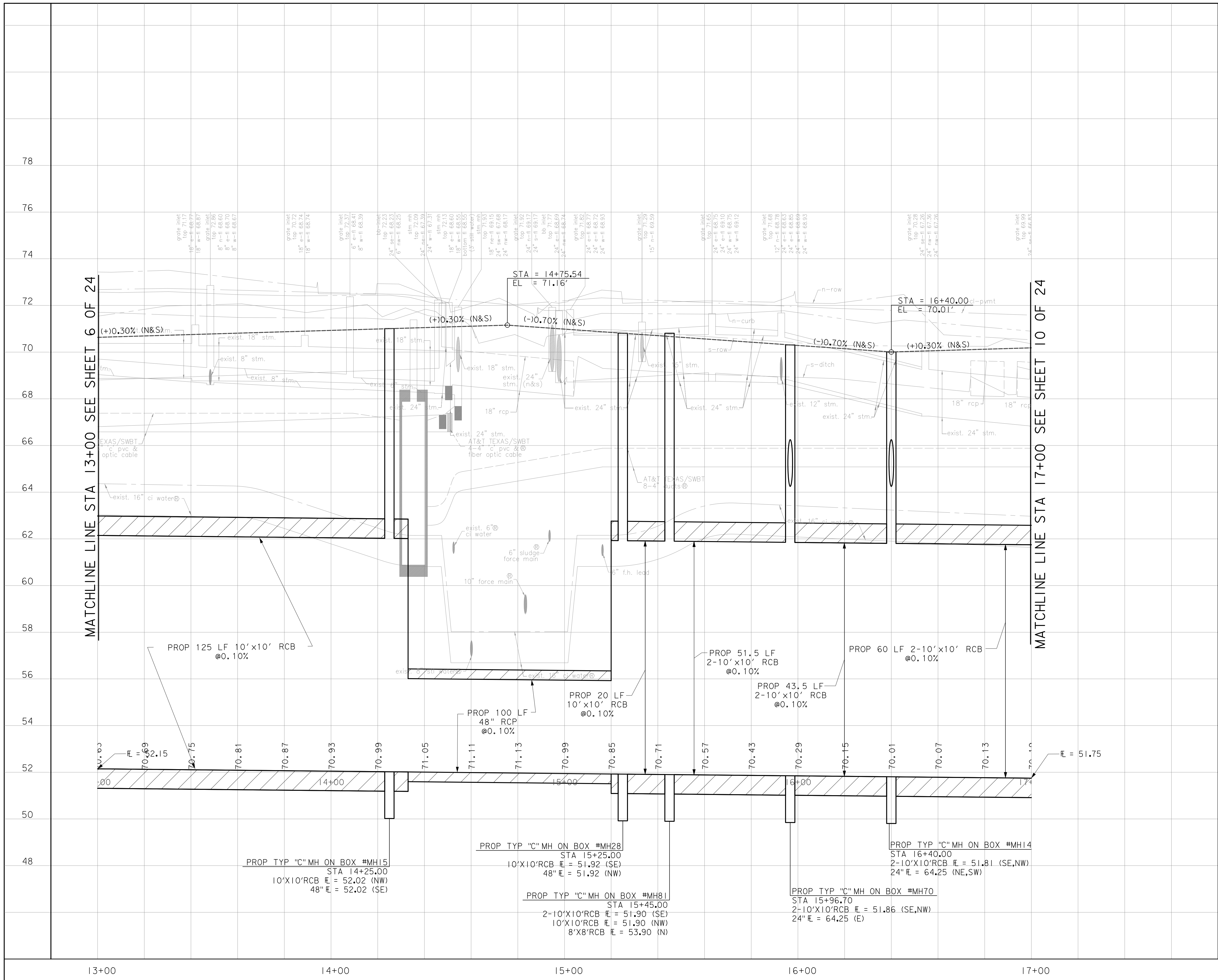
**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
 PVMT & STM SWR IMPROVEMENTS STA 13+00 TO STA 17+00  
 SHEET 7 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	HORIZ: 1"=40'	
SHEET:	OF XX	

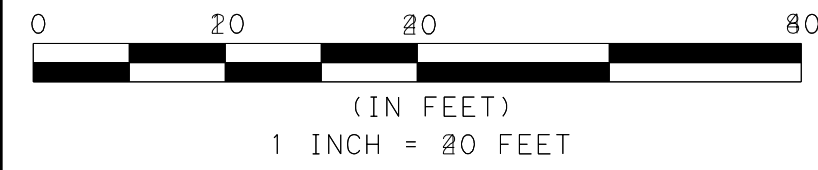
- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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MATCHLINE LINE STA 13+00 SEE SHEET 6 OF 24

MATCHLINE LINE STA 17+00 SEE SHEET 10 OF 24



PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWB underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.  
 Engineer: **BRIAN R. WHITNEY** / **MUHAMMAD ALI**  
 P.E. Serial No. 81599/146 98146  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: F-2614  
 Date: 10/9/2015

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
 PVMT & STM SWR IMPROVEMENTS  
 STA 13+00 TO STA 17+00  
 SHEET 8 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

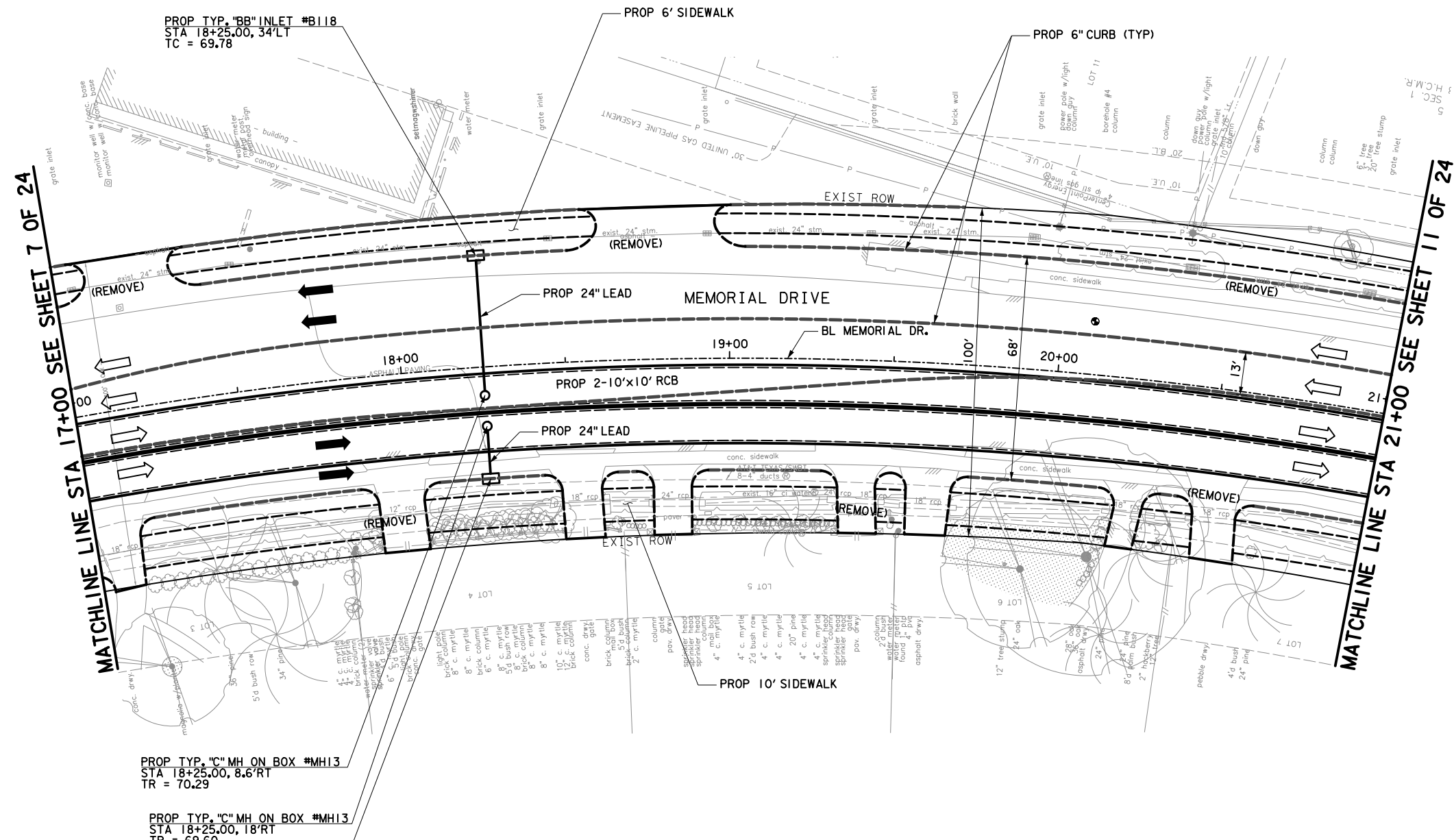
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO.: \_\_\_\_\_ FACILITY: \_\_\_\_\_  
 DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_  
 VERT: 1"=4'  
 HORZ: 1"=40'  
 SHEET: \_\_\_\_\_ OF XX

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**LEGEND:**

→ EXISTING TRAFFIC FLOW

→ PROPOSED TRAFFIC FLOW

0 10 20 40  
 (IN FEET)  
 1 INCH = 20 FEET

**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND  
 ELECTRICAL FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE  
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Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS  
 FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN ONP NATURAL GAS  
 LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.)  
 (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBT underground  
 conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
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Engineer: **BRIAN R. WHITNEY** **MUHAMMAD ALI**  
 P.E. Serial No. **81591** **98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY  
 REDEVELOPMENT AUTHORITY**



**MEMORIAL DRIVE  
 N-T17000-031B-4  
 PLAN  
 PVMT & STM SWR IMPROVEMENTS  
 STA 17+00 TO STA 21+00  
 SHEET 9 OF 24**

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
WATER	WASTEWATER TRAFFIC
ST. & BRIDGE	STORMWATER SWD
FILE NO:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=4'	
HORZ: 1"=40'	
SHEET:	OF XX

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

PROP TYP. "BB" INLET #B118  
 STA 18+25.00, 34'LT  
 TC = 69.78

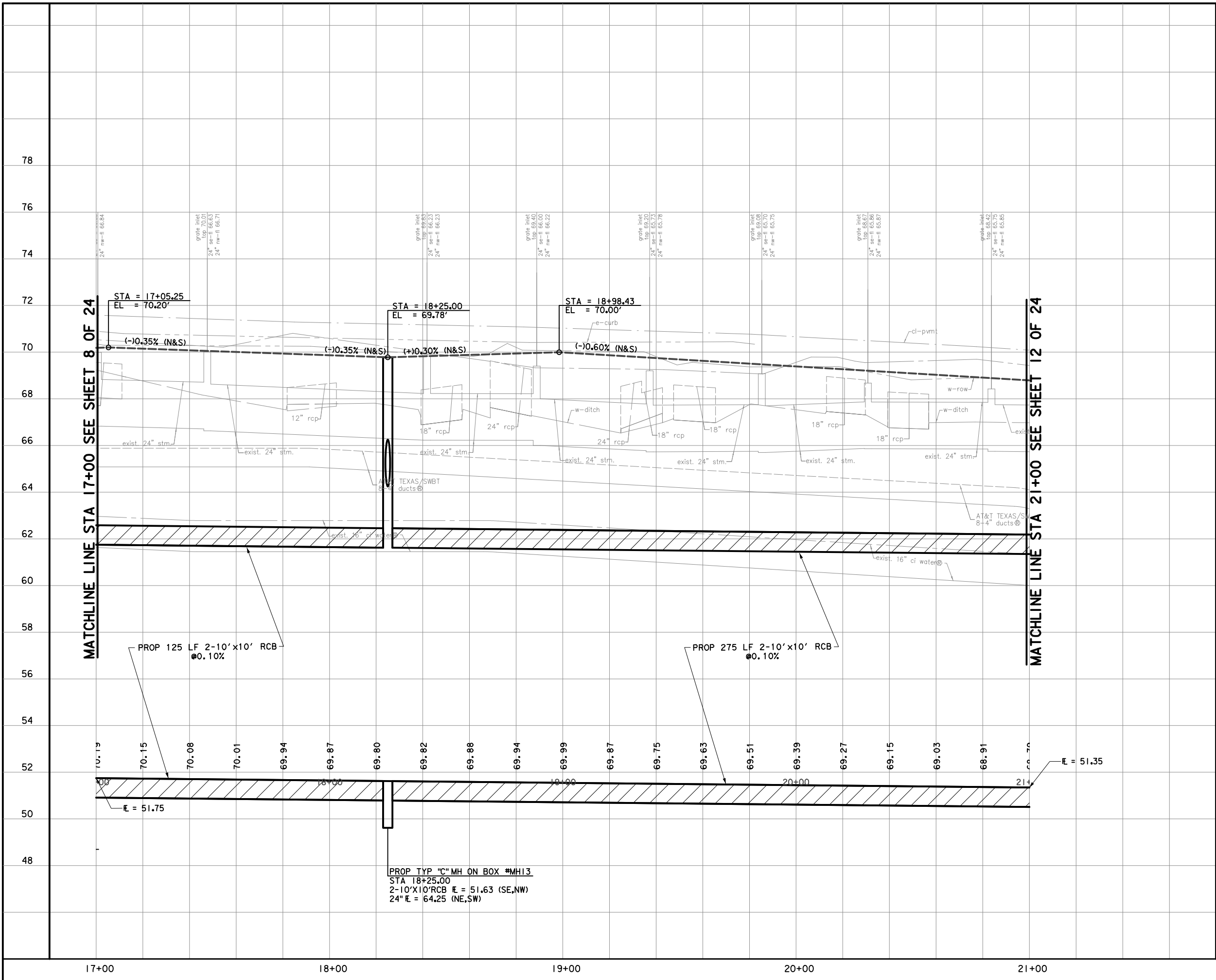
PROP TYP. "C" MH ON BOX #MH13  
 STA 18+25.00, 8.6'RT  
 TR = 70.29

PROP TYP. "C" MH ON BOX #MH13  
 STA 18+25.00, 18'RT  
 TR = 69.60

PROP TYP. "BB" INLET #B117  
 STA 18+25.00, 34'RT  
 TC = 69.78

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(IN FEET)  
1 INCH = 20 FEET

PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_  
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
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INTERIM REVIEW ONLY  
Document incomplete: not intended for permit, bidding or construction.

Engineer: BRIAN R. WHITNEY MUHAMMAD ALI  
P.E. Serial No. 81591 98146  
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.  
Firm No.: F-2614  
Date: 10/6/2015

MEMORIAL CITY REDEVELOPMENT AUTHORITY

**LAN** Lockwood, Andrews & Newnam, Inc.  
A LEO A DALY COMPANY

MEMORIAL DRIVE N-T17000-031B-4 PROFILE  
PVMT & STM SWR IMPROVEMENTS STA 17+00 TO STA 21+00  
SHEET 10 OF 24

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY: \_\_\_\_\_  
DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_  
VERT: 1"=4'  
HORZ: 1"=40'  
SHEET: \_\_\_\_\_ OF XX

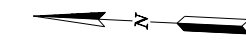
17+00 18+00 19+00 20+00 21+00

10.19 70.15 70.08 70.01 69.94 69.87 69.80 69.82 69.88 69.94 69.99 69.87 69.75 69.63 69.51 69.39 69.27 69.15 69.03 68.91

E = 51.75 E = 51.35

MATCHLINE LINE STA 17+00 SEE SHEET 8 OF 24

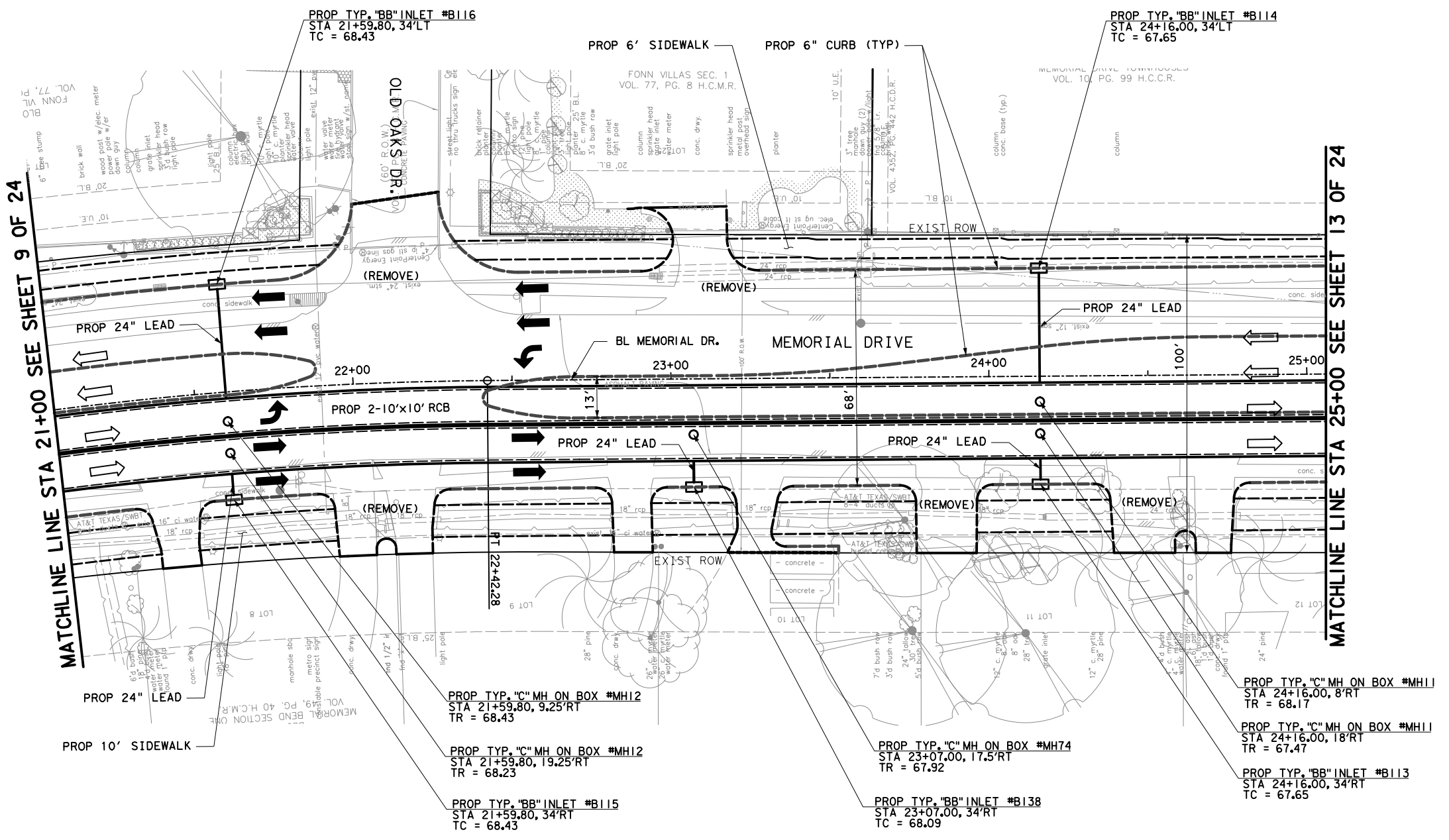
MATCHLINE LINE STA 21+00 SEE SHEET 12 OF 24



**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**LEGEND:**

→ EXISTING TRAFFIC FLOW

➔ PROPOSED TRAFFIC FLOW

0 10 20 40  
 (IN FEET)  
 1 INCH = 20 FEET

**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND  
 ELECTRICAL FACILITIES VERIFICATION ONLY.  
 (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE  
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Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS  
 FACILITIES VERIFICATION ONLY.  
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 (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWB underground  
 conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWMAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY  
 REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews  
 & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE  
 N-T17000-031B-4  
 PLAN  
 PVMT & STM SWR IMPROVEMENTS  
 STA 21+00 TO STA 25+00  
 SHEET 11 OF 24**

**CITY OF HOUSTON  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING**

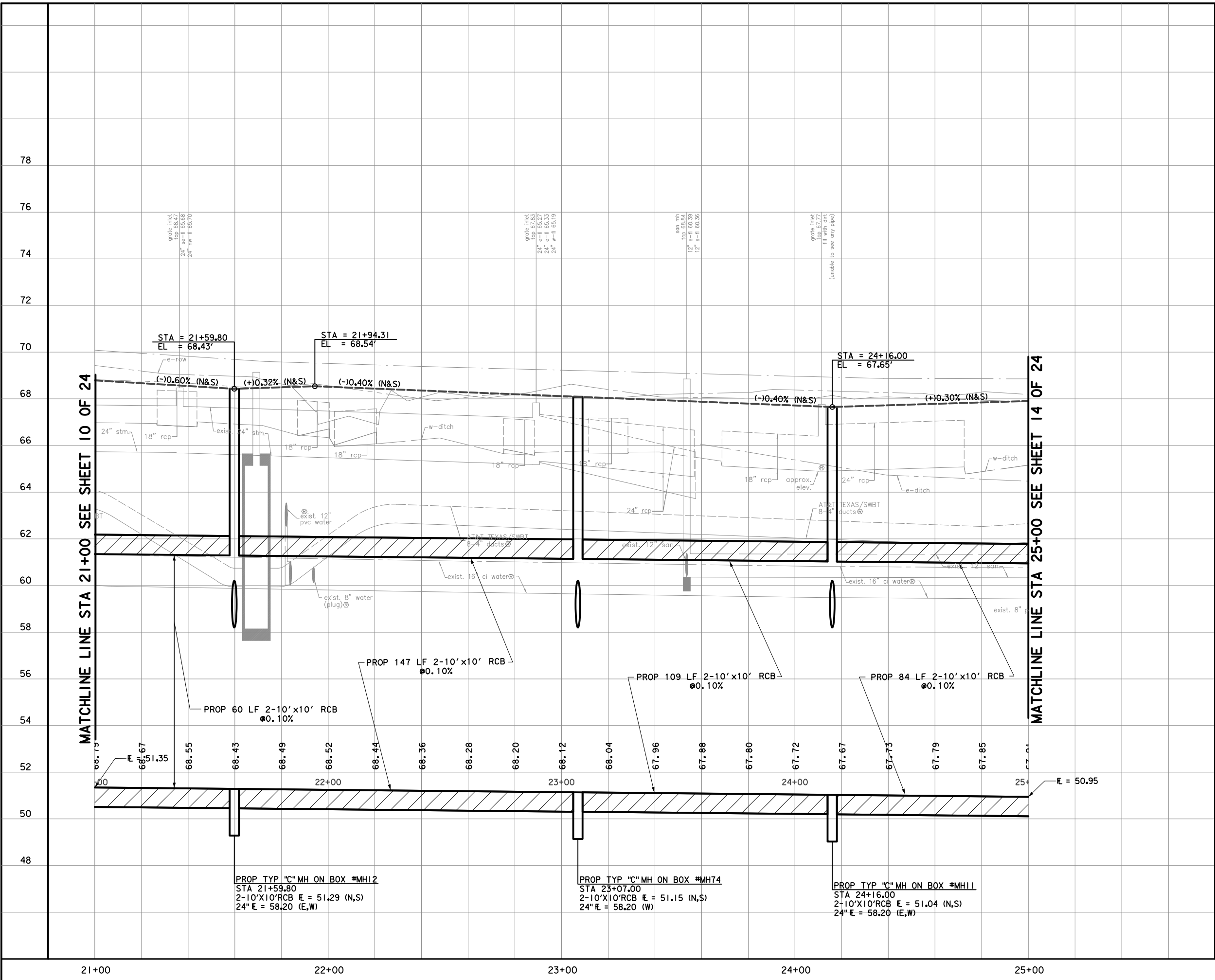
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	SHEET: _____	
HORZ: 1"=40'	OF XX	

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- X SEE DRIVEWAY TABULATION & DETAILS SHEET

MATCHLINE LINE STA 21+00 SEE SHEET 9 OF 24

MATCHLINE LINE STA 25+00 SEE SHEET 13 OF 24

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48
48

0 10 20 40  
(IN FEET)  
1 INCH = 20 FEET

**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND  
ELECTRICAL FACILITIES VERIFICATION ONLY.  
(THE SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE  
USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

CENTERPOINT ENERGY/NATURAL GAS  
FACILITIES VERIFICATION ONLY.  
(THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS  
LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.)  
(GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

Approved for AT&T Texas/SWBT underground  
conduit facilities only.  
SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
Document incomplete: not intended  
for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY** **MUHAMMAD ALI**  
P.E. Serial No. **81591** **98146**  
Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
Firm No.: **F-2614**  
Date: **10/6/2015**

**MEMORIAL CITY  
REDEVELOPMENT AUTHORITY**

**LAN Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

**MEMORIAL DRIVE  
N-T17000-031B-4  
PROFILE**  
PVMT & STM SWR IMPROVEMENTS  
STA 21+00 TO STA 25+00  
SHEET 12 OF 24

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY \_\_\_\_\_

DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_

VERT: 1"=4'  
HORZ: 1"=40'

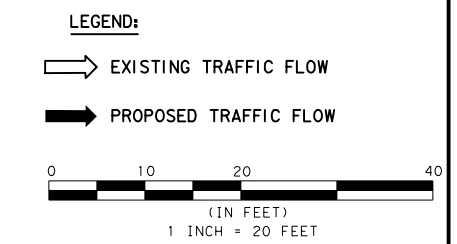
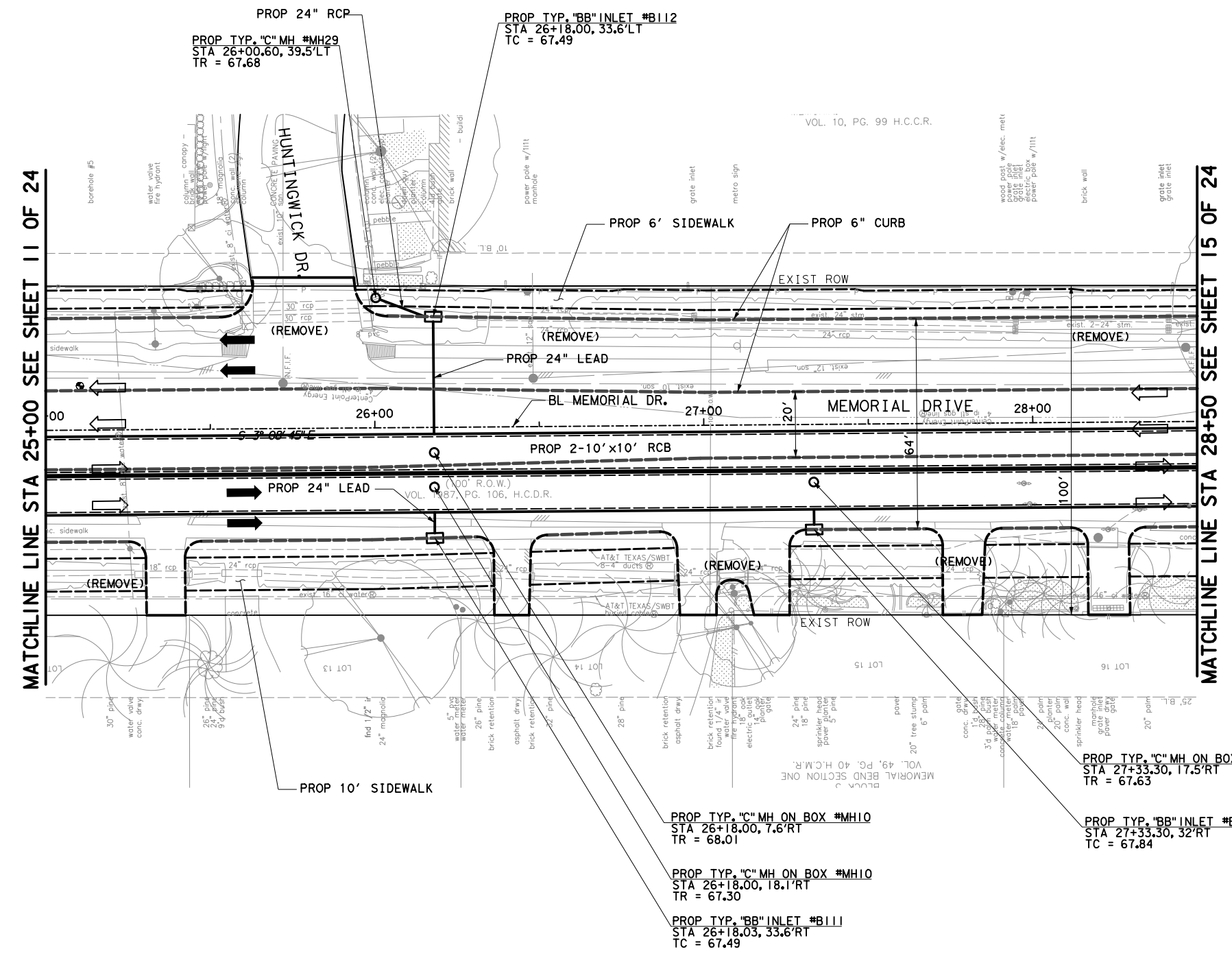
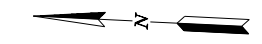
SHEET: \_\_\_\_\_ OF XX

21+00
22+00
23+00
24+00
25+00

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c:\projects\15e\1ccorr\11\0\0254550\024-PR-RDWY 12.dgn

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.  
 ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*  
 \* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBt underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 25+00 TO STA 28+50**  
 SHEET 13 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORIZ: 1"=40'		
SHEET:	OF XX	

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

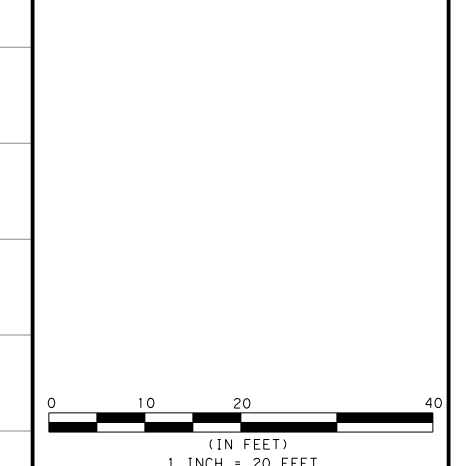
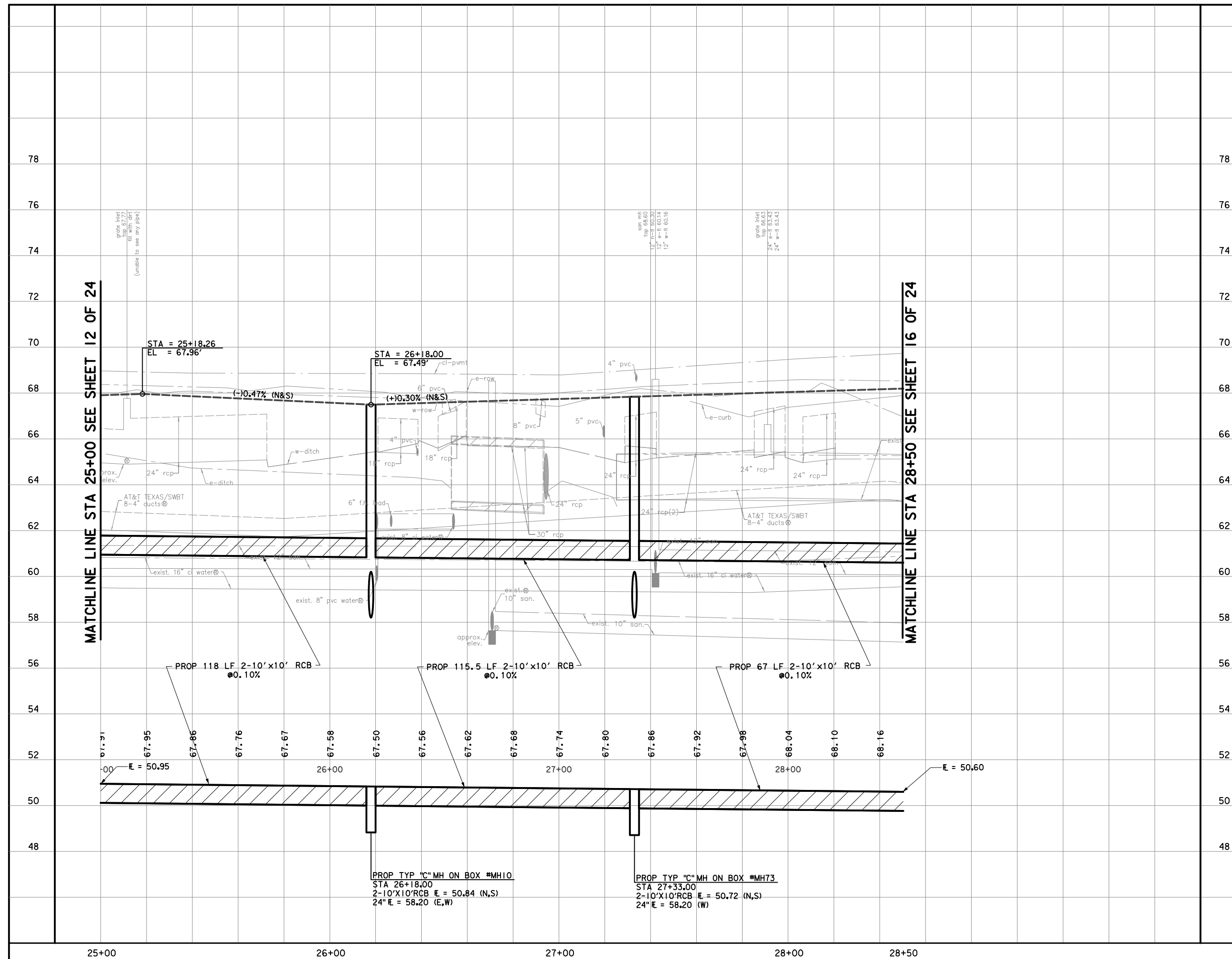
MATCHLINE LINE STA 25+00 SEE SHEET 11 OF 24

MATCHLINE LINE STA 28+50 SEE SHEET 15 OF 24

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**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.  
 ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*  
 \* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17,2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**LAN Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
**PVMT & STM SWR IMPROVEMENTS STA 25+00 TO STA 28+50**  
 SHEET 14 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

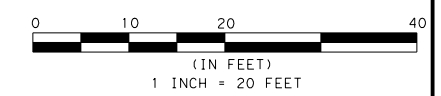
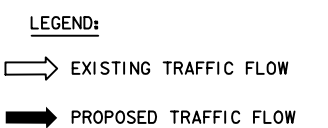
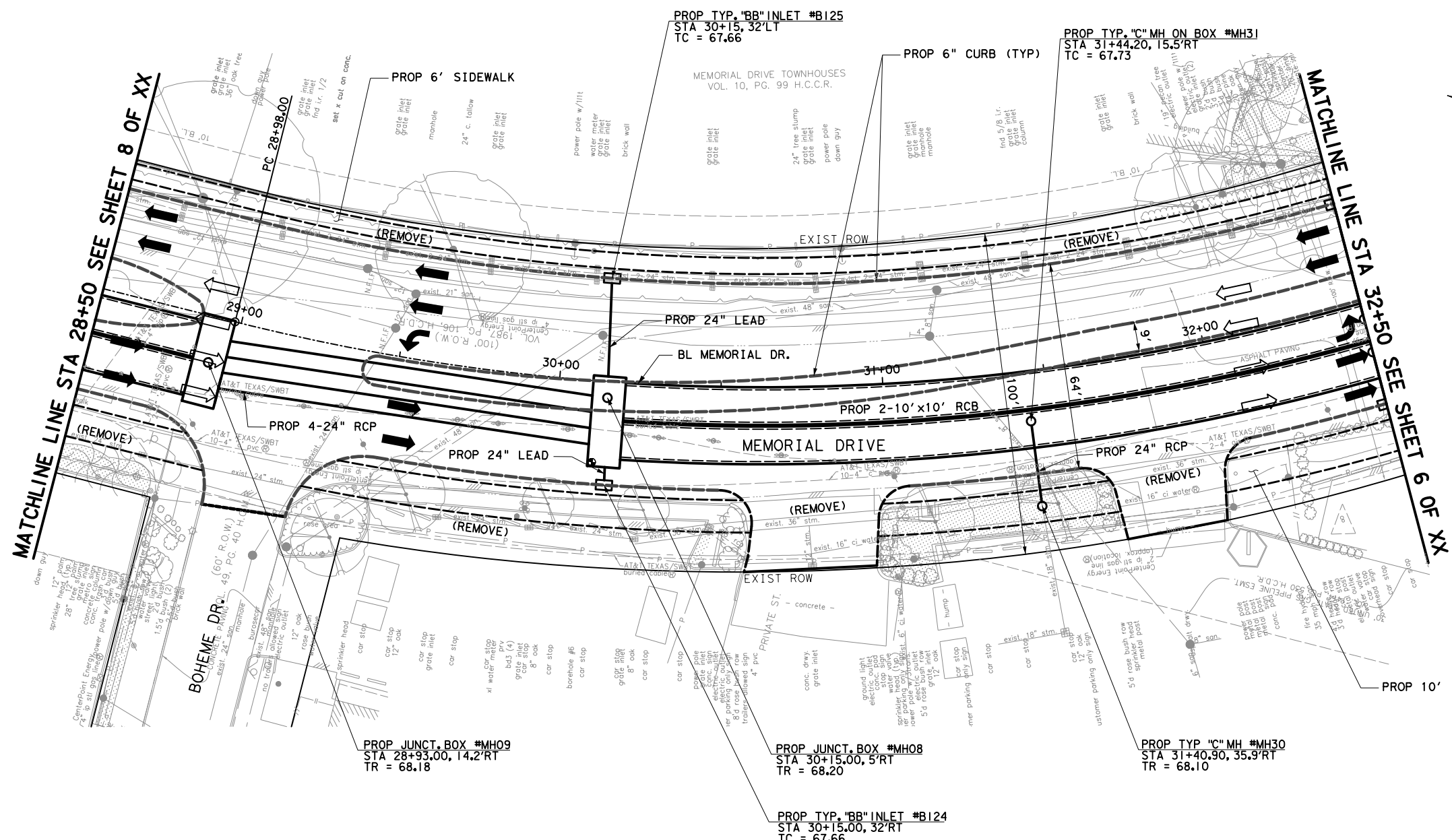
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORIZ: 1"=40'		
SHEET:	OF XX	

10/6/2015 11:09:49 PM ICCorr1110 c:\projects\1501\ccorr\11\0254550\024-PR-RDWY 14.dgn

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

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CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

Approved for AT&T Texas/SWB underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



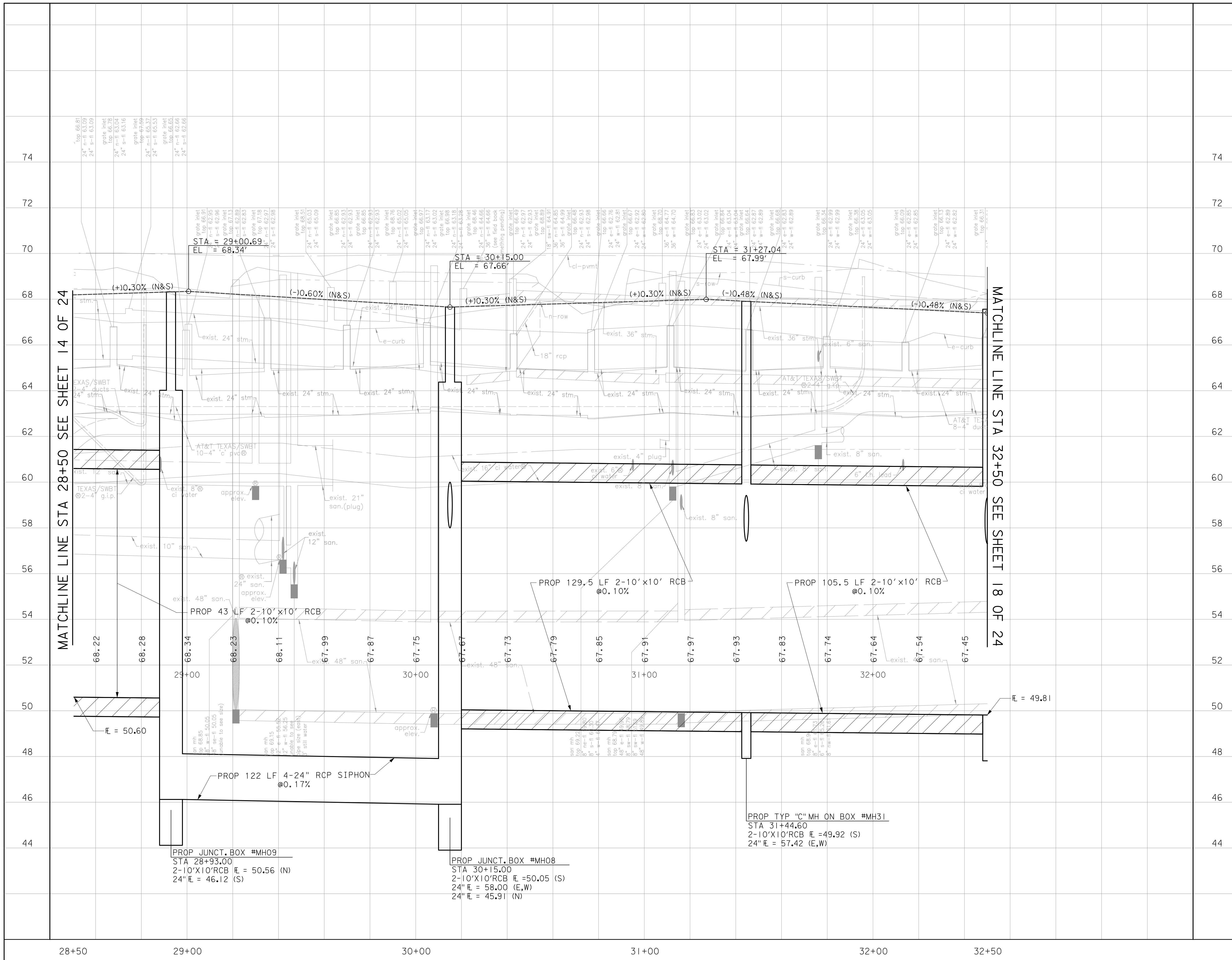
**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 28+50 TO STA 32+50**  
 SHEET 15 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORZ: 1"=40'		
SHEET:	OF XX	

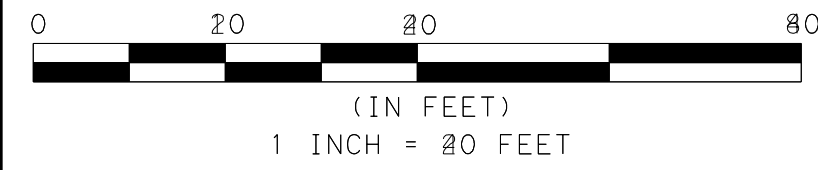
- NOTES:**
1. ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  2. SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  3. SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  4. PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  5. SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  6. SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  7. ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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MATCHLINE LINE STA 28+50 SEE SHEET 14 OF 24

MATCHLINE LINE STA 32+50 SEE SHEET 18 OF 24



PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND  
 ELECTRICAL FACILITIES VERIFICATION ONLY.  
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Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS  
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Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBt underground  
 conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

INTERIM REVIEW ONLY  
 Document incomplete: not intended  
 for permit, bidding or construction.  
 Engineer: BRIAN R. WHITNEY, AMUHAMMAD ALI  
 P.E. Serial No. 815998146 98146  
 Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.  
 Firm No.: F-2614  
 Date: 10/9/2015

MEMORIAL CITY  
 REDEVELOPMENT AUTHORITY

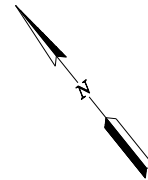


MEMORIAL DRIVE  
 N-T17000-031B-4  
 PROFILE  
 PVMT & STM SWR IMPROVEMENTS  
 STA 28+50 TO STA 32+50  
 SHEET 16 OF 24

CITY OF HOUSTON  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

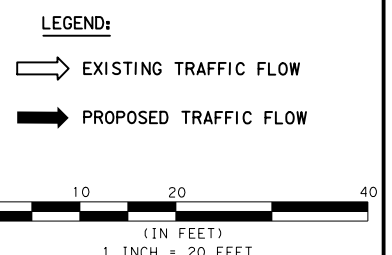
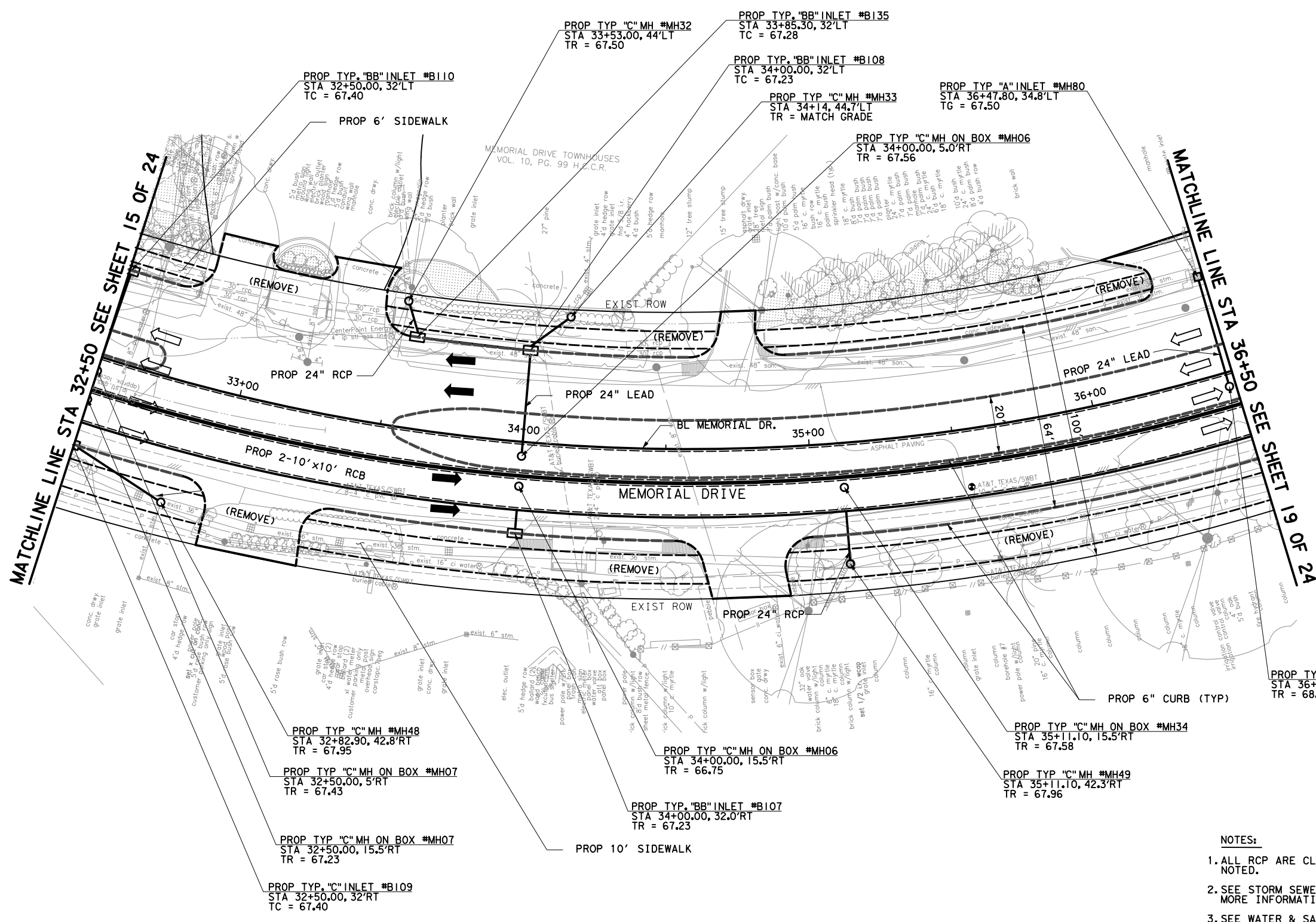
FILE NO.: \_\_\_\_\_ FACILITY \_\_\_\_\_  
 DRAWING SCALE: \_\_\_\_\_ CITY DWG NO. \_\_\_\_\_  
 VERT: 1"=4'  
 HORZ: 1"=40'  
 SHEET: \_\_\_\_\_ OF XX



**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

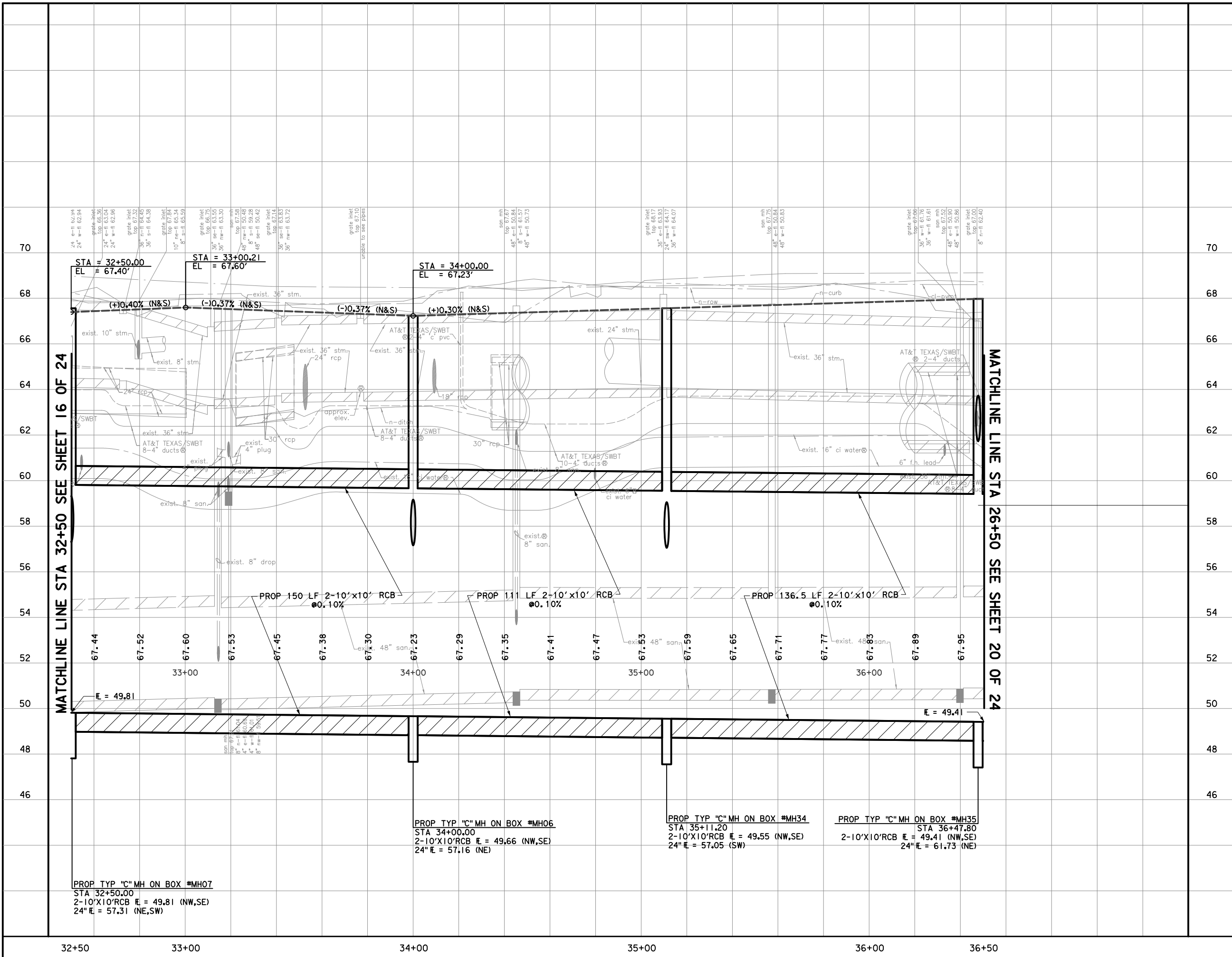


**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 32+50 TO STA 36+50**  
 SHEET 17 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	HORIZ: 1"=40'	
SHEET:	OF XX	

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- X SEE DRIVEWAY TABULATION & DETAILS SHEET



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0 10 20 40  
 (IN FEET)  
 1 INCH = 20 FEET

**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

**CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.**  
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Date: \_\_\_\_\_

**CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY.**  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWMAN, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
**PVMT & STM SWR IMPROVEMENTS**  
**STA 32+50 TO STA 36+50**  
**SHEET 18 OF 24**

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

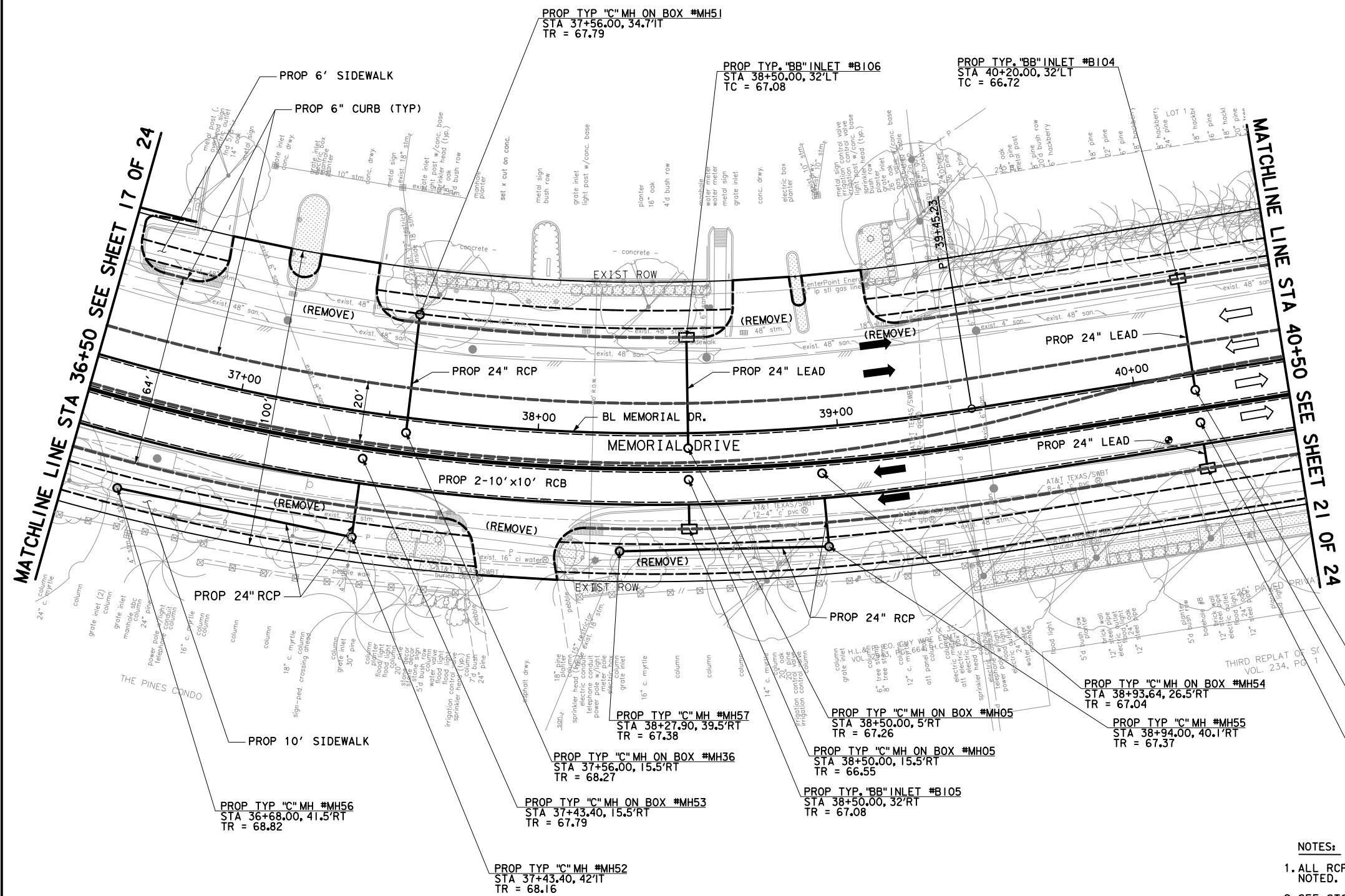
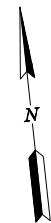
FILE NO:	FACILITY
DRAWING SCALE:	CITY DWG NO.
VERT: 1"=4'	
HORZ: 1"=40'	
SHEET: _____	OF XX



**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

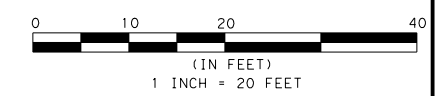
\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**LEGEND:**

→ EXISTING TRAFFIC FLOW

➔ PROPOSED TRAFFIC FLOW



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

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Date: \_\_\_\_\_

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**INTERIM REVIEW ONLY**

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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWMAN, INC.**  
 Firm No.: **F-2814**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

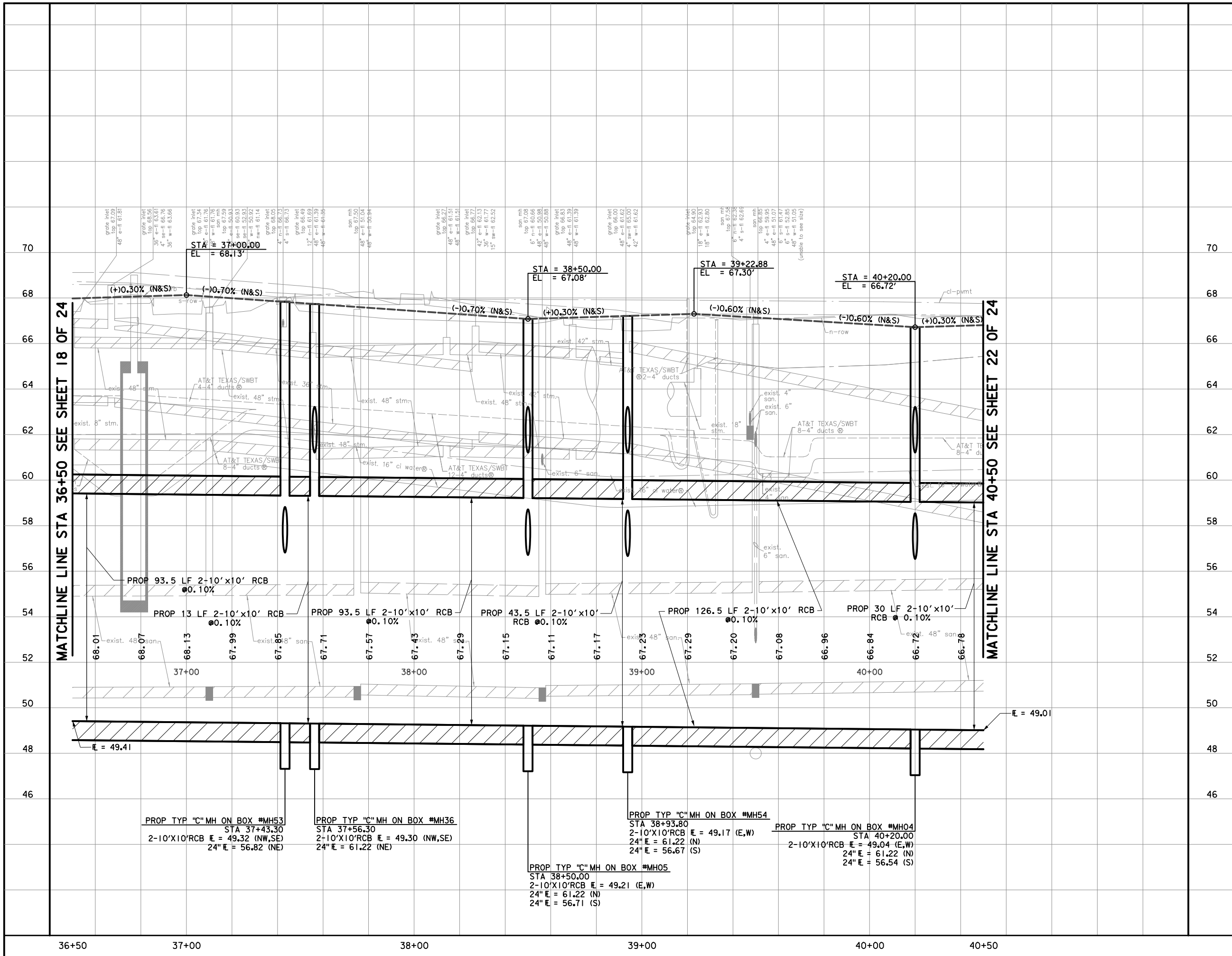
**MEMORIAL DRIVE N-T17000-031B-4 PLAN & PROFILE PVMT & STM SWR IMPROVEMENTS STA 36+50 TO STA 40+50 SHEET 19 OF 24**

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	SHEET: _____ OF XX	
HORZ: 1"=40'		

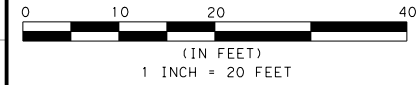
- NOTES:**
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  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

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MATCHLINE LINE STA 36+50 SEE SHEET 18 OF 24

MATCHLINE LINE STA 40+50 SEE SHEET 22 OF 24



PRIVATE UTILITY LINES SHOWN

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

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**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.  
 Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2814**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
**PVMT & STM SWR IMPROVEMENTS**  
**STA 36+50 TO STA 40+50**  
**SHEET 20 OF 24**

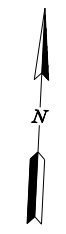
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORZ: 1"=40'		
SHEET:	OF XX	

**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



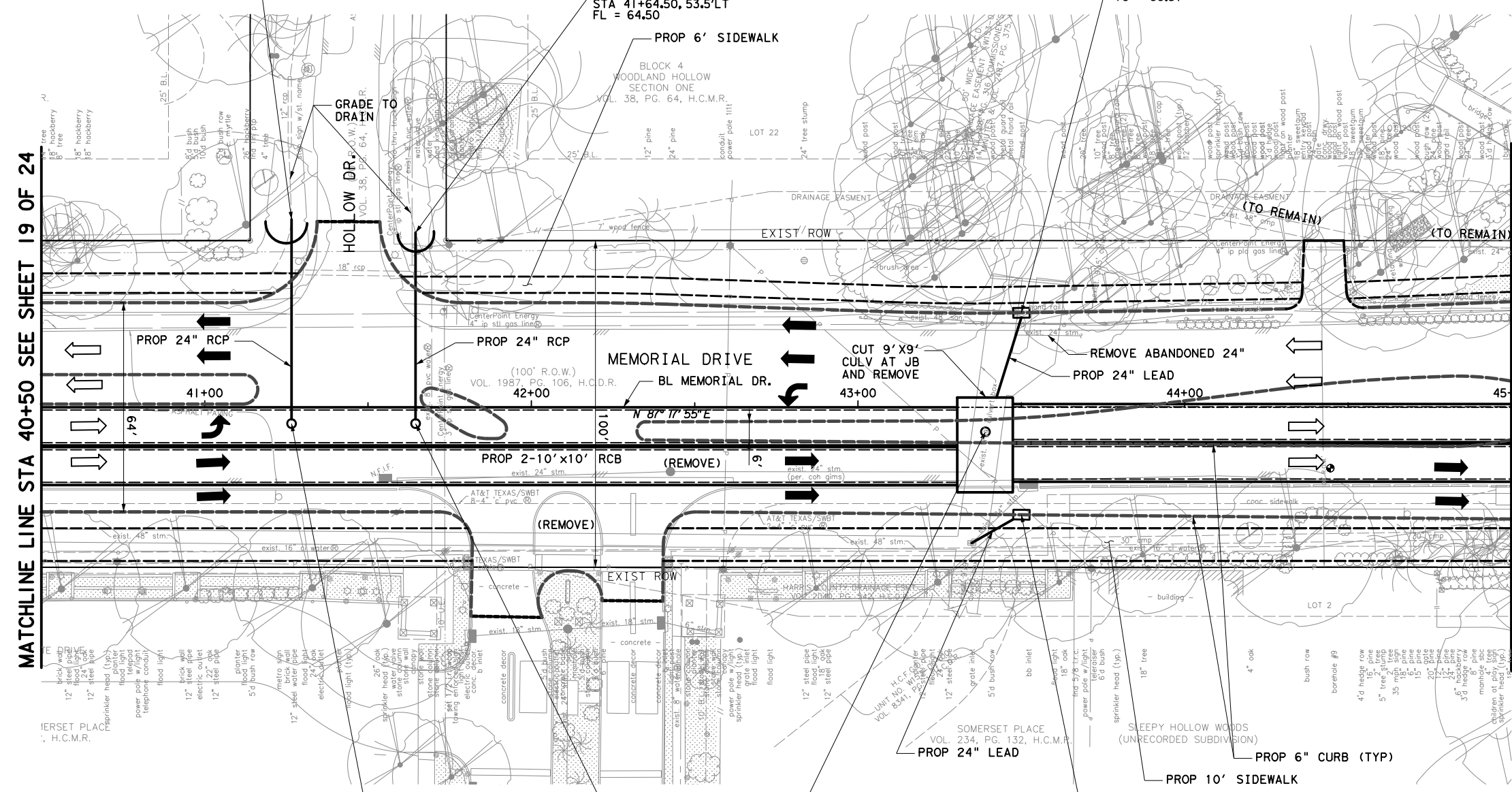
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 STA 41+26.60, 57.5'LT  
 FL = 64.50

REGRADE DITCH TO RCP STUB #B64  
 STA 41+64.50, 53.5'LT  
 FL = 64.50

PROP TYP "BB" INLET #B102  
 STA 43+50.00, 28.9'LT  
 TC = 66.51

MATCHLINE LINE STA 40+50 SEE SHEET 19 OF 24

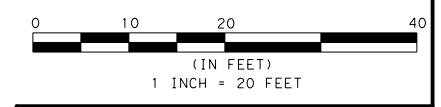
MATCHLINE LINE STA 45+00 SEE SHEET 23 OF 24



**LEGEND:**

⇨ EXISTING TRAFFIC FLOW

⇨ PROPOSED TRAFFIC FLOW



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_

CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CNP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_

Approved for AT&T Texas/SWBT underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**

Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWMAN, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

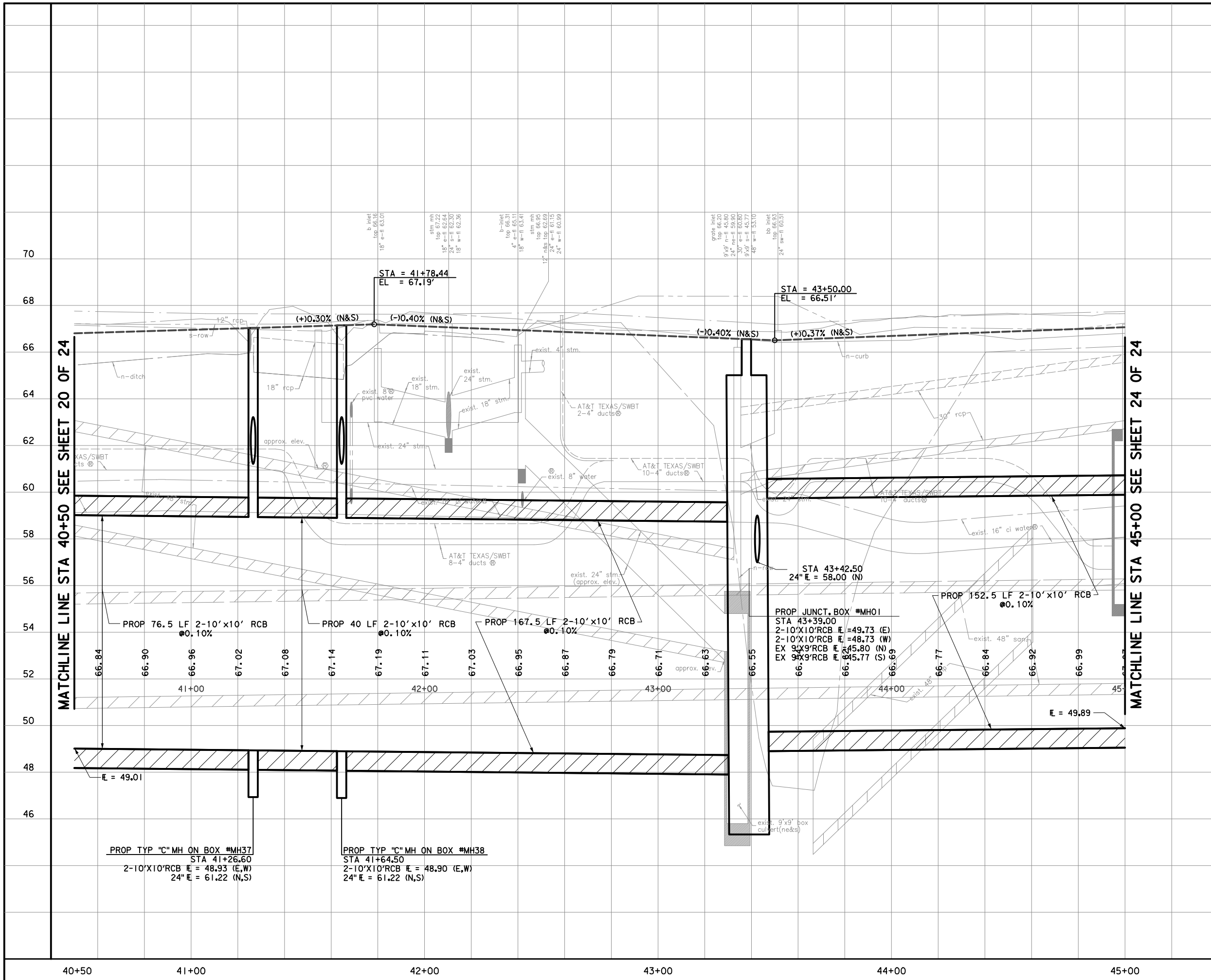
**LAN Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS**  
**STA 40+50 TO STA 45+00**  
 SHEET 21 OF 24  
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	SHEET: _____	
HORZ: 1"=40'	OF XX	

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

10/6/2015 11:03 PM ICCorr110



PRIVATE UTILITY LINES SHOWN

\_\_\_\_\_  
Date: \_\_\_\_\_  
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

\_\_\_\_\_  
Date: \_\_\_\_\_  
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN ONP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

\_\_\_\_\_  
Date: \_\_\_\_\_  
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**INTERIM REVIEW ONLY**  
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Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
P.E. Serial No. **81591 98146**  
Firm: **LOCKWOOD, ANDREWS & NEWMAN, INC.**  
Firm No.: **F-2614**  
Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

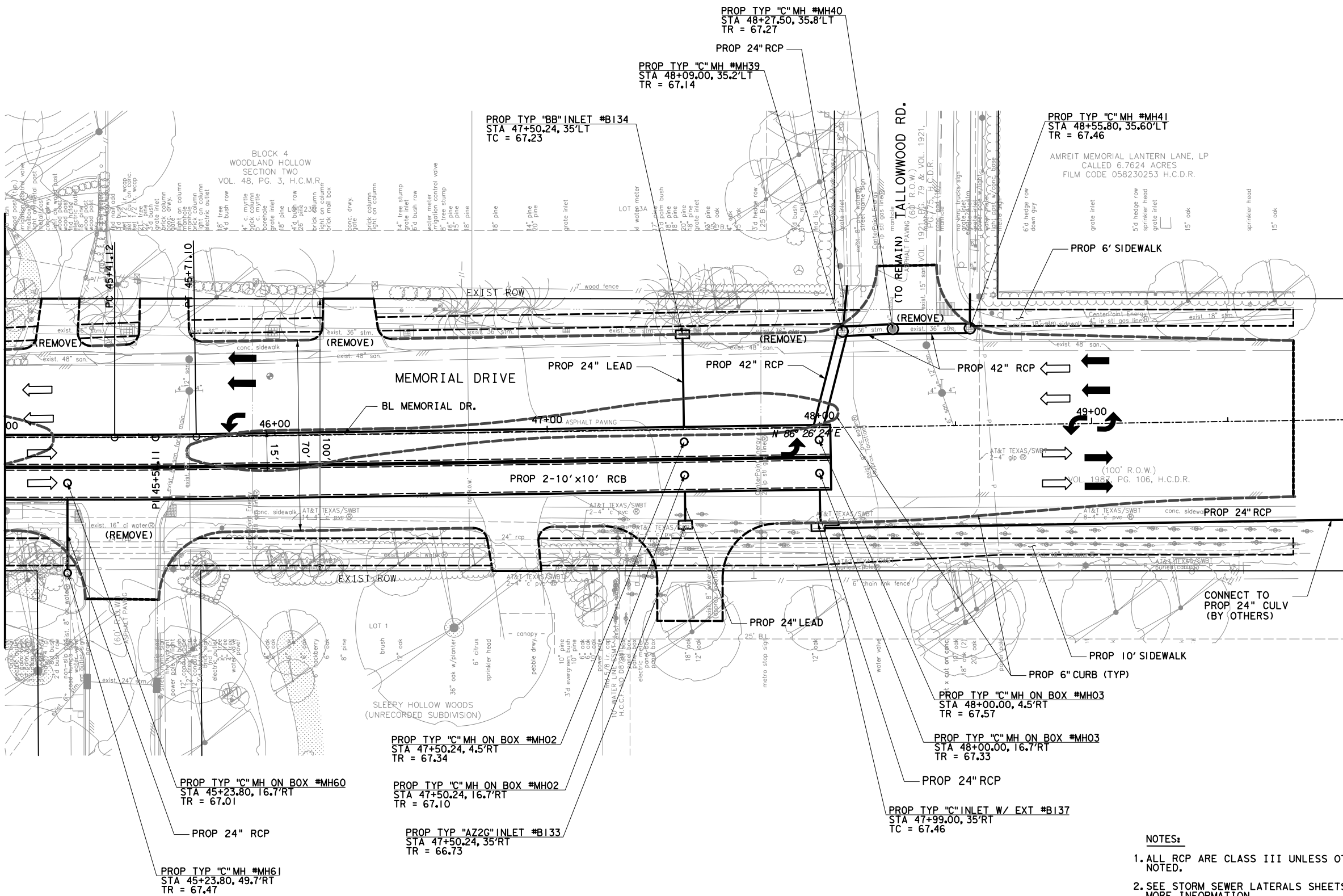


**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
PVMT & STM SWR IMPROVEMENTS  
STA 40+50 TO STA 45+00  
SHEET 22 OF 24

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'		
HORZ: 1"=40'		
SHEET:	OF XX	

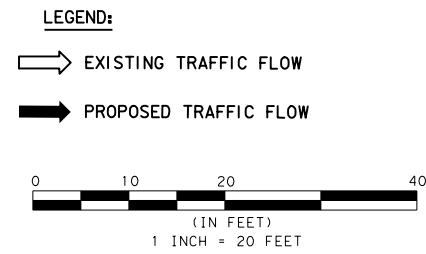
MATCHLINE LINE STA 45+00 SEE SHEET 21 OF 24



**BENCHMARK:**  
 CITY OF HOUSTON MONUMENT \_\_\_\_\_,  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORS  
 DATED DECEMBER 17, 2014.



**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN ONP NATURAL GAS LINES CORRECTLY - NOT TO BE USED FOR CONFLICT VERIFICATION.) (GAS SERVICE LINES ARE NOT SHOWN.) SIGNATURE VALID FOR SIX MONTHS.

Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBT underground conduit facilities only. SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWMAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PLAN**  
**PVMT & STM SWR IMPROVEMENTS STA 40+50 TO END PROJECT**  
 SHEET 23 OF 24

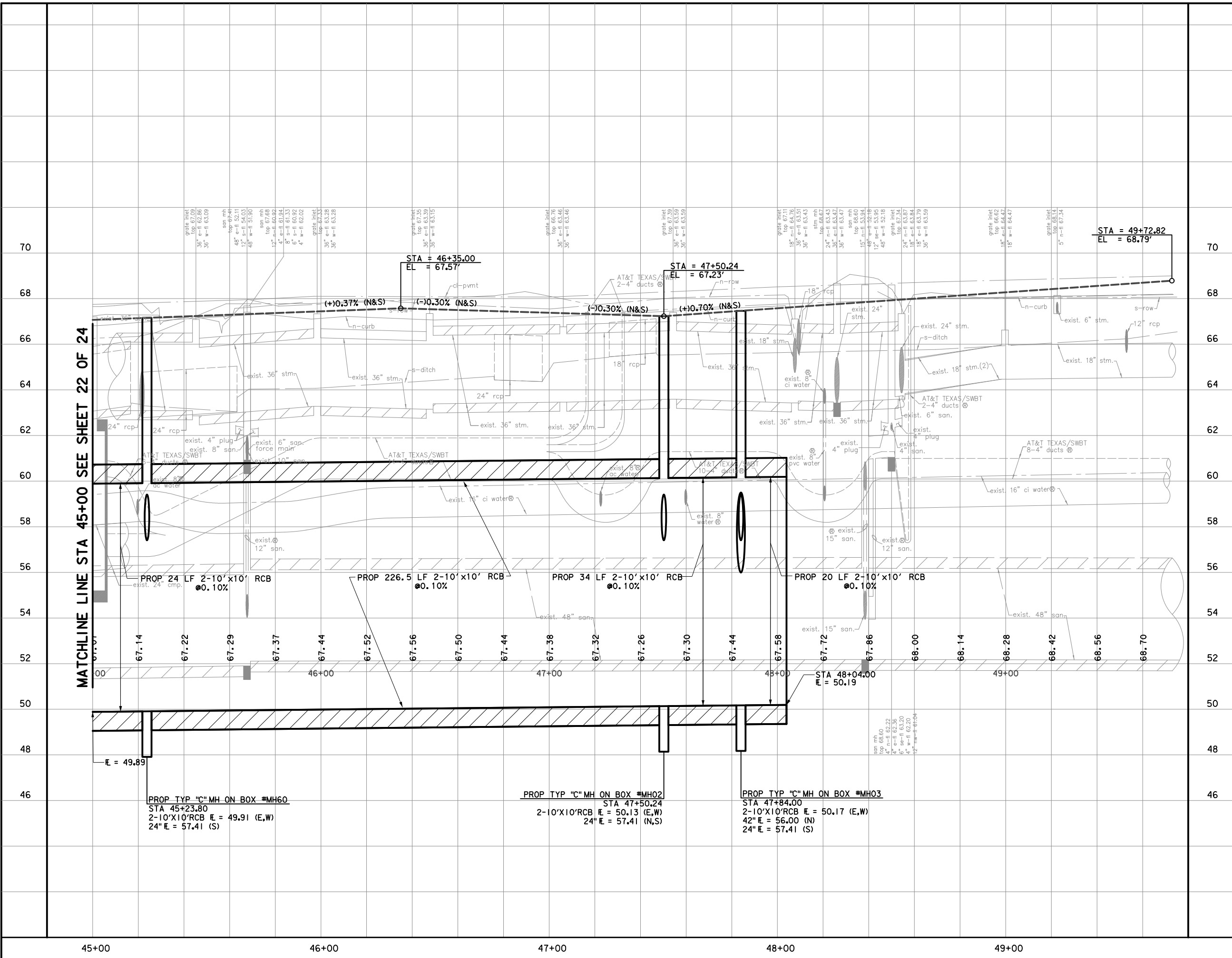
**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	HORIZ: 1"=40'	
SHEET:	OF XX	

- NOTES:**
- ALL RCP ARE CLASS III UNLESS OTHERWISE NOTED.
  - SEE STORM SEWER LATERALS SHEETS FOR MORE INFORMATION.
  - SEE WATER & SAN SWR SHEETS FOR MORE INFORMATION.
  - PROPOSED HGL CALCULATED FOR POST-PROJECT CONDITIONS USING NFORWORKS SD.
  - SEE ROADWAY HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - SEE STORM SEWER HORIZONTAL GEOMETRY SHEETS FOR MORE INFORMATION.
  - ALL EXISTING STORM SEWER TO BE REMOVED UNLESS SHOWN OTHERWISE. MAINTAIN DRAINAGE DURING CONSTRUCTION.
- (X) SEE DRIVEWAY TABULATION & DETAILS SHEET

10/6/2015 11:25 PM ICCorr110





STA = 49+72.82  
EL = 68.79'

0 10 20 40  
IN FEET  
1 INCH = 20 FEET

**PRIVATE UTILITY LINES SHOWN**

Date: \_\_\_\_\_  
**CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.**  
 (THIS SIGNATURE VERIFIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONFLICT VERIFICATION.) SIGNATURE VALID FOR SIX MONTHS.

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Date: \_\_\_\_\_  
 Approved for AT&T Texas/SWBt underground conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: **BRIAN R. WHITNEY MUHAMMAD ALI**  
 P.E. Serial No. **81591 98146**  
 Firm: **LOCKWOOD, ANDREWS & NEWNAM, INC.**  
 Firm No.: **F-2614**  
 Date: **10/6/2015**

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

**LAN Lockwood, Andrews & Newnam, Inc.**  
 A LEO A DALY COMPANY

**MEMORIAL DRIVE N-T17000-031B-4 PROFILE**  
**PVMT & STM SWR IMPROVEMENTS STA 40+50 TO END PROJECT**  
 SHEET 24 OF 24

**CITY OF HOUSTON**  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO: \_\_\_\_\_ FACILITY: \_\_\_\_\_  
 DRAWING SCALE: \_\_\_\_\_ CITY DWG NO.: \_\_\_\_\_  
 VERT: 1"=4'  
 HORZ: 1"=40'  
 SHEET: \_\_\_\_\_ OF XX

45+00 46+00 47+00 48+00 49+00

10/6/2015 11:35 PM ICCorr1110

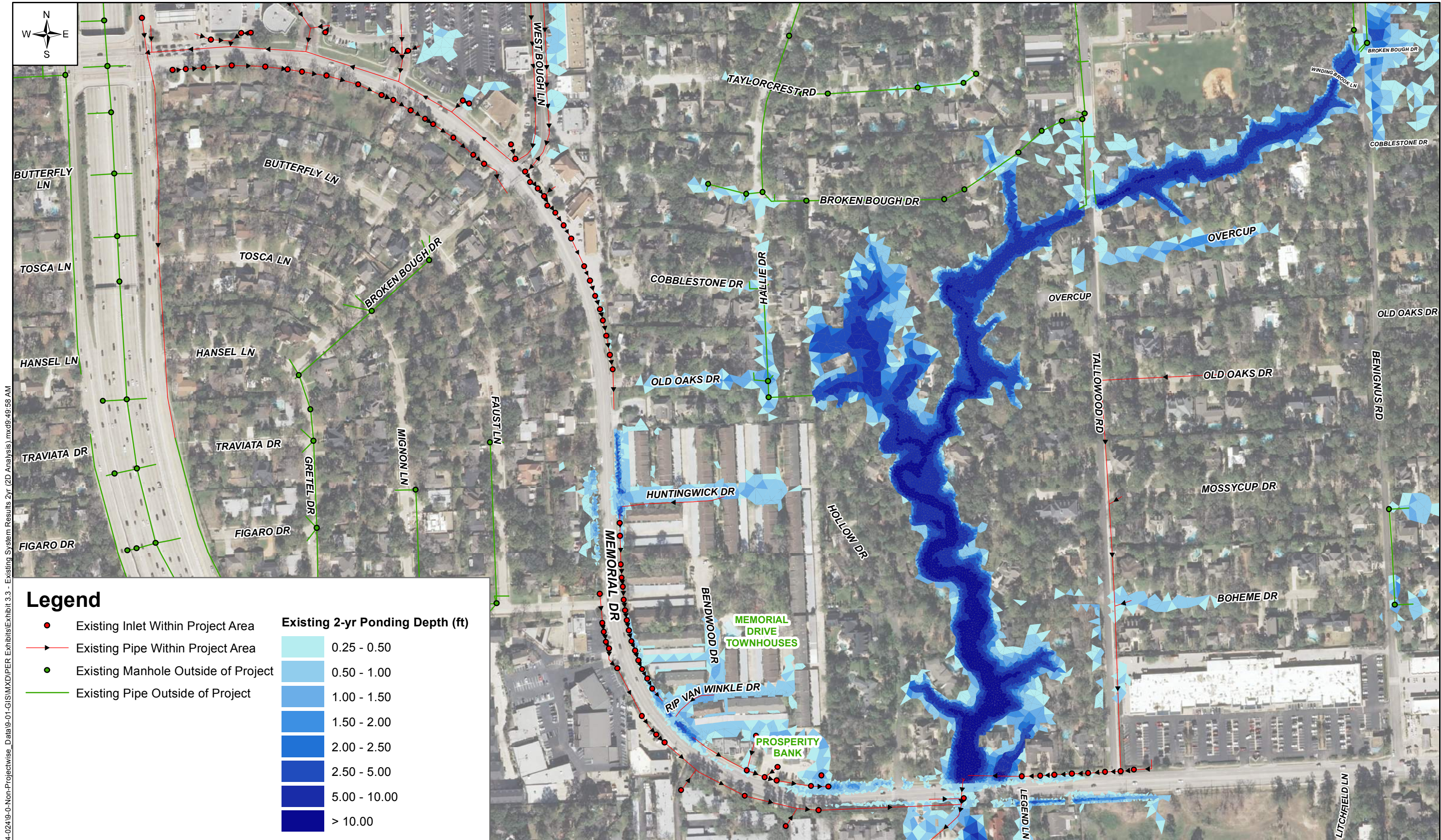










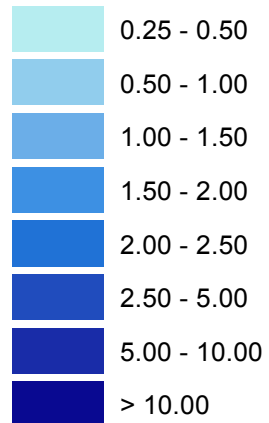


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### Legend

- Existing Inlet Within Project Area
- ▶ Existing Pipe Within Project Area
- Existing Manhole Outside of Project
- Existing Pipe Outside of Project

### Existing 2-yr Ponding Depth (ft)



REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.  
 Engineer: FERGUS GRAHAM  
 P.E. Serial No.:  
 Firm: Lockwood, Andrews, and Newnam, Inc.  
 Firm No.: 2614  
 Date: AUGUST 2015

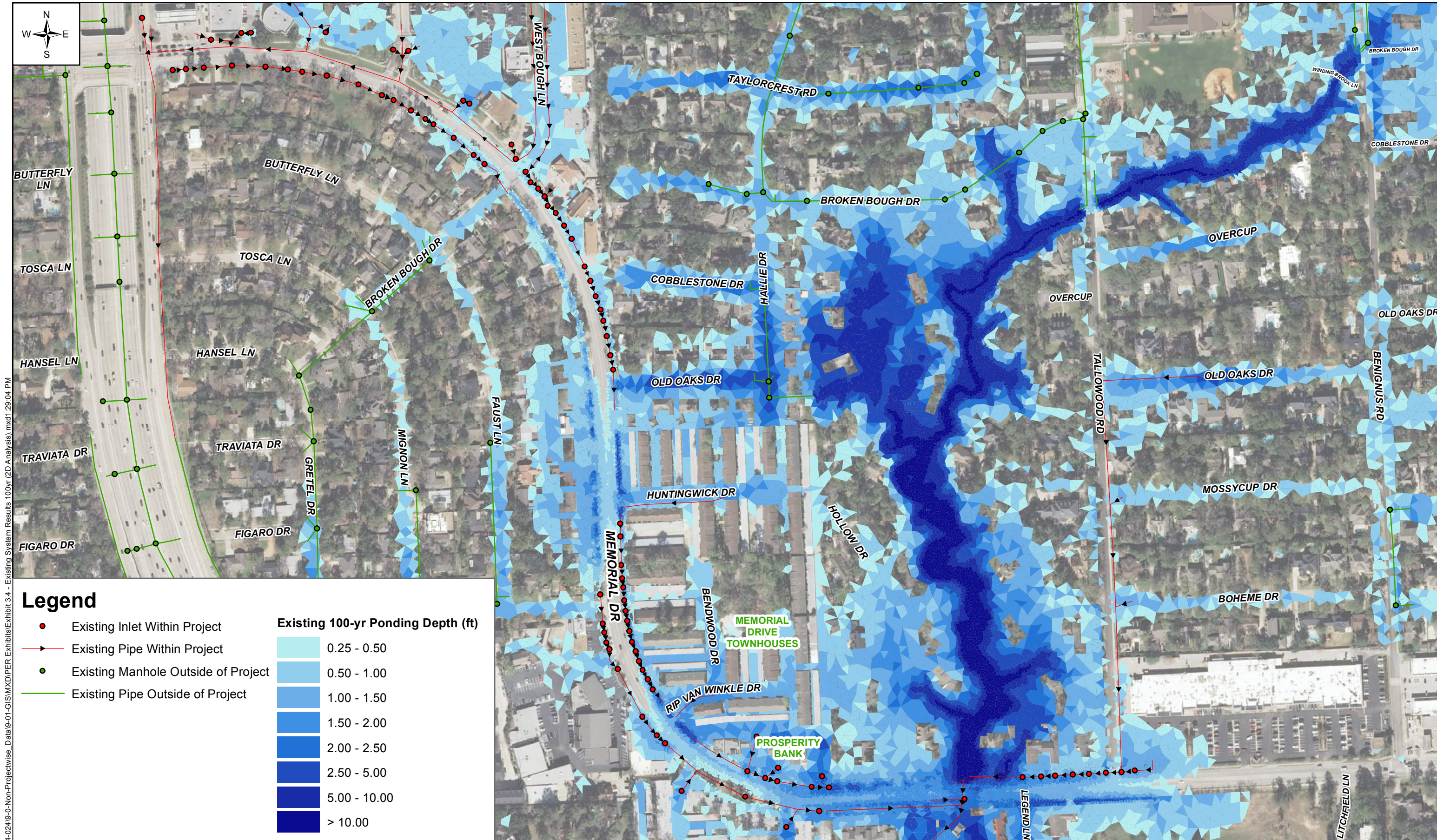
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DRN BY	DATE
DRW	DATE
DRN CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
 DRAINAGE & MOBILITY IMPROVEMENT STUDY**

**EXHIBIT 3.3  
 EXISTING SYSTEM RESULTS - 2YR**

CONTRACT NO.	DRAWING NO.	REV.
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Document Path: L:\130-10384-024\9-0-Non-Projectwise\_Data\9-01-GIS\MD\IPER\_Exhibits\Exhibit 3.4 - Existing System Results 100yr (2D Analysis).mxd 1:29:04 PM

### Legend

- Existing Inlet Within Project
- Existing Pipe Within Project
- Existing Manhole Outside of Project
- Existing Pipe Outside of Project

Existing 100-yr Ponding Depth (ft)	
	0.25 - 0.50
	0.50 - 1.00
	1.00 - 1.50
	1.50 - 2.00
	2.00 - 2.50
	2.50 - 5.00
	5.00 - 10.00
	> 10.00

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



INTERIM REVIEW ONLY

Document incomplete: not intended for permit, bidding or construction.

Engineer: FERGUS GRAHAM  
 P.E. Serial No.:  
 Firm: Lockwood, Andrews, and Newnam, Inc.  
 Firm No.: 2614  
 Date: AUGUST 2015

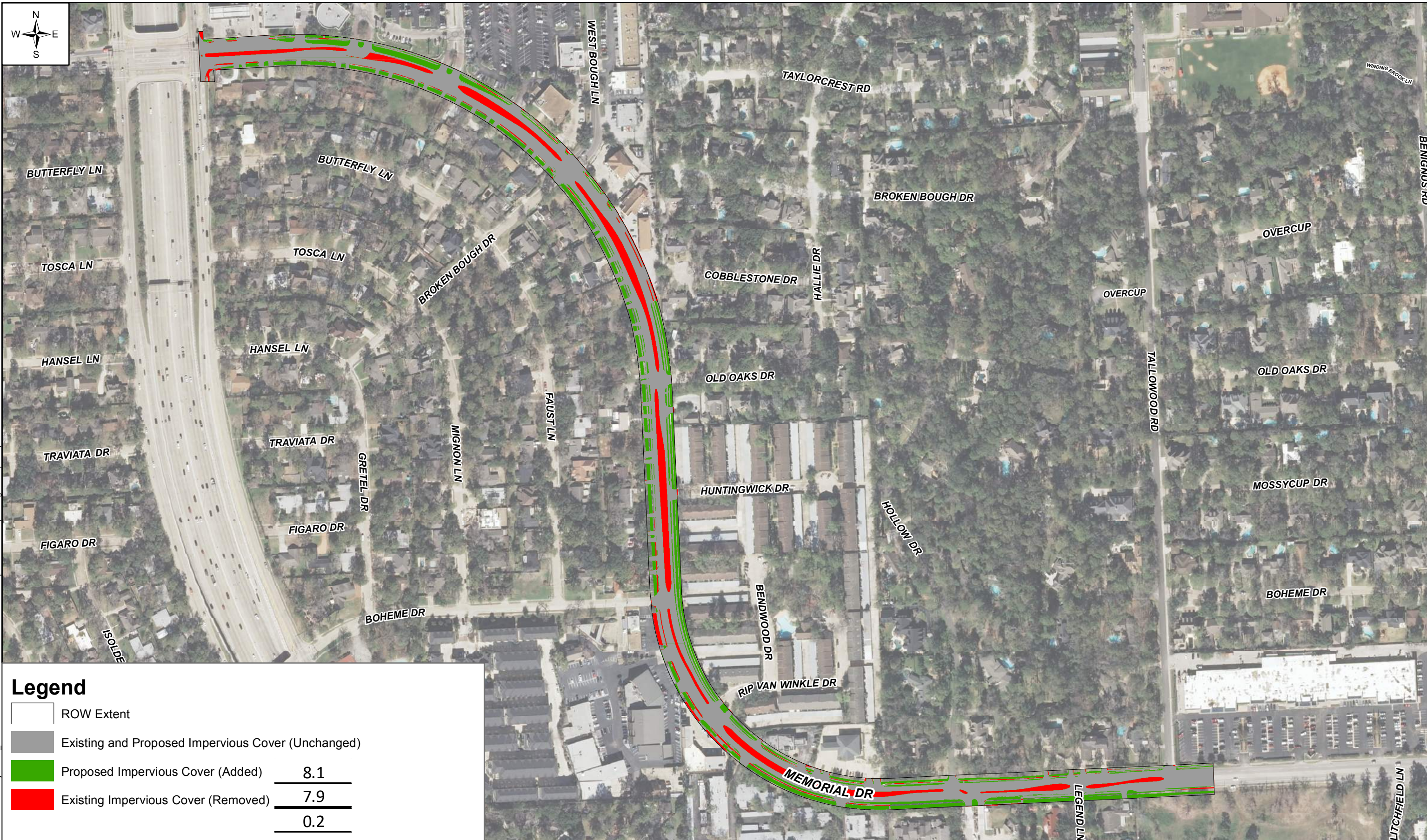
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DRN BY	DATE
DRW	DATE
DRN CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
DRAINAGE & MOBILITY IMPROVEMENT STUDY**

**EXHIBIT 3.4  
EXISTING SYSTEM RESULTS - 100YR**

CONTRACT NO.	DRAWING NO.	REV.
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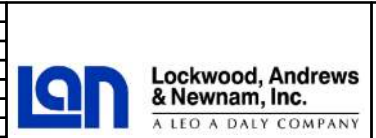


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### Legend

	ROW Extent	
	Existing and Proposed Impervious Cover (Unchanged)	
	Proposed Impervious Cover (Added)	8.1
	Existing Impervious Cover (Removed)	7.9
		0.2

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.  
 Engineer: FERGUS GRAHAM  
 P.E. Serial No.:  
 Firm: Lockwood, Andrews, and Newnam, Inc.  
 Firm No.: 2614  
 Date: AUGUST 2015

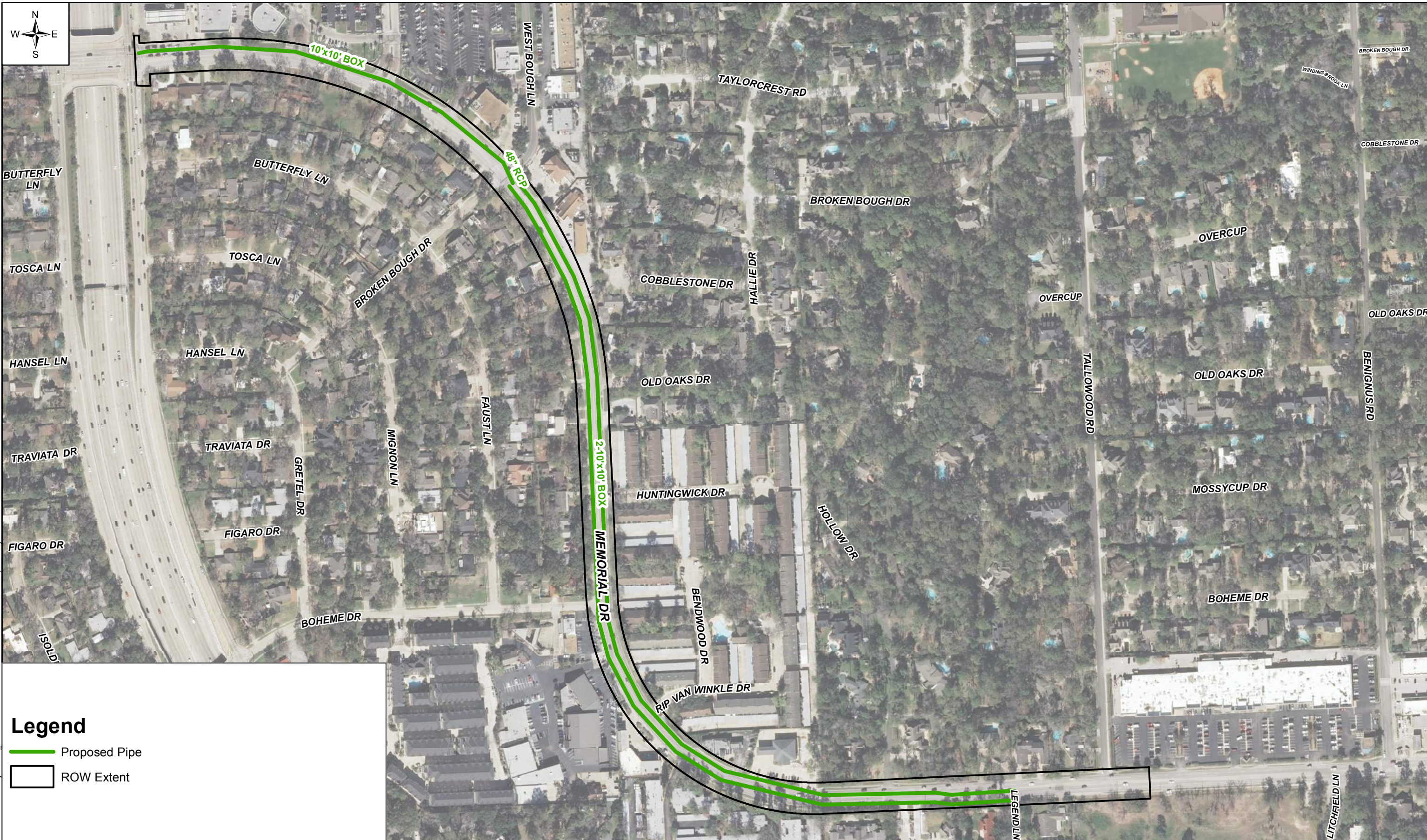
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DRN BY	DATE
DRW	DATE
DRW CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
 DRAINAGE & MOBILITY IMPROVEMENT STUDY**

**EXHIBIT 3.5  
 IMPERVIOUS COVER**

CONTRACT NO.	DRAWING NO.	REV.
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**Legend**

— Proposed Pipe

ROW Extent

Document Path: L:\130-10384-024\9-0-Non-Projectwise\_Data\9-01-GIS\MXD\IPER\_Exhibits\Exhibit 3.6 - Proposed System Schematic.mxd; 5:29 PM

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



**INTERIM REVIEW ONLY**  
Document incomplete: not intended for permit, bidding or construction.

Engineer: FERGUS GRAHAM  
P.E. Serial No.:  
Firm: Lockwood, Andrews, and Newnam, Inc.  
Firm No.: 2614  
Date: AUGUST 2015

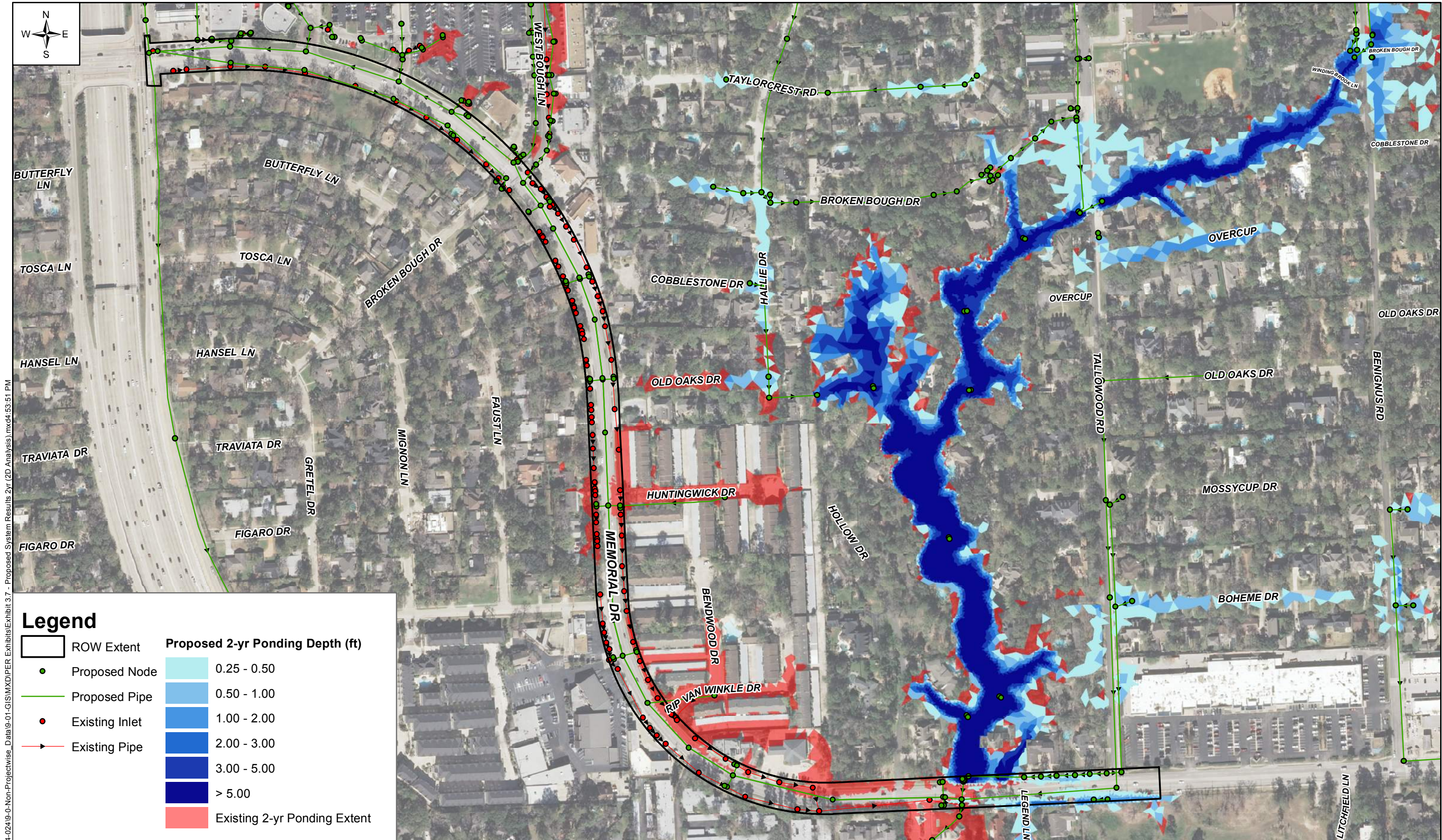
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DRN BY	DATE
DRW	DATE
DRN CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
DRAINAGE & MOBILITY IMPROVEMENT STUDY**

**EXHIBIT 3.6  
RECOMMENDED SYSTEM SCHEMATIC**

CONTRACT NO.	DRAWING NO.	REV.
--------------	-------------	------





Document Path: L:\130-10384-024\9-0-Non-Projectwise\_Data\9-01-GIS\MXD\IPER\_Exhibits\Exhibit 3.7 - Proposed System Results 2yr (2D Analysis).mxd:4:53:51 PM

### Legend

- ROW Extent
  - Proposed Node
  - Proposed Pipe
  - Existing Inlet
  - Existing Pipe
- | Proposed 2-yr Ponding Depth (ft) |   |
|----------------------------------|---|
| 0.25 - 0.50                      | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; margin-right: 5px;"></span> |
| 0.50 - 1.00                      | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; margin-right: 5px;"></span> |
| 1.00 - 2.00                      | <span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span>      |
| 2.00 - 3.00                      | <span style="display: inline-block; width: 15px; height: 10px; background-color: darkblue; margin-right: 5px;"></span>  |
| 3.00 - 5.00                      | <span style="display: inline-block; width: 15px; height: 10px; background-color: navy; margin-right: 5px;"></span>      |
| > 5.00                           | <span style="display: inline-block; width: 15px; height: 10px; background-color: darkblue; margin-right: 5px;"></span>  |
| Existing 2-yr Ponding Extent     | <span style="display: inline-block; width: 15px; height: 10px; background-color: red; margin-right: 5px;"></span>       |

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: FERGUS GRAHAM  
 P.E. Serial No.:  
 Firm: Lockwood, Andrews, and Newnam, Inc.  
 Firm No.: 2614  
 Date: AUGUST 2015

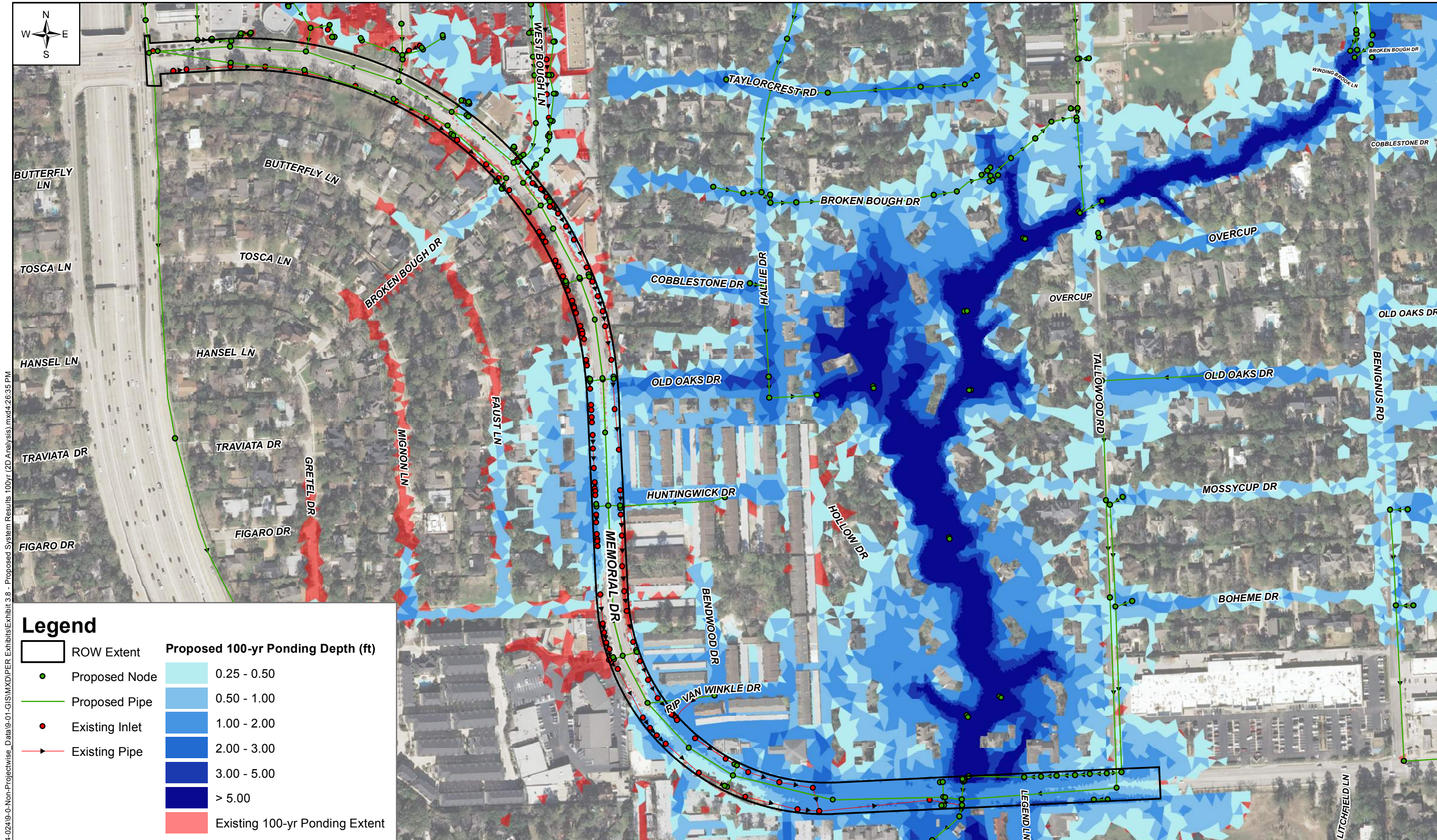
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DRN BY	DATE
DRW	DATE
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EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

## MEMORIAL DRIVE DRAINAGE & MOBILITY IMPROVEMENT STUDY

### EXHIBIT 3.7 RECOMMENDED SYSTEM RESULTS - 2YR

CONTRACT NO.	DRAWING NO.	REV.
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Document Path: L:\130-10384-024\9-0-Non-Projectwise\_Data\9-01-GIS\MXD\PER\_Exhibits\Exhibit 3.8 - Proposed System Results 100Yr (2D Analysis).mxd 4:26:35 PM

### Legend

	ROW Extent	<b>Proposed 100-yr Ponding Depth (ft)</b>	
	Proposed Node		0.25 - 0.50
	Proposed Pipe		0.50 - 1.00
	Existing Inlet		1.00 - 2.00
	Existing Pipe		2.00 - 3.00
			3.00 - 5.00
			Existing 100-yr Ponding Extent

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP



**INTERIM REVIEW ONLY**  
 Document incomplete: not intended for permit, bidding or construction.

Engineer: FERGUS GRAHAM  
 P.E. Serial No.:  
 Firm: Lockwood, Andrews, and Newnam, Inc.  
 Firm No.: 2614  
 Date: AUGUST 2015

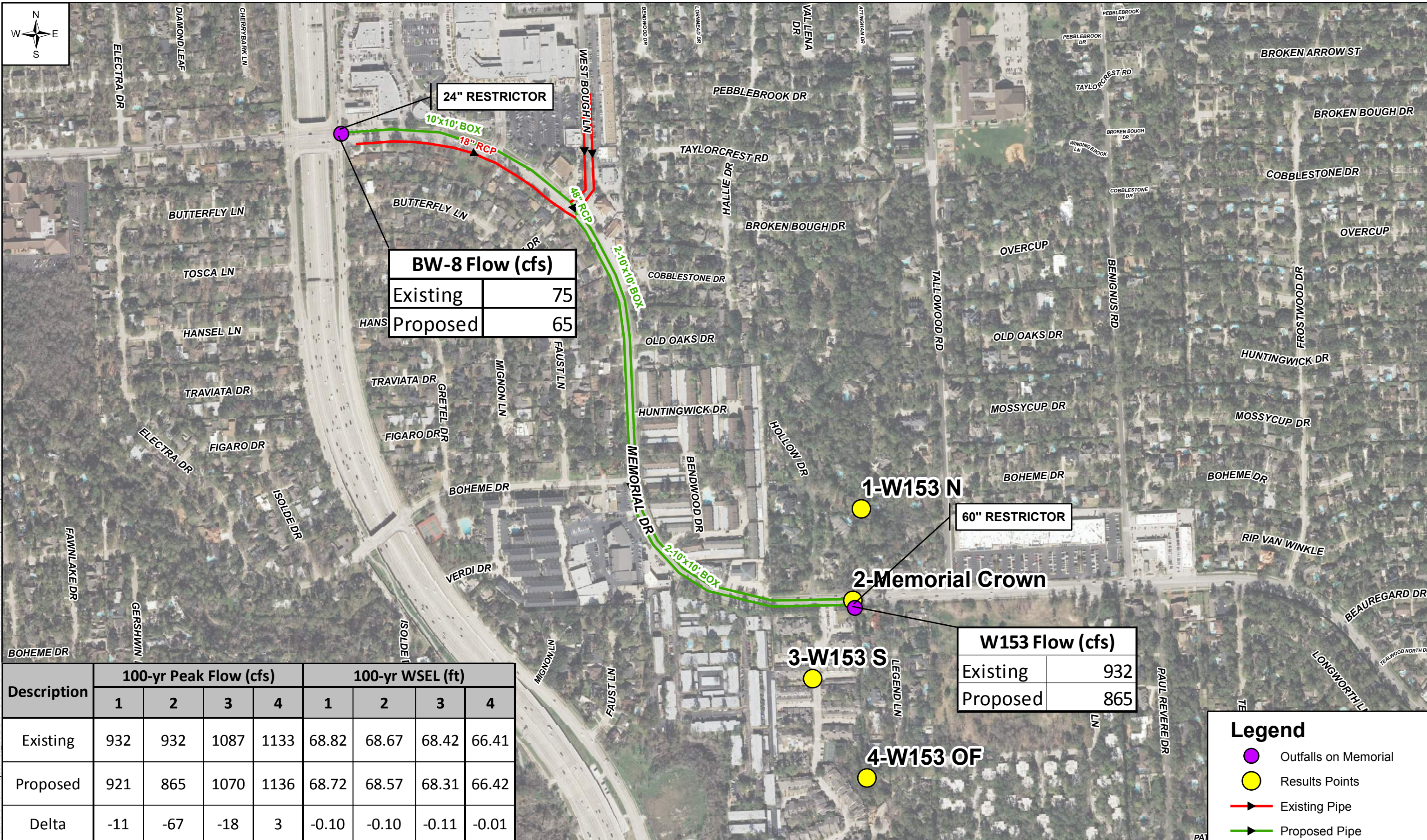
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DRN BY	DATE
DRW	DATE
DRN CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
 DRAINAGE & MOBILITY IMPROVEMENT STUDY**

**EXHIBIT 3.8  
 RECOMMENDED SYSTEM RESULTS - 2YR**

CONTRACT NO.	DRAWING NO.	REV.
--------------	-------------	------





BW-8 Flow (cfs)	
Existing	75
Proposed	65

W153 Flow (cfs)	
Existing	932
Proposed	865

Description	100-yr Peak Flow (cfs)				100-yr WSEL (ft)			
	1	2	3	4	1	2	3	4
Existing	932	932	1087	1133	68.82	68.67	68.42	66.41
Proposed	921	865	1070	1136	68.72	68.57	68.31	66.42
Delta	-11	-67	-18	3	-0.10	-0.10	-0.11	-0.01

**Legend**

- Outfalls on Memorial
- Results Points
- ▶ Existing Pipe
- ▶ Proposed Pipe

Document Path: L:\130-10384-02419-0-Non-Projectwise\_Data\9-01-GIS\MXD\PER Exhibits\Exhibit 3.9 - No Adverse Impact - Proposed.mxd 9/24/19 AM

REV	DATE	DESCRIPTION	ADD	AMD	CCR	BY	ENG	CHK	APP

Lockwood, Andrews & Newnam, Inc.  
A LEO A DALY COMPANY

TIRZ 17  
REDEVELOPMENT  
AUTHORITY

**INTERIM REVIEW ONLY**  
Document incomplete: not intended for permit, bidding or construction.

Engineer: FERGUS GRAHAM  
P.E. Serial No.:  
Firm: Lockwood, Andrews, and Newnam, Inc.  
Firm No.: 2614  
Date: AUGUST 2015

ACL	AUGUST 2015
DRN BY	DATE
BRW	DATE
DRN CKD BY	DATE
EG	DATE
DES BY	DATE
N/A	DATE
DES CKD BY	DATE
APPROVED BY	DATE

**MEMORIAL DRIVE  
DRAINAGE & MOBILITY IMPROVEMENT STUDY**

EXHIBIT 3.9  
NO ADVERSE IMPACT- PROPOSED

CONTRACT NO.	DRAWING NO.	REV.
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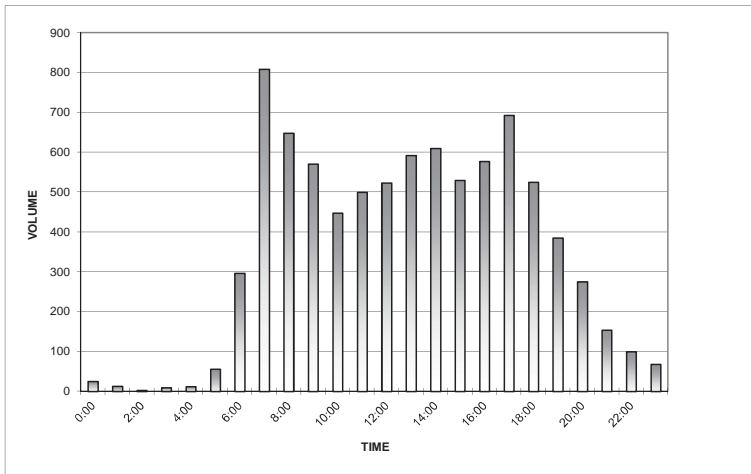
**Appendix D.1**  
**24-Hour Traffic Volumes**

Eastbound Memorial Dr west of Benignus

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	10	8	4	3	25
1:00	5	4	3	1	13
2:00	0	1	0	2	3
3:00	4	3	0	2	9
4:00	1	2	2	7	12
5:00	4	17	18	17	56
6:00	43	67	95	92	297
7:00	160	191	254	204	809
8:00	151	181	172	144	648
9:00	164	152	130	125	571
10:00	124	95	107	122	448
11:00	121	108	127	144	500
12:00	126	141	121	135	523
13:00	137	139	158	158	592
14:00	153	173	133	151	610
15:00	117	152	130	131	530
16:00	149	131	136	161	577
17:00	172	171	189	161	693
18:00	154	146	110	115	525
19:00	113	101	87	84	385
20:00	80	84	49	62	275
21:00	47	47	37	23	154
22:00	36	24	22	18	100
23:00	21	17	16	14	68
TOTAL:					8423

The A.M. peak hour from 7:00 to 8:00 is 809  
The P.M. peak hour from 17:00 to 18:00 is 693

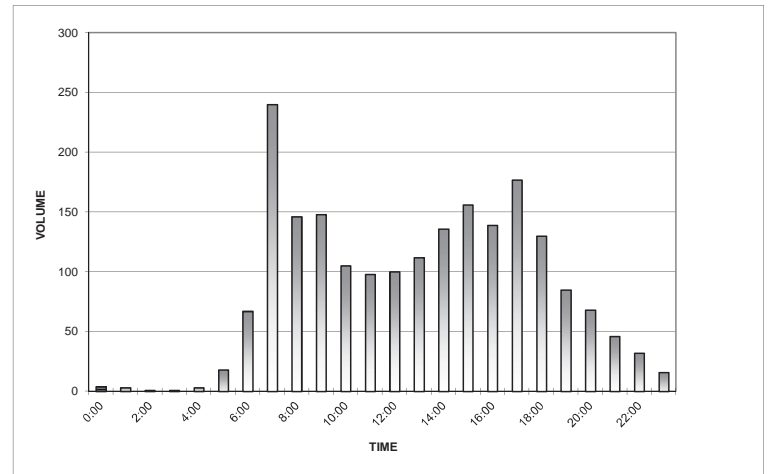


Eastbound Boheme Dr west of Memorial Dr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	0	1	1	2	4
1:00	0	1	1	1	3
2:00	0	0	0	1	1
3:00	0	1	0	0	1
4:00	0	1	1	1	3
5:00	1	8	8	1	18
6:00	12	14	17	24	67
7:00	37	70	82	51	240
8:00	38	35	40	33	146
9:00	38	42	33	35	148
10:00	32	29	17	27	105
11:00	19	18	34	27	98
12:00	35	25	18	22	100
13:00	25	31	29	27	112
14:00	35	34	34	33	136
15:00	36	44	41	35	156
16:00	38	36	31	34	139
17:00	36	40	55	46	177
18:00	33	34	32	31	130
19:00	23	22	20	20	85
20:00	16	17	14	21	68
21:00	20	12	7	7	46
22:00	11	7	9	5	32
23:00	4	6	2	4	16
TOTAL:					2031

The A.M. peak hour from 7:15 to 8:15 is 241  
The P.M. peak hour from 17:00 to 18:00 is 177

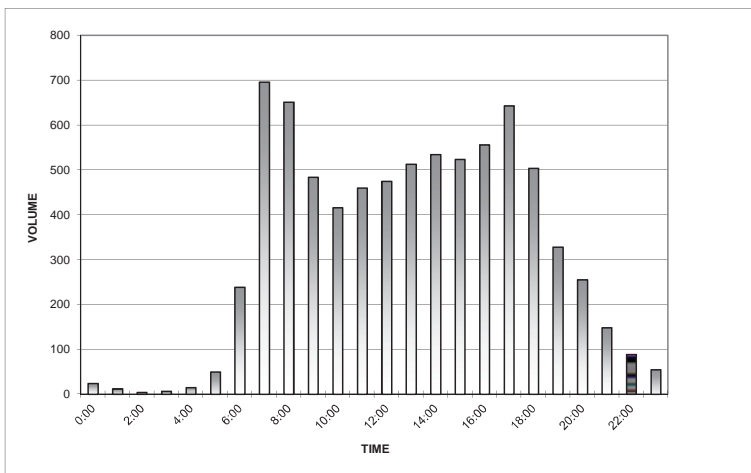


Eastbound Memorial Dr west of Gessner Rc

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	8	8	4	4	24
1:00	4	4	3	1	12
2:00	0	1	2	1	4
3:00	3	3	0	1	7
4:00	1	4	4	6	15
5:00	6	11	16	17	50
6:00	36	50	69	84	239
7:00	131	176	196	193	696
8:00	155	194	158	145	652
9:00	150	125	103	106	484
10:00	105	91	114	106	416
11:00	110	109	115	126	460
12:00	112	123	112	128	475
13:00	118	122	133	140	513
14:00	117	153	129	136	535
15:00	118	122	128	156	524
16:00	139	144	125	148	556
17:00	161	159	180	143	643
18:00	153	136	105	110	504
19:00	101	85	79	63	328
20:00	84	79	39	53	255
21:00	44	45	30	29	148
22:00	33	21	19	16	89
23:00	15	17	12	11	55
TOTAL:					7684

The A.M. peak hour from 7:30 to 8:30 is 738  
The P.M. peak hour from 16:45 to 17:45 is 648

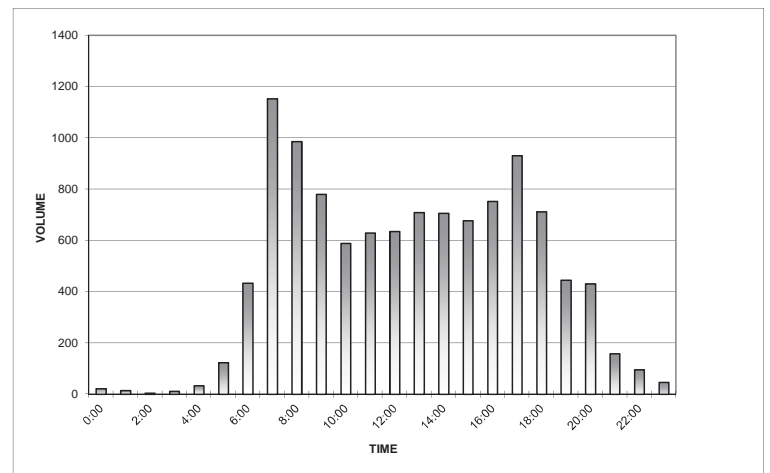


Eastbound Memorial Dr west of Beltway 8

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	9	3	4	6	22
1:00	6	4	0	5	15
2:00	0	1	0	4	5
3:00	3	3	5	1	12
4:00	3	8	7	16	34
5:00	15	30	37	42	124
6:00	73	82	126	153	434
7:00	211	285	331	327	1154
8:00	272	262	236	217	987
9:00	233	202	174	172	781
10:00	150	148	149	142	589
11:00	141	157	159	172	629
12:00	150	153	183	149	635
13:00	172	160	180	197	709
14:00	192	167	178	170	707
15:00	173	170	170	164	677
16:00	152	187	202	212	753
17:00	213	237	256	225	931
18:00	212	200	163	137	712
19:00	120	92	92	141	445
20:00	107	152	88	84	431
21:00	60	33	29	36	158
22:00	32	28	29	7	96
23:00	13	14	10	10	47
TOTAL:					11087

The A.M. peak hour from 7:15 to 8:15 is 1215  
The P.M. peak hour from 17:00 to 18:00 is 931



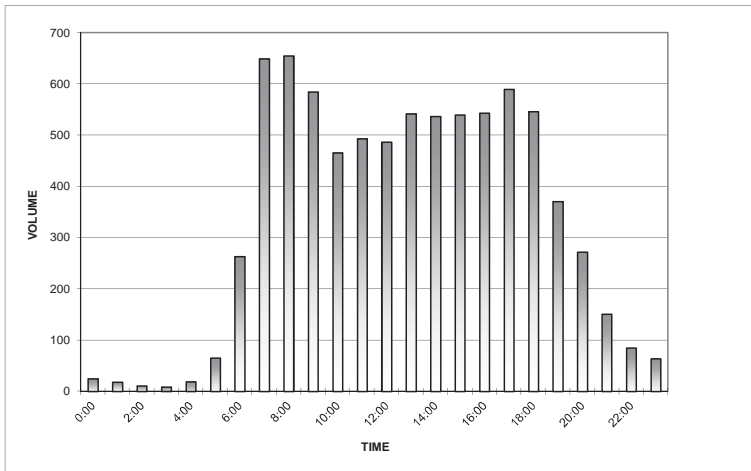


Eastbound Memorial Dr west of Bough Lr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	10	9	3	3	25
1:00	8	6	2	2	18
2:00	5	0	1	5	11
3:00	2	4	1	2	9
4:00	0	5	5	9	19
5:00	9	16	21	19	65
6:00	35	57	76	95	263
7:00	120	154	173	202	649
8:00	151	180	153	171	655
9:00	170	152	132	131	585
10:00	114	116	111	125	466
11:00	109	104	135	145	493
12:00	123	115	114	135	487
13:00	133	131	128	150	542
14:00	142	127	122	146	537
15:00	122	147	128	143	540
16:00	121	148	138	136	543
17:00	137	135	153	165	590
18:00	144	154	128	120	546
19:00	112	83	89	87	371
20:00	63	93	59	57	272
21:00	51	35	33	32	151
22:00	30	17	27	11	85
23:00	21	15	14	14	64
TOTAL:					7986

The A.M. peak hour from 7:30 to 8:30 is 706  
The P.M. peak hour from 17:30 to 18:30 is 616

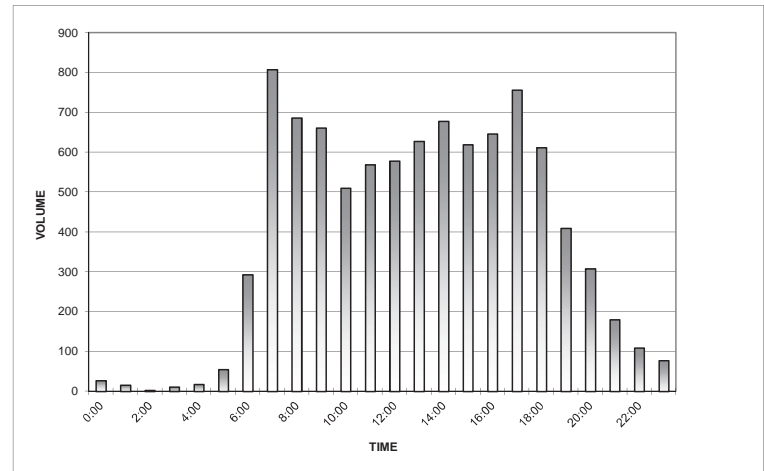


Eastbound Memorial Dr west of Hollow Dr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	10	9	5	3	27
1:00	6	4	3	3	16
2:00	0	0	0	3	3
3:00	4	4	1	2	11
4:00	2	1	4	11	18
5:00	6	14	19	16	55
6:00	43	55	93	102	293
7:00	153	199	245	211	808
8:00	162	184	184	156	686
9:00	184	169	157	151	661
10:00	134	129	115	132	510
11:00	140	126	140	163	569
12:00	155	154	121	148	578
13:00	147	149	165	167	628
14:00	158	185	155	180	678
15:00	157	155	151	156	619
16:00	171	143	159	173	646
17:00	189	182	206	179	756
18:00	182	160	145	125	612
19:00	114	106	92	97	409
20:00	84	92	65	67	308
21:00	60	53	41	26	180
22:00	40	25	25	19	109
23:00	24	21	17	15	77
TOTAL:					9257

The A.M. peak hour from 7:15 to 8:15 is 817  
The P.M. peak hour from 17:00 to 18:00 is 756

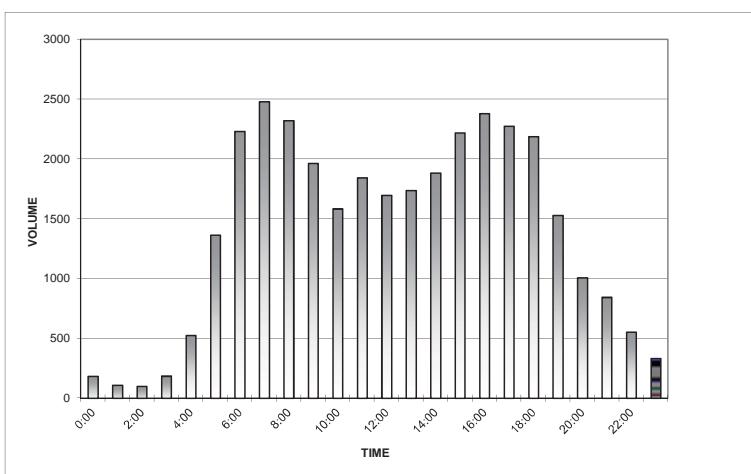


Northbound Beltway 8 south of Memorial Dr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	54	51	44	33	182
1:00	31	24	38	16	109
2:00	27	30	22	21	100
3:00	39	31	55	60	185
4:00	61	104	153	206	524
5:00	166	322	401	476	1365
6:00	411	553	609	658	2231
7:00	614	571	660	635	2480
8:00	588	618	564	552	2322
9:00	478	519	490	477	1964
10:00	425	376	362	421	1584
11:00	439	463	477	465	1844
12:00	412	395	444	447	1698
13:00	413	453	459	414	1739
14:00	405	499	481	499	1884
15:00	550	537	540	594	2221
16:00	585	612	606	578	2381
17:00	596	521	589	571	2277
18:00	571	572	565	482	2190
19:00	444	435	347	304	1530
20:00	266	293	256	192	1007
21:00	229	223	217	175	844
22:00	145	122	158	128	553
23:00	124	77	71	62	334
TOTAL:					33548

The A.M. peak hour from 6:45 to 7:45 is 2503  
The P.M. peak hour from 15:45 to 16:45 is 2397

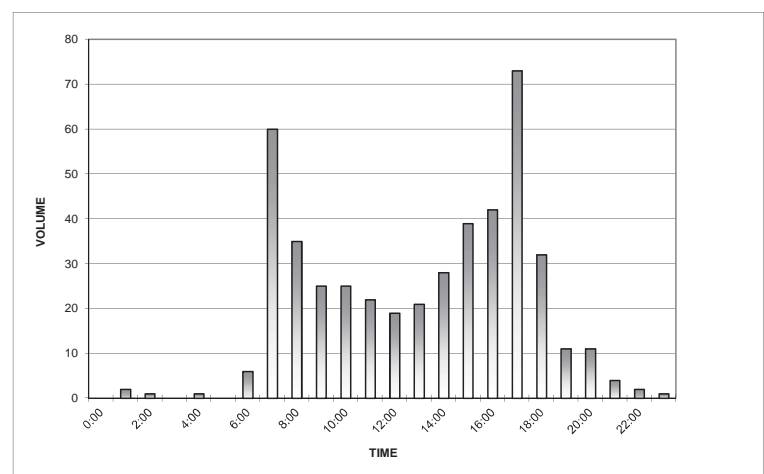


Northbound Broken Bough Dr south of Memorial D

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	0	0	0	0	0
1:00	0	0	2	0	2
2:00	0	0	1	0	1
3:00	0	0	0	0	0
4:00	0	0	0	1	1
5:00	0	0	0	0	0
6:00	1	0	1	4	6
7:00	9	17	13	21	60
8:00	17	8	3	7	35
9:00	9	6	6	4	25
10:00	8	4	10	3	25
11:00	5	7	3	7	22
12:00	7	3	5	4	19
13:00	4	7	6	4	21
14:00	7	8	8	5	28
15:00	11	13	5	10	39
16:00	12	9	8	13	42
17:00	13	21	16	23	73
18:00	14	7	3	8	32
19:00	6	2	3	0	11
20:00	6	2	3	0	11
21:00	0	1	2	1	4
22:00	0	1	0	1	2
23:00	0	0	0	1	1
TOTAL:					460

The A.M. peak hour from 7:15 to 8:15 is 68  
The P.M. peak hour from 17:15 to 18:15 is 74

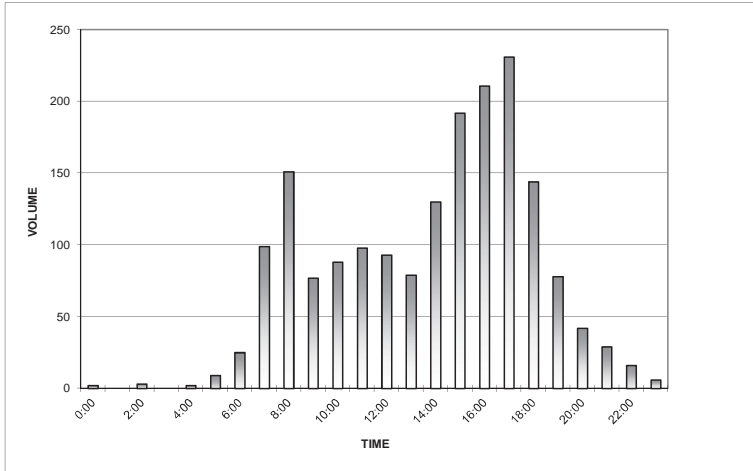


**Southbound Benignus Rd north of Memorial D**

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	0	1	1	0	2
1:00	0	0	0	0	0
2:00	0	0	3	0	3
3:00	0	0	0	0	0
4:00	0	0	1	1	2
5:00	1	3	2	3	9
6:00	2	1	9	13	25
7:00	14	8	32	45	99
8:00	57	54	27	13	151
9:00	19	19	19	20	77
10:00	14	19	28	27	88
11:00	24	20	24	30	98
12:00	32	19	24	18	93
13:00	16	16	24	23	79
14:00	26	31	37	36	130
15:00	33	33	68	58	192
16:00	50	55	52	54	211
17:00	63	52	63	53	231
18:00	50	28	36	30	144
19:00	35	10	15	18	78
20:00	15	14	7	6	42
21:00	15	9	2	3	29
22:00	8	2	4	2	16
23:00	1	3	1	1	6
TOTAL:					1805

The A.M. peak hour from 7:30 to 8:30 is 188  
The P.M. peak hour from 16:45 to 17:45 is 232

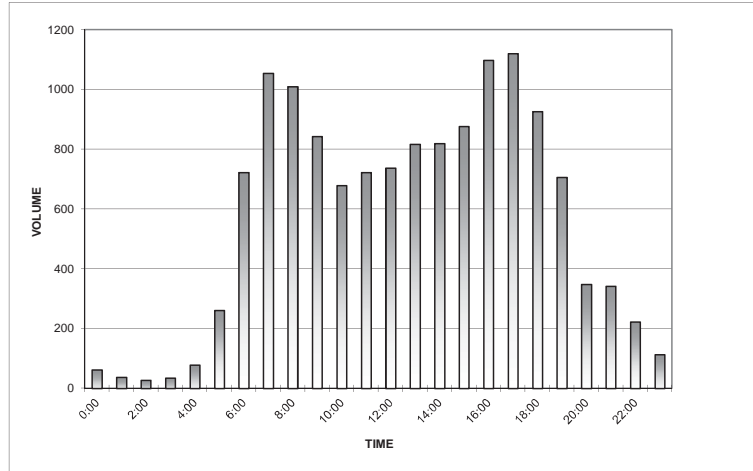


**Northbound Gessner Rd south of Memorial D**

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	16	15	9	22	62
1:00	15	7	8	7	37
2:00	8	10	1	8	27
3:00	6	5	11	13	35
4:00	9	22	24	23	78
5:00	32	57	89	83	261
6:00	106	149	223	245	723
7:00	244	239	291	281	1055
8:00	266	271	229	244	1010
9:00	237	206	214	186	843
10:00	175	177	163	164	679
11:00	154	196	170	203	723
12:00	180	174	190	193	737
13:00	211	212	180	214	817
14:00	200	196	207	216	819
15:00	199	198	247	233	877
16:00	251	277	299	271	1098
17:00	293	290	272	265	1120
18:00	211	261	244	211	927
19:00	231	200	144	131	706
20:00	103	84	85	76	348
21:00	96	95	72	79	342
22:00	70	75	39	38	222
23:00	33	32	22	26	113
TOTAL:					13659

The A.M. peak hour from 7:30 to 8:30 is 1109  
The P.M. peak hour from 16:30 to 17:30 is 1153

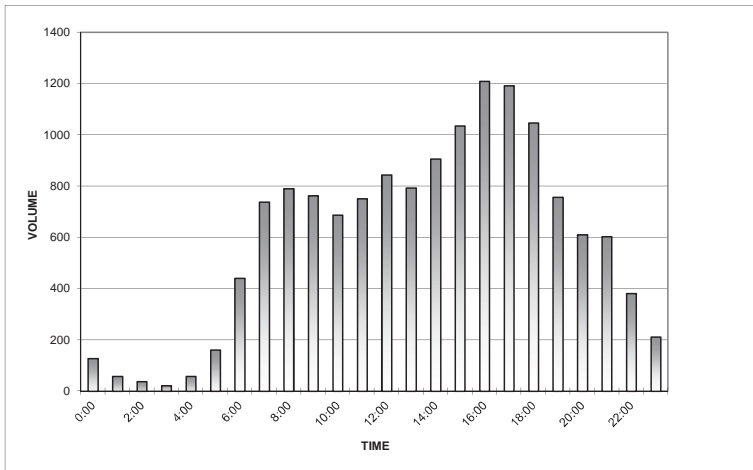


**Southbound Gessner Rd north of Memorial D**

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	37	47	29	15	128
1:00	18	17	15	8	58
2:00	12	9	10	7	38
3:00	8	4	4	6	22
4:00	10	9	18	21	58
5:00	15	35	48	63	161
6:00	63	108	127	143	441
7:00	132	163	207	237	739
8:00	212	173	216	190	791
9:00	191	191	206	175	763
10:00	164	164	177	183	688
11:00	178	204	184	186	752
12:00	237	197	207	203	844
13:00	189	205	185	214	793
14:00	220	229	205	253	907
15:00	258	271	264	243	1036
16:00	315	303	309	283	1210
17:00	311	313	284	285	1193
18:00	279	269	275	225	1048
19:00	226	191	181	159	757
20:00	136	158	163	154	611
21:00	183	170	126	124	603
22:00	121	103	84	73	381
23:00	69	58	50	35	212
TOTAL:					14234

The A.M. peak hour from 7:45 to 8:45 is 838  
The P.M. peak hour from 16:30 to 17:30 is 1216

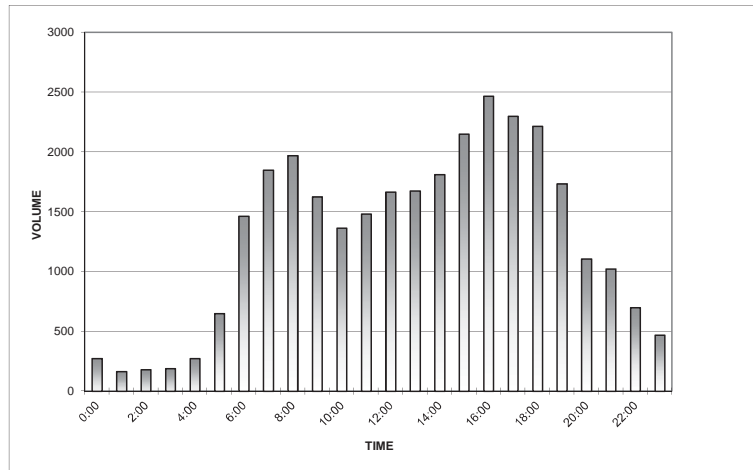


**Southbound Beltway 8 north of Memorial D**

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	91	78	53	53	275
1:00	34	48	50	33	165
2:00	50	58	35	38	181
3:00	45	31	66	48	190
4:00	34	49	103	88	274
5:00	78	137	209	227	651
6:00	296	382	405	380	1463
7:00	392	445	492	521	1850
8:00	483	492	536	461	1972
9:00	451	428	364	382	1625
10:00	366	322	339	338	1365
11:00	329	364	386	405	1484
12:00	366	408	461	430	1665
13:00	416	440	412	408	1676
14:00	416	441	469	485	1811
15:00	470	514	587	579	2150
16:00	654	596	650	568	2468
17:00	639	530	610	522	2301
18:00	622	571	558	466	2217
19:00	497	492	416	329	1734
20:00	307	302	238	259	1106
21:00	297	256	244	227	1024
22:00	261	172	155	111	699
23:00	123	124	112	111	470
TOTAL:					30816

The A.M. peak hour from 7:45 to 8:45 is 2032  
The P.M. peak hour from 15:45 to 16:45 is 2479

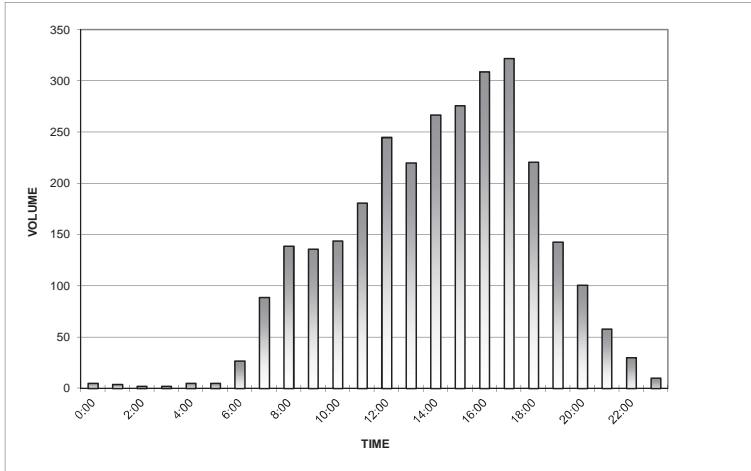


Southbound W. Bough Ln north of Memorial D

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	2	1	2	0	5
1:00	0	1	2	1	4
2:00	1	0	0	1	2
3:00	0	1	1	0	2
4:00	3	0	1	1	5
5:00	0	2	2	1	5
6:00	4	4	9	10	27
7:00	18	14	30	27	89
8:00	38	58	22	21	139
9:00	41	34	31	30	136
10:00	28	27	48	41	144
11:00	43	43	35	60	181
12:00	72	57	62	54	245
13:00	41	61	60	58	220
14:00	76	64	71	56	267
15:00	67	58	80	71	276
16:00	85	62	87	75	309
17:00	87	69	91	75	322
18:00	71	58	54	38	221
19:00	44	45	29	25	143
20:00	29	18	24	30	101
21:00	17	13	17	11	58
22:00	14	6	4	6	30
23:00	5	1	2	2	10
TOTAL:					2941

The A.M. peak hour from 7:30 to 8:30 is 153  
 The P.M. peak hour from 17:00 to 18:00 is 322

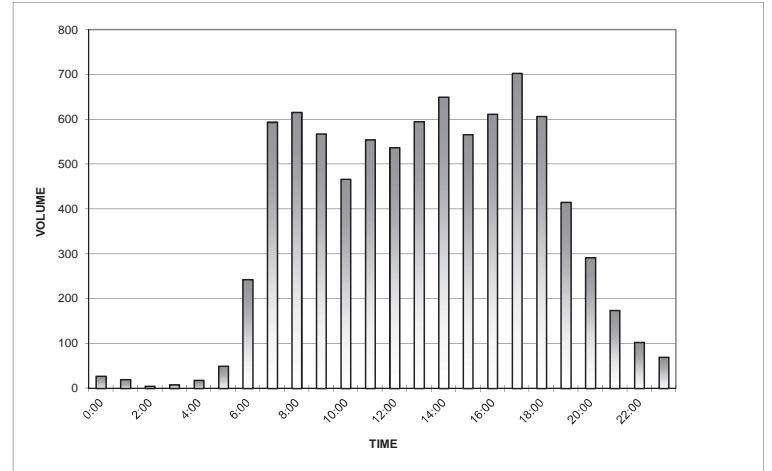


Southbound Memorial Dr north of Boheme D

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	9	9	4	5	27
1:00	7	6	4	3	20
2:00	0	0	1	4	5
3:00	1	3	1	3	8
4:00	3	1	5	9	18
5:00	7	11	16	16	50
6:00	34	51	77	81	243
7:00	116	142	163	173	594
8:00	136	172	157	151	616
9:00	165	150	133	120	568
10:00	115	107	115	130	467
11:00	130	126	136	163	555
12:00	139	138	120	140	537
13:00	141	148	145	161	595
14:00	157	176	152	165	650
15:00	140	136	147	143	566
16:00	158	136	160	158	612
17:00	176	159	195	173	703
18:00	180	160	147	120	607
19:00	124	105	92	94	415
20:00	69	91	63	69	292
21:00	60	39	45	30	174
22:00	38	17	29	19	103
23:00	22	17	15	16	70
TOTAL:					8495

The A.M. peak hour from 8:15 to 9:15 is 645  
 The P.M. peak hour from 17:30 to 18:30 is 708

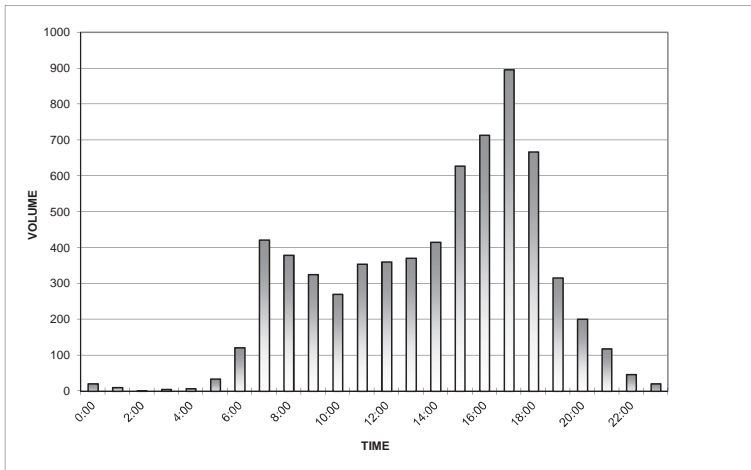


Westbound Memorial Dr east of Gessner Dr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	8	5	5	3	21
1:00	1	1	5	3	10
2:00	0	0	1	0	1
3:00	1	0	0	4	5
4:00	0	2	0	5	7
5:00	4	10	9	11	34
6:00	14	17	43	47	121
7:00	51	81	126	164	422
8:00	148	80	76	75	379
9:00	83	84	71	87	325
10:00	67	72	63	68	270
11:00	79	76	97	102	354
12:00	107	78	90	86	361
13:00	99	84	95	93	371
14:00	85	106	109	116	416
15:00	173	165	156	134	628
16:00	160	159	200	195	714
17:00	214	230	224	228	896
18:00	199	203	139	126	667
19:00	106	83	69	58	316
20:00	59	47	60	35	201
21:00	33	36	23	26	118
22:00	19	10	9	9	47
23:00	7	6	7	1	21
TOTAL:					6705

The A.M. peak hour from 7:15 to 8:15 is 519  
 The P.M. peak hour from 17:00 to 18:00 is 896

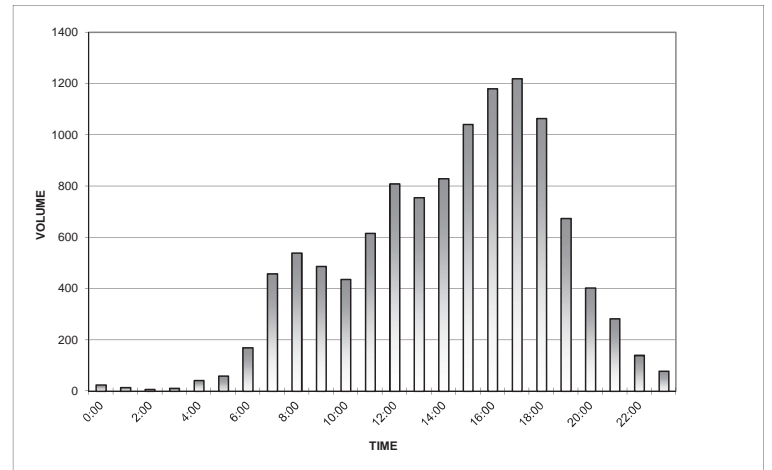


Westbound Memorial Dr east of Beltway 8

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	10	6	5	3	24
1:00	4	4	4	2	14
2:00	3	0	3	1	7
3:00	4	4	2	1	11
4:00	3	7	16	16	42
5:00	18	15	14	13	60
6:00	32	29	46	63	170
7:00	85	104	132	138	459
8:00	146	138	120	135	539
9:00	134	119	115	119	487
10:00	85	113	109	129	436
11:00	160	140	145	171	616
12:00	213	193	201	202	809
13:00	202	210	158	186	756
14:00	206	203	204	217	830
15:00	235	234	279	293	1041
16:00	246	324	314	297	1181
17:00	316	325	298	281	1220
18:00	283	304	247	231	1065
19:00	250	175	134	116	675
20:00	126	108	92	77	403
21:00	84	70	60	69	283
22:00	57	43	23	17	140
23:00	26	29	16	8	79
TOTAL:					11347

The A.M. peak hour from 7:30 to 8:30 is 554  
 The P.M. peak hour from 16:30 to 17:30 is 1252



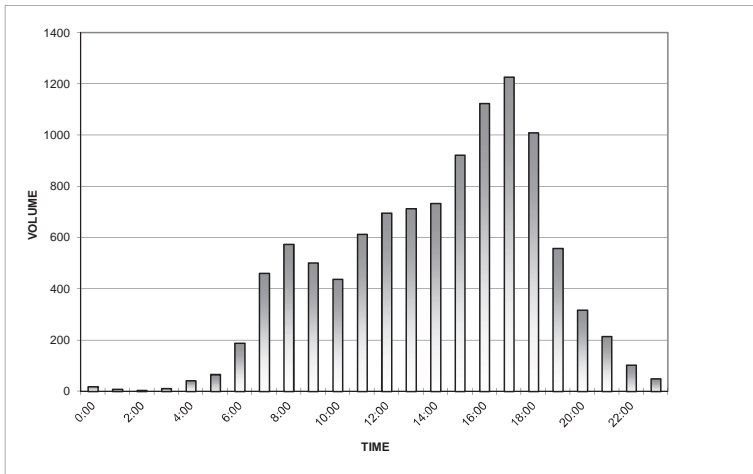


Westbound Memorial Dr east of W. Bough Lr

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	7	4	6	2	19
1:00	3	2	3	1	9
2:00	2	0	2	0	4
3:00	6	3	2	1	12
4:00	0	8	16	18	42
5:00	20	16	13	17	66
6:00	32	40	43	74	189
7:00	76	106	123	156	461
8:00	165	128	129	152	574
9:00	134	114	118	136	502
10:00	91	115	110	122	438
11:00	149	143	143	179	614
12:00	185	166	182	164	697
13:00	195	167	150	202	714
14:00	171	180	178	205	734
15:00	201	206	268	248	923
16:00	246	287	291	300	1124
17:00	297	310	316	305	1228
18:00	283	293	246	188	1010
19:00	197	155	107	99	558
20:00	89	89	82	58	318
21:00	72	47	47	49	215
22:00	41	33	20	9	103
23:00	16	18	11	5	50
TOTAL:					10604

The A.M. peak hour from 7:45 to 8:45 is 578  
 The P.M. peak hour from 17:00 to 18:00 is 1228

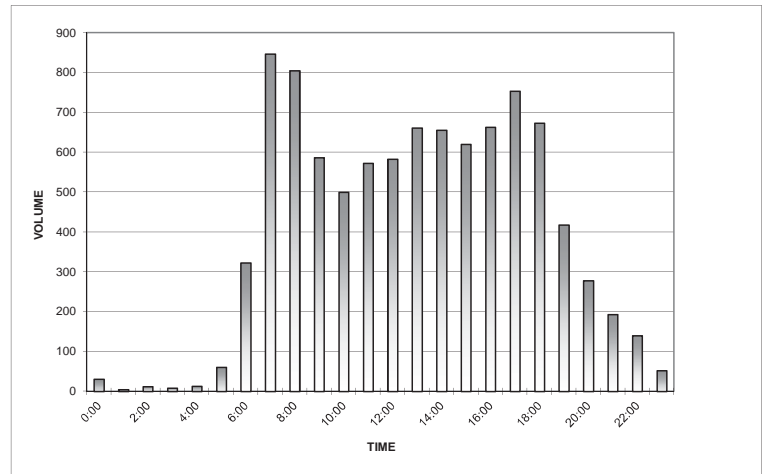


Westbound Memorial Dr east of Hollow Dr

Date Began: 1/15/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	8	12	7	4	31
1:00	1	1	2	1	5
2:00	5	1	3	3	12
3:00	3	0	5	0	8
4:00	2	4	2	5	13
5:00	7	11	22	21	61
6:00	45	63	93	122	323
7:00	142	212	265	228	847
8:00	202	228	197	178	805
9:00	155	157	150	125	587
10:00	125	124	136	115	500
11:00	135	151	136	151	573
12:00	149	158	126	150	583
13:00	175	172	142	172	661
14:00	147	158	161	190	656
15:00	134	162	148	176	620
16:00	169	156	170	168	663
17:00	186	183	178	207	754
18:00	194	191	160	128	673
19:00	122	115	106	75	418
20:00	80	69	64	65	278
21:00	53	53	49	38	193
22:00	37	38	29	36	140
23:00	16	20	10	6	52
TOTAL:					9456

The A.M. peak hour from 7:30 to 8:30 is 923  
 The P.M. peak hour from 17:30 to 18:30 is 770

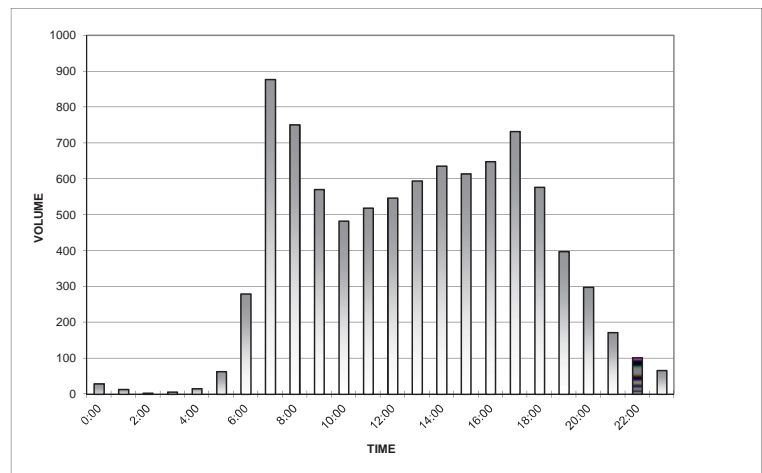


Westbound Memorial Dr west of Benignus Rc

Date Began: 1/13/2015

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	9	10	6	4	29
1:00	5	4	3	1	13
2:00	0	1	1	1	3
3:00	3	2	0	1	6
4:00	1	4	4	7	16
5:00	6	13	21	23	63
6:00	45	59	80	96	280
7:00	162	205	289	222	878
8:00	189	221	187	154	751
9:00	167	149	127	128	571
10:00	122	108	130	123	483
11:00	128	119	130	142	519
12:00	137	145	127	138	547
13:00	132	138	165	160	595
14:00	145	188	146	157	636
15:00	132	152	164	167	615
16:00	162	163	156	168	649
17:00	188	180	206	159	733
18:00	178	148	121	130	577
19:00	119	99	95	85	398
20:00	95	86	50	67	298
21:00	49	57	31	35	172
22:00	36	23	22	21	102
23:00	21	17	15	13	66
TOTAL:					9000

The A.M. peak hour from 7:30 to 8:30 is 921  
 The P.M. peak hour from 16:45 to 17:45 is 742



**Appendix D.2**

**Turning Movement Counts**



C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Beltway 8 SBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 1

### Turning Movement Data

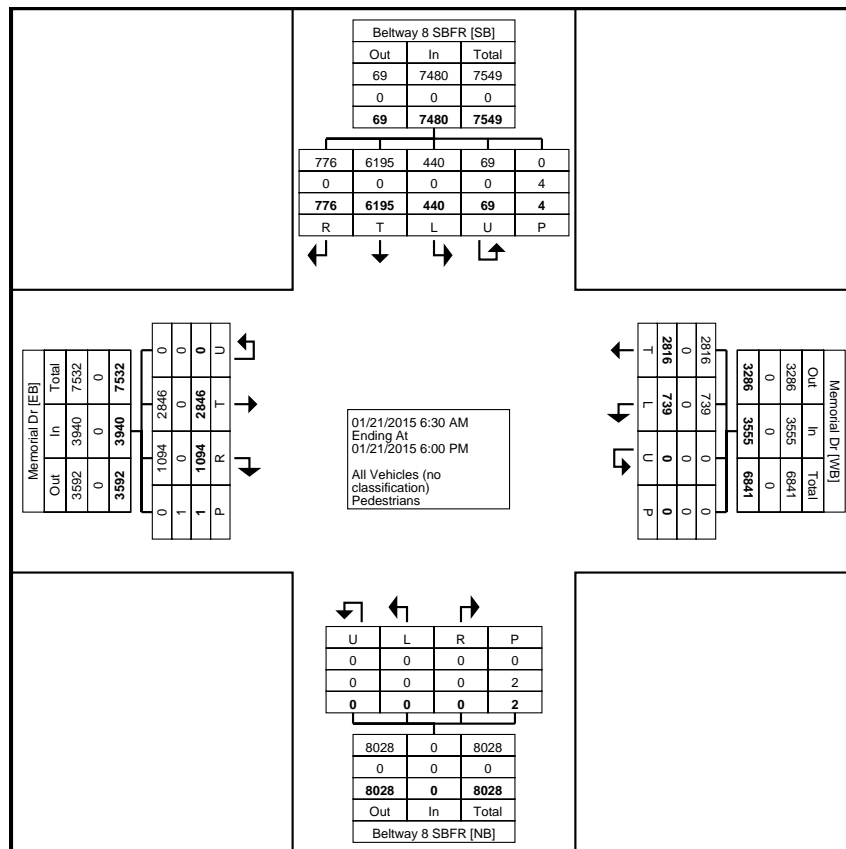
Start Time	Beltway 8 SBFR Southbound						Memorial Dr Westbound					Beltway 8 SBFR Northbound					Memorial Dr Eastbound					Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
6:30 AM	18	267	22	4	0	311	10	60	0	0	70	0	0	0	0	0	91	40	0	0	131	512
6:45 AM	17	326	23	7	0	373	20	83	0	0	103	0	0	0	0	0	102	46	0	0	148	624
Hourly Total	35	593	45	11	0	684	30	143	0	0	173	0	0	0	0	0	193	86	0	0	279	1136
7:00 AM	24	275	13	1	0	313	15	79	0	0	94	0	0	0	0	0	168	63	0	0	231	638
7:15 AM	23	385	22	4	2	434	28	107	0	0	135	0	0	0	0	0	195	79	0	1	274	843
7:30 AM	31	342	31	9	0	413	39	98	0	0	137	0	0	0	0	0	268	96	0	0	364	914
7:45 AM	37	365	36	5	0	443	42	119	0	0	161	0	0	0	0	0	266	85	0	0	351	955
Hourly Total	115	1367	102	19	2	1603	124	403	0	0	527	0	0	0	0	0	897	323	0	1	1220	3350
8:00 AM	31	329	24	5	0	389	35	122	0	0	157	0	0	0	0	0	270	72	0	0	342	888
8:15 AM	35	397	47	7	0	486	37	112	0	0	149	0	0	0	0	0	209	74	0	0	283	918
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	66	726	71	12	0	875	72	234	0	0	306	0	0	0	0	0	479	146	0	0	625	1806
4:00 PM	32	397	78	5	0	512	62	218	0	0	280	0	0	0	0	0	160	51	0	0	211	1003
4:15 PM	30	479	74	3	0	586	61	204	0	0	265	0	0	0	0	0	127	42	0	0	169	1020
4:30 PM	26	420	69	3	0	518	68	285	0	0	353	0	0	0	2	0	146	49	0	0	195	1066
4:45 PM	37	449	71	6	2	563	68	238	0	0	306	0	0	0	0	0	129	57	0	0	186	1055
Hourly Total	125	1745	292	17	2	2179	259	945	0	0	1204	0	0	0	2	0	562	199	0	0	761	4144
5:00 PM	19	408	66	5	0	498	75	288	0	0	363	0	0	0	0	0	195	92	0	0	287	1148
5:15 PM	27	483	61	3	0	574	58	253	0	0	311	0	0	0	0	0	155	94	0	0	249	1134
5:30 PM	27	402	69	1	0	499	74	296	0	0	370	0	0	0	0	0	202	85	0	0	287	1156
5:45 PM	26	471	70	1	0	568	47	254	0	0	301	0	0	0	0	0	163	69	0	0	232	1101
Hourly Total	99	1764	266	10	0	2139	254	1091	0	0	1345	0	0	0	0	0	715	340	0	0	1055	4539
Grand Total	440	6195	776	69	4	7480	739	2816	0	0	3555	0	0	0	2	0	2846	1094	0	1	3940	14975
Approach %	5.9	82.8	10.4	0.9	-	-	20.8	79.2	0.0	-	-	NaN	NaN	NaN	-	-	72.2	27.8	0.0	-	-	-
Total %	2.9	41.4	5.2	0.5	-	49.9	4.9	18.8	0.0	-	23.7	0.0	0.0	0.0	-	0.0	19.0	7.3	0.0	-	26.3	-
All Vehicles (no classification)	440	6195	776	69	-	7480	739	2816	0	-	3555	0	0	0	-	0	2846	1094	0	-	3940	14975
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	-	-	-	-	-	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	4	-	-	-	-	0	-	-	-	-	2	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Beltway 8 SBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 2



Turning Movement Data Plot





C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Beltway 8 SBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 3

### Turning Movement Peak Hour Data (7:30 AM)

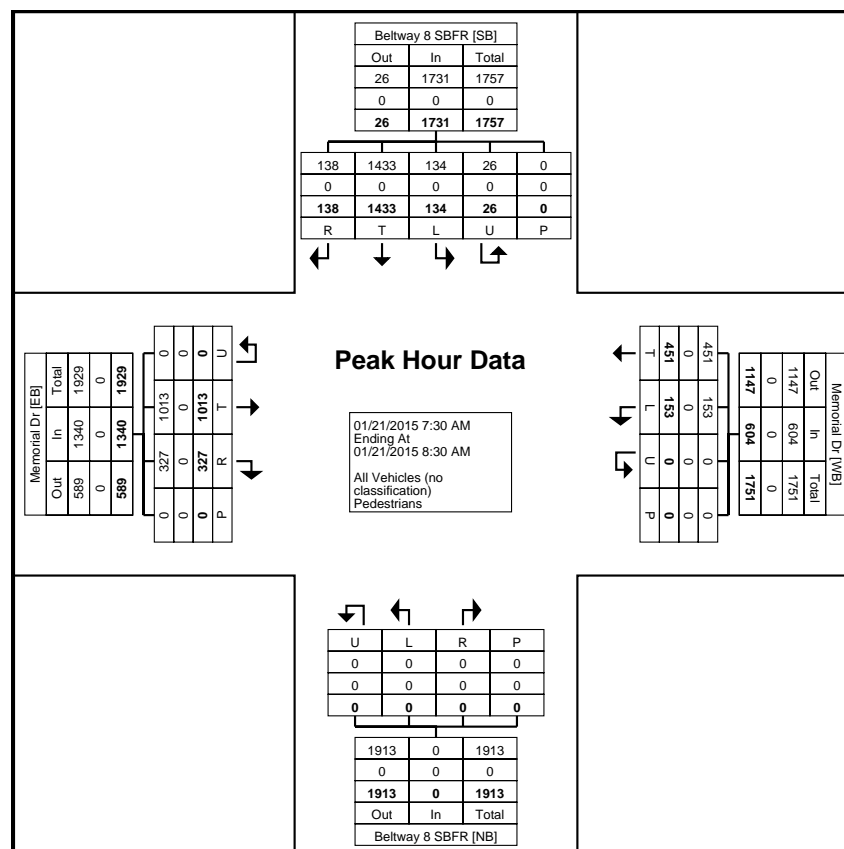
Start Time	Beltway 8 SBFR Southbound						Memorial Dr Westbound					Beltway 8 SBFR Northbound					Memorial Dr Eastbound					Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total		
7:30 AM	31	342	31	9	0	413	39	98	0	0	137	0	0	0	0	0	268	96	0	0	364	914	
7:45 AM	37	365	36	5	0	443	42	119	0	0	161	0	0	0	0	0	266	85	0	0	351	955	
8:00 AM	31	329	24	5	0	389	35	122	0	0	157	0	0	0	0	0	270	72	0	0	342	888	
8:15 AM	35	397	47	7	0	486	37	112	0	0	149	0	0	0	0	0	209	74	0	0	283	918	
<b>Total</b>	<b>134</b>	<b>1433</b>	<b>138</b>	<b>26</b>	<b>0</b>	<b>1731</b>	<b>153</b>	<b>451</b>	<b>0</b>	<b>0</b>	<b>604</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1013</b>	<b>327</b>	<b>0</b>	<b>0</b>	<b>1340</b>	<b>3675</b>	
Approach %	7.7	82.8	8.0	1.5	-	-	25.3	74.7	0.0	-	-	NaN	NaN	NaN	-	-	75.6	24.4	0.0	-	-	-	
Total %	3.6	39.0	3.8	0.7	-	47.1	4.2	12.3	0.0	-	16.4	0.0	0.0	0.0	-	0.0	27.6	8.9	0.0	-	36.5	-	
PHF	0.905	0.902	0.734	0.722	-	0.890	0.911	0.924	0.000	-	0.938	0.000	0.000	0.000	-	0.000	0.938	0.852	0.000	-	0.920	0.962	
All Vehicles (no classification)	134	1433	138	26	-	1731	153	451	0	-	604	0	0	0	-	0	1013	327	0	-	1340	3675	
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	-	-	-	-	-	100.0	100.0	-	-	100.0	100.0	
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



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Site Code:  
Start Date: 01/21/2015  
Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)



C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Beltway 8 SBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 5

### Turning Movement Peak Hour Data (5:00 PM)

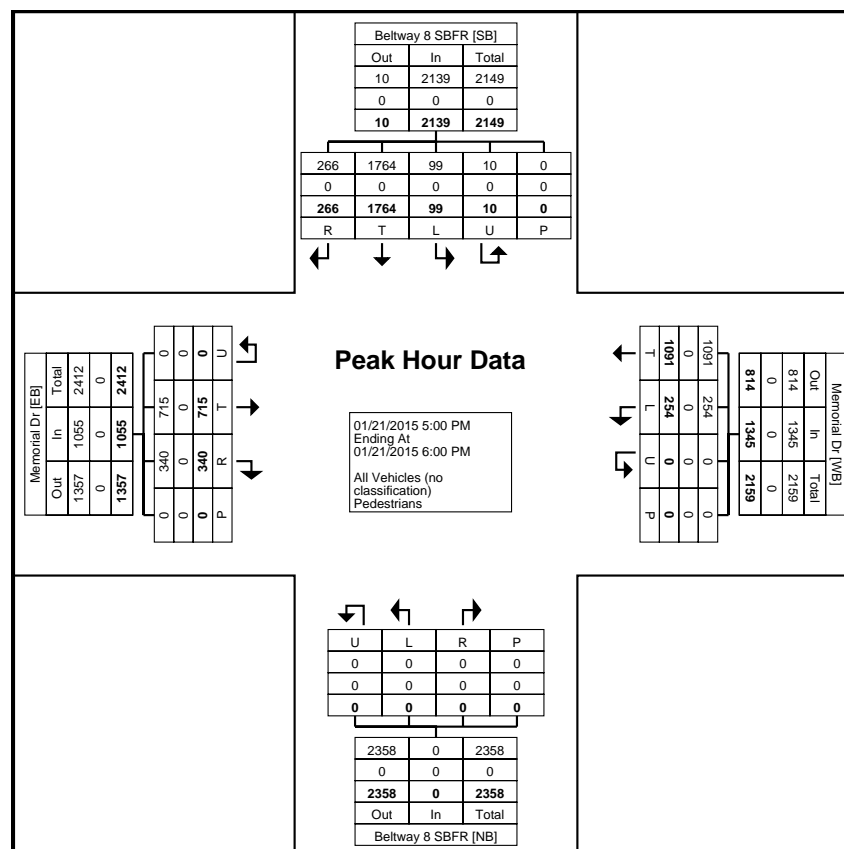
Start Time	Beltway 8 SBFR Southbound						Memorial Dr Westbound					Beltway 8 SBFR Northbound					Memorial Dr Eastbound					Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	19	408	66	5	0	498	75	288	0	0	363	0	0	0	0	0	195	92	0	0	287	1148
5:15 PM	27	483	61	3	0	574	58	253	0	0	311	0	0	0	0	0	155	94	0	0	249	1134
5:30 PM	27	402	69	1	0	499	74	296	0	0	370	0	0	0	0	0	202	85	0	0	287	1156
5:45 PM	26	471	70	1	0	568	47	254	0	0	301	0	0	0	0	0	163	69	0	0	232	1101
<b>Total</b>	<b>99</b>	<b>1764</b>	<b>266</b>	<b>10</b>	<b>0</b>	<b>2139</b>	<b>254</b>	<b>1091</b>	<b>0</b>	<b>0</b>	<b>1345</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>715</b>	<b>340</b>	<b>0</b>	<b>0</b>	<b>1055</b>	<b>4539</b>
Approach %	4.6	82.5	12.4	0.5	-	-	18.9	81.1	0.0	-	-	NaN	NaN	NaN	-	-	67.8	32.2	0.0	-	-	-
Total %	2.2	38.9	5.9	0.2	-	47.1	5.6	24.0	0.0	-	29.6	0.0	0.0	0.0	-	0.0	15.8	7.5	0.0	-	-	23.2
PHF	0.917	0.913	0.950	0.500	-	0.932	0.847	0.921	0.000	-	0.909	0.000	0.000	0.000	-	0.000	0.885	0.904	0.000	-	0.919	0.982
All Vehicles (no classification)	99	1764	266	10	-	2139	254	1091	0	-	1345	0	0	0	-	0	715	340	0	-	1055	4539
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	-	-	-	-	-	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



C. J. Hensch & Associates Inc.  
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Count Name: Memorial Dr at Beltway 8 SBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 6



Turning Movement Peak Hour Data Plot (5:00 PM)



C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Beltway 8 NBFR  
Site Code:  
Start Date: 01/21/2015  
Page No: 1

### Turning Movement Data

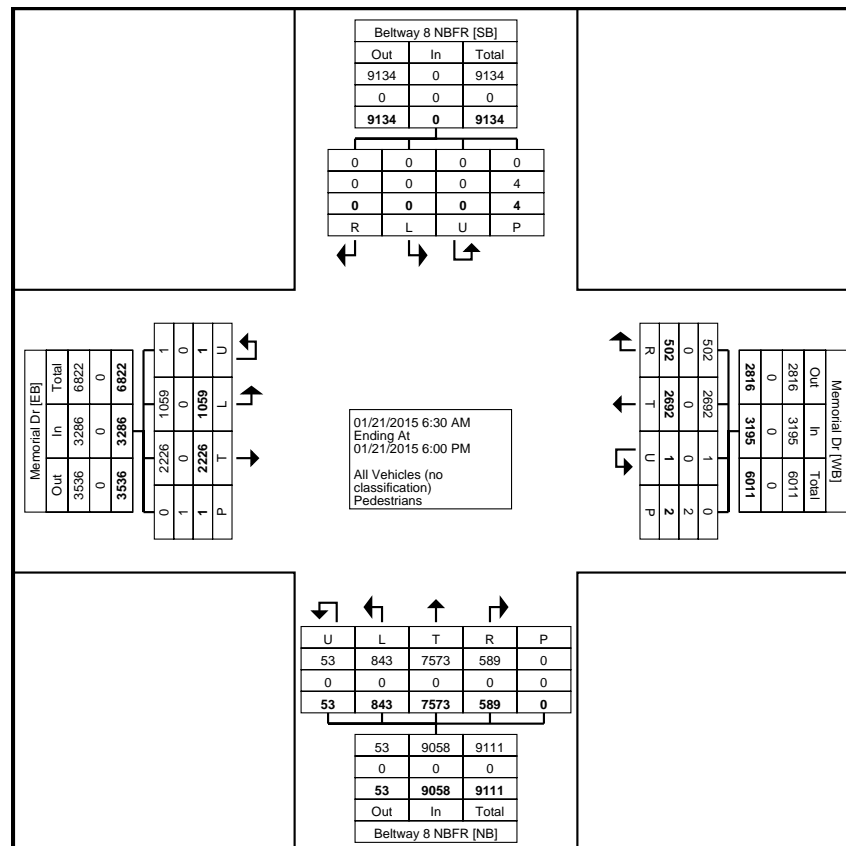
Start Time	Beltway 8 NBFR Southbound					Memorial Dr Westbound					Beltway 8 NBFR Northbound					Memorial Dr Eastbound					Int. Total	
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds		App. Total
6:30 AM	0	0	0	0	0	37	12	0	0	49	38	570	24	0	0	632	32	62	0	0	94	775
6:45 AM	0	0	0	0	0	64	22	0	0	86	33	481	37	5	0	556	54	83	0	0	137	779
Hourly Total	0	0	0	0	0	101	34	0	0	135	71	1051	61	5	0	1188	86	145	0	0	231	1554
7:00 AM	0	0	0	0	0	45	22	0	0	67	50	579	24	3	0	656	59	116	0	0	175	898
7:15 AM	0	0	0	0	0	96	43	0	0	139	42	505	34	4	0	585	89	151	0	0	240	964
7:30 AM	0	0	0	0	0	91	37	0	0	128	45	543	35	2	0	625	89	186	0	0	275	1028
7:45 AM	0	0	0	0	0	129	47	0	0	176	44	485	39	1	0	569	115	218	0	0	333	1078
Hourly Total	0	0	0	0	0	361	149	0	0	510	181	2112	132	10	0	2435	352	671	0	0	1023	3968
8:00 AM	0	0	0	0	0	100	26	1	0	127	45	517	31	4	0	597	97	172	0	0	269	993
8:15 AM	0	0	0	0	0	106	36	0	0	142	52	465	46	4	0	567	82	179	1	0	262	971
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	206	62	1	0	269	97	982	77	8	0	1164	179	351	1	0	531	1964
4:00 PM	0	0	0	0	0	208	42	0	0	250	54	438	35	7	0	534	55	122	0	0	177	961
4:15 PM	0	0	0	0	0	226	36	0	0	262	55	435	33	5	0	528	52	120	0	0	172	962
4:30 PM	0	0	0	0	0	239	28	0	0	267	77	473	33	5	0	588	42	113	0	0	155	1010
4:45 PM	0	0	0	1	0	271	39	0	0	310	59	378	47	3	0	487	49	138	0	0	187	984
Hourly Total	0	0	0	1	0	944	145	0	0	1089	245	1724	148	20	0	2137	198	493	0	0	691	3917
5:00 PM	0	0	0	0	0	260	33	0	0	293	73	468	35	2	0	578	60	128	0	0	188	1059
5:15 PM	0	0	0	3	0	292	24	0	0	316	48	383	55	1	0	487	61	148	0	1	209	1012
5:30 PM	0	0	0	0	0	255	18	0	2	273	69	433	45	4	0	551	60	142	0	0	202	1026
5:45 PM	0	0	0	0	0	273	37	0	0	310	59	420	36	3	0	518	63	148	0	0	211	1039
Hourly Total	0	0	0	3	0	1080	112	0	2	1192	249	1704	171	10	0	2134	244	566	0	1	810	4136
Grand Total	0	0	0	4	0	2692	502	1	2	3195	843	7573	589	53	0	9058	1059	2226	1	1	3286	15539
Approach %	NaN	NaN	NaN	-	-	84.3	15.7	0.0	-	-	9.3	83.6	6.5	0.6	-	-	32.2	67.7	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	0.0	17.3	3.2	0.0	-	20.6	5.4	48.7	3.8	0.3	-	58.3	6.8	14.3	0.0	-	21.1	-
All Vehicles (no classification)	0	0	0	-	0	2692	502	1	-	3195	843	7573	589	53	-	9058	1059	2226	1	-	3286	15539
% All Vehicles (no classification)	-	-	-	-	-	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	-	100.0	100.0	100.0	-	100.0	100.0
Pedestrians	-	-	-	4	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	100.0	-	-



C. J. Hensch & Associates Inc.  
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Count Name: Memorial Dr at Beltway 8 NBFR  
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Turning Movement Data Plot





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Count Name: Memorial Dr at Beltway 8 NBFR  
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### Turning Movement Peak Hour Data (7:30 AM)

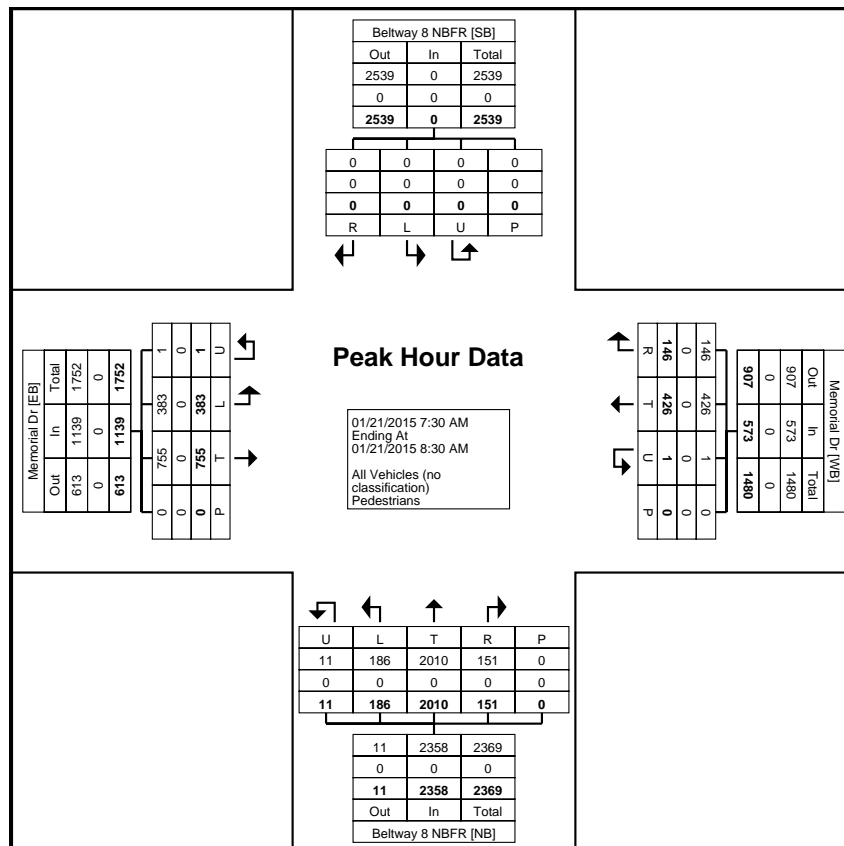
Start Time	Beltway 8 NBFR Southbound					Memorial Dr Westbound					Beltway 8 NBFR Northbound					Memorial Dr Eastbound					Int. Total	
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds		App. Total
7:30 AM	0	0	0	0	0	91	37	0	0	128	45	543	35	2	0	625	89	186	0	0	275	1028
7:45 AM	0	0	0	0	0	129	47	0	0	176	44	485	39	1	0	569	115	218	0	0	333	1078
8:00 AM	0	0	0	0	0	100	26	1	0	127	45	517	31	4	0	597	97	172	0	0	269	993
8:15 AM	0	0	0	0	0	106	36	0	0	142	52	465	46	4	0	567	82	179	1	0	262	971
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>426</b>	<b>146</b>	<b>1</b>	<b>0</b>	<b>573</b>	<b>186</b>	<b>2010</b>	<b>151</b>	<b>11</b>	<b>0</b>	<b>2358</b>	<b>383</b>	<b>755</b>	<b>1</b>	<b>0</b>	<b>1139</b>	<b>4070</b>
Approach %	NaN	NaN	NaN	-	-	74.3	25.5	0.2	-	-	7.9	85.2	6.4	0.5	-	-	33.6	66.3	0.1	-	-	-
Total %	0.0	0.0	0.0	-	0.0	10.5	3.6	0.0	-	14.1	4.6	49.4	3.7	0.3	-	57.9	9.4	18.6	0.0	-	28.0	-
PHF	0.000	0.000	0.000	-	0.000	0.826	0.777	0.250	-	0.814	0.894	0.925	0.821	0.688	-	0.943	0.833	0.866	0.250	-	0.855	0.944
All Vehicles (no classification)	0	0	0	-	0	426	146	1	-	573	186	2010	151	11	-	2358	383	755	1	-	1139	4070
% All Vehicles (no classification)	-	-	-	-	-	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (7:30 AM)



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### Turning Movement Peak Hour Data (5:00 PM)

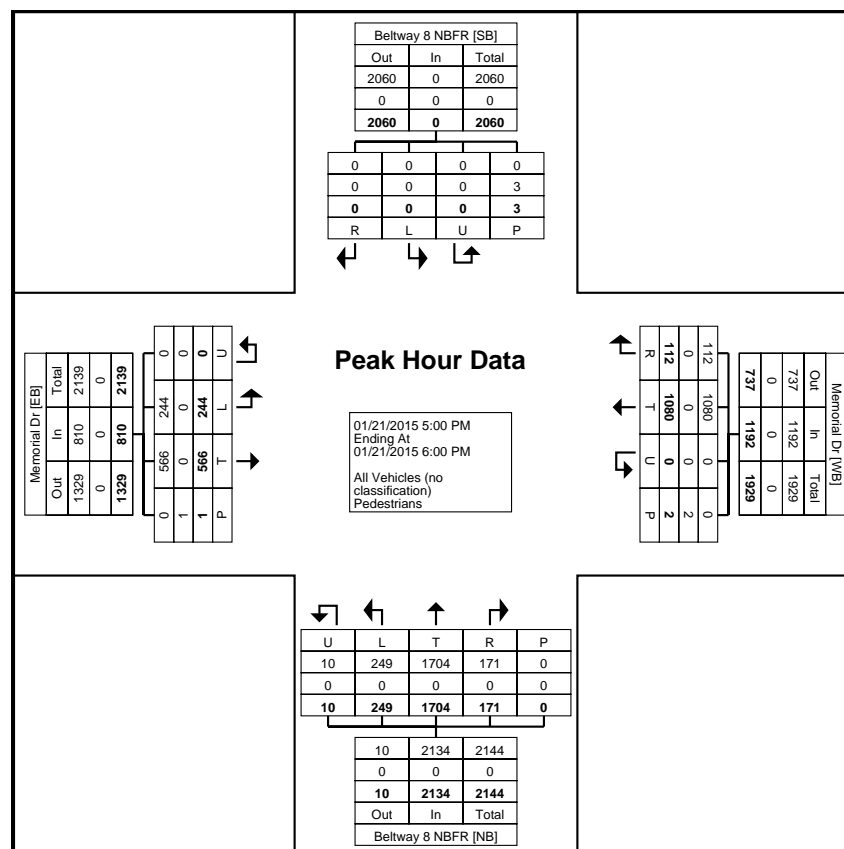
Start Time	Beltway 8 NBFR Southbound					Memorial Dr Westbound					Beltway 8 NBFR Northbound					Memorial Dr Eastbound					Int. Total	
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds		App. Total
5:00 PM	0	0	0	0	0	260	33	0	0	293	73	468	35	2	0	578	60	128	0	0	188	1059
5:15 PM	0	0	0	3	0	292	24	0	0	316	48	383	55	1	0	487	61	148	0	1	209	1012
5:30 PM	0	0	0	0	0	255	18	0	2	273	69	433	45	4	0	551	60	142	0	0	202	1026
5:45 PM	0	0	0	0	0	273	37	0	0	310	59	420	36	3	0	518	63	148	0	0	211	1039
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1080</b>	<b>112</b>	<b>0</b>	<b>2</b>	<b>1192</b>	<b>249</b>	<b>1704</b>	<b>171</b>	<b>10</b>	<b>0</b>	<b>2134</b>	<b>244</b>	<b>566</b>	<b>0</b>	<b>1</b>	<b>810</b>	<b>4136</b>
Approach %	NaN	NaN	NaN	-	-	90.6	9.4	0.0	-	-	11.7	79.9	8.0	0.5	-	-	30.1	69.9	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	26.1	2.7	0.0	-	28.8	6.0	41.2	4.1	0.2	-	51.6	5.9	13.7	0.0	-	19.6	-
PHF	0.000	0.000	0.000	-	0.000	0.925	0.757	0.000	-	0.943	0.853	0.910	0.777	0.625	-	0.923	0.968	0.956	0.000	-	0.960	0.976
All Vehicles (no classification)	0	0	0	-	0	1080	112	0	-	1192	249	1704	171	10	-	2134	244	566	0	-	810	4136
% All Vehicles (no classification)	-	-	-	-	-	100.0	100.0	-	-	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	3	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data Plot (5:00 PM)



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Count Name: Memorial Dr at W Bough Ln  
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### Turning Movement Data

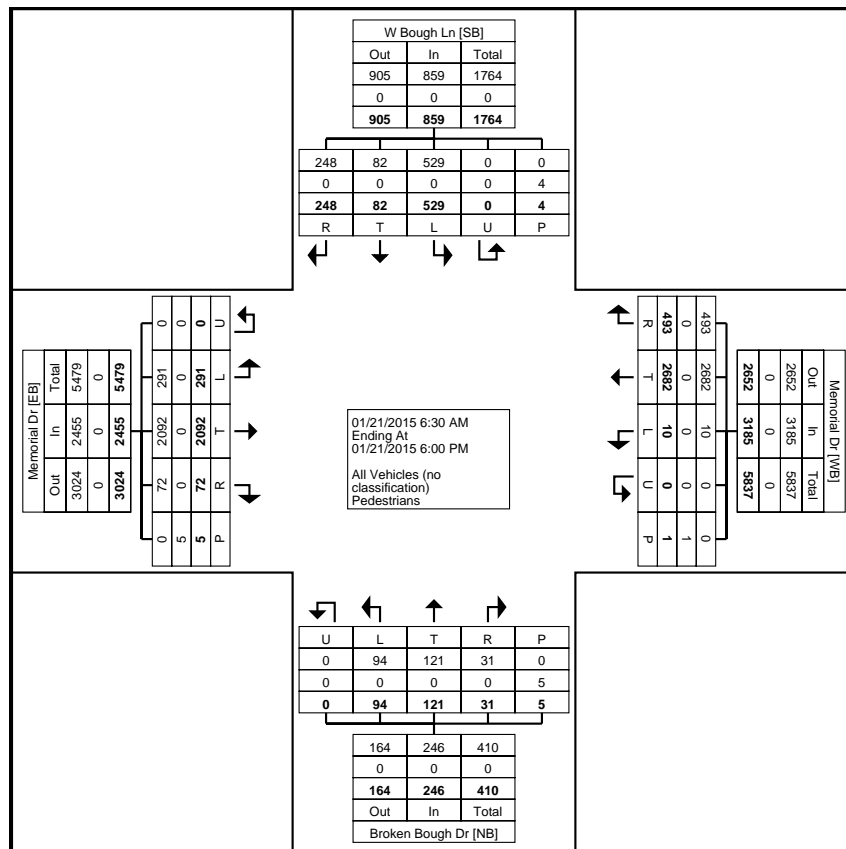
Start Time	W Bough Ln Southbound						Memorial Dr Westbound						Broken Bough Dr Northbound						Memorial Dr Eastbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
6:30 AM	2	1	1	0	0	4	0	41	10	0	0	51	3	0	0	0	0	3	6	65	3	0	1	74	132	
6:45 AM	5	0	10	0	0	15	0	71	10	0	0	81	0	2	3	0	2	5	11	80	1	0	0	92	193	
Hourly Total	7	1	11	0	0	19	0	112	20	0	0	132	3	2	3	0	2	8	17	145	4	0	1	166	325	
7:00 AM	9	1	7	0	0	17	0	54	13	0	0	67	5	3	0	0	1	8	8	117	2	0	0	127	219	
7:15 AM	12	2	13	0	1	27	1	95	21	0	0	117	8	10	3	0	0	21	12	147	1	0	1	160	325	
7:30 AM	16	1	10	0	0	27	1	110	22	0	0	133	6	6	0	0	0	12	18	185	0	0	0	203	375	
7:45 AM	11	0	14	0	1	25	1	147	30	0	0	178	18	6	1	0	0	25	37	177	3	0	0	217	445	
Hourly Total	48	4	44	0	2	96	3	406	86	0	0	495	37	25	4	0	1	66	75	626	6	0	1	707	1364	
8:00 AM	19	2	11	0	0	32	3	118	34	0	0	155	9	16	2	0	0	27	26	142	6	0	0	174	388	
8:15 AM	41	9	18	0	0	68	0	110	23	0	0	133	9	13	1	0	0	23	33	164	4	0	0	201	425	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hourly Total	60	11	29	0	0	100	3	228	57	0	0	288	18	29	3	0	0	50	59	306	10	0	0	375	813	
4:00 PM	53	5	34	0	0	92	2	208	35	0	1	245	0	8	3	0	0	11	19	109	15	0	0	143	491	
4:15 PM	55	13	12	0	0	80	0	186	25	0	0	211	6	6	3	0	0	15	17	112	9	0	2	138	444	
4:30 PM	51	2	20	0	0	73	1	265	42	0	0	308	6	4	2	0	0	12	8	121	5	0	0	134	527	
4:45 PM	48	13	23	0	0	84	1	230	47	0	0	278	5	5	3	0	1	13	21	120	6	0	1	147	522	
Hourly Total	207	33	89	0	0	329	4	889	149	0	1	1042	17	23	11	0	1	51	65	462	35	0	3	562	1984	
5:00 PM	43	8	22	0	0	73	0	292	49	0	0	341	4	14	4	0	1	22	7	140	3	0	0	150	586	
5:15 PM	65	6	27	0	1	98	0	244	35	0	0	279	9	9	2	0	0	20	29	132	7	0	0	168	565	
5:30 PM	52	8	12	0	1	72	0	265	55	0	0	320	3	8	1	0	0	12	20	154	4	0	0	178	582	
5:45 PM	47	11	14	0	0	72	0	246	42	0	0	288	3	11	3	0	0	17	19	127	3	0	0	149	526	
Hourly Total	207	33	75	0	2	315	0	1047	181	0	0	1228	19	42	10	0	1	71	75	553	17	0	0	645	2259	
Grand Total	529	82	248	0	4	859	10	2682	493	0	1	3185	94	121	31	0	5	246	291	2092	72	0	5	2455	6745	
Approach %	61.6	9.5	28.9	0.0	-	-	0.3	84.2	15.5	0.0	-	-	38.2	49.2	12.6	0.0	-	-	11.9	85.2	2.9	0.0	-	-	-	
Total %	7.8	1.2	3.7	0.0	-	12.7	0.1	39.8	7.3	0.0	-	47.2	1.4	1.8	0.5	0.0	-	3.6	4.3	31.0	1.1	0.0	-	36.4	-	
All Vehicles (no classification)	529	82	248	0	-	859	10	2682	493	0	-	3185	94	121	31	0	-	246	291	2092	72	0	-	2455	6745	
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-



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Count Name: Memorial Dr at W Bough Ln  
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Start Date: 01/21/2015  
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Turning Movement Data Plot





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Count Name: Memorial Dr at W Bough Ln  
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### Turning Movement Peak Hour Data (7:30 AM)

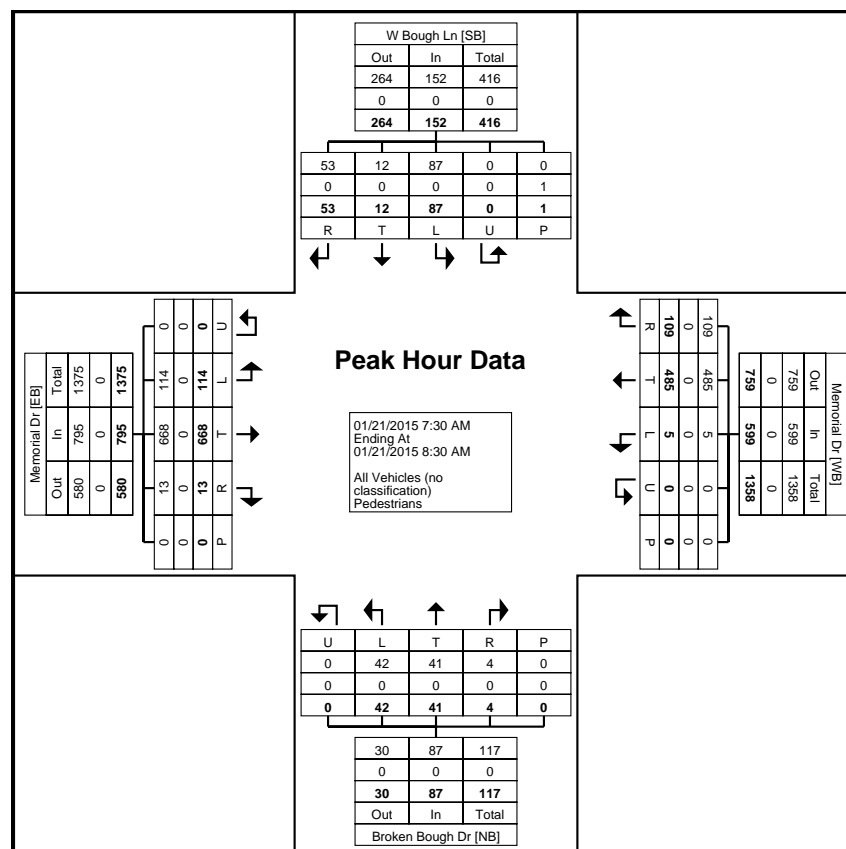
Start Time	W Bough Ln Southbound						Memorial Dr Westbound						Broken Bough Dr Northbound						Memorial Dr Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	16	1	10	0	0	27	1	110	22	0	0	133	6	6	0	0	0	12	18	185	0	0	0	203	375
7:45 AM	11	0	14	0	1	25	1	147	30	0	0	178	18	6	1	0	0	25	37	177	3	0	0	217	445
8:00 AM	19	2	11	0	0	32	3	118	34	0	0	155	9	16	2	0	0	27	26	142	6	0	0	174	388
8:15 AM	41	9	18	0	0	68	0	110	23	0	0	133	9	13	1	0	0	23	33	164	4	0	0	201	425
Total	87	12	53	0	1	152	5	485	109	0	0	599	42	41	4	0	0	87	114	668	13	0	0	795	1633
Approach %	57.2	7.9	34.9	0.0	-	-	0.8	81.0	18.2	0.0	-	-	48.3	47.1	4.6	0.0	-	-	14.3	84.0	1.6	0.0	-	-	-
Total %	5.3	0.7	3.2	0.0	-	9.3	0.3	29.7	6.7	0.0	-	36.7	2.6	2.5	0.2	0.0	-	5.3	7.0	40.9	0.8	0.0	-	48.7	-
PHF	0.530	0.333	0.736	0.000	-	0.559	0.417	0.825	0.801	0.000	-	0.841	0.583	0.641	0.500	0.000	-	0.806	0.770	0.903	0.542	0.000	-	0.916	0.917
All Vehicles (no classification)	87	12	53	0	-	152	5	485	109	0	-	599	42	41	4	0	-	87	114	668	13	0	-	795	1633
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (7:30 AM)



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### Turning Movement Peak Hour Data (5:00 PM)

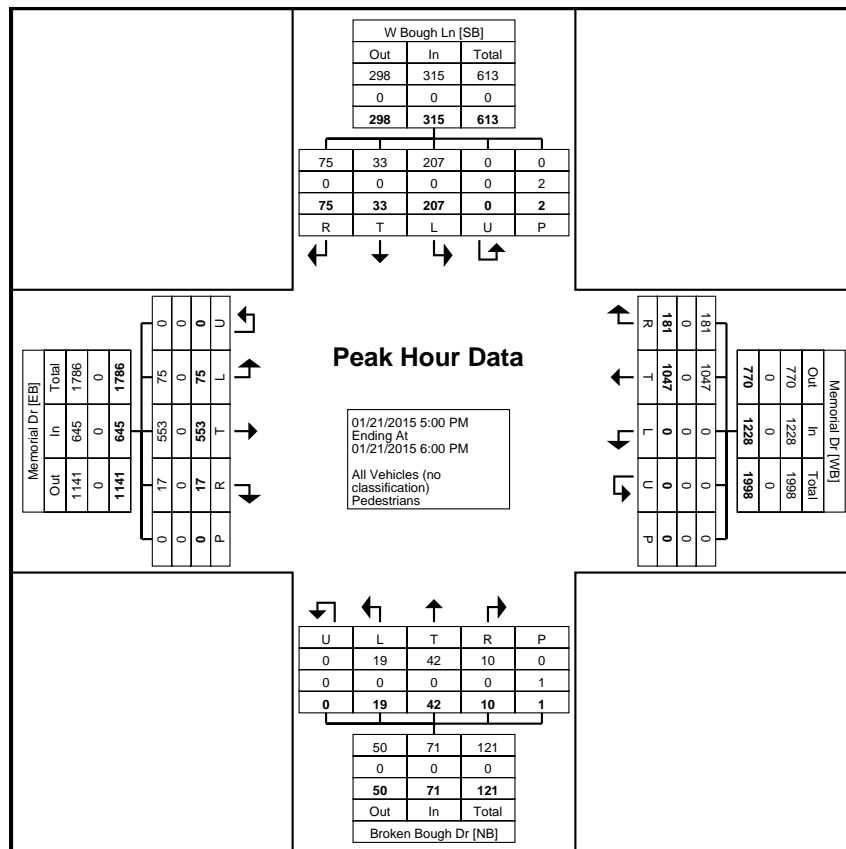
Start Time	W Bough Ln Southbound						Memorial Dr Westbound						Broken Bough Dr Northbound						Memorial Dr Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	43	8	22	0	0	73	0	292	49	0	0	341	4	14	4	0	1	22	7	140	3	0	0	150	586
5:15 PM	65	6	27	0	1	98	0	244	35	0	0	279	9	9	2	0	0	20	29	132	7	0	0	168	565
5:30 PM	52	8	12	0	1	72	0	265	55	0	0	320	3	8	1	0	0	12	20	154	4	0	0	178	582
5:45 PM	47	11	14	0	0	72	0	246	42	0	0	288	3	11	3	0	0	17	19	127	3	0	0	149	526
<b>Total</b>	<b>207</b>	<b>33</b>	<b>75</b>	<b>0</b>	<b>2</b>	<b>315</b>	<b>0</b>	<b>1047</b>	<b>181</b>	<b>0</b>	<b>0</b>	<b>1228</b>	<b>19</b>	<b>42</b>	<b>10</b>	<b>0</b>	<b>1</b>	<b>71</b>	<b>75</b>	<b>553</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>645</b>	<b>2259</b>
Approach %	65.7	10.5	23.8	0.0	-	-	0.0	85.3	14.7	0.0	-	-	26.8	59.2	14.1	0.0	-	-	11.6	85.7	2.6	0.0	-	-	-
Total %	9.2	1.5	3.3	0.0	-	13.9	0.0	46.3	8.0	0.0	-	54.4	0.8	1.9	0.4	0.0	-	3.1	3.3	24.5	0.8	0.0	-	28.6	-
PHF	0.796	0.750	0.694	0.000	-	0.804	0.000	0.896	0.823	0.000	-	0.900	0.528	0.750	0.625	0.000	-	0.807	0.647	0.898	0.607	0.000	-	0.906	0.964
All Vehicles (no classification)	207	33	75	0	-	315	0	1047	181	0	-	1228	19	42	10	0	-	71	75	553	17	0	-	645	2259
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	-	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (5:00 PM)



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### Turning Movement Data

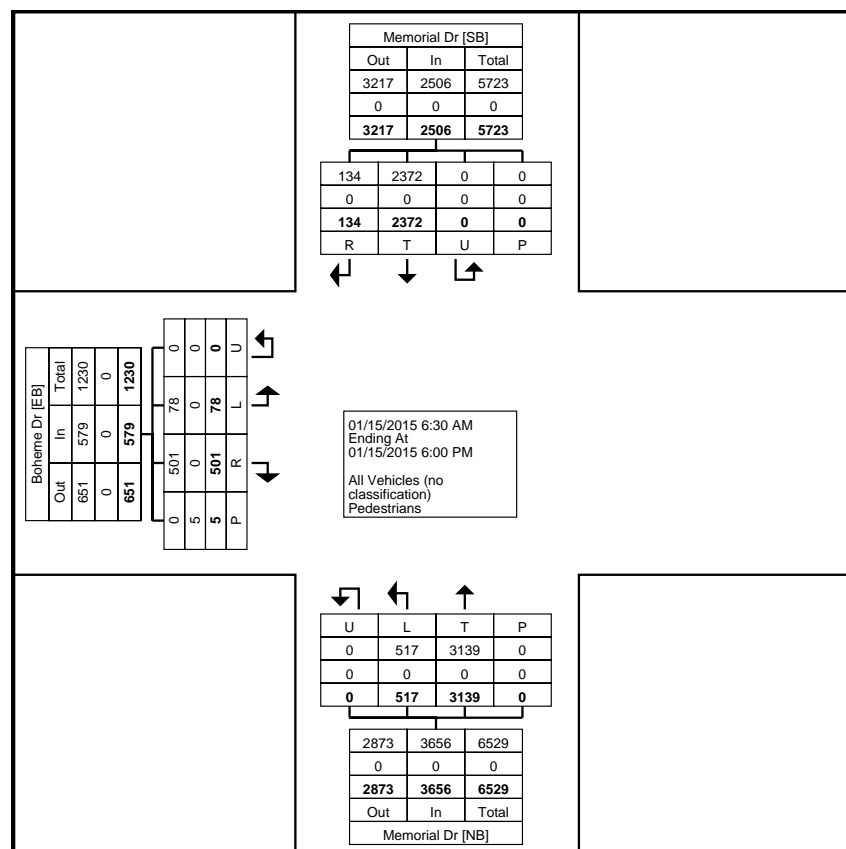
Start Time	Memorial Dr Southbound					Memorial Dr Northbound					Boheme Dr Eastbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
6:30 AM	75	1	0	0	76	4	32	0	0	36	1	16	0	1	17	129
6:45 AM	109	1	0	0	110	7	58	0	0	65	3	21	0	0	24	199
Hourly Total	184	2	0	0	186	11	90	0	0	101	4	37	0	1	41	328
7:00 AM	101	4	0	0	105	10	71	0	0	81	2	32	0	0	34	220
7:15 AM	134	2	0	0	136	7	88	0	0	95	11	53	0	0	64	295
7:30 AM	177	1	0	0	178	11	120	0	0	131	10	74	0	0	84	393
7:45 AM	165	4	0	0	169	29	144	0	0	173	6	42	0	0	48	390
Hourly Total	577	11	0	0	588	57	423	0	0	480	29	201	0	0	230	1298
8:00 AM	172	9	0	0	181	14	155	0	0	169	6	31	0	0	37	387
8:15 AM	196	16	0	0	212	19	125	0	0	144	3	29	0	0	32	388
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	368	25	0	0	393	33	280	0	0	313	9	60	0	0	69	775
4:00 PM	132	9	0	0	141	31	240	0	0	271	8	26	0	0	34	446
4:15 PM	150	11	0	0	161	33	272	0	0	305	2	25	0	2	27	493
4:30 PM	144	13	0	0	157	43	272	0	0	315	1	19	0	0	20	492
4:45 PM	162	11	0	0	173	52	301	0	0	353	7	20	0	1	27	553
Hourly Total	588	44	0	0	632	159	1085	0	0	1244	18	90	0	3	108	1984
5:00 PM	160	10	0	0	170	61	307	0	0	368	4	27	0	0	31	569
5:15 PM	154	16	0	0	170	69	329	0	0	398	8	24	0	0	32	600
5:30 PM	161	14	0	0	175	55	300	0	0	355	3	26	0	0	29	559
5:45 PM	180	12	0	0	192	72	325	0	0	397	3	36	0	1	39	628
Hourly Total	655	52	0	0	707	257	1261	0	0	1518	18	113	0	1	131	2356
Grand Total	2372	134	0	0	2506	517	3139	0	0	3656	78	501	0	5	579	6741
Approach %	94.7	5.3	0.0	-	-	14.1	85.9	0.0	-	-	13.5	86.5	0.0	-	-	-
Total %	35.2	2.0	0.0	-	37.2	7.7	46.6	0.0	-	54.2	1.2	7.4	0.0	-	8.6	-
All Vehicles (no classification)	2372	134	0	-	2506	517	3139	0	-	3656	78	501	0	-	579	6741
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: Memorial Dr at Boheme Dr  
Site Code:  
Start Date: 01/15/2015  
Page No: 2



Turning Movement Data Plot





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Count Name: Memorial Dr at Boheme Dr  
Site Code:  
Start Date: 01/15/2015  
Page No: 3

### Turning Movement Peak Hour Data (7:30 AM)

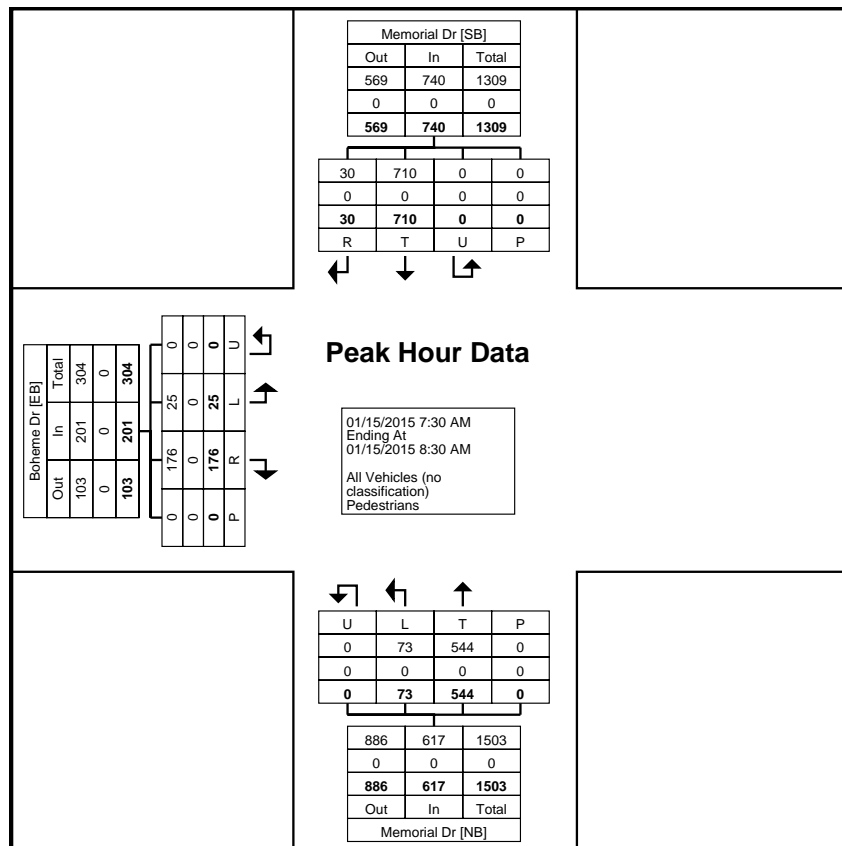
Start Time	Memorial Dr Southbound					Memorial Dr Northbound					Boheme Dr Eastbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	177	1	0	0	178	11	120	0	0	131	10	74	0	0	84	393
7:45 AM	165	4	0	0	169	29	144	0	0	173	6	42	0	0	48	390
8:00 AM	172	9	0	0	181	14	155	0	0	169	6	31	0	0	37	387
8:15 AM	196	16	0	0	212	19	125	0	0	144	3	29	0	0	32	388
<b>Total</b>	<b>710</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>740</b>	<b>73</b>	<b>544</b>	<b>0</b>	<b>0</b>	<b>617</b>	<b>25</b>	<b>176</b>	<b>0</b>	<b>0</b>	<b>201</b>	<b>1558</b>
Approach %	95.9	4.1	0.0	-	-	11.8	88.2	0.0	-	-	12.4	87.6	0.0	-	-	-
Total %	45.6	1.9	0.0	-	47.5	4.7	34.9	0.0	-	39.6	1.6	11.3	0.0	-	12.9	-
PHF	0.906	0.469	0.000	-	0.873	0.629	0.877	0.000	-	0.892	0.625	0.595	0.000	-	0.598	0.991
All Vehicles (no classification)	710	30	0	-	740	73	544	0	-	617	25	176	0	-	201	1558
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	0	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Count Name: Memorial Dr at Boheme Dr  
Site Code:  
Start Date: 01/15/2015  
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Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: Memorial Dr at Boheme Dr  
Site Code:  
Start Date: 01/15/2015  
Page No: 5

### Turning Movement Peak Hour Data (5:00 PM)

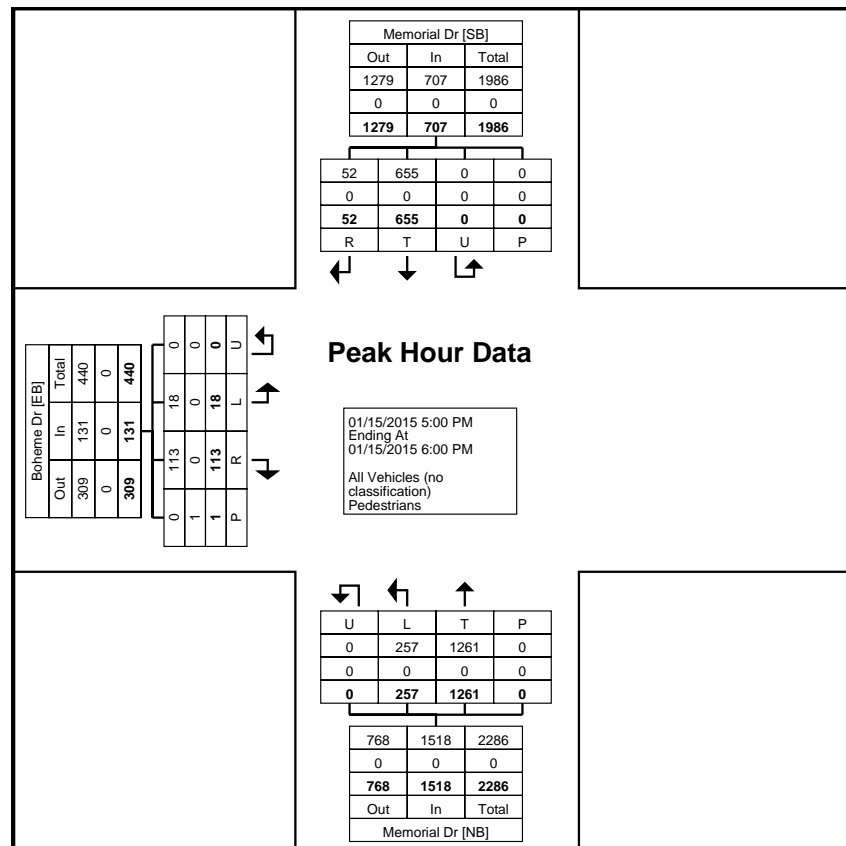
Start Time	Memorial Dr Southbound					Memorial Dr Northbound					Boheme Dr Eastbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
5:00 PM	160	10	0	0	170	61	307	0	0	368	4	27	0	0	31	569
5:15 PM	154	16	0	0	170	69	329	0	0	398	8	24	0	0	32	600
5:30 PM	161	14	0	0	175	55	300	0	0	355	3	26	0	0	29	559
5:45 PM	180	12	0	0	192	72	325	0	0	397	3	36	0	1	39	628
<b>Total</b>	<b>655</b>	<b>52</b>	<b>0</b>	<b>0</b>	<b>707</b>	<b>257</b>	<b>1261</b>	<b>0</b>	<b>0</b>	<b>1518</b>	<b>18</b>	<b>113</b>	<b>0</b>	<b>1</b>	<b>131</b>	<b>2356</b>
Approach %	92.6	7.4	0.0	-	-	16.9	83.1	0.0	-	-	13.7	86.3	0.0	-	-	-
Total %	27.8	2.2	0.0	-	30.0	10.9	53.5	0.0	-	64.4	0.8	4.8	0.0	-	5.6	-
PHF	0.910	0.813	0.000	-	0.921	0.892	0.958	0.000	-	0.954	0.563	0.785	0.000	-	0.840	0.938
All Vehicles (no classification)	655	52	0	-	707	257	1261	0	-	1518	18	113	0	-	131	2356
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-



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Count Name: Memorial Dr at Boheme Dr  
Site Code:  
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Turning Movement Peak Hour Data Plot (5:00 PM)



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Count Name: Memorial Dr at Hollow Dr  
Site Code:  
Start Date: 01/21/2015  
Page No: 1

### Turning Movement Data

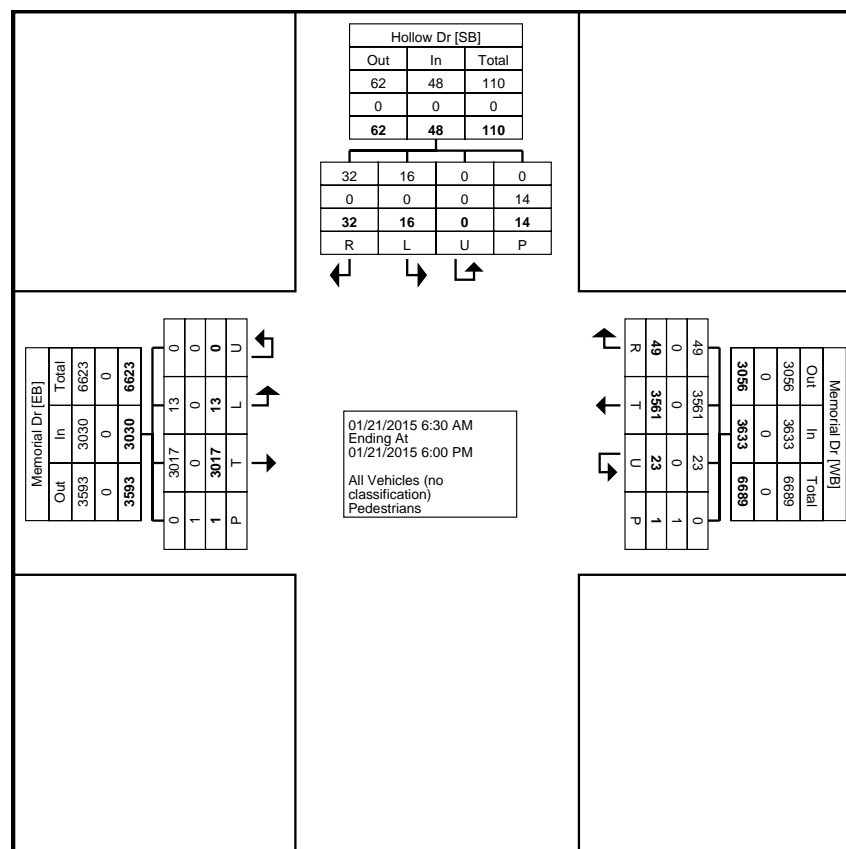
Start Time	Hollow Dr Southbound					Memorial Dr Westbound					Memorial Dr Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
6:30 AM	1	0	0	1	1	66	0	0	0	66	0	92	0	0	92	159
6:45 AM	1	0	0	2	1	71	1	2	0	74	0	116	0	0	116	191
Hourly Total	2	0	0	3	2	137	1	2	0	140	0	208	0	0	208	350
7:00 AM	2	1	0	0	3	65	1	0	0	66	0	164	0	0	164	233
7:15 AM	0	3	0	1	3	102	0	0	0	102	0	228	0	0	228	333
7:30 AM	0	3	0	1	3	145	6	1	0	152	0	255	0	0	255	410
7:45 AM	0	4	0	0	4	191	3	4	0	198	1	221	0	1	222	424
Hourly Total	2	11	0	2	13	503	10	5	0	518	1	868	0	1	869	1400
8:00 AM	0	2	0	0	2	162	12	3	0	177	0	207	0	0	207	386
8:15 AM	2	4	0	0	6	109	2	3	0	114	1	243	0	0	244	364
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	6	0	0	8	271	14	6	0	291	1	450	0	0	451	750
4:00 PM	1	2	0	0	3	264	4	1	0	269	1	177	0	0	178	450
4:15 PM	2	3	0	1	5	271	6	1	0	278	4	159	0	0	163	446
4:30 PM	0	3	0	2	3	322	0	0	0	322	0	174	0	0	174	499
4:45 PM	1	4	0	0	5	354	3	1	0	358	1	167	0	0	168	531
Hourly Total	4	12	0	3	16	1211	13	3	0	1227	6	677	0	0	683	1926
5:00 PM	4	2	0	2	6	384	1	0	0	385	1	211	0	0	212	603
5:15 PM	0	0	0	1	0	362	6	0	0	368	3	193	0	0	196	564
5:30 PM	1	0	0	1	1	365	2	6	1	373	0	225	0	0	225	599
5:45 PM	1	1	0	2	2	328	2	1	0	331	1	185	0	0	186	519
Hourly Total	6	3	0	6	9	1439	11	7	1	1457	5	814	0	0	819	2285
Grand Total	16	32	0	14	48	3561	49	23	1	3633	13	3017	0	1	3030	6711
Approach %	33.3	66.7	0.0	-	-	98.0	1.3	0.6	-	-	0.4	99.6	0.0	-	-	-
Total %	0.2	0.5	0.0	-	0.7	53.1	0.7	0.3	-	54.1	0.2	45.0	0.0	-	45.1	-
All Vehicles (no classification)	16	32	0	-	48	3561	49	23	-	3633	13	3017	0	-	3030	6711
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	14	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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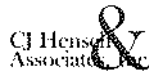
Pasadena, Texas, United States 77503  
(281) 487-5417 denniscox@cjhensch.com

Count Name: Memorial Dr at Hollow Dr  
Site Code:  
Start Date: 01/21/2015  
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Turning Movement Data Plot





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Count Name: Memorial Dr at Hollow Dr  
Site Code:  
Start Date: 01/21/2015  
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### Turning Movement Peak Hour Data (7:30 AM)

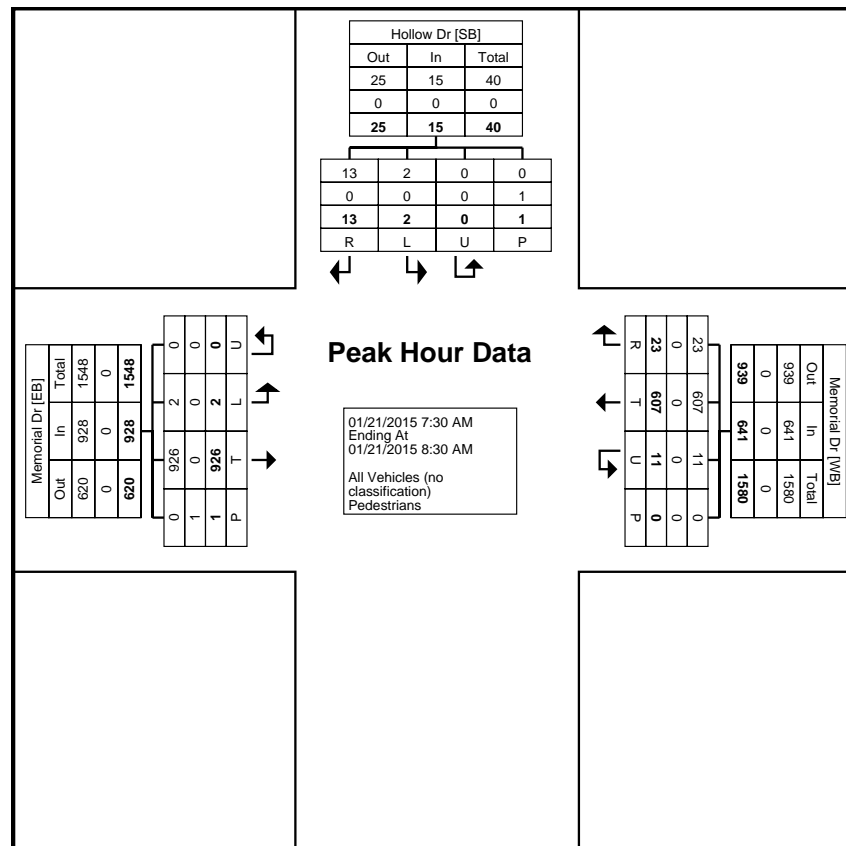
Start Time	Hollow Dr Southbound					Memorial Dr Westbound					Memorial Dr Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	0	3	0	1	3	145	6	1	0	152	0	255	0	0	255	410
7:45 AM	0	4	0	0	4	191	3	4	0	198	1	221	0	1	222	424
8:00 AM	0	2	0	0	2	162	12	3	0	177	0	207	0	0	207	386
8:15 AM	2	4	0	0	6	109	2	3	0	114	1	243	0	0	244	364
<b>Total</b>	<b>2</b>	<b>13</b>	<b>0</b>	<b>1</b>	<b>15</b>	<b>607</b>	<b>23</b>	<b>11</b>	<b>0</b>	<b>641</b>	<b>2</b>	<b>926</b>	<b>0</b>	<b>1</b>	<b>928</b>	<b>1584</b>
Approach %	13.3	86.7	0.0	-	-	94.7	3.6	1.7	-	-	0.2	99.8	0.0	-	-	-
Total %	0.1	0.8	0.0	-	0.9	38.3	1.5	0.7	-	40.5	0.1	58.5	0.0	-	58.6	-
PHF	0.250	0.813	0.000	-	0.625	0.795	0.479	0.688	-	0.809	0.500	0.908	0.000	-	0.910	0.934
All Vehicles (no classification)	2	13	0	-	15	607	23	11	-	641	2	926	0	-	928	1584
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	1	-	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	100.0	-	-	-



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Count Name: Memorial Dr at Hollow Dr  
Site Code:  
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Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)



C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.

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Count Name: Memorial Dr at Hollow Dr  
Site Code:  
Start Date: 01/21/2015  
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Turning Movement Peak Hour Data (4:45 PM)

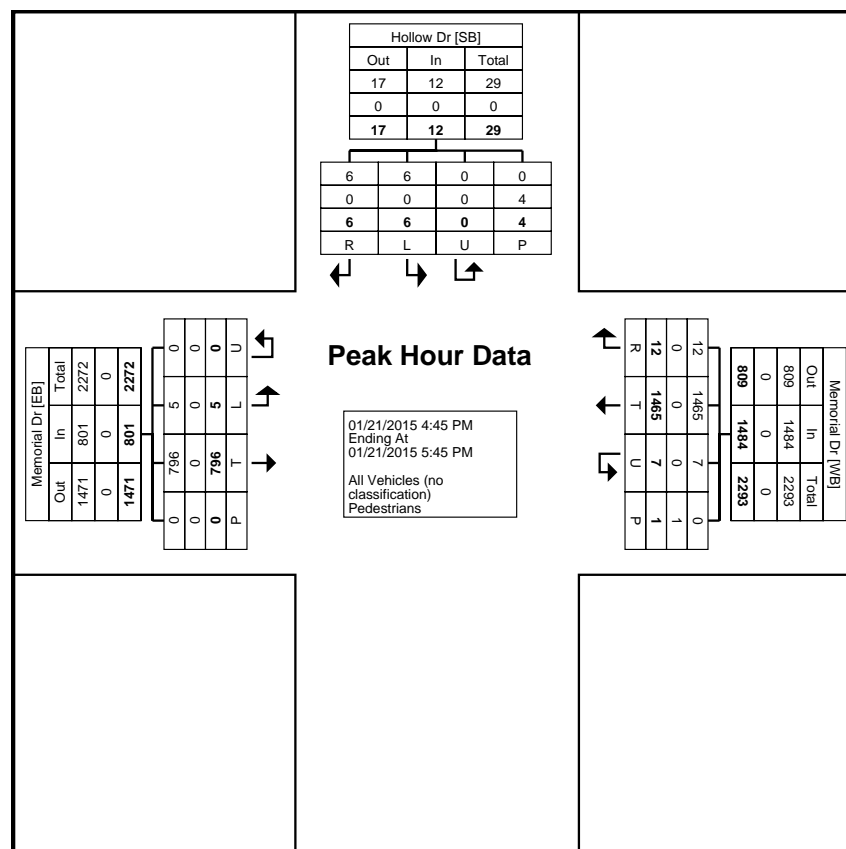
Start Time	Hollow Dr Southbound					Memorial Dr Westbound					Memorial Dr Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
4:45 PM	1	4	0	0	5	354	3	1	0	358	1	167	0	0	168	531
5:00 PM	4	2	0	2	6	384	1	0	0	385	1	211	0	0	212	603
5:15 PM	0	0	0	1	0	362	6	0	0	368	3	193	0	0	196	564
5:30 PM	1	0	0	1	1	365	2	6	1	373	0	225	0	0	225	599
<b>Total</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>4</b>	<b>12</b>	<b>1465</b>	<b>12</b>	<b>7</b>	<b>1</b>	<b>1484</b>	<b>5</b>	<b>796</b>	<b>0</b>	<b>0</b>	<b>801</b>	<b>2297</b>
Approach %	50.0	50.0	0.0	-	-	98.7	0.8	0.5	-	-	0.6	99.4	0.0	-	-	-
Total %	0.3	0.3	0.0	-	0.5	63.8	0.5	0.3	-	64.6	0.2	34.7	0.0	-	34.9	-
PHF	0.375	0.375	0.000	-	0.500	0.954	0.500	0.292	-	0.964	0.417	0.884	0.000	-	0.890	0.952
All Vehicles (no classification)	6	6	0	-	12	1465	12	7	-	1484	5	796	0	-	801	2297
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	4	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



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Count Name: Memorial Dr at Hollow Dr  
Site Code:  
Start Date: 01/21/2015  
Page No: 6



Turning Movement Peak Hour Data Plot (4:45 PM)



C. J. Hensch & Associates Inc.  
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Count Name: Memorial Dr at Benignus Rd  
Site Code:  
Start Date: 01/13/2015  
Page No: 1

### Turning Movement Data

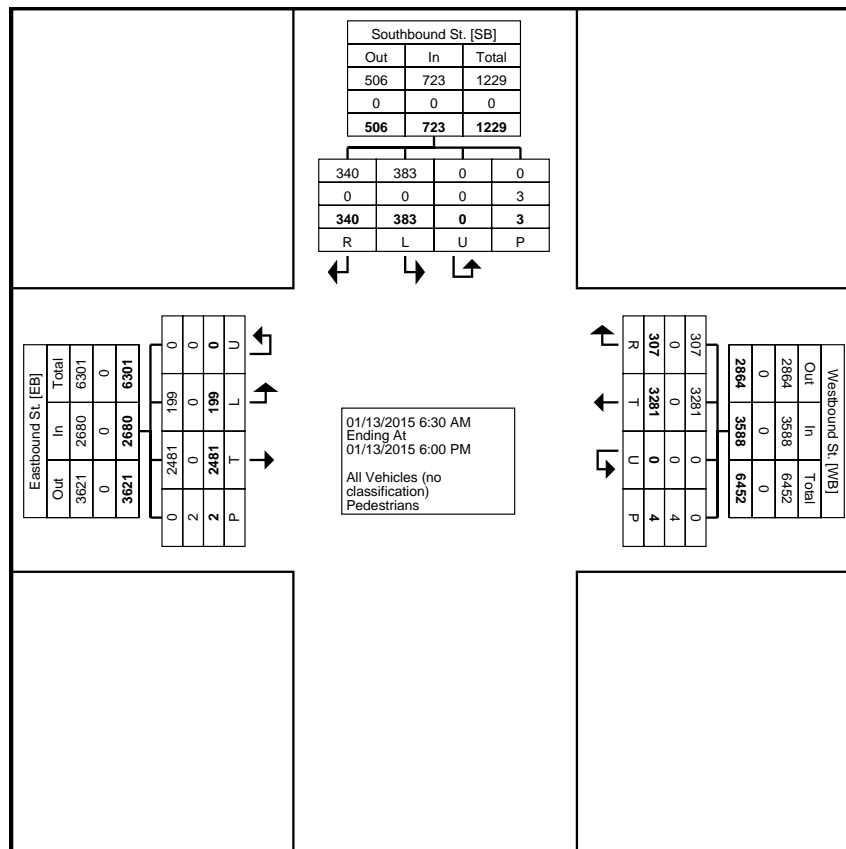
Start Time	Southbound St. Southbound					Westbound St. Westbound					Eastbound St. Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
6:30 AM	7	3	0	0	10	43	4	0	0	47	13	76	0	0	89	146
6:45 AM	5	4	0	1	9	61	4	0	0	65	11	97	0	0	108	182
Hourly Total	12	7	0	1	19	104	8	0	0	112	24	173	0	0	197	328
7:00 AM	3	3	0	0	6	62	12	0	1	74	11	164	0	0	175	255
7:15 AM	12	4	0	0	16	87	13	0	0	100	17	206	0	0	223	339
7:30 AM	28	7	0	0	35	117	41	0	0	158	19	266	0	0	285	478
7:45 AM	28	11	0	0	39	143	40	0	0	183	19	197	0	0	216	438
Hourly Total	71	25	0	0	96	409	106	0	1	515	66	833	0	0	899	1510
8:00 AM	41	11	0	1	52	169	33	0	0	202	13	152	0	0	165	419
8:15 AM	42	16	0	1	58	100	11	0	0	111	10	176	0	2	186	355
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	83	27	0	2	110	269	44	0	0	313	23	328	0	2	351	774
4:00 PM	19	31	0	0	50	246	25	0	0	271	9	138	0	0	147	468
4:15 PM	42	32	0	0	74	283	21	0	0	304	9	111	0	0	120	498
4:30 PM	28	33	0	0	61	289	20	0	0	309	12	140	0	0	152	522
4:45 PM	26	30	0	0	56	303	13	0	2	316	13	143	0	0	156	528
Hourly Total	115	126	0	0	241	1121	79	0	2	1200	43	532	0	0	575	2016
5:00 PM	22	50	0	0	72	325	13	0	0	338	19	159	0	0	178	588
5:15 PM	26	35	0	0	61	357	12	0	0	369	5	146	0	0	151	581
5:30 PM	27	42	0	0	69	351	22	0	1	373	8	181	0	0	189	631
5:45 PM	27	28	0	0	55	345	23	0	0	368	11	129	0	0	140	563
Hourly Total	102	155	0	0	257	1378	70	0	1	1448	43	615	0	0	658	2363
Grand Total	383	340	0	3	723	3281	307	0	4	3588	199	2481	0	2	2680	6991
Approach %	53.0	47.0	0.0	-	-	91.4	8.6	0.0	-	-	7.4	92.6	0.0	-	-	-
Total %	5.5	4.9	0.0	-	10.3	46.9	4.4	0.0	-	51.3	2.8	35.5	0.0	-	38.3	-
All Vehicles (no classification)	383	340	0	-	723	3281	307	0	-	3588	199	2481	0	-	2680	6991
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	3	-	-	-	-	4	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Count Name: Memorial Dr at Benignus Rd  
Site Code:  
Start Date: 01/13/2015  
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Turning Movement Data Plot





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Count Name: Memorial Dr at Benignus Rd  
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### Turning Movement Peak Hour Data (7:30 AM)

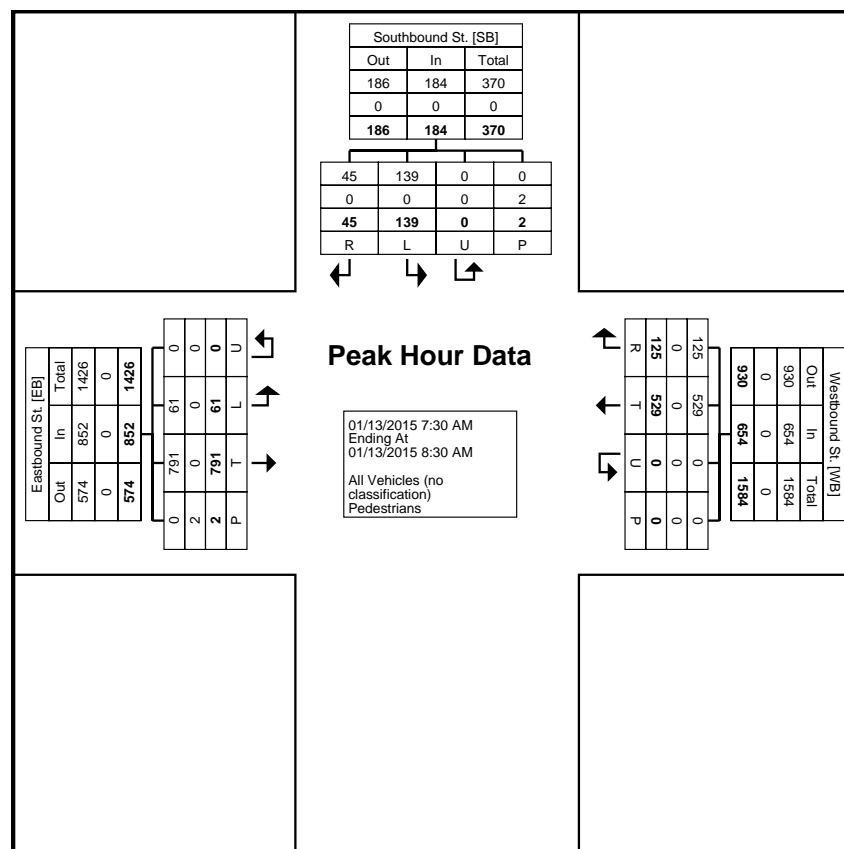
Start Time	Southbound St. Southbound					Westbound St. Westbound					Eastbound St. Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:30 AM	28	7	0	0	35	117	41	0	0	158	19	266	0	0	285	478
7:45 AM	28	11	0	0	39	143	40	0	0	183	19	197	0	0	216	438
8:00 AM	41	11	0	1	52	169	33	0	0	202	13	152	0	0	165	419
8:15 AM	42	16	0	1	58	100	11	0	0	111	10	176	0	2	186	355
<b>Total</b>	<b>139</b>	<b>45</b>	<b>0</b>	<b>2</b>	<b>184</b>	<b>529</b>	<b>125</b>	<b>0</b>	<b>0</b>	<b>654</b>	<b>61</b>	<b>791</b>	<b>0</b>	<b>2</b>	<b>852</b>	<b>1690</b>
Approach %	75.5	24.5	0.0	-	-	80.9	19.1	0.0	-	-	7.2	92.8	0.0	-	-	-
Total %	8.2	2.7	0.0	-	10.9	31.3	7.4	0.0	-	38.7	3.6	46.8	0.0	-	50.4	-
PHF	0.827	0.703	0.000	-	0.793	0.783	0.762	0.000	-	0.809	0.803	0.743	0.000	-	0.747	0.884
All Vehicles (no classification)	139	45	0	-	184	529	125	0	-	654	61	791	0	-	852	1690
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



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Count Name: Memorial Dr at Benignus Rd  
Site Code:  
Start Date: 01/13/2015  
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Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: Memorial Dr at Benignus Rd  
Site Code:  
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### Turning Movement Peak Hour Data (5:00 PM)

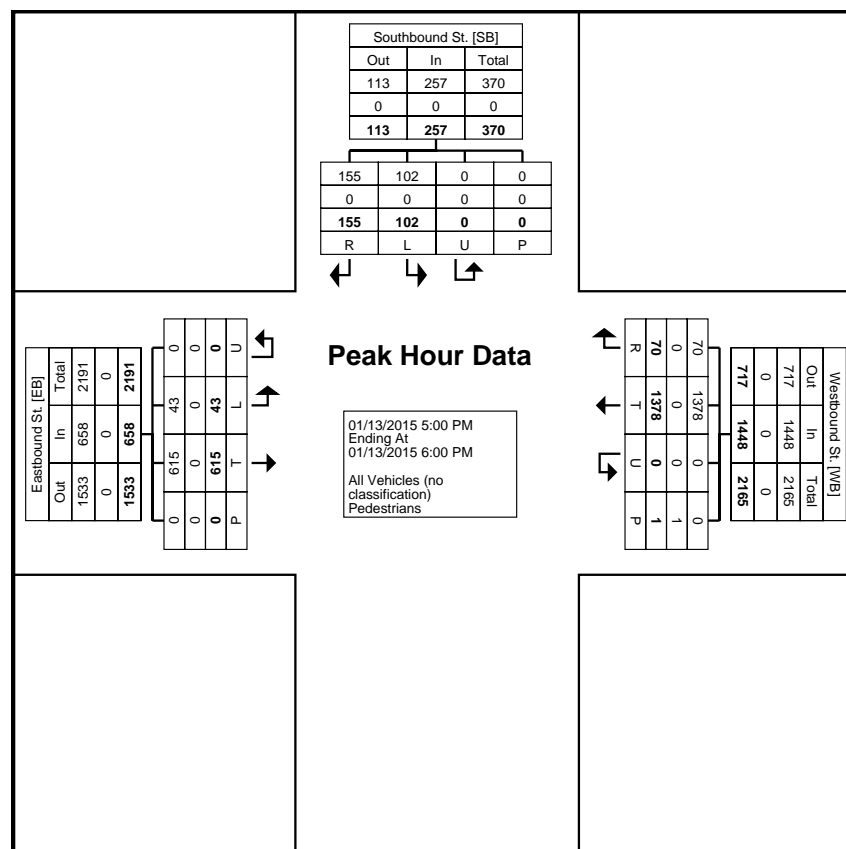
Start Time	Southbound St. Southbound					Westbound St. Westbound					Eastbound St. Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
5:00 PM	22	50	0	0	72	325	13	0	0	338	19	159	0	0	178	588
5:15 PM	26	35	0	0	61	357	12	0	0	369	5	146	0	0	151	581
5:30 PM	27	42	0	0	69	351	22	0	1	373	8	181	0	0	189	631
5:45 PM	27	28	0	0	55	345	23	0	0	368	11	129	0	0	140	563
<b>Total</b>	<b>102</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>257</b>	<b>1378</b>	<b>70</b>	<b>0</b>	<b>1</b>	<b>1448</b>	<b>43</b>	<b>615</b>	<b>0</b>	<b>0</b>	<b>658</b>	<b>2363</b>
Approach %	39.7	60.3	0.0	-	-	95.2	4.8	0.0	-	-	6.5	93.5	0.0	-	-	-
Total %	4.3	6.6	0.0	-	10.9	58.3	3.0	0.0	-	61.3	1.8	26.0	0.0	-	27.8	-
PHF	0.944	0.775	0.000	-	0.892	0.965	0.761	0.000	-	0.971	0.566	0.849	0.000	-	0.870	0.936
All Vehicles (no classification)	102	155	0	-	257	1378	70	0	-	1448	43	615	0	-	658	2363
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (5:00 PM)







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Count Name: Memorial Dr at Frostwood Dr  
Site Code:  
Start Date: 01/21/2015  
Page No: 3

### Turning Movement Peak Hour Data (7:15 AM)

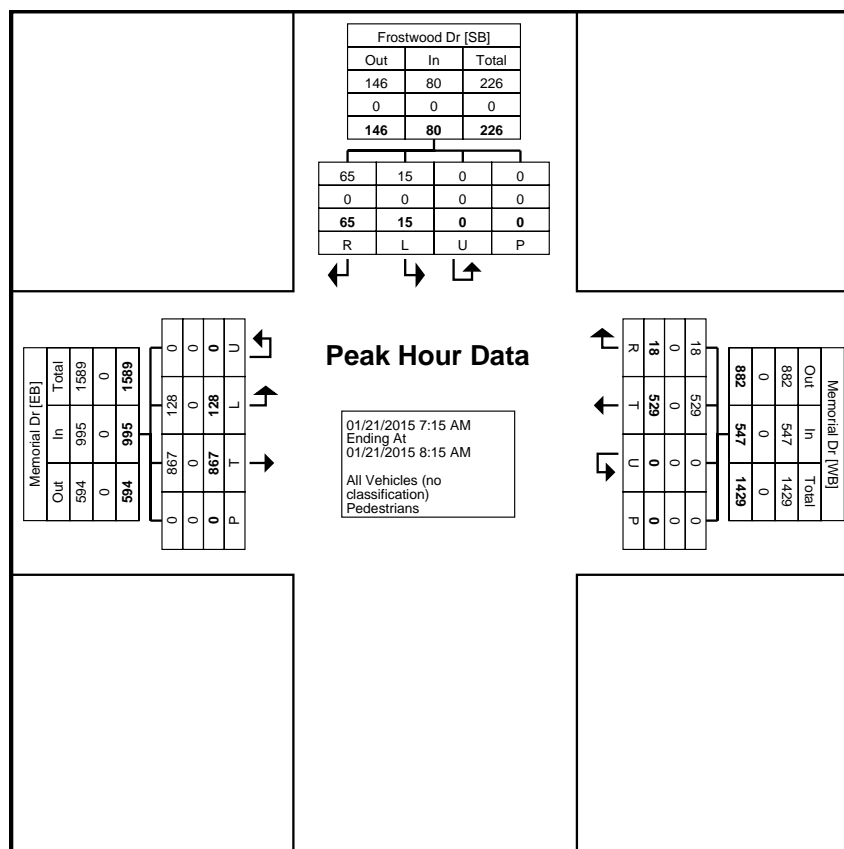
Start Time	Frostwood Dr Southbound					Memorial Dr Westbound					Memorial Dr Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:15 AM	5	15	0	0	20	76	4	0	0	80	42	213	0	0	255	355
7:30 AM	4	17	0	0	21	113	4	0	0	117	42	242	0	0	284	422
7:45 AM	3	19	0	0	22	178	4	0	0	182	21	208	0	0	229	433
8:00 AM	3	14	0	0	17	162	6	0	0	168	23	204	0	0	227	412
<b>Total</b>	<b>15</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>80</b>	<b>529</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>547</b>	<b>128</b>	<b>867</b>	<b>0</b>	<b>0</b>	<b>995</b>	<b>1622</b>
Approach %	18.8	81.3	0.0	-	-	96.7	3.3	0.0	-	-	12.9	87.1	0.0	-	-	-
Total %	0.9	4.0	0.0	-	4.9	32.6	1.1	0.0	-	33.7	7.9	53.5	0.0	-	61.3	-
PHF	0.750	0.855	0.000	-	0.909	0.743	0.750	0.000	-	0.751	0.762	0.896	0.000	-	0.876	0.936
All Vehicles (no classification)	15	65	0	-	80	529	18	0	-	547	128	867	0	-	995	1622
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (7:15 AM)



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Count Name: Memorial Dr at Frostwood Dr  
Site Code:  
Start Date: 01/21/2015  
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### Turning Movement Peak Hour Data (5:00 PM)

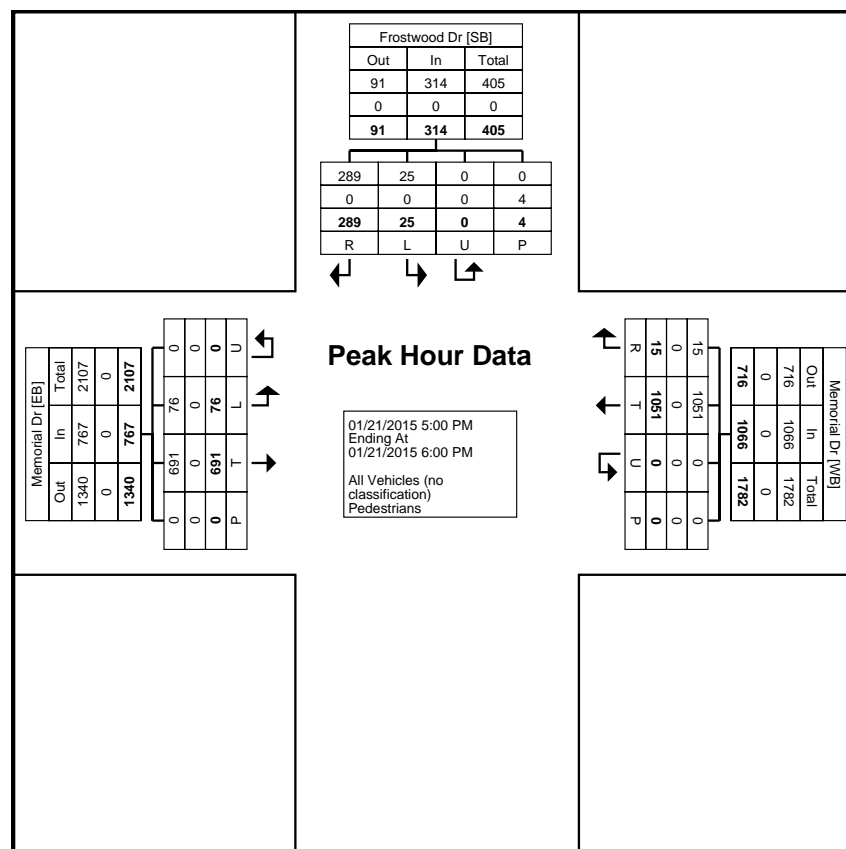
Start Time	Frostwood Dr Southbound					Memorial Dr Westbound					Memorial Dr Eastbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
5:00 PM	2	68	0	2	70	275	5	0	0	280	23	166	0	0	189	539
5:15 PM	8	89	0	0	97	255	3	0	0	258	18	184	0	0	202	557
5:30 PM	6	71	0	0	77	249	5	0	0	254	16	192	0	0	208	539
5:45 PM	9	61	0	2	70	272	2	0	0	274	19	149	0	0	168	512
<b>Total</b>	<b>25</b>	<b>289</b>	<b>0</b>	<b>4</b>	<b>314</b>	<b>1051</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>1066</b>	<b>76</b>	<b>691</b>	<b>0</b>	<b>0</b>	<b>767</b>	<b>2147</b>
Approach %	8.0	92.0	0.0	-	-	98.6	1.4	0.0	-	-	9.9	90.1	0.0	-	-	-
Total %	1.2	13.5	0.0	-	14.6	49.0	0.7	0.0	-	49.7	3.5	32.2	0.0	-	35.7	-
PHF	0.694	0.812	0.000	-	0.809	0.955	0.750	0.000	-	0.952	0.826	0.900	0.000	-	0.922	0.964
All Vehicles (no classification)	25	289	0	-	314	1051	15	0	-	1066	76	691	0	-	767	2147
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (5:00 PM)



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Count Name: Memorial Dr at Gessner Rd  
Site Code:  
Start Date: 01/13/2015  
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### Turning Movement Data

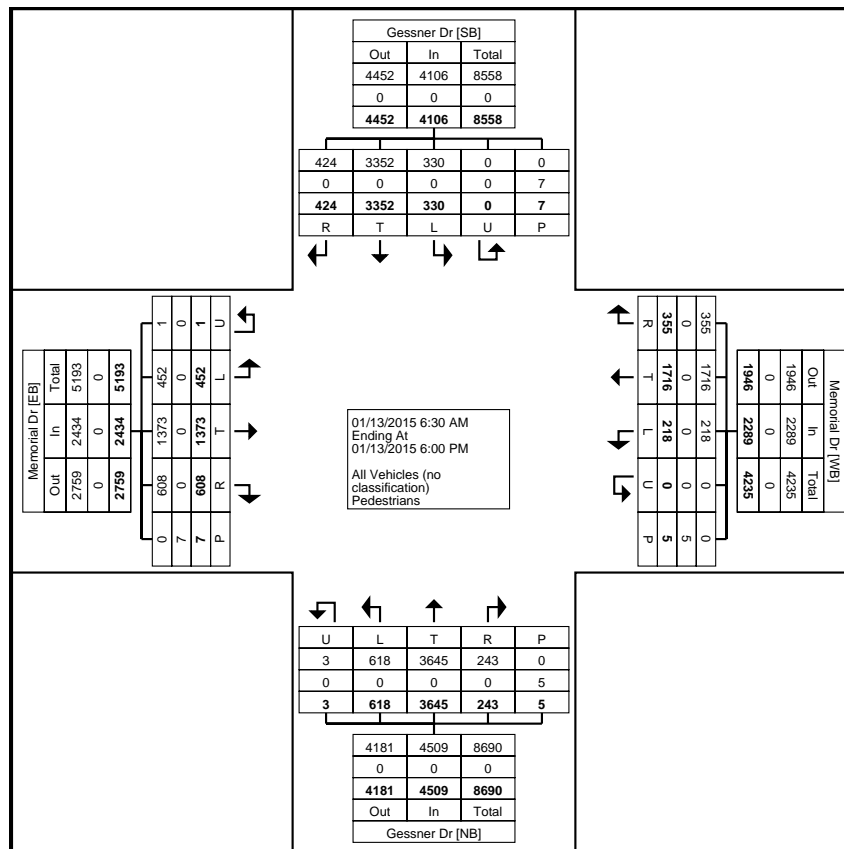
Start Time	Gessner Dr Southbound						Memorial Dr Westbound						Gessner Dr Northbound						Memorial Dr Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:30 AM	8	115	8	0	0	131	2	19	9	0	0	30	17	223	0	0	0	240	12	40	19	0	0	71	472
6:45 AM	11	149	5	0	0	165	2	22	16	0	0	40	20	227	10	0	1	257	23	49	13	0	0	85	547
Hourly Total	19	264	13	0	0	296	4	41	25	0	0	70	37	450	10	0	1	497	35	89	32	0	0	156	1019
7:00 AM	5	113	4	0	0	122	3	29	17	0	0	49	27	215	2	0	0	244	32	73	30	0	0	135	550
7:15 AM	15	165	8	0	0	188	8	43	23	0	0	74	16	235	10	0	1	261	36	95	37	0	1	168	691
7:30 AM	19	157	10	0	0	186	17	76	31	0	0	124	34	253	19	0	0	306	40	119	53	0	0	212	828
7:45 AM	16	233	20	0	4	269	19	88	39	0	5	146	33	248	12	0	2	293	35	122	60	0	4	217	925
Hourly Total	55	668	42	0	4	765	47	236	110	0	5	393	110	951	43	0	3	1104	143	409	180	0	5	732	2994
8:00 AM	20	169	13	0	0	202	7	115	25	0	0	147	45	227	5	0	1	277	26	105	37	0	0	168	794
8:15 AM	21	168	8	0	0	197	4	44	29	0	0	77	32	239	9	1	0	281	34	99	50	0	0	183	738
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	41	337	21	0	0	399	11	159	54	0	0	224	77	466	14	1	1	558	60	204	87	0	0	351	1532
4:00 PM	21	256	34	0	1	311	21	127	16	0	0	164	51	211	11	0	0	273	31	69	28	0	1	128	876
4:15 PM	22	287	47	0	2	356	16	119	14	0	0	149	45	229	17	1	0	292	22	81	44	0	1	147	944
4:30 PM	27	254	37	0	0	318	13	170	22	0	0	205	59	241	28	0	0	328	26	54	39	0	0	119	970
4:45 PM	18	274	40	0	0	332	18	144	16	0	0	178	49	203	22	0	0	274	27	73	53	0	0	153	937
Hourly Total	88	1071	158	0	3	1317	68	560	68	0	0	696	204	884	78	1	0	1167	106	277	164	0	2	547	3727
5:00 PM	31	244	46	0	0	321	19	185	23	0	0	227	53	228	30	1	0	312	24	103	36	0	0	163	1023
5:15 PM	28	286	50	0	0	364	23	173	27	0	0	223	44	214	37	0	0	295	28	86	45	1	0	160	1042
5:30 PM	35	217	41	0	0	293	20	197	28	0	0	245	52	217	16	0	0	285	31	113	35	0	0	179	1002
5:45 PM	33	265	53	0	0	351	26	165	20	0	0	211	41	235	15	0	0	291	25	92	29	0	0	146	999
Hourly Total	127	1012	190	0	0	1329	88	720	98	0	0	906	190	894	98	1	0	1183	108	394	145	1	0	648	4066
Grand Total	330	3352	424	0	7	4106	218	1716	355	0	5	2289	618	3645	243	3	5	4509	452	1373	608	1	7	2434	13338
Approach %	8.0	81.6	10.3	0.0	-	-	9.5	75.0	15.5	0.0	-	-	13.7	80.8	5.4	0.1	-	-	18.6	56.4	25.0	0.0	-	-	-
Total %	2.5	25.1	3.2	0.0	-	30.8	1.6	12.9	2.7	0.0	-	17.2	4.6	27.3	1.8	0.0	-	33.8	3.4	10.3	4.6	0.0	-	18.2	-
All Vehicles (no classification)	330	3352	424	0	-	4106	218	1716	355	0	-	2289	618	3645	243	3	-	4509	452	1373	608	1	-	2434	13338
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Data Plot





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### Turning Movement Peak Hour Data (7:30 AM)

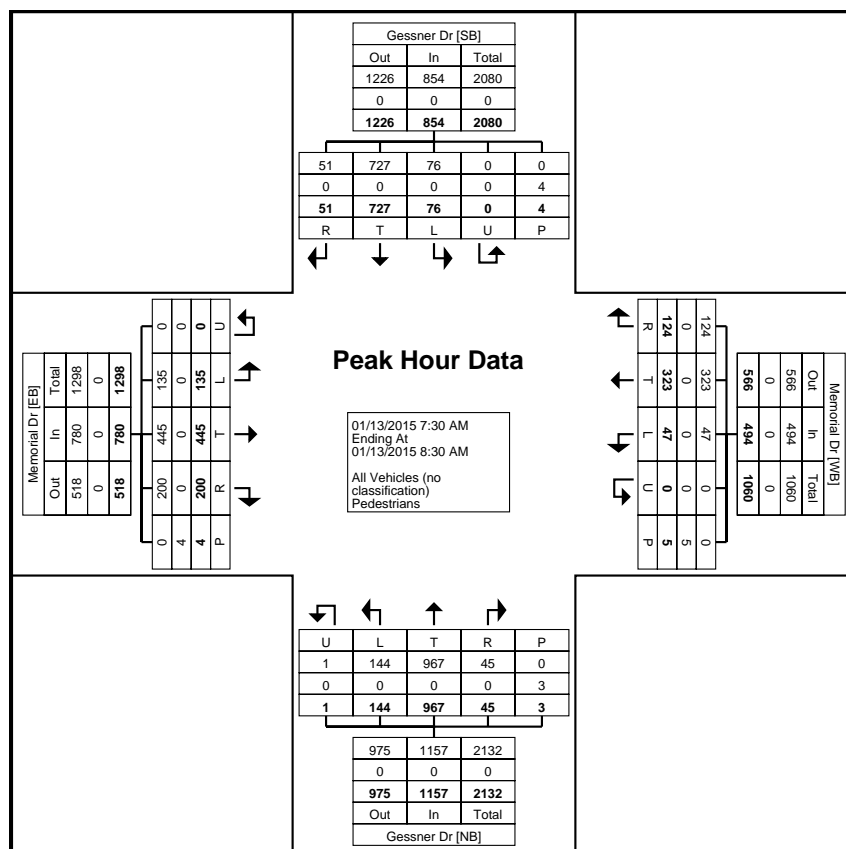
Start Time	Gessner Dr Southbound						Memorial Dr Westbound						Gessner Dr Northbound						Memorial Dr Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	19	157	10	0	0	186	17	76	31	0	0	124	34	253	19	0	0	306	40	119	53	0	0	212	828
7:45 AM	16	233	20	0	4	269	19	88	39	0	5	146	33	248	12	0	2	293	35	122	60	0	4	217	925
8:00 AM	20	169	13	0	0	202	7	115	25	0	0	147	45	227	5	0	1	277	26	105	37	0	0	168	794
8:15 AM	21	168	8	0	0	197	4	44	29	0	0	77	32	239	9	1	0	281	34	99	50	0	0	183	738
Total	76	727	51	0	4	854	47	323	124	0	5	494	144	967	45	1	3	1157	135	445	200	0	4	780	3285
Approach %	8.9	85.1	6.0	0.0	-	-	9.5	65.4	25.1	0.0	-	-	12.4	83.6	3.9	0.1	-	-	17.3	57.1	25.6	0.0	-	-	-
Total %	2.3	22.1	1.6	0.0	-	26.0	1.4	9.8	3.8	0.0	-	15.0	4.4	29.4	1.4	0.0	-	35.2	4.1	13.5	6.1	0.0	-	23.7	-
PHF	0.905	0.780	0.638	0.000	-	0.794	0.618	0.702	0.795	0.000	-	0.840	0.800	0.956	0.592	0.250	-	0.945	0.844	0.912	0.833	0.000	-	0.899	0.888
All Vehicles (no classification)	76	727	51	0	-	854	47	323	124	0	-	494	144	967	45	1	-	1157	135	445	200	0	-	780	3285
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Pedestrians	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Turning Movement Peak Hour Data Plot (7:30 AM)



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Start Date: 01/13/2015  
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### Turning Movement Peak Hour Data (5:00 PM)

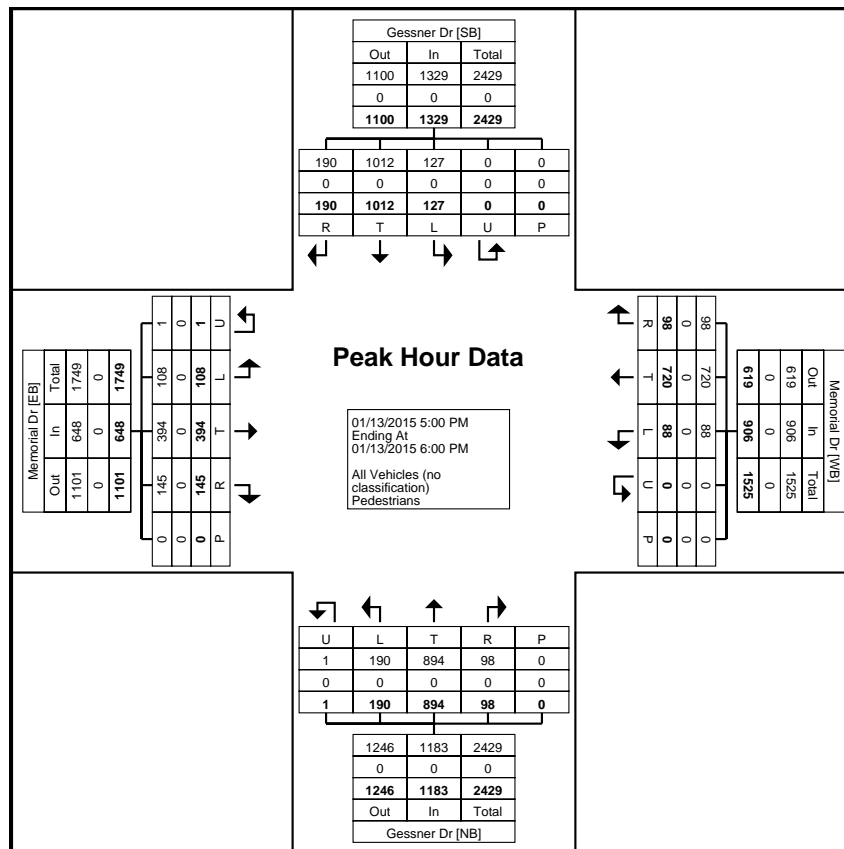
Start Time	Gessner Dr Southbound						Memorial Dr Westbound						Gessner Dr Northbound						Memorial Dr Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	31	244	46	0	0	321	19	185	23	0	0	227	53	228	30	1	0	312	24	103	36	0	0	163	1023
5:15 PM	28	286	50	0	0	364	23	173	27	0	0	223	44	214	37	0	0	295	28	86	45	1	0	160	1042
5:30 PM	35	217	41	0	0	293	20	197	28	0	0	245	52	217	16	0	0	285	31	113	35	0	0	179	1002
5:45 PM	33	265	53	0	0	351	26	165	20	0	0	211	41	235	15	0	0	291	25	92	29	0	0	146	999
<b>Total</b>	<b>127</b>	<b>1012</b>	<b>190</b>	<b>0</b>	<b>0</b>	<b>1329</b>	<b>88</b>	<b>720</b>	<b>98</b>	<b>0</b>	<b>0</b>	<b>906</b>	<b>190</b>	<b>894</b>	<b>98</b>	<b>1</b>	<b>0</b>	<b>1183</b>	<b>108</b>	<b>394</b>	<b>145</b>	<b>1</b>	<b>0</b>	<b>648</b>	<b>4066</b>
Approach %	9.6	76.1	14.3	0.0	-	-	9.7	79.5	10.8	0.0	-	-	16.1	75.6	8.3	0.1	-	-	16.7	60.8	22.4	0.2	-	-	-
Total %	3.1	24.9	4.7	0.0	-	32.7	2.2	17.7	2.4	0.0	-	22.3	4.7	22.0	2.4	0.0	-	29.1	2.7	9.7	3.6	0.0	-	15.9	-
PHF	0.907	0.885	0.896	0.000	-	0.913	0.846	0.914	0.875	0.000	-	0.924	0.896	0.951	0.662	0.250	-	0.948	0.871	0.872	0.806	0.250	-	0.905	0.976
All Vehicles (no classification)	127	1012	190	0	-	1329	88	720	98	0	-	906	190	894	98	1	-	1183	108	394	145	1	-	648	4066
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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Count Name: Memorial Dr at Gessner Rd  
Site Code:  
Start Date: 01/13/2015  
Page No: 6



Turning Movement Peak Hour Data Plot (5:00 PM)

### Appendix D.3

#### Synchro Summary Table



**Traffic Operational Analysis Results**

**2015 A.M. Peak – Existing Year  
7:30 A.M. – 8:30 A.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	1013	327	153	451	0	0	0	0	134	1433	138			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850									0.985			
Flt Protected				0.950								0.996			
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Flt Permitted				0.950							0.996				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								20				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	1078	385	168	490	0	0	0	0	147	1592	189			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1078	385	168	490	0	0	0	0	0	1928	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6							8					
Total Split (s)		40.7	40.7	19.3						60.0	60.0		36.0	24.0	60.0

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

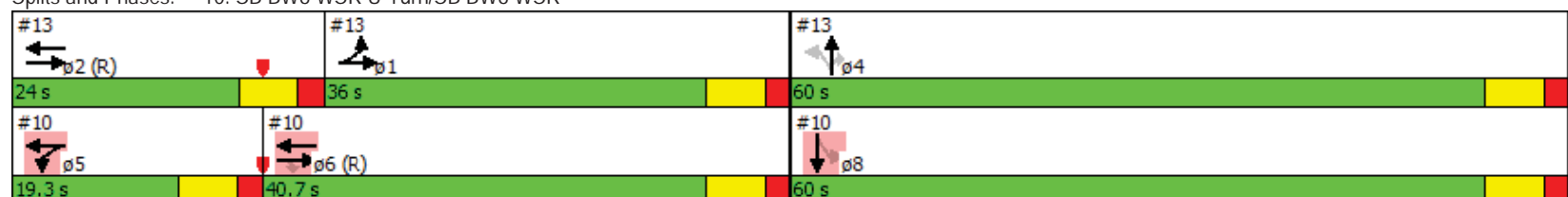
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Total Lost Time (s)		6.5	6.5	6.5							6.5				
Act Effct Green (s)		34.2	34.2	12.8	53.5						53.5				
Actuated g/C Ratio		0.28	0.28	0.11	0.45						0.45				
v/c Ratio		0.77	0.77	0.92	0.32						0.89				
Control Delay		43.7	41.2	56.8	10.3						36.8				
Queue Delay		0.7	0.0	19.5	9.5						0.0				
Total Delay		44.4	41.2	76.3	19.9						36.8				
LOS		D	D	E	B						D				
Approach Delay		43.6			34.3						36.8				
Approach LOS		D			C						D				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.10  
 Intersection Signal Delay: 38.8  
 Intersection LOS: D  
 Intersection Capacity Utilization 91.6%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↗			↖↗			↖↗	↖						
Volume (vph)	383	755	0	0	426	146	186	2010	151	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Fr <sub>t</sub>					0.960				0.850						
Flt Protected	0.950							0.996							
Satd. Flow (prot)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Flt Permitted	0.950							0.996							
Satd. Flow (perm)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					33				91						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.83	0.87	0.92	0.92	0.83	0.78	0.89	0.93	0.82	0.92	0.92	0.92			
Adj. Flow (vph)	461	868	0	0	513	187	209	2161	184	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	461	868	0	0	700	0	0	2370	184	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	12			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	36.0				24.0		60.0	60.0	60.0				19.3	40.7	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	29.5	53.5			17.5			53.5	53.5						
Actuated g/C Ratio	0.25	0.45			0.15			0.45	0.45						

2015 AM Peak 7:30 am 12/17/2014 Existing  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

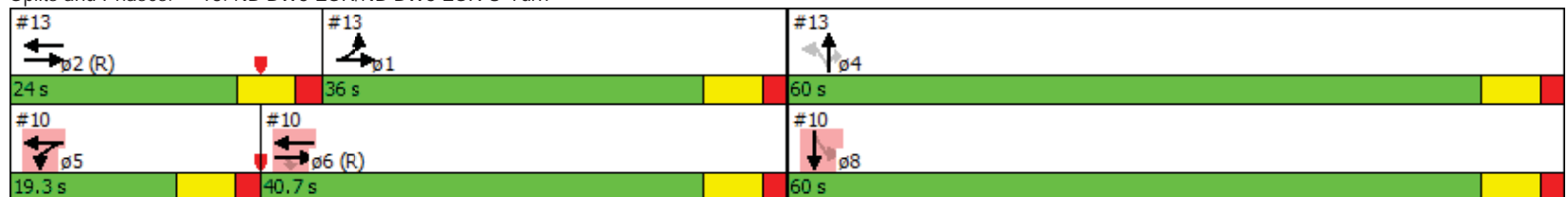
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
v/c Ratio	1.10	0.57			0.98			1.09	0.25						
Control Delay	86.0	8.8			91.5			79.9	11.2						
Queue Delay	0.0	1.1			10.7			6.0	0.0						
Total Delay	86.0	9.9			102.2			85.9	11.2						
LOS	F	A			F			F	B						
Approach Delay		36.3			102.2			80.5							
Approach LOS		D			F			F							

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.10  
 Intersection Signal Delay: 71.0  
 Intersection Capacity Utilization 91.6%  
 Analysis Period (min) 15  
 Intersection LOS: E  
 ICU Level of Service F

Splits and Phases: 13: NB BW8 ESR/NB BW8 ESR U-Turn



2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	114	668	13	5	485	109	42	41	4	87	12	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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		0.995			0.972			0.992				0.850
Flt Protected	0.950			0.950				0.976			0.961	
Satd. Flow (prot)	1711	3404	0	1711	3325	0	0	1743	0	0	1730	1531
Flt Permitted	0.950			0.950				0.465			0.631	
Satd. Flow (perm)	1711	3404	0	1711	3325	0	0	831	0	0	1136	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			40			2				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	148	742	24	12	591	136	72	64	8	164	36	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	766	0	12	727	0	0	144	0	0	200	72
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	20.0	75.0		20.0	75.0		25.0	25.0		25.0	25.0	25.0

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)		4.9		4.9	4.9			5.1			5.1	5.1
Act Effct Green (s)		13.8		82.1	9.5			71.4			19.9	19.9
Actuated g/C Ratio		0.12		0.68	0.08			0.60			0.17	0.17
v/c Ratio		0.76		0.33	0.09			0.36			1.06	0.21
Control Delay		70.3		17.5	49.4			12.6			134.9	4.5
Queue Delay		0.0		0.0	0.0			0.0			0.0	0.0
Total Delay		70.3		17.5	49.4			12.6			134.9	4.5
LOS		E		B	D			B			F	A
Approach Delay				26.1				13.2			134.9	98.0
Approach LOS				C				B			F	F

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:NWT and 6:SET, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.06  
 Intersection Signal Delay: 38.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 47.0%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 22: Broken Bough



2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	31	34	554	50	44	715
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	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	48	701	68	68	861
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1301	384	0	0	769	0
Stage 1	735	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	153	614	-	-	841	-
Stage 1	435	-	-	-	-	-
Stage 2	532	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	129	614	-	-	841	-
Mov Cap-2 Maneuver	129	-	-	-	-	-
Stage 1	435	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Approach	WB		NB		SB	

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	32.9		0		1.3
HCM LOS	D				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	219	841	-
HCM Lane V/C Ratio	-	-	0.421	0.08	-
HCM Control Delay (s)	-	-	32.9	9.7	0.6
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	1.9	0.3	-

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	1.3					
<b>Movement</b>						
	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	16	25	564	10	9	738
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	36	732	12	16	879
<b>Major/Minor</b>						
	Minor1		Major1		Major2	
Conflicting Flow All	1209	372	0	0	745	0
Stage 1	738	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	175	625	-	-	859	-
Stage 1	434	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	169	625	-	-	859	-
Mov Cap-2 Maneuver	169	-	-	-	-	-
Stage 1	434	-	-	-	-	-
Stage 2	573	-	-	-	-	-
<b>Approach</b>						
	WB		NB		SB	

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	24.6		0		0.4
HCM LOS	C				
<b>Minor Lane/Major Mvmt</b>					
	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	259	859	-
HCM Lane V/C Ratio	-	-	0.294	0.019	-
HCM Control Delay (s)	-	-	24.6	9.3	0.2
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	3.5					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	25	176	73	544	710	30
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	191	79	591	772	33
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1242	402	804	0	-	0
Stage 1	788	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	167	598	816	-	-	-
Stage 1	409	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	143	598	816	-	-	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	409	-	-	-	-	-
Stage 2	519	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	21.9		1.7		0
HCM LOS	C				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	816	-	428	-	-
HCM Lane V/C Ratio	0.097	-	0.51	-	-
HCM Control Delay (s)	9.9	0.6	21.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	2.8	-	-

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 2

Intersection						
Int Delay, s/veh	0.6					
<hr/>						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Vol, veh/h	10	14	4	887	616	8
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	79	67	50	89	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	21	8	997	1232	11
<hr/>						
Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	1752	622	1243	0	-	0
Stage 1	1238	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	77	430	556	-	-	-
Stage 1	237	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	75	430	556	-	-	-
Mov Cap-2 Maneuver	75	-	-	-	-	-
Stage 1	237	-	-	-	-	-
Stage 2	547	-	-	-	-	-
<hr/>						
Approach	WB	SE			NW	

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
HCM Control Delay, s	34.8		0.3		0	
HCM LOS	D					
<hr/>						
Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET	
Capacity (veh/h)	-	-	154	556	-	-
HCM Lane V/C Ratio	-	-	0.218	0.014	-	-
HCM Control Delay (s)	-	-	34.8	11.6	0.2	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0	-	-

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	0.3					
<hr/>						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	2	926	618	23	2	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	91	79	48	25	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1018	782	48	8	16
<hr/>						
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	830	0	-	0	1323	415
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	517	-
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	798	-	-	-	148	586
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	798	-	-	-	146	586
Mov Cap-2 Maneuver	-	-	-	-	146	-
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	556	-
<hr/>						
Approach	EB		WB		SB	

Intersection					
HCM Control Delay, s	0.1		0		18.4
HCM LOS					C
<hr/>					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	798	-	-	-	293
HCM Lane V/C Ratio	0.005	-	-	-	0.082
HCM Control Delay (s)	9.5	0.1	-	-	18.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection							
Int Delay, s/veh	1.6						
<hr/>							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	928	6	28	592	14	49	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	85	75	78	76	88	58	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1092	8	36	779	16	84	
<hr/>							
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1100	0	1557	550	
Stage 1	-	-	-	-	1096	-	
Stage 2	-	-	-	-	461	-	
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	-	-	630	-	103	479	
Stage 1	-	-	-	-	282	-	
Stage 2	-	-	-	-	601	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	630	-	93	479	
Mov Cap-2 Maneuver	-	-	-	-	93	-	
Stage 1	-	-	-	-	282	-	
Stage 2	-	-	-	-	540	-	
<hr/>							
Approach	EB		WB		NB		

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 9

Intersection							
HCM Control Delay, s	0		1		23.9		
HCM LOS	C						
<hr/>							
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	289	-	-	630	-		
HCM Lane V/C Ratio	0.347	-	-	0.057	-		
HCM Control Delay (s)	23.9	-	-	11.1	0.5		
HCM Lane LOS	C	-	-	B	A		
HCM 95th %tile Q(veh)	1.5	-	-	0.2	-		

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection							
Int Delay, s/veh	0.9						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	964	5	9	633	8	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	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	84	63	45	75	50	71	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1148	8	20	844	16	28	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1156	0	1614	578	
Stage 1	-	-	-	-	1152	-	
Stage 2	-	-	-	-	462	-	
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	-	-	600	-	95	459	
Stage 1	-	-	-	-	263	-	
Stage 2	-	-	-	-	601	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	600	-	89	459	
Mov Cap-2 Maneuver	-	-	-	-	89	-	
Stage 1	-	-	-	-	263	-	
Stage 2	-	-	-	-	563	-	
Approach	EB		WB		NB		

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LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		0.6		30.8
HCM LOS	D				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	183	-	-	600	-
HCM Lane V/C Ratio	0.241	-	-	0.033	-
HCM Control Delay (s)	30.8	-	-	11.2	0.3
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	89	890	573	29	12	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	86	73	73	60	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	1035	785	40	20	105
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	825	0	-	0	1577	412
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	772	-
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	801	-	-	-	100	589
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	416	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	801	-	-	-	63	589
Mov Cap-2 Maneuver	-	-	-	-	63	-
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	261	-
Approach	EB		WB		SB	

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	2.5		0		32.5
HCM LOS	D				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	801	-	-	-	252
HCM Lane V/C Ratio	0.159	-	-	-	0.495
HCM Control Delay (s)	10.3	1.5	-	-	32.5
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0.6	-	-	-	2.5

2015 AM Peak 7:30 am 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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**Traffic Operational Analysis Results**

**2016 A.M. Peak – Opening Year (No Build)  
7:30 A.M. – 8:30 A.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Group															
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	1080	330	165	485	0	0	0	0	171	1446	140			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850									0.986			
Flt Protected				0.950								0.995			
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Flt Permitted				0.950							0.995				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								19				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	1149	388	181	527	0	0	0	0	188	1607	192			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1149	388	181	527	0	0	0	0	0	1987	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Split	NA				
Protected Phases		6		5	5 6					8	8		1	2	4
Permitted Phases			6												
Total Split (s)		40.0	40.0	20.0						60.0	60.0		36.0	24.0	60.0

2016 AM Peak 7:30 am 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

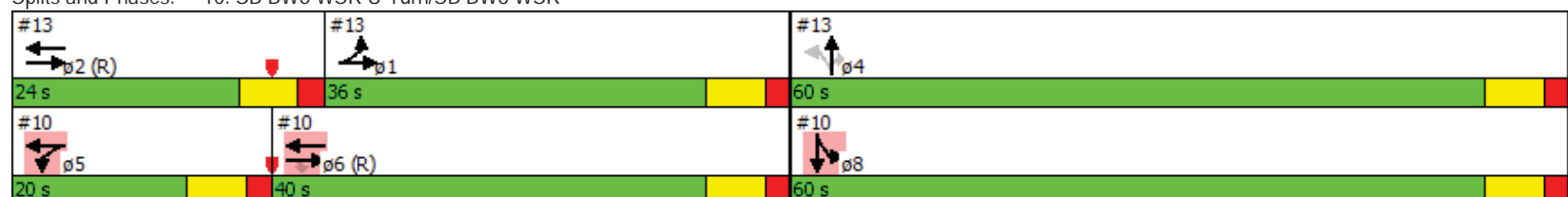
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Total Lost Time (s)		6.5	6.5	6.5							6.5				
Act Effct Green (s)		33.5	33.5	13.5	53.5						53.5				
Actuated g/C Ratio		0.28	0.28	0.11	0.45						0.45				
v/c Ratio		0.84	0.79	0.94	0.35						0.92				
Control Delay		47.2	43.0	57.2	9.9						39.1				
Queue Delay		1.7	0.0	28.1	19.9						0.7				
Total Delay		48.9	43.0	85.3	29.8						39.8				
LOS		D	D	F	C						D				
Approach Delay		47.4			44.0						39.8				
Approach LOS		D			D						D				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.11  
 Intersection Signal Delay: 43.3 Intersection LOS: D  
 Intersection Capacity Utilization 93.4% ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



2016 AM Peak 7:30 am 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↗			↖↗			↖↗	↖						
Volume (vph)	387	828	0	0	470	162	188	2027	166	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frts					0.960				0.850						
Flt Protected	0.950							0.996							
Satd. Flow (prot)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Flt Permitted	0.950							0.996							
Satd. Flow (perm)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					32				91						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.83	0.87	0.92	0.92	0.83	0.78	0.89	0.93	0.82	0.92	0.92	0.92			
Adj. Flow (vph)	466	952	0	0	566	208	211	2180	202	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	466	952	0	0	774	0	0	2391	202	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	12			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	36.0				24.0		60.0	60.0	60.0				20.0	40.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	29.5	53.5			17.5			53.5	53.5						
Actuated g/C Ratio	0.25	0.45			0.15			0.45	0.45						

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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

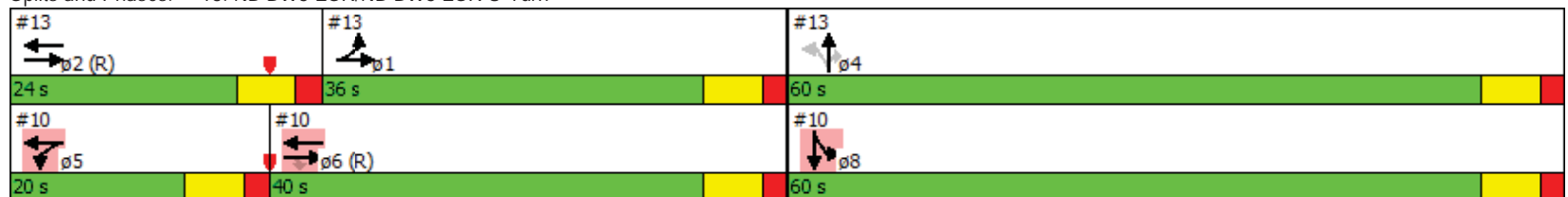
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
v/c Ratio	1.11	0.62			1.08			1.10	0.28						
Control Delay	88.4	10.5			101.8			83.6	12.3						
Queue Delay	0.1	2.0			7.3			1.9	0.0						
Total Delay	88.5	12.4			109.0			85.4	12.3						
LOS	F	B			F			F	B						
Approach Delay		37.4			109.0			79.7							
Approach LOS		D			F			E							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	71.9
Intersection LOS:	E
Intersection Capacity Utilization:	93.4%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 13: NB BW8 ESR/NB BW8 ESR U-Turn



2016 AM Peak 7:30 am 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	115	753	14	6	544	110	43	42	5	88	13	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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		0.995			0.974			0.991				0.850
Flt Protected	0.950			0.950				0.976			0.961	
Satd. Flow (prot)	1711	3404	0	1711	3332	0	0	1742	0	0	1730	1531
Flt Permitted	0.950			0.950				0.479			0.634	
Satd. Flow (perm)	1711	3404	0	1711	3332	0	0	855	0	0	1142	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			34			3				150
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	149	837	26	14	663	138	74	66	10	166	39	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	863	0	14	801	0	0	150	0	0	205	73
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	20.0	75.0		20.0	75.0		25.0	25.0		25.0	25.0	25.0

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Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Act Effct Green (s)	12.9	80.5		8.9	69.1			18.5			18.5	18.5
Actuated g/C Ratio	0.11	0.67		0.07	0.58			0.15			0.15	0.15
v/c Ratio	0.81	0.38		0.11	0.41			1.12			1.16	0.20
Control Delay	89.3	3.1		51.2	14.4			159.2			164.1	1.3
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	89.3	3.1		51.2	14.4			159.2			164.1	1.3
LOS	F	A		D	B			F			F	A
Approach Delay		15.8			15.0			159.2			121.3	
Approach LOS		B			B			F			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 38.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 52.7%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 22: Broken Bough



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Intersection						
Int Delay, s/veh	3					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	32	35	613	51	45	801
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	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	46	49	776	69	69	965
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1431	422	0	0	845	0
Stage 1	810	-	-	-	-	-
Stage 2	621	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	125	580	-	-	787	-
Stage 1	398	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	101	580	-	-	787	-
Mov Cap-2 Maneuver	101	-	-	-	-	-
Stage 1	398	-	-	-	-	-
Stage 2	404	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

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Intersection					
HCM Control Delay, s	46.7		0		1.4
HCM LOS	E				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	177	787	-
HCM Lane V/C Ratio	-	-	0.537	0.088	-
HCM Control Delay (s)	-	-	46.7	10	0.8
HCM Lane LOS	-	-	E	B	A
HCM 95th %tile Q(veh)	-	-	2.7	0.3	-

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	17	26	623	11	10	824
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	38	809	13	18	981
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1342	411	0	0	822	0
Stage 1	816	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	143	590	-	-	803	-
Stage 1	395	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	136	590	-	-	803	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Approach	WB		NB		SB	

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Intersection					
HCM Control Delay, s	31.8		0		0.4
HCM LOS	D				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	213	803	-
HCM Lane V/C Ratio	-	-	0.376	0.022	-
HCM Control Delay (s)	-	-	31.8	9.6	0.2
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1	-



Intersection						
Int Delay, s/veh	17.2					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	26	178	74	603	795	31
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	63	59	63	88	91	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	302	117	685	874	66
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1485	470	940	0	-	0
Stage 1	907	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	115	540	725	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	85	540	725	-	-	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	387	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

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Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	98.8		2.5		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	725	-	328	-	-
HCM Lane V/C Ratio	0.162	-	1.046	-	-
HCM Control Delay (s)	10.9	1.1	98.8	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.6	-	12.3	-	-

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Synchro 9 Report  
Page 2

Intersection						
Int Delay, s/veh	0.9					
<b>Movement</b>						
	WBL	WBR	SEL	SET	NWT	NWR
Vol, veh/h	11	15	5	974	676	9
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	79	67	50	89	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	22	10	1094	1352	13
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1925	682	1365	0	-	0
Stage 1	1358	-	-	-	-	-
Stage 2	567	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	59	392	499	-	-	-
Stage 1	204	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	56	392	499	-	-	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	204	-	-	-	-	-
Stage 2	504	-	-	-	-	-
<b>Approach</b>						
	WB		SE		NW	

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Intersection					
HCM Control Delay, s	48		0.4		0
HCM LOS	E				
<b>Minor Lane/Major Mvmt</b>					
	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	119	499	-
HCM Lane V/C Ratio	-	-	0.305	0.02	-
HCM Control Delay (s)	-	-	48	12.4	0.3
HCM Lane LOS	-	-	E	B	A
HCM 95th %tile Q(veh)	-	-	1.2	0.1	-

Intersection						
Int Delay, s/veh	0.4					
<hr/>						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	3	1013	667	36	3	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	91	79	48	25	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	1113	844	75	12	17
<hr/>						
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	919	0	-	0	1451	460
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	569	-
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	738	-	-	-	122	548
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	738	-	-	-	119	548
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	519	-
<hr/>						
Approach	EB		WB		SB	

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Synchro 9 Report  
Page 6

Intersection					
HCM Control Delay, s	0.2		0		23.8
HCM LOS	C				
<hr/>					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	738	-	-	-	221
HCM Lane V/C Ratio	0.008	-	-	-	0.133
HCM Control Delay (s)	9.9	0.1	-	-	23.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.5

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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	2.7					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1015	14	58	651	15	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	75	78	76	88	58
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1194	19	74	857	17	86
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1213	0	1780	606
Stage 1	-	-	-	-	1203	-
Stage 2	-	-	-	-	577	-
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	-	-	571	-	73	440
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	571	-	55	440
Mov Cap-2 Maneuver	-	-	-	-	55	-
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	395	-
<b>Approach</b>						
	EB		WB		NB	

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		2.2		39.5
HCM LOS	E				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	204	-	-	571	-
HCM Lane V/C Ratio	0.506	-	-	0.13	-
HCM Control Delay (s)	39.5	-	-	12.2	1.3
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	2.6	-	-	0.4	-

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Synchro 9 Report  
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Intersection							
Int Delay, s/veh	1.2						
<hr/>							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	1052	6	10	693	9	21	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	84	63	45	75	50	71	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1252	10	22	924	18	30	
<hr/>							
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1262	0	1763	631	
Stage 1	-	-	-	-	1257	-	
Stage 2	-	-	-	-	506	-	
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	-	-	547	-	75	424	
Stage 1	-	-	-	-	231	-	
Stage 2	-	-	-	-	571	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	547	-	69	424	
Mov Cap-2 Maneuver	-	-	-	-	69	-	
Stage 1	-	-	-	-	231	-	
Stage 2	-	-	-	-	524	-	
<hr/>							
Approach	EB		WB		NB		

2016 AM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
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Synchro 9 Report  
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Intersection							
HCM Control Delay, s	0		0.8		41.9		
HCM LOS	E						
<hr/>							
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	144	-	-	547	-		
HCM Lane V/C Ratio	0.33	-	-	0.041	-		
HCM Control Delay (s)	41.9	-	-	11.9	0.5		
HCM Lane LOS	E	-	-	B	A		
HCM 95th %tile Q(veh)	1.3	-	-	0.1	-		

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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	90	977	632	30	13	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	86	73	73	60	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	129	1136	866	41	22	106
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	907	0	-	0	1711	453
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	825	-
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	746	-	-	-	82	554
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	391	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	746	-	-	-	44	554
Mov Cap-2 Maneuver	-	-	-	-	44	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	208	-
Approach	EB		WB		SB	

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Intersection					
HCM Control Delay, s	3		0		58
HCM LOS	F				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	746	-	-	-	187
HCM Lane V/C Ratio	0.172	-	-	-	0.685
HCM Control Delay (s)	10.8	2.1	-	-	58
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	4.2

**Traffic Operational Analysis Results**

**2016 A.M. Peak – Opening Year (Build)  
7:30 A.M. – 8:30 A.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Group															
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	1080	330	165	485	0	0	0	0	171	1446	140			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.986				
Flt Protected				0.950							0.995				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Flt Permitted				0.950							0.995				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								19				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	1149	388	181	527	0	0	0	0	188	1607	192			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1149	388	181	527	0	0	0	0	0	1987	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6							8					
Total Split (s)		40.0	40.0	20.0						60.0	60.0		36.0	24.0	60.0
Total Lost Time (s)		6.5	6.5	6.5						6.5					

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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

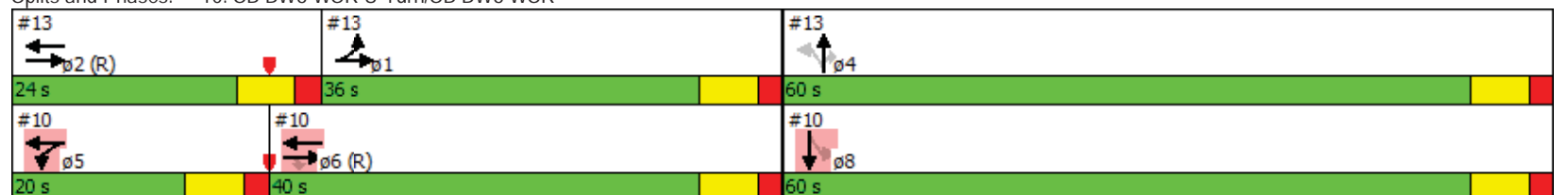
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effct Green (s)		33.5	33.5	13.5	53.5						53.5				
Actuated g/C Ratio		0.28	0.28	0.11	0.45						0.45				
v/c Ratio		0.84	0.79	0.94	0.35						0.92				
Control Delay		47.2	43.0	56.9	10.4						39.1				
Queue Delay		1.7	0.0	30.1	22.7						0.7				
Total Delay		48.9	43.0	87.0	33.2						39.8				
LOS		D	D	F	C						D				
Approach Delay		47.4			46.9						39.8				
Approach LOS		D			D						D				

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6., Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	43.8
Intersection LOS:	D
Intersection Capacity Utilization:	93.7%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↗			↖↗			↖↗	↖						
Volume (vph)	387	828	0	0	470	164	201	2027	166	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.959				0.850						
Flt Protected	0.950							0.995							
Satd. Flow (prot)	1711	3421	0	0	4714	0	0	4891	1531	0	0	0			
Flt Permitted	0.950							0.995							
Satd. Flow (perm)	1711	3421	0	0	4714	0	0	4891	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					32				91						
Link Speed (mph)		35			35			35		35					
Link Distance (ft)		225			208			132		141					
Travel Time (s)		4.4			4.1			2.6		2.7					
Peak Hour Factor	0.83	0.87	0.92	0.92	0.83	0.78	0.89	0.93	0.82	0.92	0.92	0.92			
Adj. Flow (vph)	466	952	0	0	566	210	226	2180	202	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	466	952	0	0	776	0	0	2406	202	0	0	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)		11			11			0		0					
Link Offset(ft)		0			0			0		0					
Crosswalk Width(ft)		16			16			16		16					
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	36.0				24.0		60.0	60.0	60.0				20.0	40.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	29.5	53.5			17.5			53.5	53.5						
Actuated g/C Ratio	0.25	0.45			0.15			0.45	0.45						
v/c Ratio	1.11	0.62			1.09			1.10	0.28						

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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

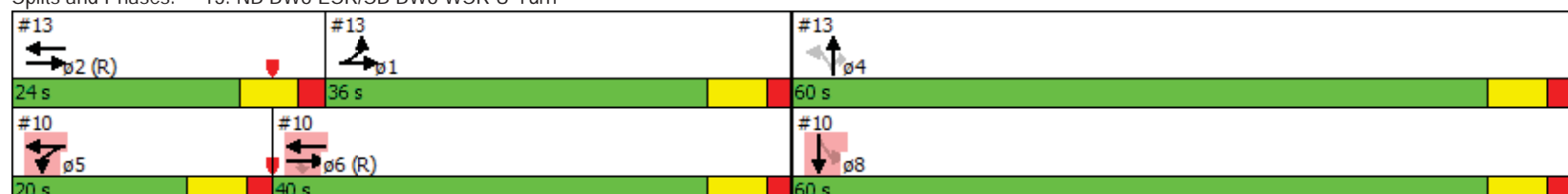
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	88.4	10.5			97.8			86.6	12.3						
Queue Delay	0.1	2.0			5.6			0.1	0.0						
Total Delay	88.5	12.4			103.4			86.7	12.3						
LOS	F	B			F			F	B						
Approach Delay		37.4			103.4			80.9							
Approach LOS		D			F			F							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	71.7
Intersection LOS:	E
Intersection Capacity Utilization:	93.7%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 13: NB BW8 ESR/SB BW8 WSR U-Turn



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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	115	753	14	6	544	110	43	42	5	88	13	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		0	100		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	0		1
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		0.995			0.974			0.991				0.850
Flt Protected	0.950			0.950				0.976			0.961	
Satd. Flow (prot)	1711	3404	0	1711	3332	0	0	1742	0	0	1730	1531
Flt Permitted	0.950			0.950				0.479			0.634	
Satd. Flow (perm)	1711	3404	0	1711	3332	0	0	855	0	0	1142	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			34			3				150
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	149	837	26	14	663	138	74	66	10	166	39	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	863	0	14	801	0	0	150	0	0	205	73
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	20.0	75.0		20.0	75.0		25.0	25.0		25.0	25.0	25.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5

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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	12.9	80.5		8.9	69.1			18.5			18.5	18.5
Actuated g/C Ratio	0.11	0.67		0.07	0.58			0.15			0.15	0.15
v/c Ratio	0.81	0.38		0.11	0.41			1.12			1.16	0.20
Control Delay	76.3	23.7		51.2	14.4			159.2			164.1	1.3
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	76.3	23.7		51.2	14.4			159.2			164.1	1.3
LOS	E	C		D	B			F			F	A
Approach Delay		31.4			15.0			159.2			121.3	
Approach LOS		C			B			F			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 45.1  
 Intersection Capacity Utilization 52.7%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service A

Splits and Phases: 22: Broken Bough



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Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	32	35	613	51	45	801
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	46	49	776	69	69	965
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1431	422	0	0	845	0
Stage 1	810	-	-	-	-	-
Stage 2	621	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	125	580	-	-	787	-
Stage 1	398	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	114	580	-	-	787	-
Mov Cap-2 Maneuver	114	-	-	-	-	-
Stage 1	398	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Approach	WB		NB		SB	

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Intersection					
HCM Control Delay, s	39.8		0		0.7
HCM LOS	E				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	195	787	-
HCM Lane V/C Ratio	-	-	0.487	0.088	-
HCM Control Delay (s)	-	-	39.8	10	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	2.4	0.3	-

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Intersection						
Int Delay, s/veh	0.4					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	43	623	11	0	801
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	62	809	13	0	954
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1293	411	0	0	822	0
Stage 1	816	-	-	-	-	-
Stage 2	477	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	154	590	-	-	803	-
Stage 1	395	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	154	590	-	-	803	-
Mov Cap-2 Maneuver	154	-	-	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	590	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	11.8		0		0
HCM LOS	B				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	590	803	-
HCM Lane V/C Ratio	-	-	0.106	-	-
HCM Control Delay (s)	-	-	11.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-



Intersection						
Int Delay, s/veh	13.9					
<hr/>						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	26	178	74	603	795	31
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	59	63	88	91	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	302	117	685	874	66
<hr/>						
Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	1485	470	940	0	-	0
Stage 1	907	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	115	540	725	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	96	540	725	-	-	-
Mov Cap-2 Maneuver	96	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	439	-	-	-	-	-
<hr/>						
Approach	EB	NB			SB	

Intersection					
HCM Control Delay, s	80.7	1.6			0
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	725	-	347	-	-
HCM Lane V/C Ratio	0.162	-	0.988	-	-
HCM Control Delay (s)	10.9	-	80.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.6	-	11.1	-	-

Intersection						
Int Delay, s/veh	0.6					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	5	974	676	9	11	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	89	79	67	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	1094	856	13	22	21
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	869	0	-	0	1429	435
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	567	-
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	771	-	-	-	126	569
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	531	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	771	-	-	-	124	569
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	524	-
Approach	SE	NW	SW			

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Intersection					
HCM Control Delay, s	0.1		0		27.6
HCM LOS	D				
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	771	-	202
HCM Lane V/C Ratio	-	-	0.013	-	0.215
HCM Control Delay (s)	-	-	9.7	-	27.6
HCM Lane LOS	-	-	A	-	D
HCM 95th %tile Q(veh)	-	-	0	-	0.8

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	3	1013	667	36	3	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	91	79	48	25	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	1113	844	75	12	17
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	919	0	-	0	1451	460
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	569	-
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	738	-	-	-	122	548
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	738	-	-	-	121	548
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	526	-
Approach	EB	WB	SB			

2016 AM Peak 7:30 am 12/17/2014 Opening Year  
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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0.1		0		23.5
HCM LOS					C
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	738	-	-	-	224
HCM Lane V/C Ratio	0.008	-	-	-	0.131
HCM Control Delay (s)	9.9	-	-	-	23.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

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Intersection						
Int Delay, s/veh	2					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1015	14	58	651	15	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	75	78	76	88	58
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1194	19	74	857	17	86
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1213	0	1780	606
Stage 1	-	-	-	-	1203	-
Stage 2	-	-	-	-	577	-
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	-	-	571	-	73	440
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	571	-	64	440
Mov Cap-2 Maneuver	-	-	-	-	64	-
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	457	-
<b>Approach</b>						
	EB		WB		NB	

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Intersection					
HCM Control Delay, s	0		1		34.3
HCM LOS	D				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	223	-	-	571	-
HCM Lane V/C Ratio	0.463	-	-	0.13	-
HCM Control Delay (s)	34.3	-	-	12.2	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	2.2	-	-	0.4	-



Intersection						
Int Delay, s/veh	1					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1052	6	10	693	9	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	63	45	75	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1252	10	22	924	18	30
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1262	0	1763	631
Stage 1	-	-	-	-	1257	-
Stage 2	-	-	-	-	506	-
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	-	-	547	-	75	424
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	571	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	547	-	72	424
Mov Cap-2 Maneuver	-	-	-	-	72	-
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	548	-
<b>Approach</b>						
	EB		WB		NB	

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		0.3		39.9
HCM LOS	E				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	150	-	-	547	-
HCM Lane V/C Ratio	0.32	-	-	0.041	-
HCM Control Delay (s)	39.9	-	-	11.9	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	1.3	-	-	0.1	-

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Intersection						
Int Delay, s/veh	2.5					
<hr/>						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	90	977	632	30	13	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	86	73	73	60	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	129	1136	866	41	22	106
<hr/>						
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	907	0	-	0	1711	453
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	825	-
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	746	-	-	-	82	554
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	391	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	746	-	-	-	68	554
Mov Cap-2 Maneuver	-	-	-	-	68	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	323	-
<hr/>						
Approach	EB		WB		SB	

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	1.1		0		33.4
HCM LOS	D				
<hr/>					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	746	-	-	-	251
HCM Lane V/C Ratio	0.172	-	-	-	0.51
HCM Control Delay (s)	10.8	-	-	-	33.4
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.6	-	-	-	2.7

**Traffic Operational Analysis Results**

**2030 A.M. Peak -- Future Year (No Build)  
7:30 A.M. – 8:30 A.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Group															
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	1215	372	186	546	0	0	0	0	162	1626	158			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.985				
Flt Protected				0.950							0.996				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Flt Permitted				0.950							0.996				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								19				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	1293	438	204	593	0	0	0	0	178	1807	216			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1293	438	204	593	0	0	0	0	0	2201	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6								8				
Total Split (s)		41.2	41.2	21.8						57.0	57.0		37.0	26.0	57.0
Total Lost Time (s)		6.5	6.5	6.5							6.5				

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Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

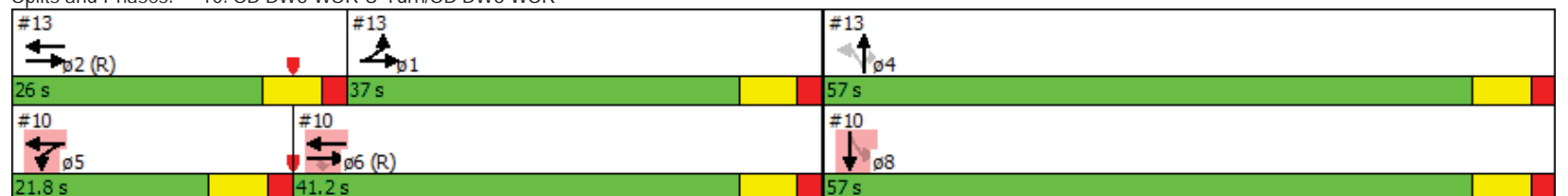
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effct Green (s)		34.7	34.7	15.3	56.5						50.5				
Actuated g/C Ratio		0.29	0.29	0.13	0.47						0.42				
v/c Ratio		0.91	0.86	0.94	0.37						1.08				
Control Delay		51.7	50.1	52.3	9.5						78.7				
Queue Delay		7.2	0.0	45.8	33.7						9.1				
Total Delay		58.9	50.1	98.2	43.2						87.8				
LOS		E	D	F	D						F				
Approach Delay		56.7			57.3						87.8				
Approach LOS		E			E						F				

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6., Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.31
Intersection Signal Delay:	71.3
Intersection LOS:	E
Intersection Capacity Utilization:	103.1%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↔	↕			↕↔			↕↔	↕						
Volume (vph)	436	932	0	0	529	183	212	2280	187	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.960				0.850						
Flt Protected	0.950							0.996							
Satd. Flow (prot)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Flt Permitted	0.950							0.996							
Satd. Flow (perm)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					26				91						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.83	0.87	0.92	0.92	0.83	0.78	0.89	0.93	0.82	0.92	0.92	0.92			
Adj. Flow (vph)	525	1071	0	0	637	235	238	2452	228	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	525	1071	0	0	872	0	0	2690	228	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4		4			5	6	8
Permitted Phases							4		4						
Total Split (s)	37.0				26.0		57.0	57.0	57.0				21.8	41.2	57.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	30.5	56.5			19.5			50.5	50.5						
Actuated g/C Ratio	0.25	0.47			0.16			0.42	0.42						
v/c Ratio	1.21	0.67			1.11			1.31	0.33						

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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

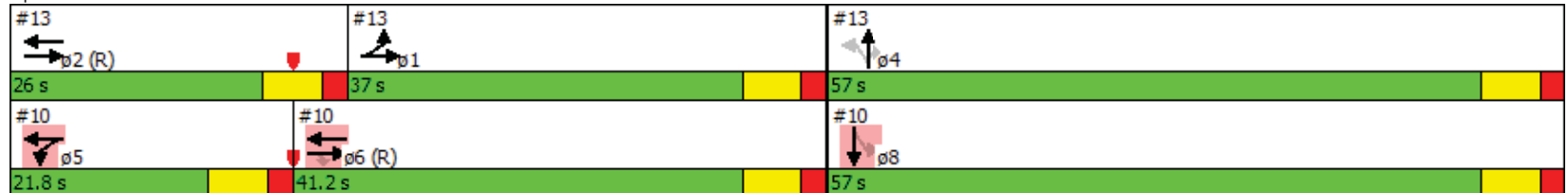
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	126.1	11.6			111.9			172.4	15.0						
Queue Delay	0.1	3.9			0.4			0.1	0.0						
Total Delay	126.2	15.5			112.3			172.5	15.0						
LOS	F	B			F			F	B						
Approach Delay		51.9			112.3			160.2							
Approach LOS		D			F			F							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.31
Intersection Signal Delay:	120.3
Intersection LOS:	F
Intersection Capacity Utilization:	103.1%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 13: NB BW8 ESR/SB BW8 WSR U-Turn



2030 A.M. Peak 7:30 am 12/17/2014 No Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	130	847	16	7	612	124	49	48	6	99	15	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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		0.995			0.974			0.991				0.850
Flt Protected	0.950			0.950				0.976			0.961	
Satd. Flow (prot)	1711	3404	0	1711	3332	0	0	1742	0	0	1730	1531
Flt Permitted	0.950			0.950				0.540			0.631	
Satd. Flow (perm)	1711	3404	0	1711	3332	0	0	964	0	0	1136	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			23			3				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	169	941	30	17	746	155	84	75	12	187	45	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	971	0	17	901	0	0	171	0	0	232	82
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	25.0	65.0		10.0	50.0		45.0	45.0		45.0	45.0	45.0
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1

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LAN Employee

Synchro 9 Report  
Page 1

Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	16.4	76.8		5.1	59.4			29.2			29.2	29.2
Actuated g/C Ratio	0.14	0.64		0.04	0.50			0.24			0.24	0.24
v/c Ratio	0.72	0.45		0.24	0.54			0.72			0.84	0.18
Control Delay	39.7	18.1		63.7	24.1			56.9			67.3	3.7
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	39.7	18.1		63.7	24.1			56.9			67.3	3.7
LOS	D	B		E	C			E			E	A
Approach Delay		21.3			24.8			56.9			50.7	
Approach LOS		C			C			E			D	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 28.6  
 Intersection Capacity Utilization 52.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 22: Broken Bough



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Synchro 9 Report  
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**Intersection**

Int Delay, s/veh 6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	36	40	690	58	51	901
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	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	56	873	78	78	1086

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1613	476	952
Stage 1	913	-	-
Stage 2	700	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	95	535	717
Stage 1	352	-	-
Stage 2	454	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	69	535	717
Mov Cap-2 Maneuver	69	-	-
Stage 1	352	-	-
Stage 2	330	-	-

**Approach**                      WB                                      NB                                      SB

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**Intersection**

HCM Control Delay, s 108.7                      0                      1.9  
HCM LOS F

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	127	717	-
HCM Lane V/C Ratio	-	-	0.849	0.109	-
HCM Control Delay (s)	-	-	108.7	10.6	1.3
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	5.3	0.4	-

Intersection						
Int Delay, s/veh	2.6					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	20	30	701	13	12	927
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	43	910	16	21	1104
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1513	463	0	0	926	0
Stage 1	918	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	111	546	-	-	734	-
Stage 1	349	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	103	546	-	-	734	-
Mov Cap-2 Maneuver	103	-	-	-	-	-
Stage 1	349	-	-	-	-	-
Stage 2	476	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

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Intersection					
HCM Control Delay, s	52.1		0		0.6
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	165	734	-
HCM Lane V/C Ratio	-	-	0.567	0.029	-
HCM Control Delay (s)	-	-	52.1	10.1	0.4
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	2.9	0.1	-



Intersection						
Int Delay, s/veh	50.5					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	30	201	84	679	894	35
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	63	59	63	88	91	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	341	133	772	982	74
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1672	528	1057	0	-	0
Stage 1	1020	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	87	495	655	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	56	495	655	-	-	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	310	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

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Intersection					
HCM Control Delay, s	298.2		3.1		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	655	-	252	-	-
HCM Lane V/C Ratio	0.204	-	1.541	-	-
HCM Control Delay (s)	11.9	1.6	298.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.8	-	23.3	-	-

Intersection						
Int Delay, s/veh	1.1					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	6	1096	761	11	13	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	89	79	67	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	1231	963	16	26	24
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	980	0	-	0	1612	490
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	640	-
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	700	-	-	-	95	524
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	700	-	-	-	90	524
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	461	-
Approach	SE	NW	SW			

Intersection					
HCM Control Delay, s	0.4		0		40.6
HCM LOS	E				
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	700	-	150
HCM Lane V/C Ratio	-	-	0.017	-	0.335
HCM Control Delay (s)	-	-	10.2	0.3	40.6
HCM Lane LOS	-	-	B	A	E
HCM 95th %tile Q(veh)	-	-	0.1	-	1.4

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	1140	750	27	4	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	91	79	48	25	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1253	949	56	16	20
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1006	0	-	0	1619	503
Stage 1	-	-	-	-	977	-
Stage 2	-	-	-	-	642	-
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	684	-	-	-	94	514
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	486	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	684	-	-	-	90	514
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	468	-
Approach	EB	WB	SB			

Intersection					
HCM Control Delay, s	0.3		0		32.8
HCM LOS					D
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	684	-	-	-	165
HCM Lane V/C Ratio	0.012	-	-	-	0.217
HCM Control Delay (s)	10.3	0.2	-	-	32.8
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection						
Int Delay, s/veh	5.8					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1142	16	66	732	17	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	75	78	76	88	58
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1344	21	85	963	19	98
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1365	0	2005	682
Stage 1	-	-	-	-	1354	-
Stage 2	-	-	-	-	651	-
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	-	-	499	-	52	392
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	499	-	33	392
Mov Cap-2 Maneuver	-	-	-	-	33	-
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	305	-
<b>Approach</b>						
	EB		WB		NB	

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Intersection					
HCM Control Delay, s	0		3		98
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	141	-	-	499	-
HCM Lane V/C Ratio	0.834	-	-	0.17	-
HCM Control Delay (s)	98	-	-	13.7	2.1
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	5.3	-	-	0.6	-

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Intersection							
Int Delay, s/veh	2.3						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	1183	7	12	780	11	24	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	84	63	45	75	50	70	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1408	11	27	1040	22	34	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1419	0	1987	710	
Stage 1	-	-	-	-	1414	-	
Stage 2	-	-	-	-	573	-	
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	-	-	476	-	53	376	
Stage 1	-	-	-	-	190	-	
Stage 2	-	-	-	-	527	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	476	-	46	376	
Mov Cap-2 Maneuver	-	-	-	-	46	-	
Stage 1	-	-	-	-	190	-	
Stage 2	-	-	-	-	456	-	
Approach	EB		WB		NB		

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Intersection							
HCM Control Delay, s	0		1.1		81.1		
HCM LOS	F						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	99	-	-	476	-		
HCM Lane V/C Ratio	0.569	-	-	0.056	-		
HCM Control Delay (s)	81.1	-	-	13	0.8		
HCM Lane LOS	F	-	-	B	A		
HCM 95th %tile Q(veh)	2.6	-	-	0.2	-		

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Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	102	1099	711	34	15	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	86	73	73	60	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	1278	974	47	25	121
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1021	0	-	0	1927	510
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	930	-
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	675	-	-	-	58	509
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	344	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	675	-	-	-	- 15	509
Mov Cap-2 Maneuver	-	-	-	-	67	-
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	87	-
Approach	EB	WB	SB			

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Intersection					
HCM Control Delay, s	4.4		0		41.1
HCM LOS	E				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	675	-	-	-	239
HCM Lane V/C Ratio	0.216	-	-	-	0.609
HCM Control Delay (s)	11.8	3.6	-	-	41.1
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.8	-	-	-	3.6
Notes					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Traffic Operational Analysis Results**

**2030 A.M. Peak – Future Year (Build)  
7:30 A.M. – 8:30 A.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Group															
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	1215	372	186	546	0	0	0	0	162	1626	158			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.985				
Flt Protected				0.950							0.996				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Flt Permitted				0.950							0.996				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4823	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								19				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	1293	438	204	593	0	0	0	0	178	1807	216			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	1293	438	204	593	0	0	0	0	0	2201	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6							8					
Total Split (s)		41.2	41.2	21.8						57.0	57.0		37.0	26.0	57.0
Total Lost Time (s)		6.5	6.5	6.5							6.5				

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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

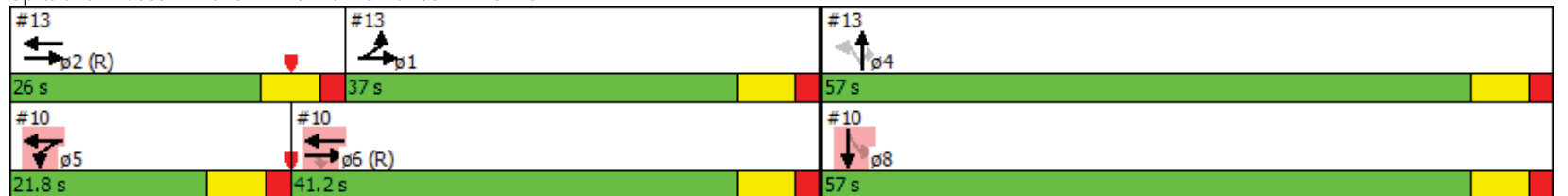
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effct Green (s)		34.7	34.7	15.3	56.5						50.5				
Actuated g/C Ratio		0.29	0.29	0.13	0.47						0.42				
v/c Ratio		0.91	0.86	0.94	0.37						1.08				
Control Delay		51.7	50.1	52.4	9.5						78.7				
Queue Delay		7.2	0.0	45.8	33.7						9.1				
Total Delay		58.9	50.1	98.2	43.2						87.8				
LOS		E	D	F	D						F				
Approach Delay		56.7			57.3						87.8				
Approach LOS		E			E						F				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6., Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.31  
 Intersection Signal Delay: 71.3  
 Intersection Capacity Utilization 103.1%  
 Analysis Period (min) 15  
 Intersection LOS: E  
 ICU Level of Service G

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↗			↖↗			↖↗	↖						
Volume (vph)	436	932	0	0	529	183	212	2280	187	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.960				0.850						
Flt Protected	0.950							0.996							
Satd. Flow (prot)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Flt Permitted	0.950							0.996							
Satd. Flow (perm)	1711	3421	0	0	4719	0	0	4896	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					26				91						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.83	0.87	0.92	0.92	0.83	0.78	0.89	0.93	0.82	0.92	0.92	0.92			
Adj. Flow (vph)	525	1071	0	0	637	235	238	2452	228	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	525	1071	0	0	872	0	0	2690	228	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4		4			5	6	8
Permitted Phases							4		4						
Total Split (s)	37.0				26.0		57.0	57.0	57.0				21.8	41.2	57.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	30.5	56.5			19.5			50.5	50.5						
Actuated g/C Ratio	0.25	0.47			0.16			0.42	0.42						
v/c Ratio	1.21	0.67			1.11			1.31	0.33						

2030 AM Peak 7:30 am 12/17/2014 Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/SB BW8 WSR U-Turn

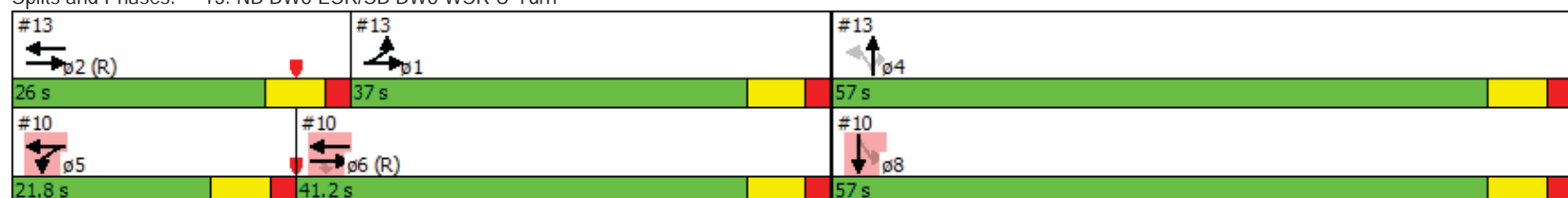
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	126.1	11.6			106.4			172.4	15.0						
Queue Delay	0.1	3.9			0.4			0.1	0.0						
Total Delay	126.2	15.5			106.8			172.5	15.0						
LOS	F	B			F			F	B						
Approach Delay		51.9			106.8			160.2							
Approach LOS		D			F			F							

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.31  
 Intersection Signal Delay: 119.5  
 Intersection LOS: F  
 Intersection Capacity Utilization 103.1%  
 ICU Level of Service G  
 Analysis Period (min) 15

Splits and Phases: 13: NB BW8 ESR/SB BW8 WSR U-Turn



2030 AM Peak 7:30 am 12/17/2014 Build  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	130	847	16	7	612	124	49	48	6	99	15	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		0	100		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	0		1
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		0.995			0.974			0.991				0.850
Flt Protected	0.950			0.950				0.976			0.961	
Satd. Flow (prot)	1711	3404	0	1711	3332	0	0	1742	0	0	1730	1531
Flt Permitted	0.950			0.950				0.540			0.631	
Satd. Flow (perm)	1711	3404	0	1711	3332	0	0	964	0	0	1136	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			23			3				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	169	941	30	17	746	155	84	75	12	187	45	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	971	0	17	901	0	0	171	0	0	232	82
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	25.0	65.0		10.0	50.0		45.0	45.0		45.0	45.0	45.0
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1

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Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

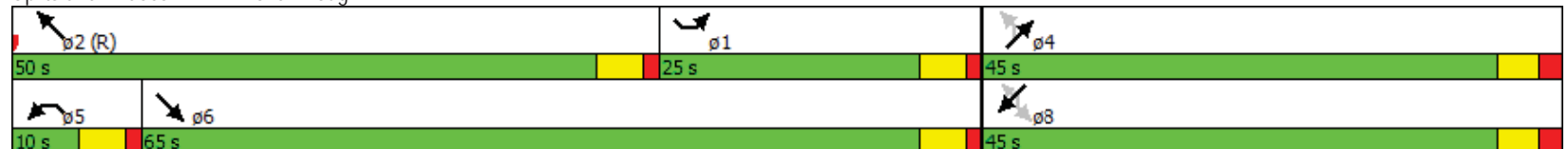
8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	20.1	76.2		6.1	55.8			29.2			29.2	29.2
Actuated g/C Ratio	0.17	0.64		0.05	0.46			0.24			0.24	0.24
v/c Ratio	0.59	0.45		0.20	0.58			0.72			0.84	0.18
Control Delay	50.7	18.5		60.0	26.1			56.9			67.3	3.7
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	50.7	18.5		60.0	26.1			56.9			67.3	3.7
LOS	D	B		E	C			E			E	A
Approach Delay		23.2			26.7			56.9			50.7	
Approach LOS		C			C			E			D	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 30.2  
 Intersection Capacity Utilization 52.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 22: Broken Bough



2030 AM Peak 7:30 am 12/17/2014 Build  
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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	36	40	690	58	51	901
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	56	873	78	78	1086
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1613	476	0	0	952	0
Stage 1	913	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	95	535	-	-	717	-
Stage 1	352	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	85	535	-	-	717	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	352	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	72		0		0.7
HCM LOS	F				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	152	717	-
HCM Lane V/C Ratio	-	-	0.709	0.109	-
HCM Control Delay (s)	-	-	72	10.6	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	4.2	0.4	-

Intersection						
Int Delay, s/veh	0.4					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	50	701	13	0	939
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	72	910	16	0	1118
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1477	463	0	0	926	0
Stage 1	918	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	117	546	-	-	734	-
Stage 1	349	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	117	546	-	-	734	-
Mov Cap-2 Maneuver	117	-	-	-	-	-
Stage 1	349	-	-	-	-	-
Stage 2	536	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	12.6		0		0
HCM LOS	B				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	546	734	-
HCM Lane V/C Ratio	-	-	0.133	-	-
HCM Control Delay (s)	-	-	12.6	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0	-



Intersection						
Int Delay, s/veh	38					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	30	201	84	679	894	35
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	59	63	88	91	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	341	133	772	982	74
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1672	528	1057	0	-	0
Stage 1	1020	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	87	495	655	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	69	495	655	-	-	-
Mov Cap-2 Maneuver	69	-	-	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	383	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

Intersection					
HCM Control Delay, s	225.5		1.8		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	655	-	282	-	-
HCM Lane V/C Ratio	0.204	-	1.377	-	-
HCM Control Delay (s)	11.9	-	225.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.8	-	20.4	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	6	1096	761	11	13	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	89	79	67	50	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	1231	963	16	26	24
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	980	0	-	0	1612	490
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	640	-
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	700	-	-	-	95	524
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	700	-	-	-	93	524
Mov Cap-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	327	-
Stage 2	-	-	-	-	479	-
Approach	SE	NW	SW			

Intersection					
HCM Control Delay, s	0.1	0	39.3		
HCM LOS	E				
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	700	-	154
HCM Lane V/C Ratio	-	-	0.017	-	0.327
HCM Control Delay (s)	-	-	10.2	-	39.3
HCM Lane LOS	-	-	B	-	E
HCM 95th %tile Q(veh)	-	-	0.1	-	1.3

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	1140	764	27	4	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	91	79	48	25	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	1253	967	56	16	20
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1023	0	-	0	1637	512
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	642	-
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	674	-	-	-	91	507
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	486	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	674	-	-	-	90	507
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	480	-
Approach	EB		WB		SB	

Intersection					
HCM Control Delay, s	0.1		0		32.8
HCM LOS					D
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	674	-	-	-	165
HCM Lane V/C Ratio	0.012	-	-	-	0.217
HCM Control Delay (s)	10.4	-	-	-	32.8
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection						
Int Delay, s/veh	3.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1142	16	66	732	17	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	75	78	76	88	58
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1344	21	85	963	19	98
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1365	0	2005	682
Stage 1	-	-	-	-	1354	-
Stage 2	-	-	-	-	651	-
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	-	-	499	-	52	392
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	499	-	43	392
Mov Cap-2 Maneuver	-	-	-	-	43	-
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	399	-
Approach	EB		WB		NB	

Intersection					
HCM Control Delay, s	0		1.1		65.3
HCM LOS	F				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	168	-	-	499	-
HCM Lane V/C Ratio	0.7	-	-	0.17	-
HCM Control Delay (s)	65.3	-	-	13.7	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	4.2	-	-	0.6	-



Intersection							
Int Delay, s/veh	1.7						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	1183	7	12	780	11	24	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	84	63	45	75	50	70	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1408	11	27	1040	22	34	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1419	0	1987	710	
Stage 1	-	-	-	-	1414	-	
Stage 2	-	-	-	-	573	-	
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	-	-	476	-	53	376	
Stage 1	-	-	-	-	190	-	
Stage 2	-	-	-	-	527	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	476	-	50	376	
Mov Cap-2 Maneuver	-	-	-	-	50	-	
Stage 1	-	-	-	-	190	-	
Stage 2	-	-	-	-	497	-	
Approach	EB		WB		NB		

Intersection						
HCM Control Delay, s	0		0.3		72.2	
HCM LOS					F	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	106	-	-	476	-	
HCM Lane V/C Ratio	0.531	-	-	0.056	-	
HCM Control Delay (s)	72.2	-	-	13	-	
HCM Lane LOS	F	-	-	B	-	
HCM 95th %tile Q(veh)	2.4	-	-	0.2	-	

Intersection						
Int Delay, s/veh	4.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	102	1099	711	34	15	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	86	73	73	60	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	1278	974	47	25	121
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1021	0	-	0	1927	510
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	930	-
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	675	-	-	-	58	509
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	344	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	675	-	-	-	45	509
Mov Cap-2 Maneuver	-	-	-	-	45	-
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	270	-
Approach	EB	WB	SB			

Intersection					
HCM Control Delay, s	1.2	0			73.4
HCM LOS	F				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	675	-	-	-	184
HCM Lane V/C Ratio	0.216	-	-	-	0.791
HCM Control Delay (s)	11.8	-	-	-	73.4
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	5.4

**Traffic Operational Analysis Results**

**2015 P.M. Peak – Existing Year  
5:00 P.M. – 6:00 P.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR

8/18/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	715	340	254	1091	0	0	0	0	99	1764	266			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91				
Frt			0.850									0.978			
Flt Protected				0.950								0.998			
Satd. Flow (prot)	0	5085	1583	1770	3539	0	0	0	0	0	4963	0			
Flt Permitted				0.950								0.998			
Satd. Flow (perm)	0	5085	1583	1770	3539	0	0	0	0	0	4963	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91									30			
Link Speed (mph)		35			35				35			35			
Link Distance (ft)		290			225				131			129			
Travel Time (s)		5.6			4.4				2.6			2.5			
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.73			
Adj. Flow (vph)	0	761	400	279	1186	0	0	0	0	108	1960	364			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	761	400	279	1186	0	0	0	0	0	2432	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															
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
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6							8					
Total Split (s)		33.0	33.0	27.0						60.0	60.0		23.0	37.0	60.0

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR

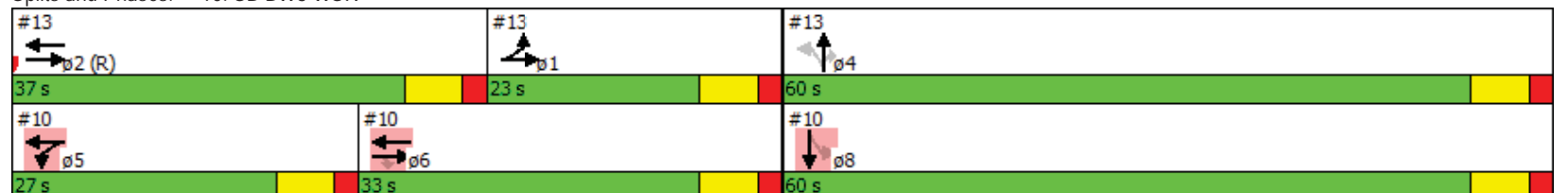
8/18/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Total Lost Time (s)		6.5	6.5	6.5							6.5				
Act Effct Green (s)		26.5	26.5	20.5	53.5						53.5				
Actuated g/C Ratio		0.22	0.22	0.17	0.45						0.45				
v/c Ratio		0.68	0.95	0.92	0.75						1.09				
Control Delay		46.4	69.6	51.0	11.7						81.2				
Queue Delay		0.6	0.0	48.5	49.2						0.0				
Total Delay		47.0	69.6	99.6	60.9						81.2				
LOS		D	E	F	E						F				
Approach Delay		54.8			68.2						81.2				
Approach LOS		D			E						F				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.09  
 Intersection Signal Delay: 71.4 Intersection LOS: E  
 Intersection Capacity Utilization 138.7% ICU Level of Service H  
 Analysis Period (min) 15

Splits and Phases: 10: SB BW8 WSR



2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↖↖			↖↖↖			↖↖↖	↖						
Volume (vph)	244	566	0	0	1080	112	249	1704	171	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frts					0.983				0.850						
Flt Protected	0.950							0.993							
Satd. Flow (prot)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Flt Permitted	0.950							0.993							
Satd. Flow (perm)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					18				164						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.97	0.96	0.92	0.92	0.92	0.76	0.85	0.91	0.78	0.92	0.92	0.92			
Adj. Flow (vph)	252	590	0	0	1174	147	293	1873	219	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	252	590	0	0	1321	0	0	2166	219	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1.2			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	23.0				37.0		60.0	60.0	60.0				27.0	33.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	16.5	53.5			30.5			53.5	53.5						
Actuated g/C Ratio	0.14	0.45			0.25			0.45	0.45						

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

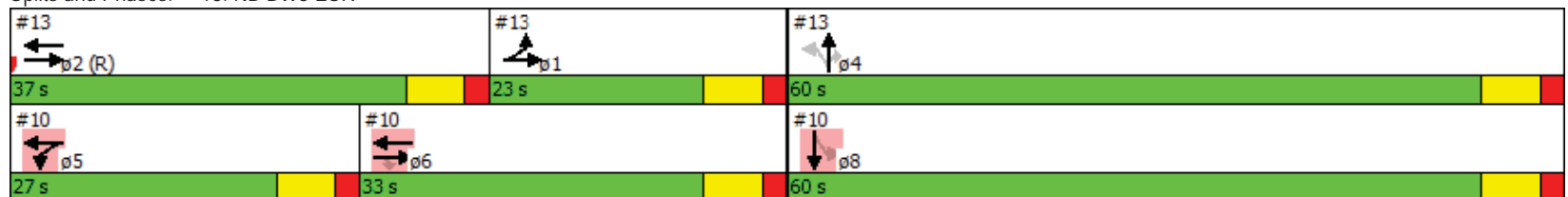
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
v/c Ratio	1.07	0.39			1.06			1.00	0.28						
Control Delay	90.4	6.9			87.0			51.6	6.9						
Queue Delay	10.2	0.8			14.8			38.5	0.0						
Total Delay	100.6	7.6			101.8			90.1	6.9						
LOS	F	A			F			F	A						
Approach Delay		35.5			101.8			82.4							
Approach LOS		D			F			F							

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.09  
 Intersection Signal Delay: 79.4  
 Intersection Capacity Utilization 138.7%  
 Analysis Period (min) 15  
 Intersection LOS: E  
 ICU Level of Service H

Splits and Phases: 13: NB BW8 ESR



2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	553	17	0	1047	181	19	42	10	207	33	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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		0.993			0.976			0.980				0.850
Flt Protected	0.950							0.984			0.959	
Satd. Flow (prot)	1711	3397	0	1801	3339	0	0	1736	0	0	1727	1531
Flt Permitted	0.950							0.510			0.656	
Satd. Flow (perm)	1711	3397	0	1801	3339	0	0	900	0	0	1181	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			31			7				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.65	0.90	0.61	0.92	0.90	0.82	0.53	0.75	0.63	0.80	0.75	0.69
Adj. Flow (vph)	115	614	28	0	1163	221	36	56	16	259	44	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	642	0	0	1384	0	0	108	0	0	303	109
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	15.0	70.0		20.0	75.0		30.0	30.0		30.0	30.0	30.0

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 1

Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1
Act Effct Green (s)	10.1	85.1			70.1			24.9			24.9	24.9
Actuated g/C Ratio	0.08	0.71			0.58			0.21			0.21	0.21
v/c Ratio	0.80	0.27			0.71			0.56			1.24	0.27
Control Delay	85.9	2.3			19.7			52.5			177.0	9.8
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	85.9	2.3			19.7			52.5			177.0	9.8
LOS	F	A			B			D			F	A
Approach Delay		15.0			19.7			52.5			132.7	
Approach LOS		B			B			D			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 7 (6%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.24  
 Intersection Signal Delay: 37.2  
 Intersection LOS: D  
 Intersection Capacity Utilization 71.2%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 22: Broken Bough



2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 2

Intersection						
Int Delay, s/veh	5.1					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	16	34	1333	13	20	738
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	44	71	96	81	50	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	48	1389	16	40	848
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Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1901	702	0	0	1405	0
Stage 1	1397	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	61	381	-	-	482	-
Stage 1	194	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	51	381	-	-	482	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	194	-	-	-	-	-
Stage 2	482	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	127.6		0		1.5
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	100	482	-
HCM Lane V/C Ratio	-	-	0.843	0.083	-
HCM Control Delay (s)	-	-	127.6	13.1	0.9
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	4.7	0.3	-

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	1					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	10	14	1132	10	22	740
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	83	58	95	50	69	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	24	1192	20	32	841
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Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1686	606	0	0	1212	0
Stage 1	1202	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	85	440	-	-	571	-
Stage 1	247	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	76	440	-	-	571	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	247	-	-	-	-	-
Stage 2	524	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 22

Intersection					
HCM Control Delay, s	31.8		0		1
HCM LOS	D				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	170	571	-
HCM Lane V/C Ratio	-	-	0.213	0.056	-
HCM Control Delay (s)	-	-	31.8	11.7	0.6
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0.2	-



Intersection						
Int Delay, s/veh	8.6					
<hr/>						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	18	113	257	1261	655	52
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	56	78	89	96	91	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	145	289	1314	720	64
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Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	1986	392	784	0	-	0
Stage 1	752	-	-	-	-	-
Stage 2	1234	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	53	607	830	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	238	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	53	607	830	-	-	-
Mov Cap-2 Maneuver	53	-	-	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	238	-	-	-	-	-
<hr/>						
Approach	EB	NB			SB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	75.8	5.4			0
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	830	-	209	-	-
HCM Lane V/C Ratio	0.348	-	0.847	-	-
HCM Control Delay (s)	11.6	4	75.8	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	1.6	-	6.4	-	-

Intersection						
Int Delay, s/veh	0.6					
<b>Movement</b>						
	WBL	WBR	SEL	SET	NWT	NWR
Vol, veh/h	2	11	16	792	1354	12
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	50	92	67	87	93	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	12	24	910	1456	16
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	1967	736	1472	0	-	0
Stage 1	1464	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	55	361	454	-	-	-
Stage 1	179	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	49	361	454	-	-	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	179	-	-	-	-	-
Stage 2	512	-	-	-	-	-
<b>Approach</b>						
	WB		SE		NW	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	34.2		1		0
HCM LOS	D				
<b>Minor Lane/Major Mvmt</b>					
	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	139	454	-
HCM Lane V/C Ratio	-	-	0.115	0.053	-
HCM Control Delay (s)	-	-	34.2	13.4	0.7
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0.2	-

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	0.7					
<hr/>						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	814	1446	11	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	42	90	94	46	38	38
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	904	1538	24	8	16
<hr/>						
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1562	0	-	0	2026	781
Stage 1	-	-	-	-	1550	-
Stage 2	-	-	-	-	476	-
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	419	-	-	-	50	338
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	591	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	419	-	-	-	47	338
Mov Cap-2 Maneuver	-	-	-	-	47	-
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	557	-
<hr/>						
Approach	EB		WB		SB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 6

Intersection					
HCM Control Delay, s	0.6		0		46.5
HCM LOS	E				
<hr/>					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	419	-	-	-	110
HCM Lane V/C Ratio	0.028	-	-	-	0.215
HCM Control Delay (s)	13.8	0.4	-	-	46.5
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
Page 7

Intersection							
Int Delay, s/veh	1						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	782	18	9	1364	7	22	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	88	38	69	94	50	50	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	889	47	13	1451	14	44	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	936	0	1664	468	
Stage 1	-	-	-	-	912	-	
Stage 2	-	-	-	-	752	-	
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	-	-	727	-	88	542	
Stage 1	-	-	-	-	352	-	
Stage 2	-	-	-	-	426	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	727	-	80	542	
Mov Cap-2 Maneuver	-	-	-	-	80	-	
Stage 1	-	-	-	-	352	-	
Stage 2	-	-	-	-	387	-	
Approach	EB		WB		NB		

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LAN Employee

Synchro 9 Report  
Page 9

Intersection							
HCM Control Delay, s	0		0.6		26.3		
HCM LOS	D						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	226	-	-	727	-		
HCM Lane V/C Ratio	0.257	-	-	0.018	-		
HCM Control Delay (s)	26.3	-	-	10	0.5		
HCM Lane LOS	D	-	-	B	A		
HCM 95th %tile Q(veh)	1	-	-	0.1	-		

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	0.9					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	793	14	10	1406	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	58	63	93	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	944	24	16	1512	12	16
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	968	0	1744	484
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	788	-
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	-	-	707	-	78	529
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	409	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	707	-	67	529
Mov Cap-2 Maneuver	-	-	-	-	67	-
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	351	-
<b>Approach</b>						
	EB		WB		NB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		0.8		38.8
HCM LOS	E				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	134	-	-	707	-
HCM Lane V/C Ratio	0.209	-	-	0.022	-
HCM Control Delay (s)	38.8	-	-	10.2	0.7
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	59	747	1338	24	5	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	86	91	67	42	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	869	1470	36	12	96
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1506	0	-	0	2074	753
Stage 1	-	-	-	-	1488	-
Stage 2	-	-	-	-	586	-
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	441	-	-	-	46	352
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	519	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	441	-	-	-	31	352
Mov Cap-2 Maneuver	-	-	-	-	31	-
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	346	-
Approach	EB		WB		SB	

2015 PM Peak 5:00 pm 12/17/2014 Existing  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	3.1		0		60.9
HCM LOS					F
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	441	-	-	-	165
HCM Lane V/C Ratio	0.172	-	-	-	0.656
HCM Control Delay (s)	14.8	2.1	-	-	60.9
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	3.7

**Traffic Operational Analysis Results**

**2016 P.M. Peak – Opening Year (No Build)  
5:00 P.M. – 6:00 P.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	762	343	281	1205	0	0	0	0	106	1779	269			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850									0.978			
Flt Protected				0.950								0.998			
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4798	0			
Flt Permitted				0.950							0.998				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4798	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91									20			
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.73			
Adj. Flow (vph)	0	811	404	309	1310	0	0	0	0	116	1977	368			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	811	404	309	1310	0	0	0	0	0	2461	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6							8					
Total Split (s)		32.0	32.0	28.0						60.0	60.0		23.0	37.0	60.0

2016 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR U-Turn/SB BW8 WSR

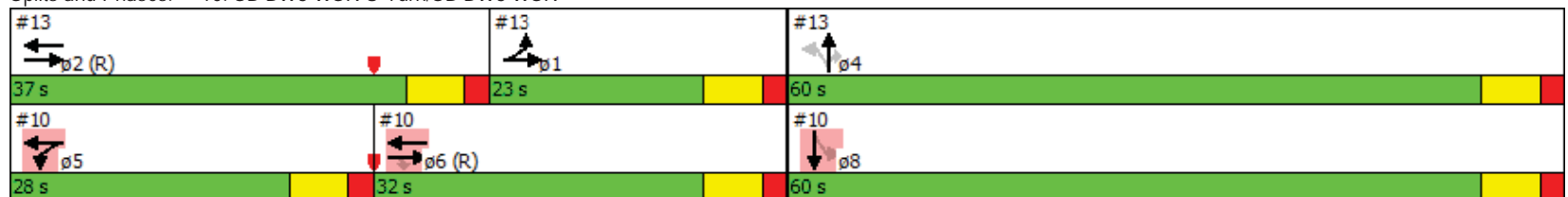
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Total Lost Time (s)		6.5	6.5	6.5							6.5				
Act Effct Green (s)		25.5	25.5	21.5	53.5						53.5				
Actuated g/C Ratio		0.21	0.21	0.18	0.45						0.45				
v/c Ratio		0.78	1.02	1.01	0.86						1.14				
Control Delay		50.5	86.4	62.0	13.9						102.9				
Queue Delay		1.4	0.0	32.7	48.2						0.0				
Total Delay		52.0	86.4	94.7	62.1						102.9				
LOS		D	F	F	E						F				
Approach Delay		63.4			68.3						102.9				
Approach LOS		E			E						F				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 83.3 Intersection LOS: F  
 Intersection Capacity Utilization 142.8% ICU Level of Service H  
 Analysis Period (min) 15

Splits and Phases: 10: SB BW8 WSR U-Turn/SB BW8 WSR



2016 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↗			↖↗			↖↗	↖						
Volume (vph)	247	617	0	0	1218	126	252	1719	187	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Fr <sub>t</sub>					0.983				0.850						
Flt Protected	0.950							0.993							
Satd. Flow (prot)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Flt Permitted	0.950							0.993							
Satd. Flow (perm)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					18				164						
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		225			208			132			141				
Travel Time (s)		4.4			4.1			2.6			2.7				
Peak Hour Factor	0.97	0.96	0.92	0.92	0.92	0.76	0.85	0.91	0.78	0.92	0.92	0.92			
Adj. Flow (vph)	255	643	0	0	1324	166	296	1889	240	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	255	643	0	0	1490	0	0	2185	240	0	0	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	12			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	23.0				37.0		60.0	60.0	60.0				28.0	32.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	16.5	53.5			30.5			53.5	53.5						
Actuated g/C Ratio	0.14	0.45			0.25			0.45	0.45						

2016 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR/NB BW8 ESR U-Turn

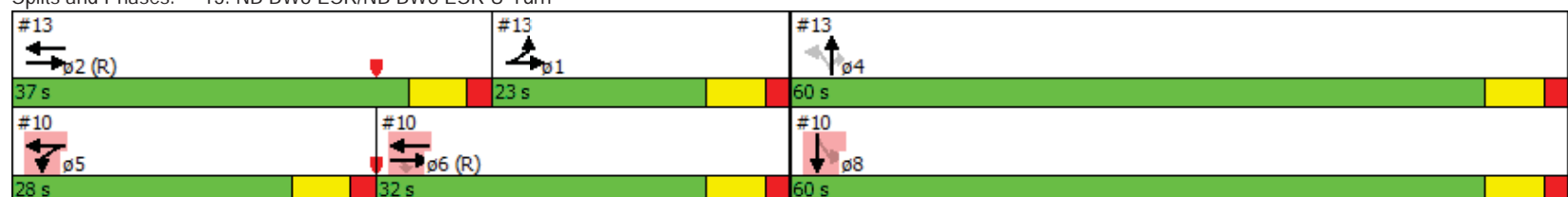
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
v/c Ratio	1.09	0.42			1.20			1.00	0.31						
Control Delay	90.6	8.6			136.9			53.7	8.1						
Queue Delay	6.2	1.2			0.5			36.6	0.0						
Total Delay	96.8	9.8			137.4			90.3	8.1						
LOS	F	A			F			F	A						
Approach Delay		34.5			137.4			82.1							
Approach LOS		C			F			F							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	90.3
Intersection Capacity Utilization	142.8%
Analysis Period (min)	15
Intersection LOS:	F
ICU Level of Service	H

Splits and Phases: 13: NB BW8 ESR/NB BW8 ESR U-Turn






















2016 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015













												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	76	618	18	0	1197	183	20	43	11	209	34	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	11	11	11	11	11	11
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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		0.993			0.980			0.976				0.850
Flt Protected	0.950							0.986			0.962	
Satd. Flow (prot)	1711	3397	0	1801	3353	0	0	1733	0	0	1732	1531
Flt Permitted	0.950							0.190			0.641	
Satd. Flow (perm)	1711	3397	0	1801	3353	0	0	334	0	0	1154	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			25			8				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.77	0.90	0.54	0.42	0.82	0.80	0.58	0.64	0.50	0.53	0.33	0.74
Adj. Flow (vph)	99	687	33	0	1460	229	34	67	22	394	103	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	99	720	0	0	1689	0	0	123	0	0	497	103
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	15.0	70.0		20.0	75.0		30.0	30.0		30.0	30.0	30.0

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
LAN Employee

Synchro 9 Report  
Page 1

Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1
Act Effect Green (s)	9.7	85.1			70.5			24.9			24.9	24.9
Actuated g/C Ratio	0.08	0.71			0.59			0.21			0.21	0.21
v/c Ratio	0.72	0.30			0.85			1.64			2.08	0.26
Control Delay	94.3	2.4			25.7			370.3			525.8	8.7
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	94.3	2.4			25.7			370.3			525.8	8.7
LOS	F	A			C			F			F	A
Approach Delay		13.5			25.7			370.3			437.1	
Approach LOS		B			C			F			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 2.08  
 Intersection Signal Delay: 112.1  
 Intersection LOS: F  
 Intersection Capacity Utilization 75.6%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 22: Broken Bough



2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
LAN Employee

Synchro 9 Report  
Page 2

Intersection						
Int Delay, s/veh	5.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	17	35	1284	14	21	805
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	70	71	79	74	65	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	49	1625	19	32	970
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	2185	822	0	0	1644	0
Stage 1	1635	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	39	317	-	-	390	-
Stage 1	144	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	32	317	-	-	390	-
Mov Cap-2 Maneuver	32	-	-	-	-	-
Stage 1	144	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Approach	WB	NB		SB		

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
LAN Employee

Synchro 9 Report  
Page 18

Intersection					
HCM Control Delay, s	169.6		0		1.7
HCM LOS	F				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	80	390	-
HCM Lane V/C Ratio	-	-	0.92	0.083	-
HCM Control Delay (s)	-	-	169.6	15.1	1.3
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	4.9	0.3	-

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	5.9					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	11	15	1283	11	23	807
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	40	69	77	83	56	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	22	1666	13	41	961
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2236	840	0	0	1679	0
Stage 1	1673	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	36	309	-	-	378	-
Stage 1	138	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	28	309	-	-	378	-
Mov Cap-2 Maneuver	28	-	-	-	-	-
Stage 1	138	-	-	-	-	-
Stage 2	410	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
LAN Employee

Synchro 9 Report  
Page 22

Intersection					
HCM Control Delay, s	282.6		0		2.3
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	47	378	-
HCM Lane V/C Ratio	-	-	1.048	0.109	-
HCM Control Delay (s)	-	-	282.6	15.7	1.7
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	4.4	0.4	-

Intersection						
Int Delay, s/veh	12.8					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	19	114	260	1413	721	53
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	56	78	89	96	91	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	146	292	1472	792	65
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	2145	429	858	0	-	0
Stage 1	825	-	-	-	-	-
Stage 2	1320	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	42	574	779	-	-	-
Stage 1	391	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	42	574	779	-	-	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	391	-	-	-	-	-
Stage 2	214	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

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Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	143.2		5.7		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	779	-	169	-	-
HCM Lane V/C Ratio	0.375	-	1.066	-	-
HCM Control Delay (s)	12.4	4.4	143.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	1.8	-	8.9	-	-

Intersection						
Int Delay, s/veh	0.9					
<hr/>						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Vol, veh/h	3	12	17	859	1507	13
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	50	92	67	87	93	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	13	25	987	1620	17
<hr/>						
Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	2173	819	1638	0	-	0
Stage 1	1629	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	40	319	392	-	-	-
Stage 1	146	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	34	319	392	-	-	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	146	-	-	-	-	-
Stage 2	469	-	-	-	-	-
<hr/>						
Approach	WB	SE			NW	

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Synchro 9 Report  
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Intersection						
HCM Control Delay, s	56.9		1.3		0	
HCM LOS	F					
<hr/>						
Minor Lane/Major Mvmt	NWT	NWR	WBLn1	SEL	SET	
Capacity (veh/h)	-	-	88	392	-	-
HCM Lane V/C Ratio	-	-	0.216	0.065	-	-
HCM Control Delay (s)	-	-	56.9	14.8	1	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.2	-	-



Intersection						
Int Delay, s/veh	1.9					
<b>Movement</b>						
	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	881	1593	12	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	42	90	94	46	38	38
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	979	1695	26	18	11
<b>Major/Minor</b>						
	Major1		Major2		Minor2	
Conflicting Flow All	1721	0	-	0	2226	860
Stage 1	-	-	-	-	1708	-
Stage 2	-	-	-	-	518	-
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	364	-	-	-	37	299
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	364	-	-	-	34	299
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	516	-
<b>Approach</b>						
	EB		WB		SB	

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Synchro 9 Report  
Page 6

Intersection					
HCM Control Delay, s	0.8		0		148.8
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	364	-	-	-	50
HCM Lane V/C Ratio	0.039	-	-	-	0.579
HCM Control Delay (s)	15.3	0.6	-	-	148.8
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.2

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Synchro 9 Report  
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Intersection							
Int Delay, s/veh	0.7						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	849	23	34	1517	8	23	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	85	75	78	76	88	58	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	999	31	44	1996	9	40	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1029	0	2099	515	
Stage 1	-	-	-	-	1014	-	
Stage 2	-	-	-	-	1085	-	
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	-	-	671	-	45	505	
Stage 1	-	-	-	-	311	-	
Stage 2	-	-	-	-	285	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	671	-	45	505	
Mov Cap-2 Maneuver	-	-	-	-	45	-	
Stage 1	-	-	-	-	311	-	
Stage 2	-	-	-	-	285	-	
Approach	EB		WB		NB		

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
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Synchro 9 Report  
Page 9

Intersection							
HCM Control Delay, s	0		0.2		33.6		
HCM LOS	D						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	174	-	-	671	-		
HCM Lane V/C Ratio	0.28	-	-	0.065	-		
HCM Control Delay (s)	33.6	-	-	10.7	0		
HCM Lane LOS	D	-	-	B	A		
HCM 95th %tile Q(veh)	1.1	-	-	0.2	-		

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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	2.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	860	15	11	1559	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	58	63	93	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1024	26	17	1676	14	18
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1050	0	1910	525
Stage 1	-	-	-	-	1037	-
Stage 2	-	-	-	-	873	-
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	-	-	659	-	60	497
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	369	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	659	-	37	497
Mov Cap-2 Maneuver	-	-	-	-	37	-
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	230	-
Approach	EB		WB		NB	

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		2.1		81.6
HCM LOS	F				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	77	-	-	659	-
HCM Lane V/C Ratio	0.416	-	-	0.026	-
HCM Control Delay (s)	81.6	-	-	10.6	2
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	1.7	-	-	0.1	-

2016 PM Peak 7:30 am 12/17/2014 Opening Year (No Build)  
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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	8.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	60	814	1491	25	6	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	86	91	67	42	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	947	1638	37	14	98
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1676	0	-	0	2284	838
Stage 1	-	-	-	-	1657	-
Stage 2	-	-	-	-	627	-
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	379	-	-	-	33	309
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	379	-	-	-	19	309
Mov Cap-2 Maneuver	-	-	-	-	19	-
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	283	-
Approach	EB		WB		SB	

2016 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	4.1		0		182.9
HCM LOS	F				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	379	-	-	-	105
HCM Lane V/C Ratio	0.203	-	-	-	1.065
HCM Control Delay (s)	16.9	3.1	-	-	182.9
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	6.9

**Traffic Operational Analysis Results**

**2016 P.M. Peak – Opening Year (Build)  
5:00 P.M. – 6:00 P.M.**



Lanes, Volumes, Timings  
10: SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	762	343	281	1205	0	0	0	0	106	1779	269			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.978				
Flt Protected				0.950							0.998				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4798	0			
Flt Permitted				0.950							0.998				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4798	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								20				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.94	0.85	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.73			
Adj. Flow (vph)	0	811	404	309	1310	0	0	0	0	115	1977	368			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	811	404	309	1310	0	0	0	0	0	2460	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6								8				
Total Split (s)		33.0	33.0	27.0						60.0	60.0		23.0	37.0	60.0
Total Lost Time (s)		6.5	6.5	6.5							6.5				

2016 PM Peak 5:00 pm 12/17/2014 Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR

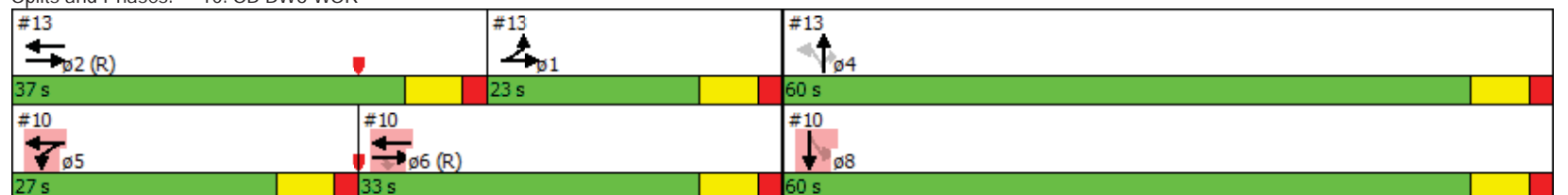
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effect Green (s)		26.5	26.5	20.5	53.5						53.5				
Actuated g/C Ratio		0.22	0.22	0.17	0.45						0.45				
v/c Ratio		0.75	0.99	1.06	0.86						1.14				
Control Delay		48.6	78.2	78.8	13.9						102.7				
Queue Delay		1.1	0.0	18.3	48.2						0.0				
Total Delay		49.7	78.2	97.1	62.1						102.7				
LOS		D	E	F	E						F				
Approach Delay		59.2			68.8						102.7				
Approach LOS		E			E						F				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 82.3  
 Intersection Capacity Utilization 142.8%  
 Analysis Period (min) 15  
 Intersection LOS: F  
 ICU Level of Service H

Splits and Phases: 10: SB BW8 WSR



2016 PM Peak 5:00 pm 12/17/2014 Build  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Configurations	↖	↖↖			↖↖↖			↖↖↖	↖						
Volume (vph)	247	617	0	0	1218	126	252	1719	187	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.983				0.850						
Flt Protected	0.950							0.993							
Satd. Flow (prot)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Flt Permitted	0.950							0.993							
Satd. Flow (perm)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					18				164						
Link Speed (mph)		35			35			35		35					
Link Distance (ft)		225			208			132		141					
Travel Time (s)		4.4			4.1			2.6		2.7					
Peak Hour Factor	0.97	0.96	0.92	0.92	0.92	0.76	0.85	0.91	0.78	0.92	0.92	0.92			
Adj. Flow (vph)	255	643	0	0	1324	166	296	1889	240	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	255	643	0	0	1490	0	0	2185	240	0	0	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)		11			11			0		0					
Link Offset(ft)		0			0			0		0					
Crosswalk Width(ft)		16			16			16		16					
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4					5	6	8
Permitted Phases							4		4						
Total Split (s)	23.0				37.0		60.0	60.0	60.0				27.0	33.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	16.5	53.5			30.5			53.5	53.5						
Actuated g/C Ratio	0.14	0.45			0.25			0.45	0.45						
v/c Ratio	1.09	0.42			1.20			1.00	0.31						

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Lanes, Volumes, Timings  
13: NB BW8 ESR

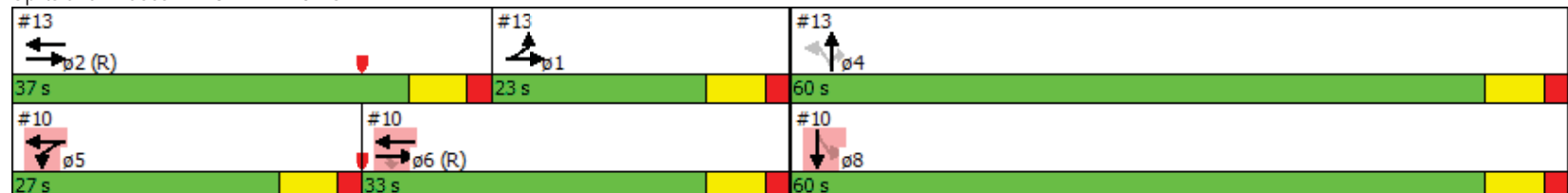
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	92.0	7.9			139.0			53.7	8.1						
Queue Delay	6.2	1.0			0.5			36.7	0.0						
Total Delay	98.1	8.9			139.5			90.4	8.1						
LOS	F	A			F			F	A						
Approach Delay		34.3			139.5			82.2							
Approach LOS		C			F			F							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	91.0
Intersection LOS:	F
Intersection Capacity Utilization:	142.8%
ICU Level of Service:	H
Analysis Period (min):	15

Splits and Phases: 13: NB BW8 ESR



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Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	76	618	18	0	1197	183	20	43	11	209	34	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		0	100		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	0		1
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		0.994			0.978			0.980				0.850
Flt Protected	0.950							0.983			0.959	
Satd. Flow (prot)	1711	3401	0	1801	3346	0	0	1735	0	0	1727	1531
Flt Permitted	0.950							0.488			0.651	
Satd. Flow (perm)	1711	3401	0	1801	3346	0	0	861	0	0	1172	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			27			7				110
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.65	0.90	0.61	0.92	0.90	0.82	0.53	0.75	0.63	0.80	0.75	0.69
Adj. Flow (vph)	117	687	30	0	1330	223	38	57	17	261	45	110
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	717	0	0	1553	0	0	112	0	0	306	110
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	15.0	70.0		20.0	75.0		30.0	30.0		30.0	30.0	30.0
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1

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Lanes, Volumes, Timings  
22: Broken Bough

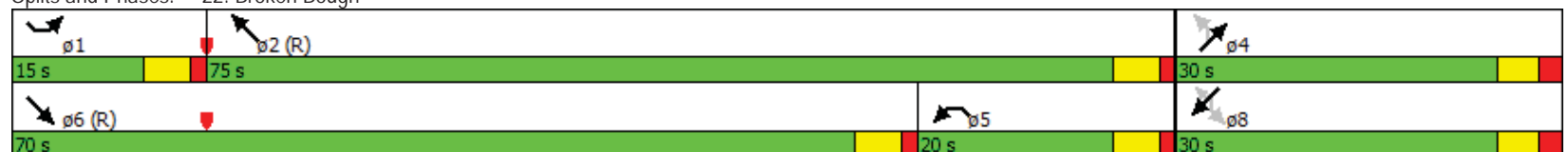
8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	10.0	85.1			70.2			24.9			24.9	24.9
Actuated g/C Ratio	0.08	0.71			0.58			0.21			0.21	0.21
v/c Ratio	0.82	0.30			0.79			0.61			1.26	0.27
Control Delay	105.4	1.7			22.6			55.9			185.4	9.1
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	105.4	1.7			22.6			55.9			185.4	9.1
LOS	F	A			C			E			F	A
Approach Delay		16.3			22.6			55.9			138.8	
Approach LOS		B			C			E			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:NWT and 6:SET, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.26  
 Intersection Signal Delay: 38.6  
 Intersection Capacity Utilization 75.6%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service D

Splits and Phases: 22: Broken Bough



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Intersection						
Int Delay, s/veh	4.3					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	17	35	1284	14	21	805
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	44	71	96	81	50	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	49	1338	17	42	925
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1893	677	0	0	1355	0
Stage 1	1346	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	62	395	-	-	504	-
Stage 1	207	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	57	395	-	-	504	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	207	-	-	-	-	-
Stage 2	499	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	110.1		0		0.6
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	110	504	-
HCM Lane V/C Ratio	-	-	0.799	0.083	-
HCM Control Delay (s)	-	-	110.1	12.8	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	4.5	0.3	-

Intersection						
Int Delay, s/veh	0.3					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	26	1283	11	0	830
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	83	58	95	50	69	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	45	1351	22	0	943
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1834	686	0	0	1373	0
Stage 1	1362	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	67	390	-	-	496	-
Stage 1	203	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	67	390	-	-	496	-
Mov Cap-2 Maneuver	67	-	-	-	-	-
Stage 1	203	-	-	-	-	-
Stage 2	594	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	15.4		0		0
HCM LOS	C				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	390	496	-
HCM Lane V/C Ratio	-	-	0.115	-	-
HCM Control Delay (s)	-	-	15.4	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-



Intersection						
Int Delay, s/veh	24.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	19	114	260	1413	721	53
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	56	78	89	96	91	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	146	292	1472	792	65
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2145	429	858	0	0	
Stage 1	825	-	-	-	-	
Stage 2	1320	-	-	-	-	
Critical Hdwy	6.84	6.94	4.14	-	-	
Critical Hdwy Stg 1	5.84	-	-	-	-	
Critical Hdwy Stg 2	5.84	-	-	-	-	
Follow-up Hdwy	3.52	3.32	2.22	-	-	
Pot Cap-1 Maneuver	42	574	779	-	-	
Stage 1	391	-	-	-	-	
Stage 2	214	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	~ 26	574	779	-	-	
Mov Cap-2 Maneuver	~ 26	-	-	-	-	
Stage 1	391	-	-	-	-	
Stage 2	134	-	-	-	-	
Approach	EB	NB		SB		

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Intersection					
HCM Control Delay, s	\$ 359.3	2			0
HCM LOS	F				
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	779	-	115	-	-
HCM Lane V/C Ratio	0.375	-	1.566	-	-
HCM Control Delay (s)	12.4	-	\$ 359.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.8	-	13.2	-	-
Notes					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.5					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	17	859	1507	13	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	67	87	93	75	50	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	987	1620	17	6	13
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1638	0	-	0	2173	819
Stage 1	-	-	-	-	1629	-
Stage 2	-	-	-	-	544	-
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	392	-	-	-	40	319
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	392	-	-	-	37	319
Mov Cap-2 Maneuver	-	-	-	-	37	-
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	511	-
Approach	SE	NW	SW			

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Intersection					
HCM Control Delay, s	0.4		0		52.8
HCM LOS	F				
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	392	-	94
HCM Lane V/C Ratio	-	-	0.065	-	0.203
HCM Control Delay (s)	-	-	14.8	-	52.8
HCM Lane LOS	-	-	B	-	F
HCM 95th %tile Q(veh)	-	-	0.2	-	0.7

Intersection						
Int Delay, s/veh	1.5					
<b>Movement</b>						
	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	881	1593	12	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	42	90	94	46	38	38
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	979	1695	26	18	11
<b>Major/Minor</b>						
	Major1		Major2		Minor2	
Conflicting Flow All	1721	0	-	0	2226	860
Stage 1	-	-	-	-	1708	-
Stage 2	-	-	-	-	518	-
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	364	-	-	-	37	299
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	364	-	-	-	36	299
Mov Cap-2 Maneuver	-	-	-	-	36	-
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	541	-
<b>Approach</b>						
	EB		WB		SB	

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Intersection					
HCM Control Delay, s	0.2		0		135.5
HCM LOS					F
<b>Minor Lane/Major Mvmt</b>					
	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	364	-	-	-	53
HCM Lane V/C Ratio	0.039	-	-	-	0.546
HCM Control Delay (s)	15.3	-	-	-	135.5
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

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Intersection							
Int Delay, s/veh	1.1						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	849	23	34	1517	8	23	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	88	38	69	94	50	50	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	965	61	49	1614	16	46	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1025	0	1900	513	
Stage 1	-	-	-	-	995	-	
Stage 2	-	-	-	-	905	-	
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	-	-	673	-	61	506	
Stage 1	-	-	-	-	318	-	
Stage 2	-	-	-	-	355	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	673	-	57	506	
Mov Cap-2 Maneuver	-	-	-	-	57	-	
Stage 1	-	-	-	-	318	-	
Stage 2	-	-	-	-	329	-	
Approach	EB		WB		NB		

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Intersection							
HCM Control Delay, s	0		0.3		38.8		
HCM LOS	E						
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT		
Capacity (veh/h)	167	-	-	673	-		
HCM Lane V/C Ratio	0.371	-	-	0.073	-		
HCM Control Delay (s)	38.8	-	-	10.8	-		
HCM Lane LOS	E	-	-	B	-		
HCM 95th %tile Q(veh)	1.6	-	-	0.2	-		

2016 PM Peak 5:00 pm 12/17/2014 Opening Year  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	860	15	11	1559	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	58	63	93	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1024	26	17	1676	14	18
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1050	0	1910	525
Stage 1	-	-	-	-	1037	-
Stage 2	-	-	-	-	873	-
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	-	-	659	-	60	497
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	369	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	659	-	58	497
Mov Cap-2 Maneuver	-	-	-	-	58	-
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	359	-
Approach	EB		WB		NB	

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Intersection					
HCM Control Delay, s	0		0.1		48
HCM LOS	E				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	115	-	-	659	-
HCM Lane V/C Ratio	0.278	-	-	0.026	-
HCM Control Delay (s)	48	-	-	10.6	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	60	814	1491	25	6	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	86	91	67	42	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	947	1638	37	14	98
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1676	0	-	0	2284	838
Stage 1	-	-	-	-	1657	-
Stage 2	-	-	-	-	627	-
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	379	-	-	-	33	309
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	379	-	-	-	26	309
Mov Cap-2 Maneuver	-	-	-	-	26	-
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	394	-
Approach	EB		WB		SB	

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	1.3		0		111.5
HCM LOS					F
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	379	-	-	-	129
HCM Lane V/C Ratio	0.203	-	-	-	0.867
HCM Control Delay (s)	16.9	-	-	-	111.5
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	5.5

**Traffic Operational Analysis Results**

**2030 P.M. Peak – Future Year (No Build)  
5:00 P.M. – 6:00 P.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	857	386	316	1355	0	0	0	0	120	2001	303			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.982				
Flt Protected				0.950							0.998				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4818	0			
Flt Permitted				0.950							0.998				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4818	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								12				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.88	0.90	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.95			
Adj. Flow (vph)	0	974	429	372	1473	0	0	0	0	130	2199	319			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	974	429	372	1473	0	0	0	0	0	2648	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA						Perm	NA			
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6								8				
Total Split (s)		33.0	33.0	27.0						60.0	60.0		23.0	37.0	60.0
Total Lost Time (s)		6.5	6.5	6.5							6.5				

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR

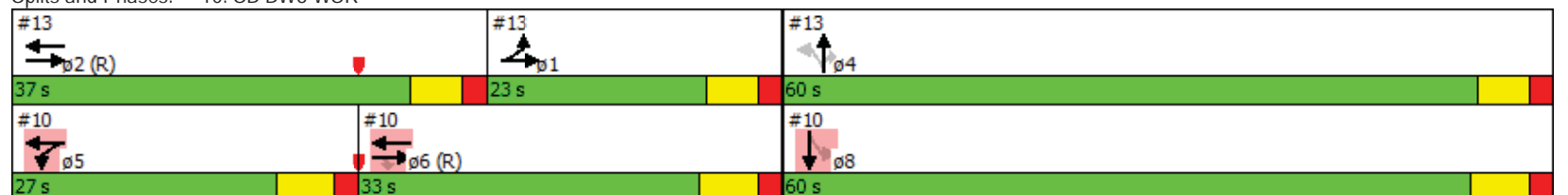
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effect Green (s)		26.5	26.5	20.5	53.5						53.5				
Actuated g/C Ratio		0.22	0.22	0.17	0.45						0.45				
v/c Ratio		0.90	1.05	1.27	0.97						1.23				
Control Delay		57.3	94.0	164.7	18.9						138.5				
Queue Delay		12.5	0.0	3.4	43.3						0.0				
Total Delay		69.9	94.0	168.1	62.2						138.5				
LOS		E	F	F	E						F				
Approach Delay		77.2			83.6						138.5				
Approach LOS		E			F						F				

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6., Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.33
Intersection Signal Delay:	106.7
Intersection Capacity Utilization:	158.0%
Analysis Period (min):	15
Intersection LOS:	F
ICU Level of Service:	H

Splits and Phases: 10: SB BW8 WSR



2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	↖	↗	↘	↙	↔	↔	↔	↕	↕	↕	↕	↕			
Lane Configurations	↖	↗			↔			↕	↕	↕					
Volume (vph)	278	694	0	0	1370	142	284	1933	211	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.983				0.850						
Flt Protected	0.950							0.993							
Satd. Flow (prot)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Flt Permitted	0.950							0.993							
Satd. Flow (perm)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					18				145						
Link Speed (mph)		35			35			35		35					
Link Distance (ft)		225			208			132		141					
Travel Time (s)		4.4			4.1			2.6		2.7					
Peak Hour Factor	0.97	0.96	0.92	0.92	0.92	0.76	0.85	0.91	0.78	0.92	0.92	0.92			
Adj. Flow (vph)	287	723	0	0	1489	187	334	2124	271	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	287	723	0	0	1676	0	0	2458	271	0	0	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)		11			11			0		0					
Link Offset(ft)		0			0			0		0					
Crosswalk Width(ft)		16			16			16		16					
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4		4			5	6	8
Permitted Phases							4		4						
Total Split (s)	23.0				37.0		60.0	60.0	60.0				27.0	33.0	60.0
Total Lost Time (s)	6.0				6.0			6.0	6.0						
Act Effct Green (s)	17.0	54.0			31.0			54.0	54.0						
Actuated g/C Ratio	0.14	0.45			0.26			0.45	0.45						
v/c Ratio	1.19	0.47			1.33			1.12	0.35						

2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

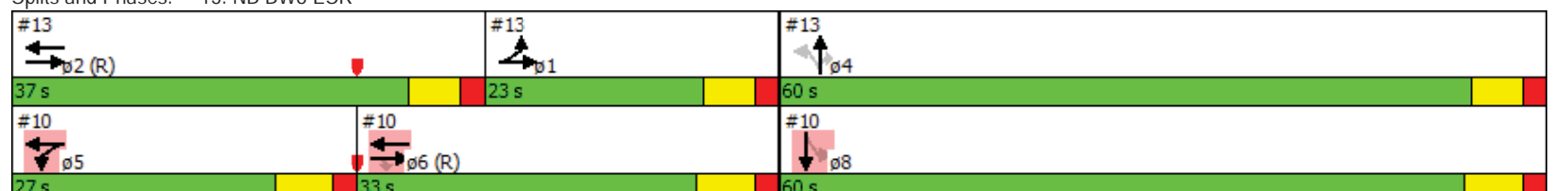
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	121.1	10.2			182.5			92.6	11.0						
Queue Delay	1.2	1.9			0.6			1.1	0.0						
Total Delay	122.3	12.1			183.1			93.7	11.0						
LOS	F	B			F			F	B						
Approach Delay		43.4			183.1			85.5							
Approach LOS		D			F			F							

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.33
Intersection Signal Delay:	107.8
Intersection LOS:	F
Intersection Capacity Utilization:	158.0%
ICU Level of Service:	H
Analysis Period (min):	15

Splits and Phases: 13: NB BW8 ESR



2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	86	695	21	0	1346	206	23	49	13	236	39	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	120		0	0		0	0		50
Storage Lanes	1		0	1		0	0		0	0		1
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
Flt		0.994			0.978			0.978				0.850
Flt Protected	0.950							0.984			0.959	
Satd. Flow (prot)	1711	3401	0	1801	3346	0	0	1733	0	0	1727	1531
Flt Permitted	0.950							0.600			0.649	
Satd. Flow (perm)	1711	3401	0	1801	3346	0	0	1057	0	0	1169	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			23			8				106
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.65	0.90	0.61	0.92	0.90	0.82	0.53	0.75	0.63	0.80	0.75	0.69
Adj. Flow (vph)	132	772	34	0	1496	251	43	65	21	295	52	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	806	0	0	1747	0	0	129	0	0	347	125
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	14.0	73.5		7.5	67.0		39.0	39.0		39.0	39.0	39.0
Total Lost Time (s)	4.9	4.9		4.9	4.9			5.1			5.1	5.1

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	9.1	76.1			62.1			33.9			33.9	33.9
Actuated g/C Ratio	0.08	0.63			0.52			0.28			0.28	0.28
v/c Ratio	1.02	0.37			1.00			0.42			1.05	0.25
Control Delay	145.8	3.2			51.2			38.0			105.9	9.9
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	145.8	3.2			51.2			38.0			105.9	9.9
LOS	F	A			D			D			F	A
Approach Delay		23.2			51.2			38.0			80.5	
Approach LOS		C			D			D			F	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 46.9  
 Intersection Capacity Utilization 82.7%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service E

Splits and Phases: 22: Broken Bough



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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	17.7					
<b>Movement</b>						
	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	20	40	1444	16	24	906
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	44	71	96	81	50	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	56	1504	20	48	1041
<b>Major/Minor</b>						
	Minor1		Major1		Major2	
Conflicting Flow All	2131	762	0	0	1524	0
Stage 1	1514	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 42	347	-	-	434	-
Stage 1	168	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	~ 31	347	-	-	434	-
Mov Cap-2 Maneuver	~ 31	-	-	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	370	-	-	-	-	-
<b>Approach</b>						
	WB		NB		SB	

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LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	\$ 447.1		0		2.3
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	63	434	-
HCM Lane V/C Ratio	-	-	1.616	0.111	-
HCM Control Delay (s)	-	-	\$ 447.1	14.3	1.7
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	9.1	0.4	-
<b>Notes</b>					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	2.3					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	13	17	1443	13	26	908
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	83	58	95	50	69	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	29	1519	26	38	1032
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2123	772	0	0	1545	0
Stage 1	1532	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	43	342	-	-	426	-
Stage 1	164	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	34	342	-	-	426	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	164	-	-	-	-	-
Stage 2	408	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	92.8		0		1.9
HCM LOS	F				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	82	426	-
HCM Lane V/C Ratio	-	-	0.548	0.088	-
HCM Control Delay (s)	-	-	92.8	14.3	1.4
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	2.4	0.3	-

Intersection						
Int Delay, s/veh	32.8					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	22	129	293	1589	811	60
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	56	78	89	96	91	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	165	329	1655	891	74
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	2414	483	965	0	-	0
Stage 1	928	-	-	-	-	-
Stage 2	1486	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 27	530	709	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 27	530	709	-	-	-
Mov Cap-2 Maneuver	~ 27	-	-	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	174	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
Page 1

Intersection					
HCM Control Delay, s	\$ 440.9		6.7		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	709	-	116	-	-
HCM Lane V/C Ratio	0.464	-	1.764	-	-
HCM Control Delay (s)	14.4	5.2	\$ 440.9	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	2.5	-	15.9	-	-
<b>Notes</b>					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.9					
<b>Movement</b>						
	WBL	WBR	SEL	SET	NWT	NWR
Vol, veh/h	4	14	20	966	1695	15
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	50	92	67	87	93	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	15	30	1110	1823	20
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	2448	921	1843	0	-	0
Stage 1	1833	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	26	273	326	-	-	-
Stage 1	112	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	20	273	326	-	-	-
Mov Cap-2 Maneuver	20	-	-	-	-	-
Stage 1	112	-	-	-	-	-
Stage 2	382	-	-	-	-	-
<b>Approach</b>						
	WB		SE		NW	

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Intersection					
HCM Control Delay, s	124.7		2.4		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NWT	NWR	WBLn1	SEL	SET
Capacity (veh/h)	-	-	51	326	-
HCM Lane V/C Ratio	-	-	0.455	0.092	-
HCM Control Delay (s)	-	-	124.7	17.2	2
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	1.7	0.3	-

2030 PM Peak 5:00 pm 12/17/2014 No Build  
LAN Employee

Synchro 9 Report  
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Intersection						
Int Delay, s/veh	4.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	7	991	1792	24	8	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	42	90	94	46	38	38
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1101	1906	52	21	13
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1959	0	-	0	2516	979
Stage 1	-	-	-	-	1932	-
Stage 2	-	-	-	-	584	-
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	294	-	-	-	23	249
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	294	-	-	-	~ 20	249
Mov Cap-2 Maneuver	-	-	-	-	~ 20	-
Stage 1	-	-	-	-	99	-
Stage 2	-	-	-	-	443	-
Approach	EB	WB	SB			

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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	1.5		0		\$ 385.7
HCM LOS					F
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	294	-	-	-	31
HCM Lane V/C Ratio	0.057	-	-	-	1.104
HCM Control Delay (s)	18	1.3	-	-	\$ 385.7
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	3.8
Notes					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Intersection							
Int Delay, s/veh	1.8						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	955	27	51	1706	9	26	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	88	38	69	94	50	50	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1085	71	74	1815	18	52	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1156	0	2176	578	
Stage 1	-	-	-	-	1121	-	
Stage 2	-	-	-	-	1055	-	
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	-	-	600	-	40	459	
Stage 1	-	-	-	-	273	-	
Stage 2	-	-	-	-	296	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	600	-	40	459	
Mov Cap-2 Maneuver	-	-	-	-	40	-	
Stage 1	-	-	-	-	273	-	
Stage 2	-	-	-	-	296	-	
Approach	EB		WB		NB		

2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		0.5		66.3
HCM LOS	F				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	124	-	-	600	-
HCM Lane V/C Ratio	0.565	-	-	0.123	-
HCM Control Delay (s)	66.3	-	-	11.8	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	2.8	-	-	0.4	-

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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	967	17	13	1753	8	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	58	63	93	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1151	29	21	1885	16	22
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1181	0	2150	590
Stage 1	-	-	-	-	1166	-
Stage 2	-	-	-	-	984	-
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	-	-	587	-	41	451
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	323	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	587	-	41	451
Mov Cap-2 Maneuver	-	-	-	-	41	-
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	323	-
Approach	EB		WB		NB	

2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	0		0.1		75.2
HCM LOS	F				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	87	-	-	587	-
HCM Lane V/C Ratio	0.437	-	-	0.035	-
HCM Control Delay (s)	75.2	-	-	11.4	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	1.8	-	-	0.1	-

2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	68	916	1677	29	7	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	86	91	67	42	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	1065	1843	43	17	110
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1886	0	-	0	2571	943
Stage 1	-	-	-	-	1864	-
Stage 2	-	-	-	-	707	-
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	314	-	-	-	21	264
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	314	-	-	-	~ 7	264
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	144	-
Approach	EB		WB		SB	

2030 PM Peak 5:00 pm 12/17/2014 No Build  
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Synchro 9 Report  
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Intersection					
HCM Control Delay, s	7.2		0		61.3
HCM LOS					F
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	314	-	-	-	181
HCM Lane V/C Ratio	0.278	-	-	-	0.699
HCM Control Delay (s)	20.8	6.1	-	-	61.3
HCM Lane LOS	C	A	-	-	F
HCM 95th %tile Q(veh)	1.1	-	-	-	4.3

Notes

-: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

**Traffic Operational Analysis Results**

**2030 P.M. Peak – Future Year (Build)  
5:00 P.M. – 6:00 P.M.**

Lanes, Volumes, Timings  
10: SB BW8 WSR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Lane Configurations		↑↑↑	↑	↑	↑↑						↑↑↑				
Volume (vph)	0	857	386	316	1355	0	0	0	0	133	2001	303			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Storage Length (ft)	0		120	0		0	0		0	0		0			
Storage Lanes	0		1	1		0	0		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.91			
Frt			0.850								0.982				
Flt Protected				0.950							0.997				
Satd. Flow (prot)	0	4916	1531	1711	3421	0	0	0	0	0	4813	0			
Flt Permitted				0.950							0.997				
Satd. Flow (perm)	0	4916	1531	1711	3421	0	0	0	0	0	4813	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)			91								12				
Link Speed (mph)		35			35			35			35				
Link Distance (ft)		290			225			131			129				
Travel Time (s)		5.6			4.4			2.6			2.5				
Peak Hour Factor	0.92	0.88	0.90	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.95			
Adj. Flow (vph)	0	974	429	372	1473	0	0	0	0	145	2199	319			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	974	429	372	1473	0	0	0	0	0	2663	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)		11			11			0			0				
Link Offset(ft)		0			0			0			0				
Crosswalk Width(ft)		16			16			16			16				
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type		NA	Perm	Prot	NA					Perm	NA				
Protected Phases		6		5	5 6						8		1	2	4
Permitted Phases			6								8				
Total Split (s)		33.0	33.0	27.0						60.0	60.0		23.0	37.0	60.0
Total Lost Time (s)		6.5	6.5	6.5							6.5				

2030 PM Peak 5:00 pm 12/17/2014 Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
10: SB BW8 WSR

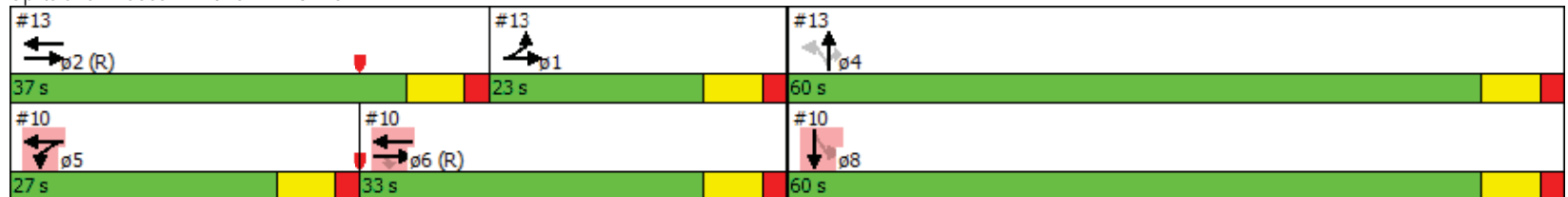
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø1	ø2	ø4
Act Effect Green (s)		26.5	26.5	20.5	53.5						53.5				
Actuated g/C Ratio		0.22	0.22	0.17	0.45						0.45				
v/c Ratio		0.90	1.05	1.27	0.97						1.24				
Control Delay		57.3	94.0	164.4	19.1						141.9				
Queue Delay		15.0	0.0	3.4	43.4						0.0				
Total Delay		72.3	94.0	167.8	62.5						141.9				
LOS		E	F	F	E						F				
Approach Delay		79.0			83.7						141.9				
Approach LOS		E			F						F				

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBWB and 6., Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.35
Intersection Signal Delay:	108.8
Intersection Capacity Utilization:	159.1%
Analysis Period (min):	15
Intersection LOS:	F
ICU Level of Service:	H

Splits and Phases: 10: SB BW8 WSR



2030 PM Peak 5:00 pm 12/17/2014 Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Lane Group	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↙			
Lane Configurations	↖	↖↖			↖↖↖			↖↖↖	↖						
Volume (vph)	278	694	0	0	1370	142	284	1933	211	0	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00			
Frt					0.983				0.850						
Flt Protected	0.950							0.993							
Satd. Flow (prot)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Flt Permitted	0.950							0.993							
Satd. Flow (perm)	1711	3421	0	0	4832	0	0	4881	1531	0	0	0			
Right Turn on Red			Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)					17				150						
Link Speed (mph)		35			35			35		35					
Link Distance (ft)		225			208			132		141					
Travel Time (s)		4.4			4.1			2.6		2.7					
Peak Hour Factor	0.97	0.96	0.92	0.92	0.92	0.76	0.85	0.91	0.78	0.92	0.92	0.92			
Adj. Flow (vph)	287	723	0	0	1489	187	334	2124	271	0	0	0			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	287	723	0	0	1676	0	0	2458	271	0	0	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)		11			11			0		0					
Link Offset(ft)		0			0			0		0					
Crosswalk Width(ft)		16			16			16		16					
Two way Left Turn Lane															
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04			
Turning Speed (mph)	15		9	15		9	15		9	15		9			
Turn Type	Prot	NA			NA		Perm	NA	Perm						
Protected Phases	1	1 2			2			4		4			5	6	8
Permitted Phases							4		4						
Total Split (s)	23.0				37.0		60.0	60.0	60.0				27.0	33.0	60.0
Total Lost Time (s)	6.5				6.5			6.5	6.5						
Act Effct Green (s)	16.5	53.5			30.5			53.5	53.5						
Actuated g/C Ratio	0.14	0.45			0.25			0.45	0.45						
v/c Ratio	1.22	0.47			1.35			1.13	0.35						

2030 PM Peak 5:00 pm 12/17/2014 Build  
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Synchro 9 Report  
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Lanes, Volumes, Timings  
13: NB BW8 ESR

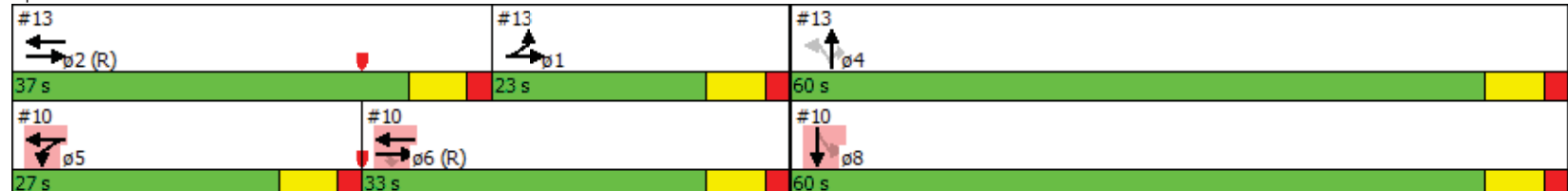
8/18/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5	ø6	ø8
Control Delay	136.7	11.2			192.3			96.9	10.7						
Queue Delay	1.2	2.2			0.6			1.1	0.0						
Total Delay	137.9	13.5			192.8			98.0	10.7						
LOS	F	B			F			F	B						
Approach Delay		48.8			192.8			89.3							
Approach LOS		D			F			F							

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green, Master Intersection  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.35  
 Intersection Signal Delay: 113.8  
 Intersection LOS: F  
 Intersection Capacity Utilization 159.1%  
 ICU Level of Service H  
 Analysis Period (min) 15

Splits and Phases: 13: NB BW8 ESR



2030 PM Peak 5:00 pm 12/17/2014 Build  
LAN Employee

Synchro 9 Report  
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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	86	695	21	0	1346	206	23	49	13	236	39	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		0	100		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	0		1
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
Flt		0.994			0.978			0.978				0.850
Flt Protected	0.950							0.984			0.959	
Satd. Flow (prot)	1711	3401	0	1801	3346	0	0	1733	0	0	1727	1531
Flt Permitted	0.950							0.600			0.649	
Satd. Flow (perm)	1711	3401	0	1801	3346	0	0	1057	0	0	1169	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			23			8				125
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		264			140			379			137	
Travel Time (s)		5.1			2.7			7.4			2.7	
Peak Hour Factor	0.65	0.90	0.61	0.92	0.90	0.82	0.53	0.75	0.63	0.80	0.75	0.69
Adj. Flow (vph)	132	772	34	0	1496	251	43	65	21	295	52	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	806	0	0	1747	0	0	129	0	0	347	125
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		8
Total Split (s)	14.0	75.1		5.9	67.0		39.0	39.0		39.0	39.0	39.0
Total Lost Time (s)	4.9	4.9		4.9	4.9		5.1	5.1		5.1	5.1	5.1

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Lanes, Volumes, Timings  
22: Broken Bough

8/18/2015

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Act Effct Green (s)	9.1	76.1			62.1			33.9			33.9	33.9
Actuated g/C Ratio	0.08	0.63			0.52			0.28			0.28	0.28
v/c Ratio	1.02	0.37			1.00			0.42			1.05	0.24
Control Delay	145.3	3.2			51.2			38.0			105.9	6.8
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	145.3	3.2			51.2			38.0			105.9	6.8
LOS	F	A			D			D			F	A
Approach Delay		23.2			51.2			38.0			79.7	
Approach LOS		C			D			D			E	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:NWT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 46.8  
 Intersection Capacity Utilization 82.7%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service E

Splits and Phases: 22: Broken Bough



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Intersection						
Int Delay, s/veh	13					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	20	40	1444	16	24	906
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	44	71	96	81	50	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	56	1504	20	48	1041
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2131	762	0	0	1524	0
Stage 1	1514	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 42	347	-	-	434	-
Stage 1	168	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	~ 37	347	-	-	434	-
Mov Cap-2 Maneuver	~ 37	-	-	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Approach	WB		NB		SB	

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Intersection					
HCM Control Delay, s	\$ 340.1		0		0.6
HCM LOS	F				
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	73	434	-
HCM Lane V/C Ratio	-	-	1.394	0.111	-
HCM Control Delay (s)	-	-	\$ 340.1	14.3	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	8.2	0.4	-
Notes					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.3					
<hr/>						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	30	1443	13	0	930
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	83	58	95	50	69	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	52	1519	26	0	1057
<hr/>						
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2060	772	0	0	1545	0
Stage 1	1532	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	47	342	-	-	426	-
Stage 1	164	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	47	342	-	-	426	-
Mov Cap-2 Maneuver	47	-	-	-	-	-
Stage 1	164	-	-	-	-	-
Stage 2	556	-	-	-	-	-
<hr/>						
Approach	WB		NB		SB	

Intersection					
HCM Control Delay, s	17.4		0		0
HCM LOS	C				
<hr/>					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	342	426	-
HCM Lane V/C Ratio	-	-	0.151	-	-
HCM Control Delay (s)	-	-	17.4	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Intersection						
Int Delay, s/veh	71.6					
<b>Movement</b>						
	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	22	129	293	1589	811	60
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	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	56	78	89	96	91	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	165	329	1655	891	74
<b>Major/Minor</b>						
	Minor2		Major1		Major2	
Conflicting Flow All	2414	483	965	0	-	0
Stage 1	928	-	-	-	-	-
Stage 2	1486	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 27	530	709	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 14	530	709	-	-	-
Mov Cap-2 Maneuver	~ 14	-	-	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	93	-	-	-	-	-
<b>Approach</b>						
	EB		NB		SB	

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Intersection					
HCM Control Delay, s	\$ 1079.6		2.4		0
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	709	-	66	-	-
HCM Lane V/C Ratio	0.464	-	3.101	-	-
HCM Control Delay (s)	14.4	-	\$ 1079.6	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	2.5	-	21	-	-
<b>Notes</b>					

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Intersection						
Int Delay, s/veh	0.9					
<b>Movement</b>						
	SEL	SET	NWT	NWR	SWL	SWR
Vol, veh/h	20	966	1695	15	4	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	67	87	93	75	50	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	1110	1823	20	8	15
<b>Major/Minor</b>						
	Major1		Major2		Minor2	
Conflicting Flow All	1843	0	-	0	2448	921
Stage 1	-	-	-	-	1833	-
Stage 2	-	-	-	-	615	-
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	326	-	-	-	26	273
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	502	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	326	-	-	-	24	273
Mov Cap-2 Maneuver	-	-	-	-	24	-
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	456	-
<b>Approach</b>						
	SE		NW		SW	

Intersection					
HCM Control Delay, s	0.4		0		98.7
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	326	-	60
HCM Lane V/C Ratio	-	-	0.092	-	0.387
HCM Control Delay (s)	-	-	17.2	-	98.7
HCM Lane LOS	-	-	C	-	F
HCM 95th %tile Q(veh)	-	-	0.3	-	1.4

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	7	991	1792	24	8	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	42	90	94	46	38	38
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1101	1906	52	21	13
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1959	0	2516	979		
Stage 1	-	-	1932	-		
Stage 2	-	-	584	-		
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	294	-	23	249		
Stage 1	-	-	99	-		
Stage 2	-	-	521	-		
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	294	-	22	249		
Mov Cap-2 Maneuver	-	-	22	-		
Stage 1	-	-	99	-		
Stage 2	-	-	491	-		
Approach	EB	WB	SB			

Intersection					
HCM Control Delay, s	0.3	0	\$ 331.2		
HCM LOS	F				
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	294	-	-	-	34
HCM Lane V/C Ratio	0.057	-	-	-	1.006
HCM Control Delay (s)	18	-	-	-	\$ 331.2
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	3.6

Notes

-: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection							
Int Delay, s/veh	2.1						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	955	27	51	1706	9	26	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	88	38	69	94	50	50	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	1085	71	74	1815	18	52	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	1156	0	2176	578	
Stage 1	-	-	-	-	1121	-	
Stage 2	-	-	-	-	1055	-	
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	-	-	600	-	40	459	
Stage 1	-	-	-	-	273	-	
Stage 2	-	-	-	-	296	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	600	-	35	459	
Mov Cap-2 Maneuver	-	-	-	-	35	-	
Stage 1	-	-	-	-	273	-	
Stage 2	-	-	-	-	259	-	
Approach	EB		WB		NB		

Intersection						
HCM Control Delay, s	0		0.5		79.9	
HCM LOS					F	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	112	-	-	600	-	
HCM Lane V/C Ratio	0.625	-	-	0.123	-	
HCM Control Delay (s)	79.9	-	-	11.8	-	
HCM Lane LOS	F	-	-	B	-	
HCM 95th %tile Q(veh)	3.1	-	-	0.4	-	

Intersection						
Int Delay, s/veh	1					
<b>Movement</b>						
	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	967	17	13	1753	8	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	58	63	93	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1151	29	21	1885	16	22
<b>Major/Minor</b>						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1181	0	2150	590
Stage 1	-	-	-	-	1166	-
Stage 2	-	-	-	-	984	-
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	-	-	587	-	41	451
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	323	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	587	-	40	451
Mov Cap-2 Maneuver	-	-	-	-	40	-
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	311	-
<b>Approach</b>						
	EB		WB		NB	

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Intersection					
HCM Control Delay, s	0		0.1		77.9
HCM LOS	F				
<b>Minor Lane/Major Mvmt</b>					
	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	85	-	-	587	-
HCM Lane V/C Ratio	0.447	-	-	0.035	-
HCM Control Delay (s)	77.9	-	-	11.4	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	1.8	-	-	0.1	-

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Intersection						
Int Delay, s/veh	15.6					
<b>Movement</b>						
	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	68	916	1677	29	7	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	86	91	67	42	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	1065	1843	43	17	110
<b>Major/Minor</b>						
	Major1		Major2		Minor2	
Conflicting Flow All	1886	0	-	0	2571	943
Stage 1	-	-	-	-	1864	-
Stage 2	-	-	-	-	707	-
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	314	-	-	-	21	264
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %						
Mov Cap-1 Maneuver	314	-	-	-	~ 15	264
Mov Cap-2 Maneuver	-	-	-	-	~ 15	-
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	325	-
<b>Approach</b>						
	EB		WB		SB	

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Intersection					
HCM Control Delay, s	1.6		0		\$ 375.4
HCM LOS					F
<b>Minor Lane/Major Mvmt</b>					
	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	314	-	-	-	83
HCM Lane V/C Ratio	0.278	-	-	-	1.525
HCM Control Delay (s)	20.8	-	-	-	\$ 375.4
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	1.1	-	-	-	10.1
<b>Notes</b>					

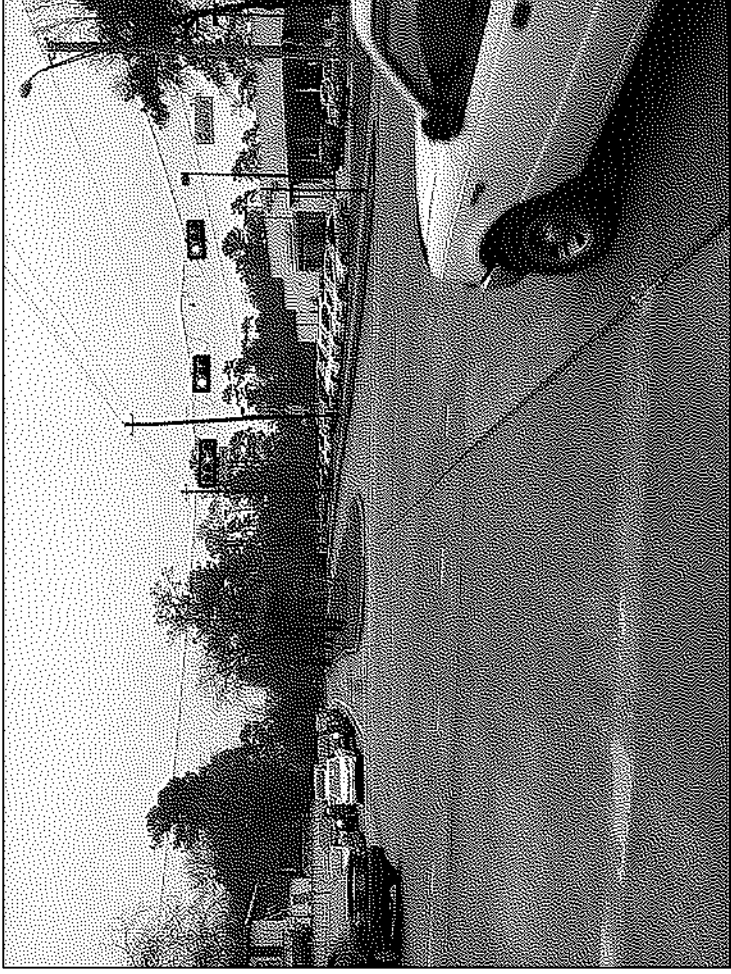
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



**Appendix D.4**

**Site Photographs**

Gessner Rd Looking North



Gessner Rd Looking West 1



Gessner Rd Looking East



Gessner Rd Looking West 2





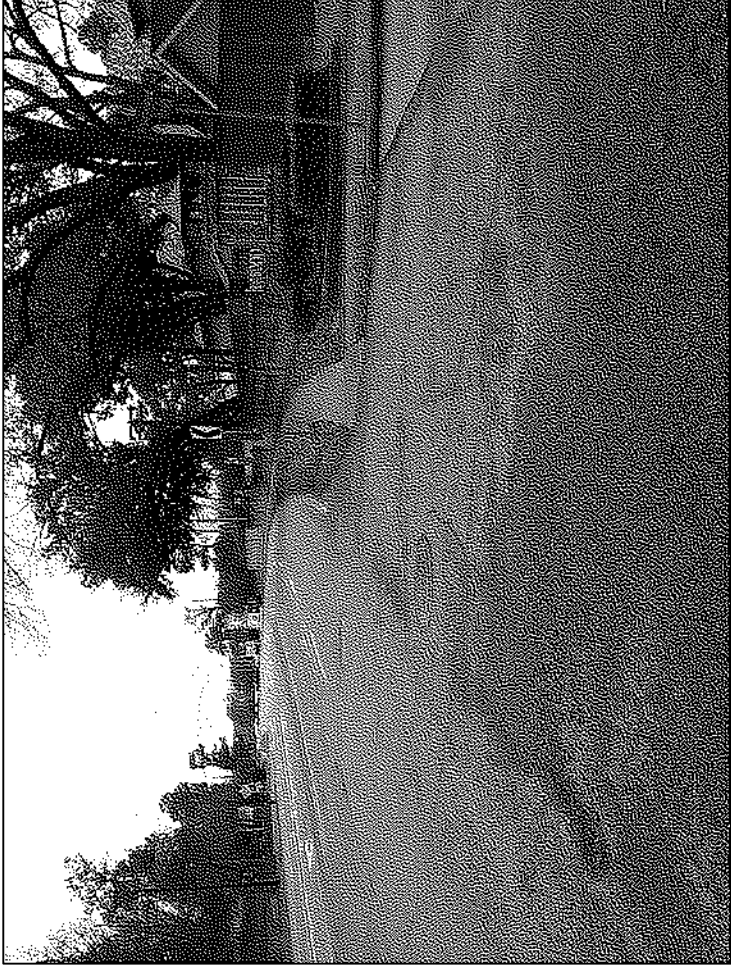
Gessner Rd Looking South



Frostwood Dr Looking East



Frostwood Dr Looking West



Frostwood Dr Looking South





Beningus Rd Looking East



Beningus Rd Looking South



Beningus Rd Looking North



Beningus Rd Looking West

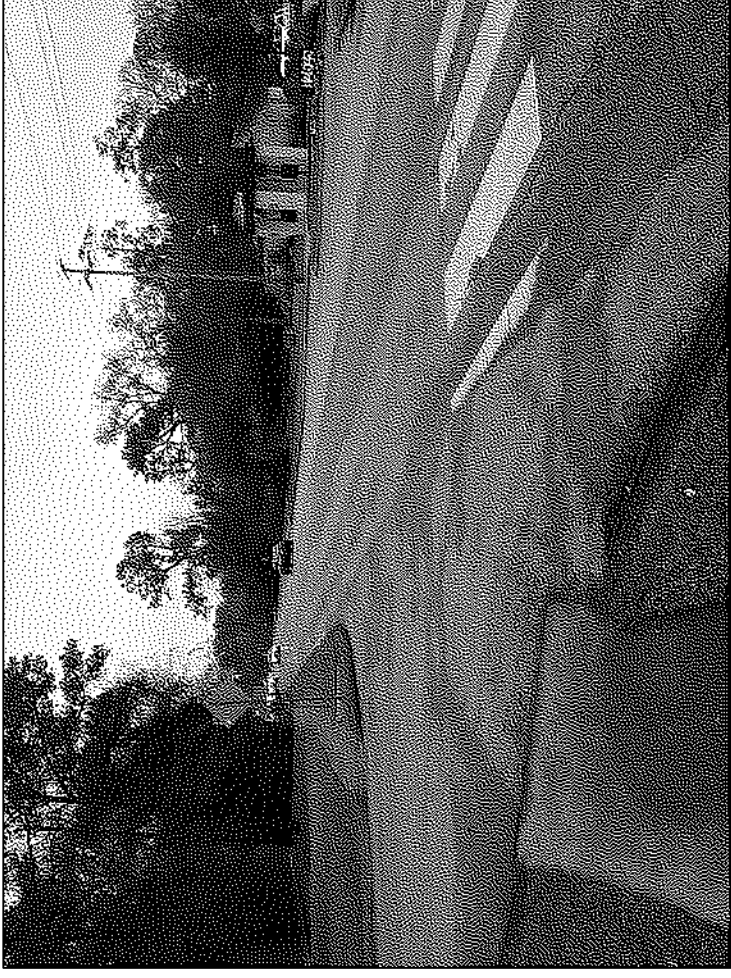




Hollow Dr Looking North



Hollow Dr Looking East



Hollow Dr Looking South

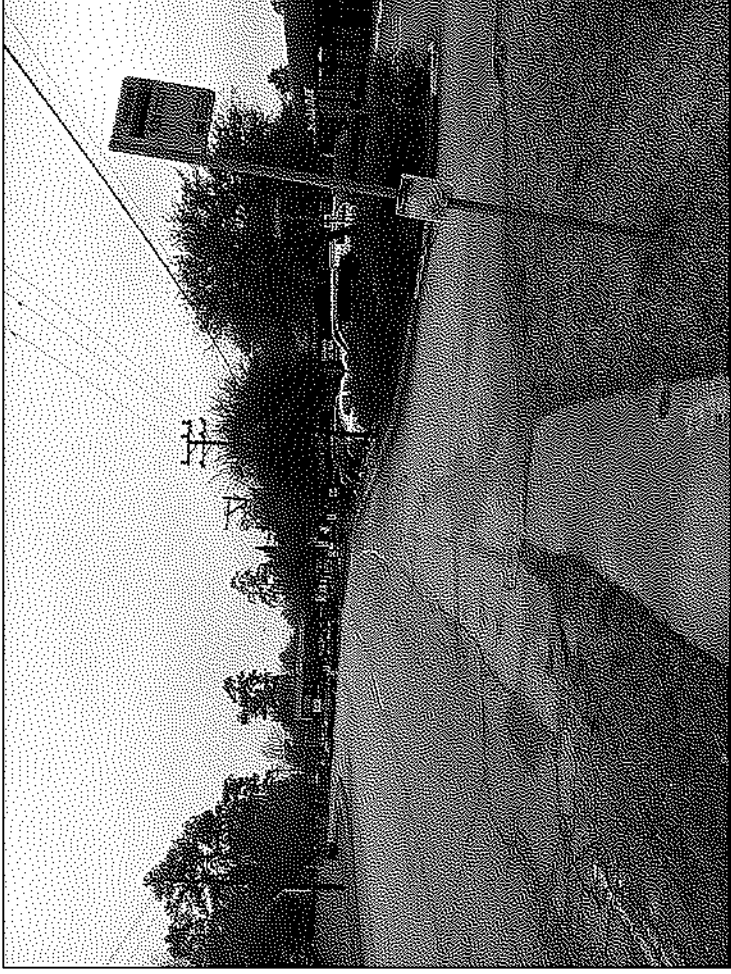


Hollow Dr Looking West

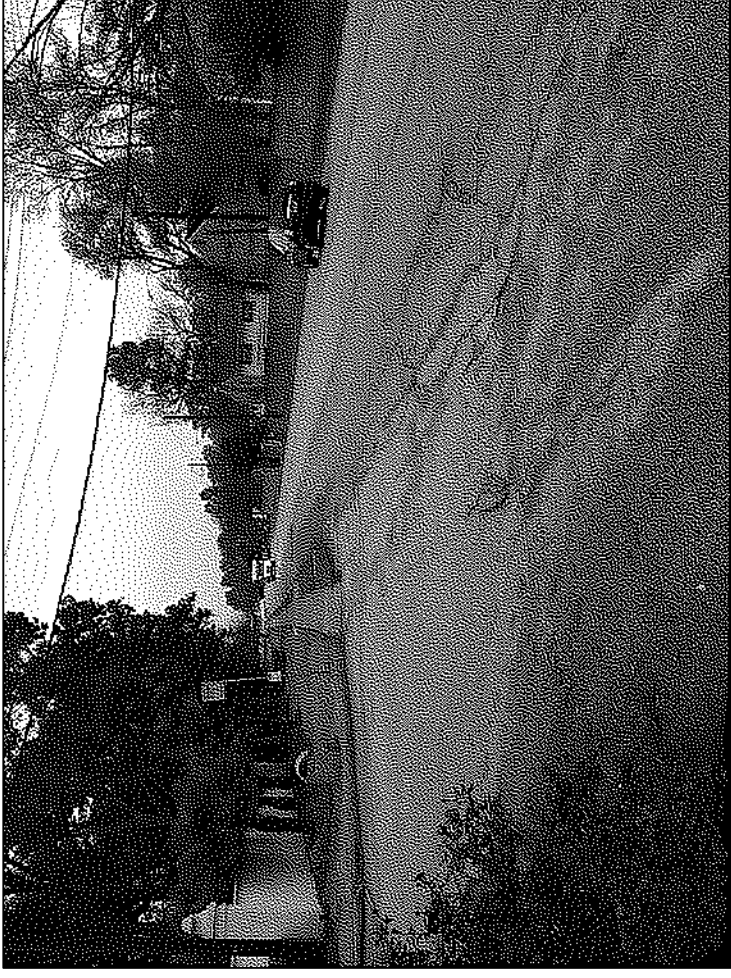




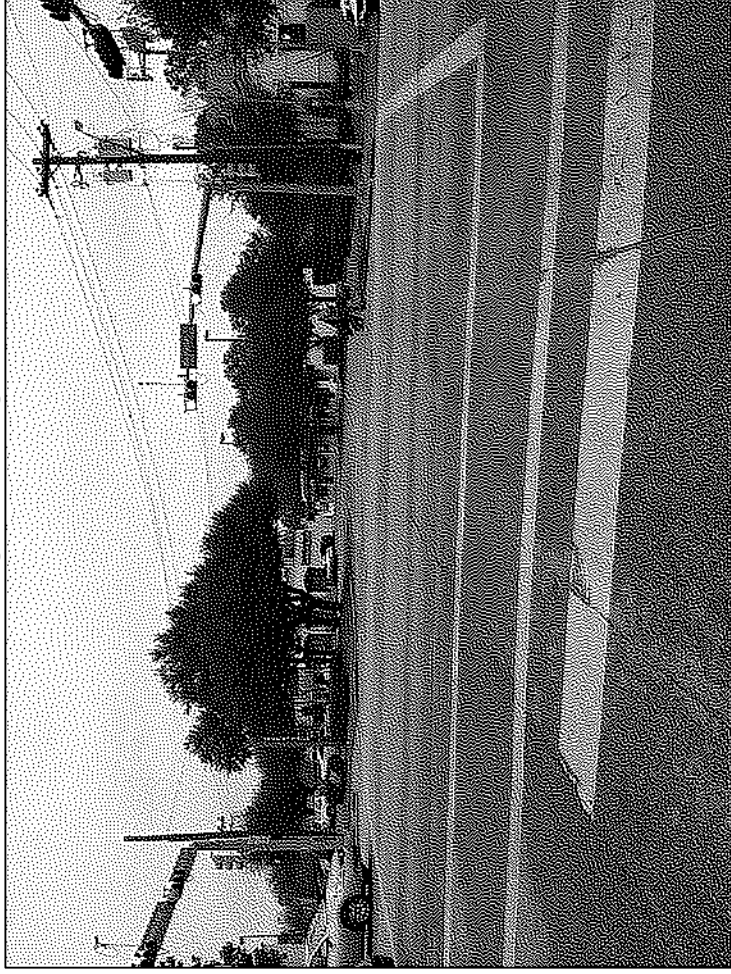
**Boheme Dr Looking West**



**Boheme Dr Looking East**



**W. Bough Ln Looking North**

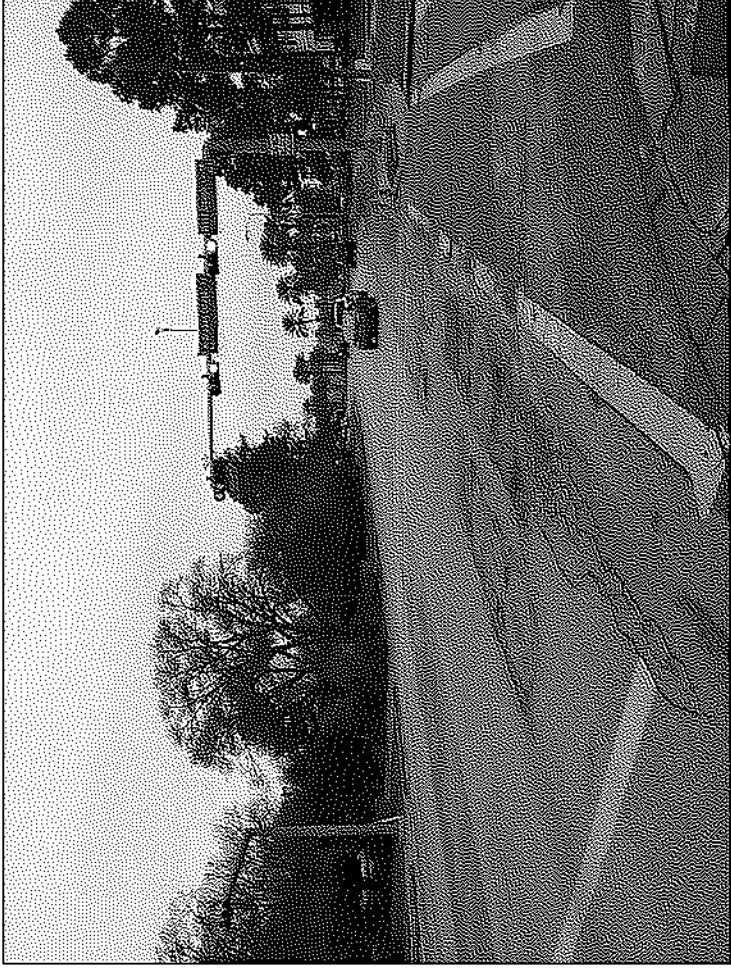


**Boheme Dr Looking South**

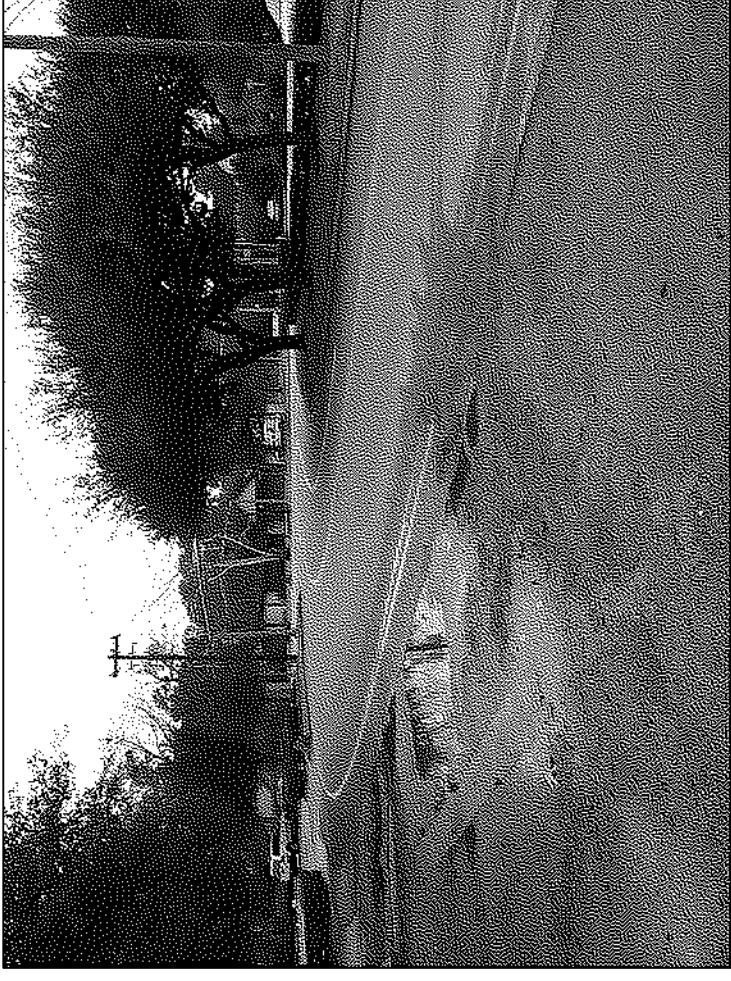




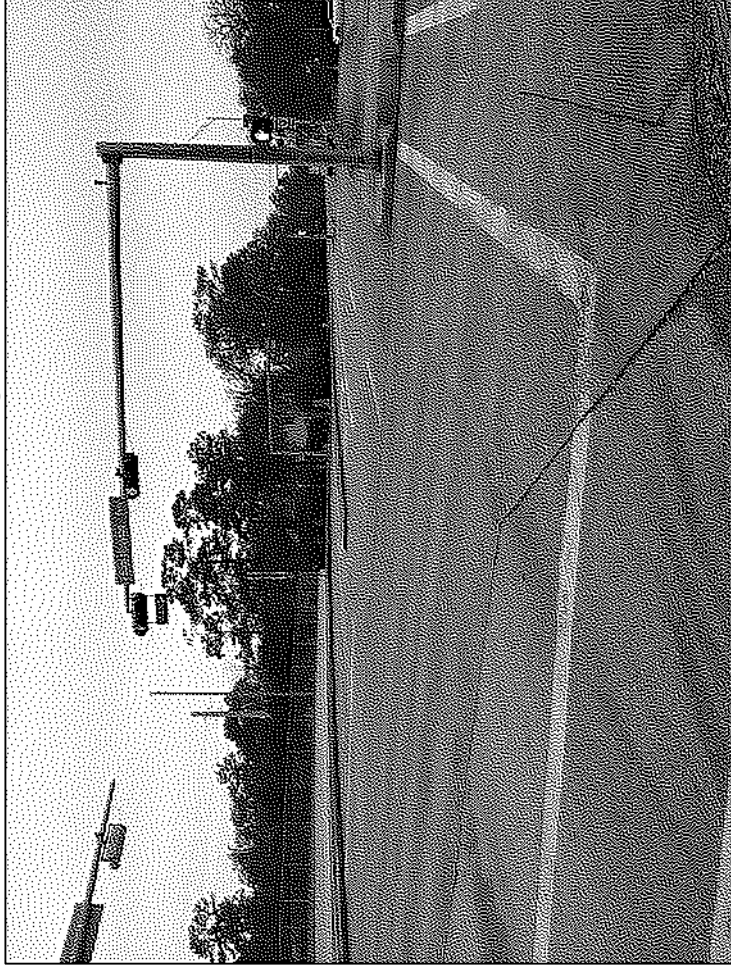
W. Bough Ln Looking West



W. Bough Ln Looking South



BW 8 FR NB Looking West



W. Bough Ln Looking East

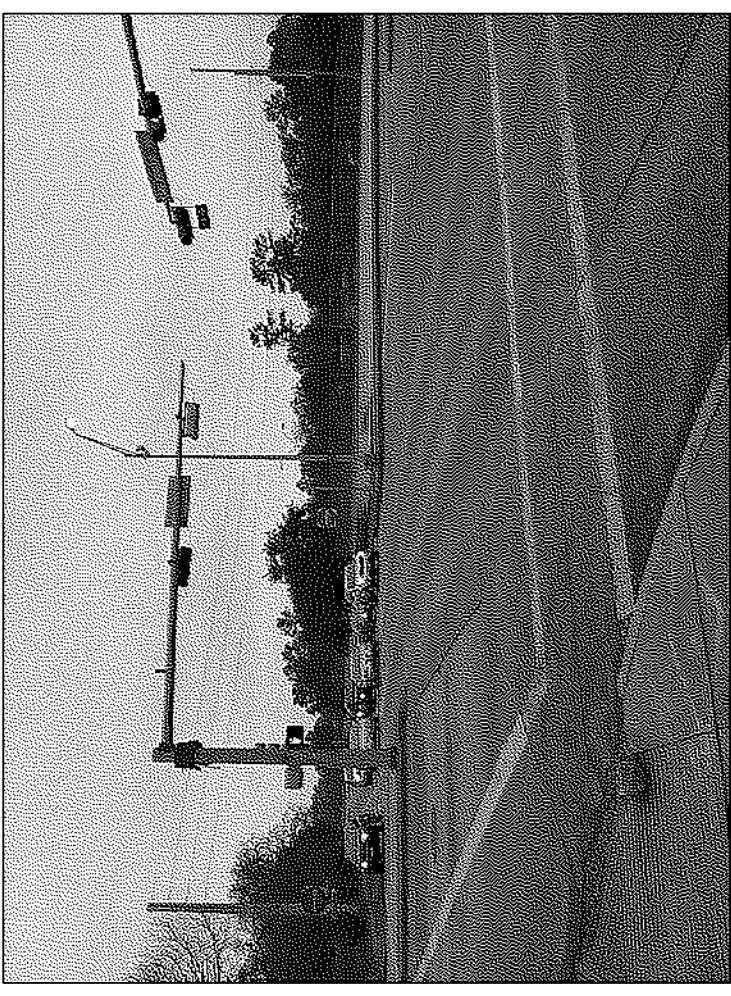




BW 8 FR NB Looking North



BW 8 FR NB Looking South



BW 8 FR SB Looking West



BW 8 FR NB Looking East

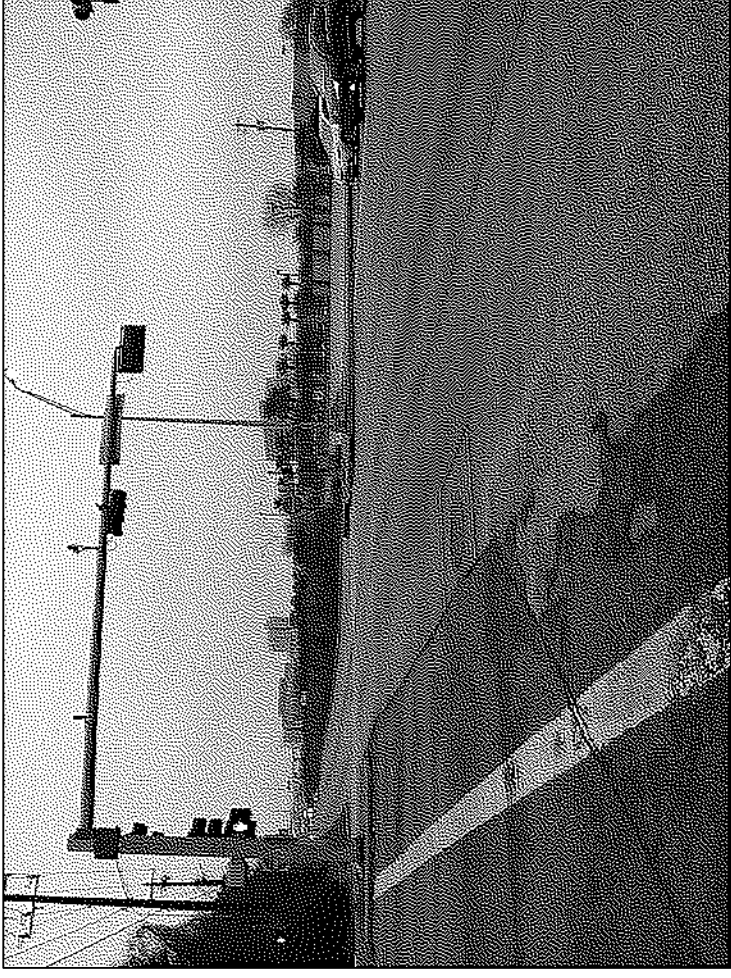




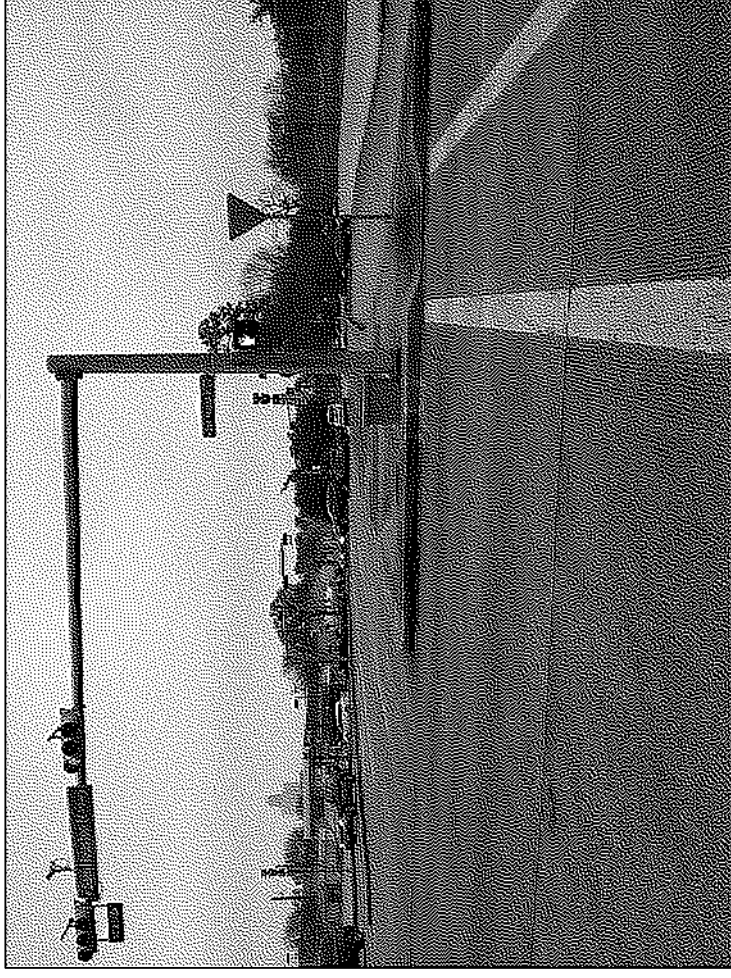
BW 8 FR SB Looking South



BW 8 FR SB Looking North



BW 8 FR SB Looking East



**Appendix D.5**  
**Existing Traffic Signal Layouts**



**BENCHMARKS:**

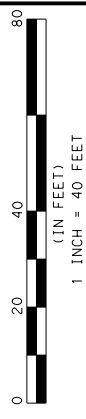
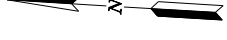
CITY OF HOUSTON MONUMENT  
A BRASS DISK IN CONCRETE, LOCATED ON  
MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
(CORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
IN REFERENCE TO THE CORRS  
DATED DECEMBER 17, 2014.

Putierrez  
11:51:17 AM  
8/4/2015

ct:\projectsw\putierrez\0319438\024-EX-SIGNAL 01.dgn



**PRIVATE UTILITY LINES SHOWN**

**CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY.**  
THE SIGNATURE VAPERS EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONDUCT VERIFICATION(S) SIGNATURE VALID FOR SIX MONTHS.

**CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY.**  
THIS SIGNATURE VERIFIES THAT YOU HAVE SHOWN CAP NATURAL GAS FACILITIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR CONDUCT VERIFICATION(S) SIGNATURE VALID FOR SIX MONTHS.  
(GAS SERVICE LINES ARE NOT SHOWN) SIGNATURE VALID FOR SIX MONTHS.

Approved for AT&T Texas/SWBT underground conduit facilities only.  
SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**

Document incomplete: not intended for permit, bidding or construction.

Engineer: THOMAS GERBRY  
P.E. Serial No. 107330  
Firm: LOCKWOOD, ANDREWS & NEWMAM, INC.  
Firm No.: F-2614  
Date: 8/4/2015

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**

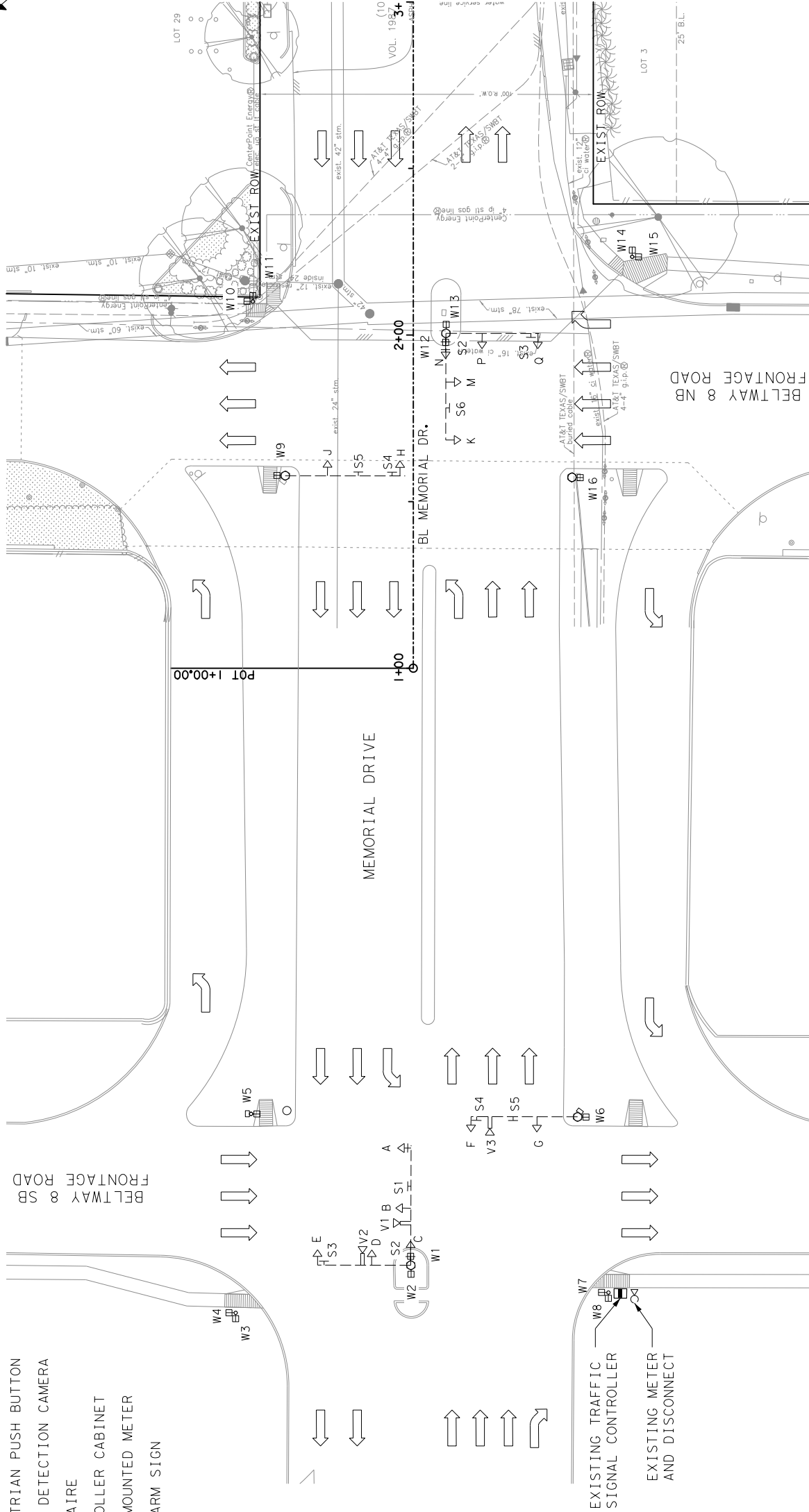
**LAN**  
**Lockwood, Andrews & Newnam, Inc.**  
A LEQ A DAILY COMPANY

**MEMORIAL DRIVE**  
**N-117000-031B-4**

BELTWAY 8  
EXISTING SIGNAL LAYOUT

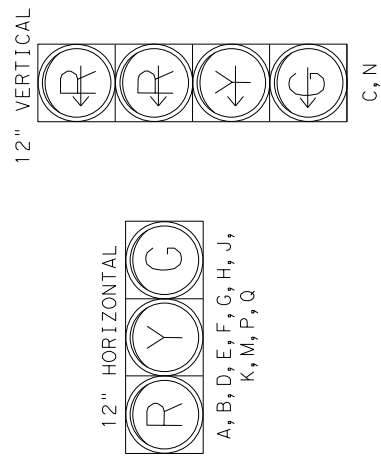
**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DATE	MASTER	TRAFFIC
ST. & BRIDGE	STORMWATER	SNO
FILE NO.	FACILITY	CITY EMP. NO.
DRAWING SCALE:		
VERT: 1"=40'		
HORZ: 1"=40'		
SHEET:		OF XX

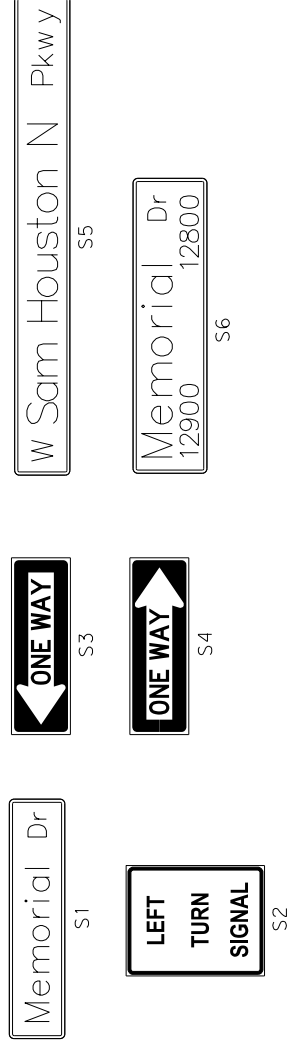


- LEGEND:**
- DIRECTION OF TRAFFIC
  - POLE W/MAST ARM
  - VEHICLE SIGNAL HEAD
  - PEDESTRIAN SIGNAL HEAD
  - PEDESTRIAN PUSH BUTTON
  - VIDEO DETECTION CAMERA
  - LUMINAIRE
  - CONTROLLER CABINET
  - POLE MOUNTED METER
  - MAST ARM SIGN

**EXISTING SIGNAL HEAD SCHEDULE**



**EXISTING OVERHEAD SIGNS**



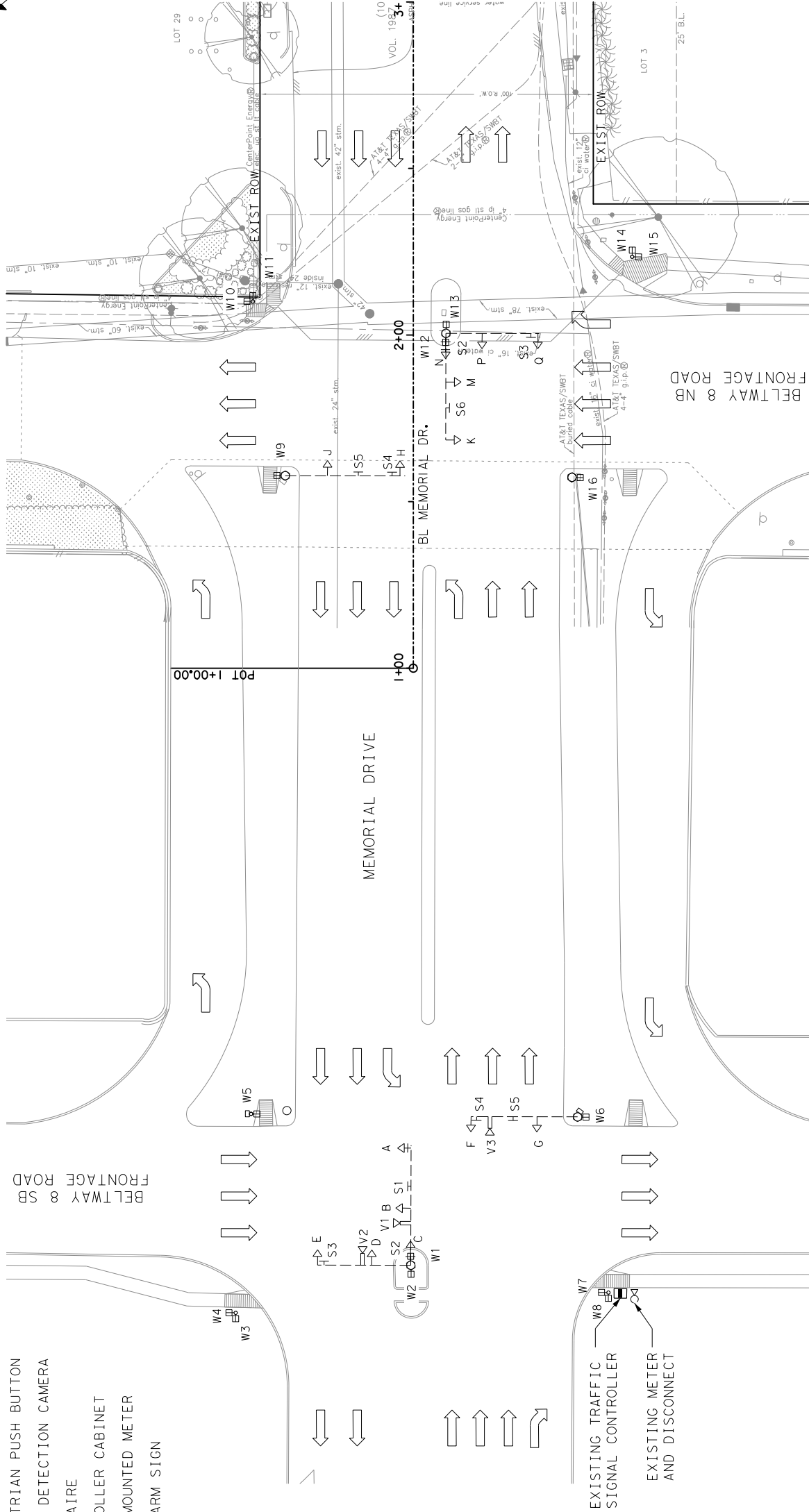
W1 THROUGH W16

FRONTAGE ROAD  
BELTWAY 8 NB

MEMORIAL DRIVE

POT 1+00.00

2+00

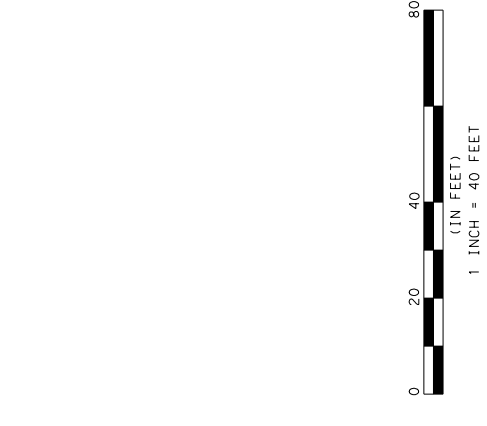




## Appendix D.6

### Proposed Traffic Signal Layouts

**BENCHMARKS:**  
 CITY OF HOUSTON MONUMENT  
 A BRASS DISK IN CONCRETE, LOCATED ON  
 MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
 OF OLD OAKS DRIVE INTERSECTION.  
 ELEV. 67.80 FEET NAVD 1988  
 (CORS96) (GEOID '12A)\*  
 \* OBSERVED BY GPS SURVEYING AND PROCESSED  
 IN REFERENCE TO THE CORRS  
 DATED DECEMBER 17,2014.



**PRIVATE UTILITY LINES SHOWN**

DATE: \_\_\_\_\_  
 CENTERPOINT ENERGY/UNDERGROUND  
 ELECTRICAL FACILITIES VERIFICATION ONLY.  
 (THE SIGNATURE VERIFIES THAT YOU HAVE SHOWN ALL NATURAL GAS  
 AND ELECTRICAL FACILITIES EXISTING UNDERGROUND FACILITIES - NOT TO BE  
 USED FOR CONDUIT VERIFICATION) SIGNATURE VALID FOR SIX MONTHS.

DATE: \_\_\_\_\_  
 CENTERPOINT ENERGY/NATURAL GAS  
 FACILITIES VERIFICATION ONLY.  
 (THE SIGNATURE VERIFIES THAT YOU HAVE SHOWN ALL NATURAL GAS  
 FACILITIES EXISTING UNDERGROUND FACILITIES - NOT TO BE USED FOR  
 CONDUIT VERIFICATION) SIGNATURE VALID FOR SIX MONTHS.

DATE: \_\_\_\_\_  
 Approved for AT&T Texas/SWBT underground  
 conduit facilities only.  
 SIGNATURE VALID FOR ONE YEAR

**INTERIM REVIEW ONLY**  
 Document incomplete: not intended  
 for permit, bidding or construction.  
 Engineer: THOMAS GERRY  
 P.E. Serial No. 107350  
 Firm: LOCKWOOD, ANDREWS & NEWMAN, INC.  
 Firm No.: F-2614  
 Date: 8/4/2015

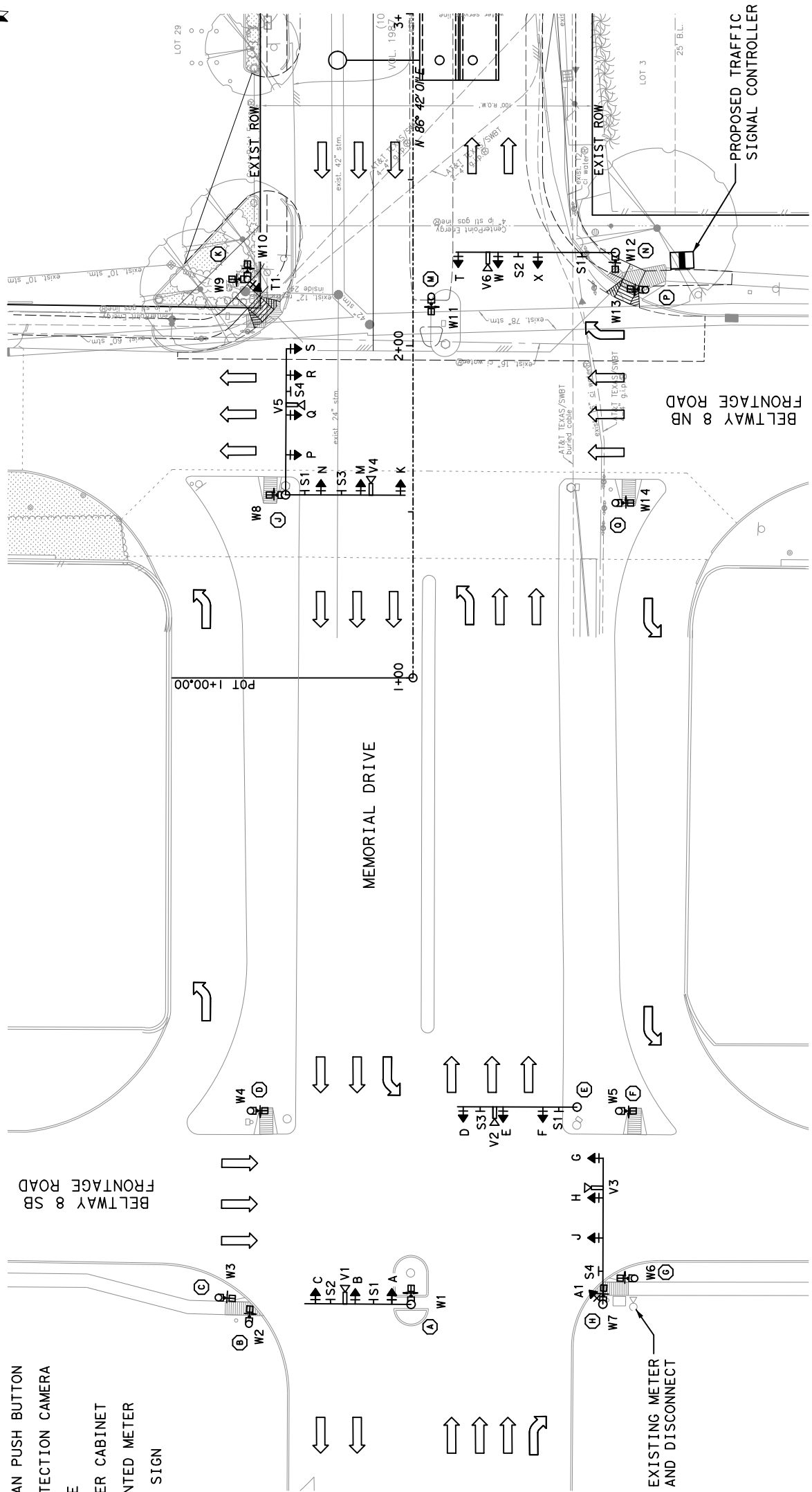
**MEMORIAL CITY  
 REDEVELOPMENT AUTHORITY**

**LAN**  
**Lockwood, Andrews  
 & Newman, Inc.**  
 A LEQ A DAILY COMPANY

**MEMORIAL DRIVE  
 N-117000-031B-4**

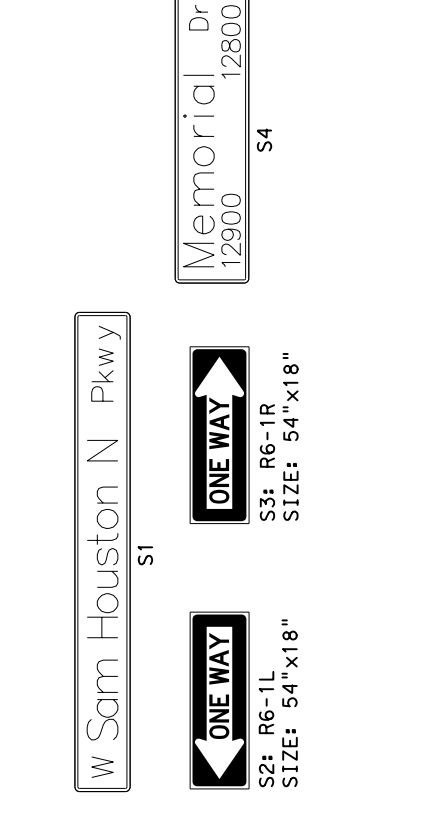
**BELTWAY 8  
 PROPOSED SIGNAL LAYOUT**

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
MASTER	TRAFFIC
ST. & BRIDGE	SNO
FILE NO.	FACILITY
DRAWING SCALE:	CITY EMP. NO.
VERT: 1"=4'	
HORZ: 1"=40'	
SHEET:	OF XX



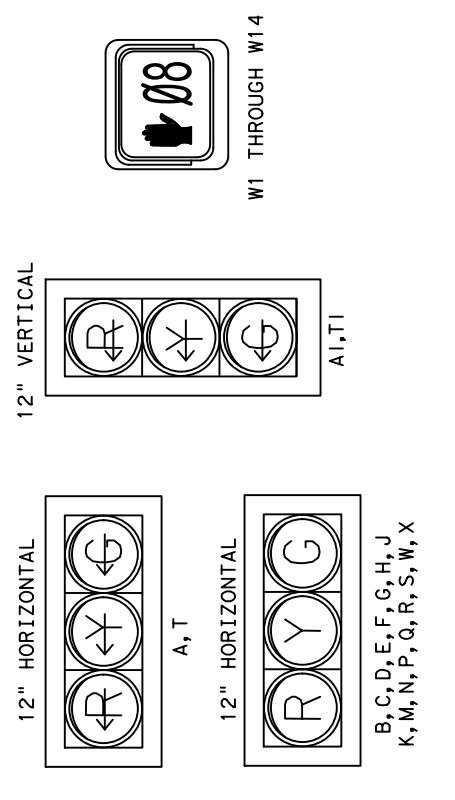
PROPOSED TRAFFIC  
 SIGNAL CONTROLLER

**PROPOSED OVERHEAD SIGNS**



- LEGEND:**
- DIRECTION OF TRAFFIC
  - POLE W/MAST ARM
  - VEHICLE SIGNAL HEAD
  - PEDESTRIAN SIGNAL HEAD
  - PEDESTRIAN PUSH BUTTON
  - VIDEO DETECTION CAMERA
  - LUMINAIRE
  - CONTROLLER CABINET
  - POLE MOUNTED METER
  - MAST ARM SIGN

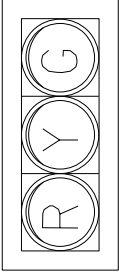
**PROPOSED SIGNAL HEAD SCHEDULE**



B, C, D, E, F, G, H, J  
 K, M, N, P, Q, R, S, W, X

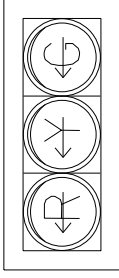
PROPOSED SIGNAL HEAD SCHEDULE

12" HORIZONTAL



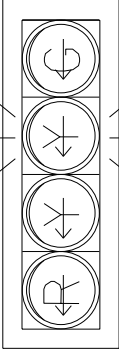
A, A1, B, C, D, F, F1, G, J, K

12" HORIZONTAL



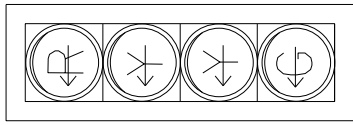
E

12" HORIZONTAL



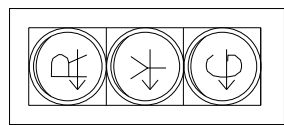
H, M

12" VERTICAL

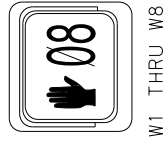


H1, M1

12" VERTICAL



E1



W1 THRU W8

LEGEND:

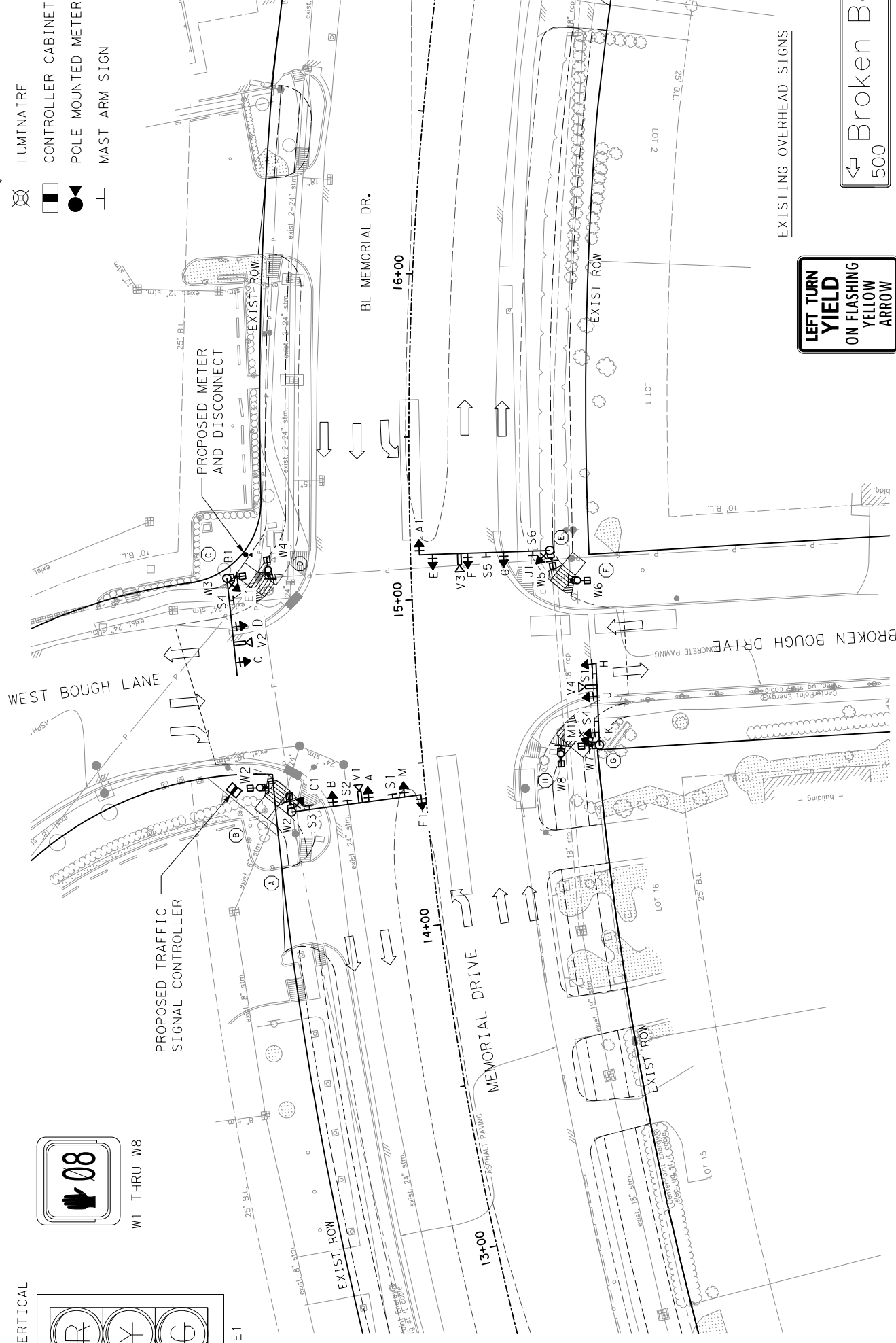
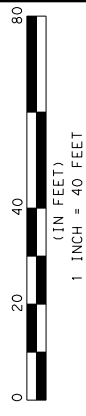
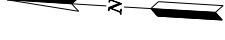
- DIRECTION OF TRAFFIC
- POLE W/MAST ARM
- VEHICLE SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- VIDEO DETECTION CAMERA
- LUMINAIRE
- CONTROLLER CABINET
- POLE MOUNTED METER
- MAST ARM SIGN

BENCHMARKS:

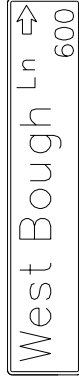
CITY OF HOUSTON MONUMENT  
A BRASS DISK IN CONCRETE, LOCATED ON  
MEMORIAL DRIVE APPROXIMATELY 150 FEET SOUTH  
OF OLD OAKS DRIVE INTERSECTION.

ELEV. 67.80 FEET NAVD 1988  
(GORS96) (GEOID '12A)\*

\* OBSERVED BY GPS SURVEYING AND PROCESSED  
IN REFERENCE TO THE CORRS  
DATED DECEMBER 17, 2014.



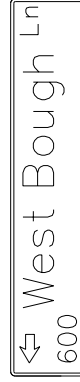
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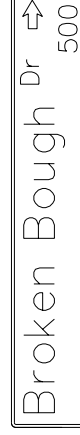
S3



S4



S5



S6

PRIVATE UTILITY LINES SHOWN

MEMORIAL DRIVE

DATE: \_\_\_\_\_  
CENTERPOINT ENERGY/UNDERGROUND  
ELECTRICAL FACILITIES VERIFICATION ONLY - NOT TO BE  
USED FOR CONDUCT VERIFICATION SIGNATURE VALID FOR SIX MONTHS.

DATE: \_\_\_\_\_  
CENTERPOINT ENERGY/NATURAL GAS  
FACILITIES VERIFICATION ONLY - NOT TO BE  
USED FOR CONDUCT VERIFICATION SIGNATURE VALID FOR SIX MONTHS.

DATE: \_\_\_\_\_  
Approved for AT&T Texas/SWBT underground  
conduit facilities only.  
SIGNATURE VALID FOR ONE YEAR

INTERIM REVIEW ONLY

Document incomplete: not intended  
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Engineer: \_\_\_\_\_  
P.E. Serial No. 107330  
Firm: LOCKWOOD, ANDREWS & NEWMAM, INC.  
Firm No.: F-2614  
Date: 8/4/2015

MEMORIAL CITY  
REDEVELOPMENT AUTHORITY

**LAN**  
Lockwood, Andrews  
& Newnam, Inc.  
A LEQ A DAILY COMPANY

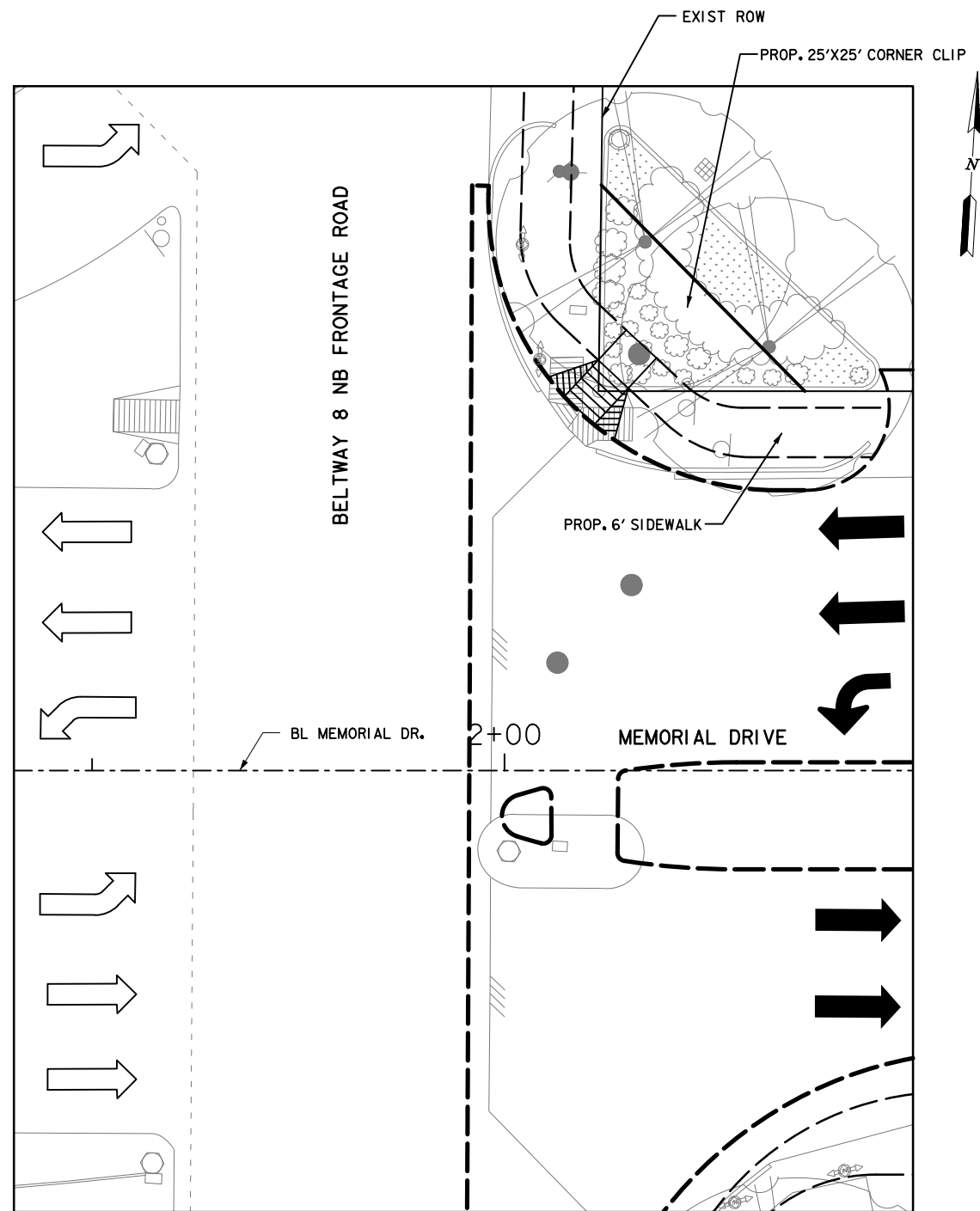
MEMORIAL DRIVE  
N-T17000-031B-4

BROKEN BOUGH  
PROPOSED SIGNAL LAYOUT

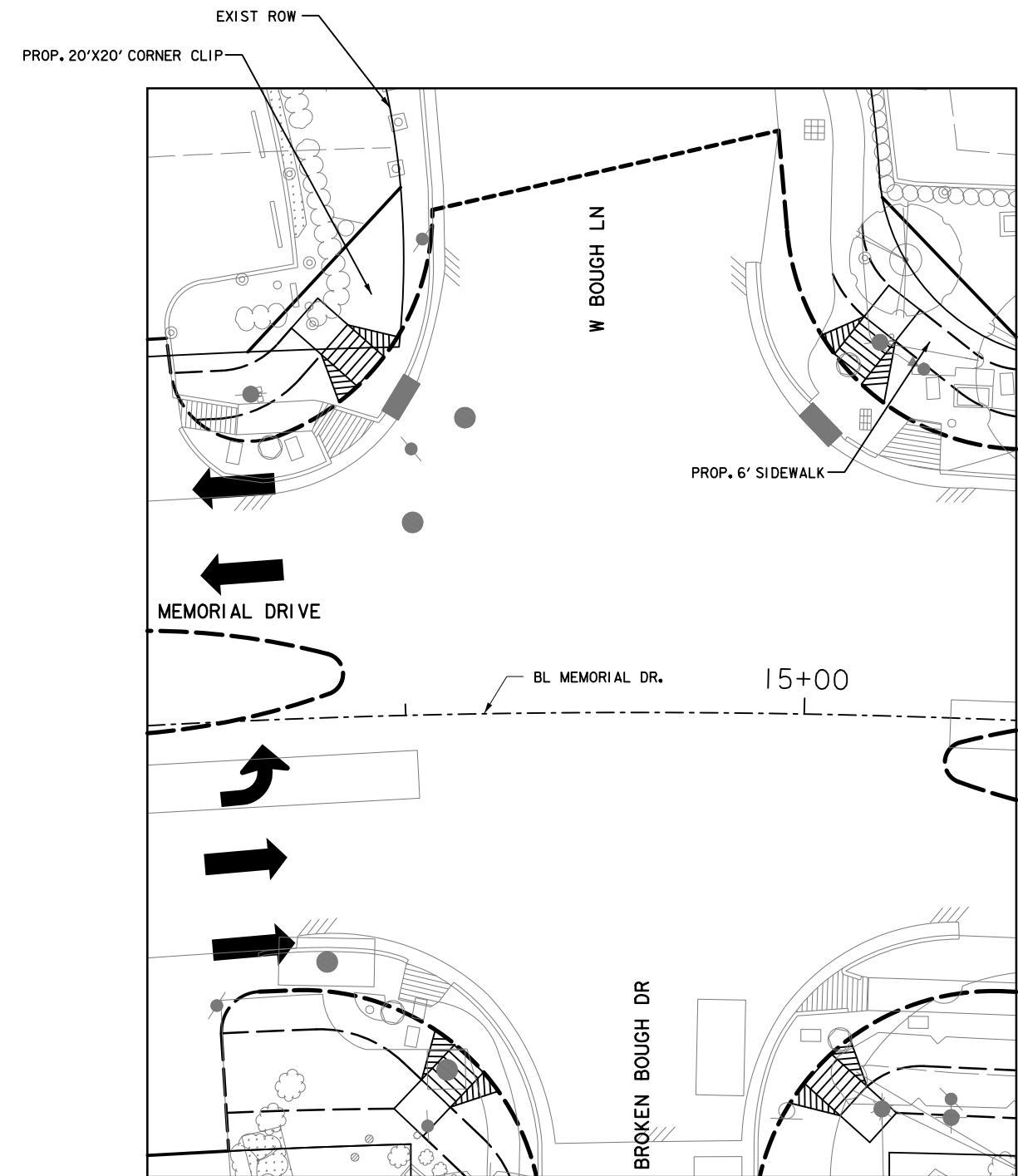
CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SNO
FILE NO.:	FACILITY	CITY EMP. NO.
DRAWING SCALE:		
VERT: 1"=4'		
HORZ: 1"=40'		
SHEET:		OF XX

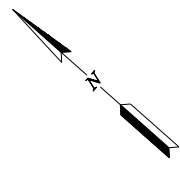




MEMORIAL DRIVE AND BELTWAY 8

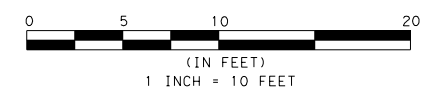


MEMORIAL DRIVE AND W BOUGH LANE/BROKEN BOUGH DRIVE



LEGEND:

➔ PROPOSED TRAFFIC FLOW



INTERIM REVIEW ONLY  
 Document incomplete: not intended for permit, bidding or construction.  
 Engineer: MUHAMMAD M ALI  
 P.E. Serial No. 98146  
 Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.  
 Firm No.: F-2614  
 Date: 10/8/2015

MEMORIAL CITY REDEVELOPMENT AUTHORITY

**LAN** Lockwood, Andrews & Newnam, Inc.  
 A LEO A DALY COMPANY

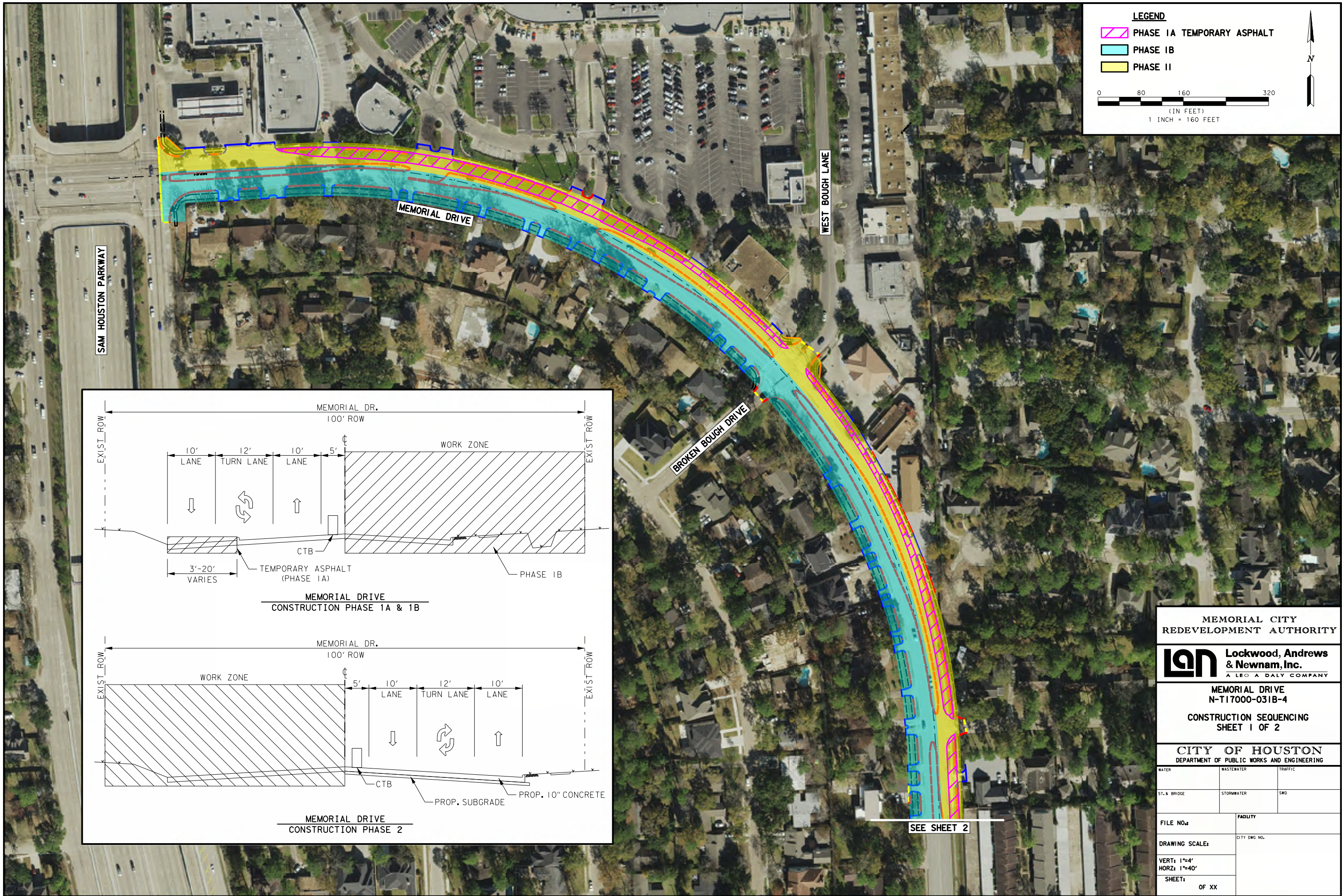
MEMORIAL DRIVE  
 N-T17000-031B-4  
 PROPOSED ROW ACQUISITION

CITY OF HOUSTON  
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD

FILE NO.:	FACILITY
DRAWING SCALE:	CITY Dwg NO.
AS SHOWN	
SHEET:	OF XX





**LEGEND**

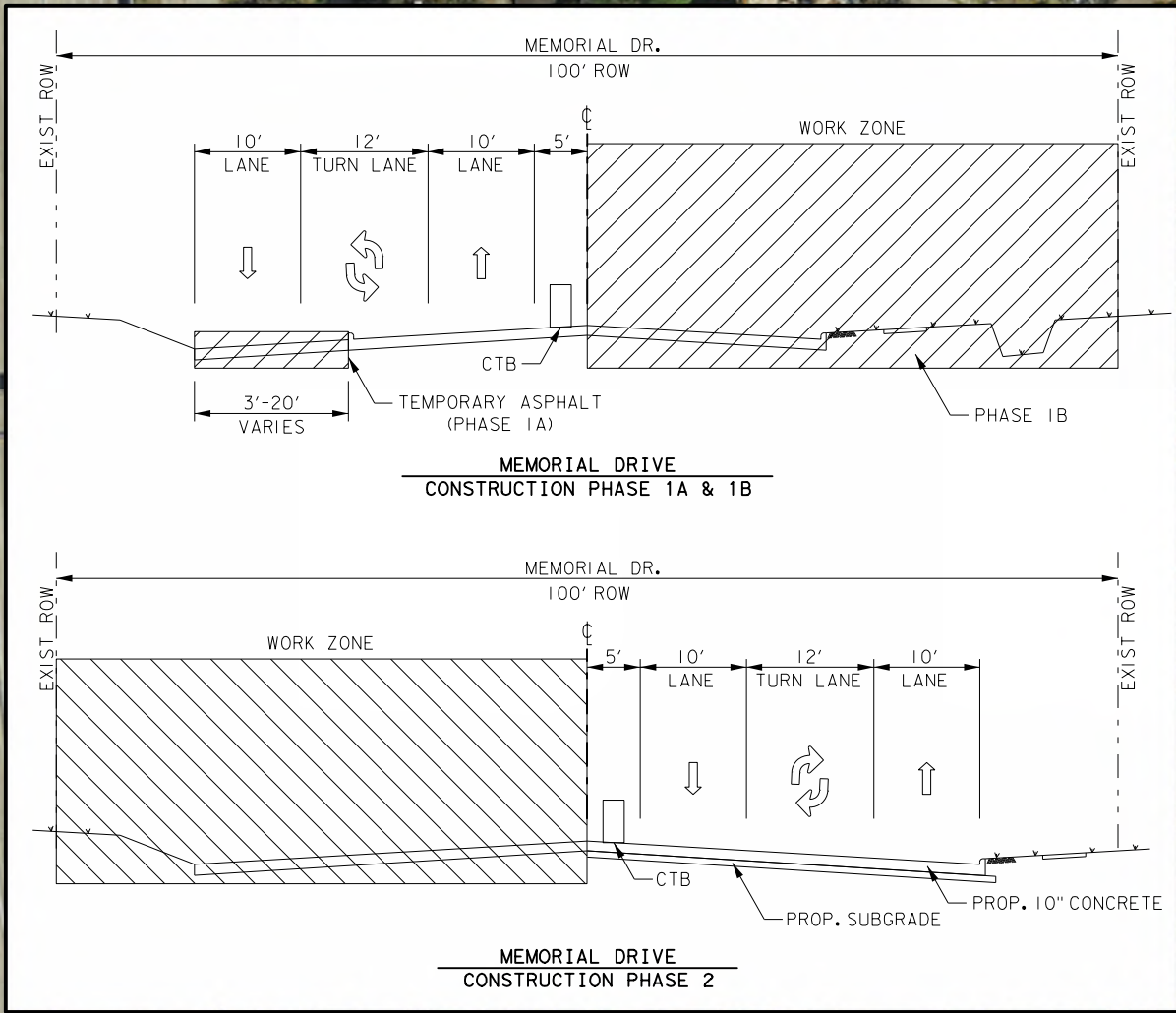
PHASE IA TEMPORARY ASPHALT

PHASE IB

PHASE II

0 80 160 320  
(IN FEET)  
1 INCH = 160 FEET

N



SEE SHEET 2

MEMORIAL CITY  
REDEVELOPMENT AUTHORITY

**LAN** Lockwood, Andrews  
& Newnam, Inc.  
A LEO A DALY COMPANY

MEMORIAL DRIVE  
N-T17000-031B-4  
CONSTRUCTION SEQUENCING  
SHEET 1 OF 2

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWD
FILE NO:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: 1"=4'	SHEET:      OF XX	
HORZ: 1"=40'		







Memorial Road @ Sam Houston Parkway (Looking West)



Memorial Road @ Sam Houston Parkway (Looking East)



Memorial Road @ Sam Houston Parkway (Looking South)



Memorial Road @ Town & Country Village Entrance (Looking West)





Memorial Road @ West Bough Lane (Looking North West)



Memorial Road @ West Bough Lane (Looking South East)



Memorial Road Near Old Oaks Drive (Looking North West)



Memorial Road Near Old Oaks Drive (Looking South)





**Memorial Road @ Boheme Drive (Looking North)**



**Memorial Road @ Boheme Drive (Looking South)**



**Memorial Road Near Hollow Drive (Looking West)**



**Memorial Road Near Hollow Drive (Looking East)**





Memorial Road @ Tallowood Road (Looking West)



Memorial Road @ Tallowood Road (Looking East)



Memorial Road @ Tallowood Road (Looking North)



Memorial City Redevelopment Authority  
Memorial Drive Pavement & Storm Sewer Improvements  
N-T17000-031B-4

Preliminary Tree Inventory-Findings  
and Recommendations





## **Overall Project Findings**

Proposed 6' wide sidewalk on north side of street and 10' wide sidewalk on south side of street will impact most of the existing trees and shrubs located in the street right of way. A majority of the plants will need to be removed for proposed design.

A handful of trees in the right of way have been identified as potential preservation candidates. These candidates are located adjacent to areas where proposed sidewalks appear to be designed in existing roadside ditches. The fill situation may allow preservation of the trees – final determination will be evaluated with 60% and 90% design drawings.

75 trees will need to be removed for proposed street and sidewalk construction. 31 of the 75 trees are protected by Street Tree Ordinance and are in good condition that will require replacement planting to comply with Ordinance. The 31 trees require replacement total of 359 inches in plantings with an estimated removal and replacement fee of \$143,950.00.

Trees located on private property will be protected by using root pruning trench for sidewalk construction or forming sidewalk on grade without cutting or otherwise damaging tree roots 1" diameter or larger. Tree protection fencing and overhead clearance pruning may also be necessary to ensure long term tree survival.

## **Individual Tree Findings**

Tree numbers and locations included on attached tree location drawings.

### Trees no. 1-6

(2)14" Laurel Oak, 10" Laurel Oak, 9" Laurel Oak, 12" Live Oak & 7" Live Oak growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

### Tree no. 7

19" Southern Red Oak growing in TXDOT right of way. Tree will not be impacted, provided no utility relocation/connection or sidewalk relocation is required within 15' of trunk. Tree is not protected by City of Houston Street Tree Ordinance but is covered by TXDOT protection and replacement requirements.

### Trees no. 8

(10)5" Italian Cypress growing on private property. Trees will not be impacted by construction in street right of way.

Tree no. 9

27" Pine growing at edge of street right of way. Proposed drive construction will significantly impact long term tree health and structural integrity. Tree will need to be removed. Tree is protected by Street Tree Ordinance and will require 27" in replacement planting to comply with ordinance. Estimated removal and replacement cost is \$8,850.00.



**Figure 1: Tree No. 9 - 27" Pine to be removed for proposed drive ways.**

Trees no. 10, 11 & 12

22" Pine, 20" Pine & 28" Water Oak are growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that trees can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 13-17

3" Crepe Myrtle, 4" Juniper, 18" Post Oak, 17" Post Oak & 3" Juniper growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 18



23" American Elm growing in street right of way and protected by Street Tree Ordinance. Tree has 40% dieback and is in fair to poor condition. It appears from preliminary drawings that tree can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings. If tree is preserved the canopy will need to be hazard pruned to remove large deadwood for public safety concerns.



**Figure 2: Large deadwood in canopy of Tree no. 18.**

Tree no. 19

10" Arborvitae growing in Street Right of way and not protected by street tree ordinance. Tree may need to be pruned to provide clearance for proposed sidewalk.

Trees no. 20-22

17" Post Oak, 19" Post Oak & 22" Post Oak growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 23

12" Post Oak growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that tree can be preserved with root pruning for street,

Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Tree no. 24

22" Post Oak growing on private property with approximately 30% canopy dieback. Tree has been impacted by private drive construction. Tree will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Trees no. 25 & 26

9" Lacebark Elm & 7" Lacebark Elm growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that trees can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Tree no. 27

13" Live Oak growing in street right of way and protected by Street Tree Ordinance. Tree will need to be removed for proposed street and sidewalk construction. Removal requires 13" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$5,125.00.



Figure 3: Tree no. 27 to be removed for street and walk construction.

Trees no. 28, 30, 32, 33, & 35

12" Live Oak, 16" Live Oak, 13" Live Oak, 16" Live Oak & 40' Palm growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Trees no. 29 & 31

26" Live Oak and 15" Live Oak growing in street right of way and protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 41" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$14,425.00.



Figure 4: Tree no. 29 - 26" Live Oak to be removed for proposed street and walk construction.

Tree no. 34 & 38

26” Crepe Myrtle & 22” Crepe Myrtle growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that trees can be preserved with root pruning for street, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.



Figure 5: Tree no. 34 - 26" Live Oak in esplanade.

Trees no. 36, 37, 39-42

(4) 40’ Palms, 13” Crepe Myrtle, 16” Pine growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 43

17” Water Oak growing on private property that has been significantly impacted by new home and driveway construction. Tree has 50% canopy dieback and has been colonized by *Hypoxylon*, which is slowly killing the tree. Tree is in poor condition and will most likely die before start of final design.





**Figure 6: Tree no. 43 with 50% canopy dieback and Hypoxylon infestation.**

Trees no. 44-48 & 50

9" Willow Oak, 8" Pine, 20" Post Oak, 18" Post Oak, 22" Pine, 21" Pine growing just outside of right of way on private property. Trees have been impacted by recent home construction and exhibit 20-50% canopy dieback. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 49

11" Redbud growing in street right of way is not protected by street tree ordinance. Tree will need to be clearance pruned to allow construction and provide Accessibility Standards requirements for new sidewalk.

Trees no. 51-62

14" Pine, 10" Pine, 11" Pine, 12" Pine, 14" Pine, (2)5" Mulberry, 7" Mulberry, 8" Tallow, 5" Cherrylaurel , 11" Water Oak & 23" Water Oak growing just outside of right of way on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Trees no. 63 & 65

(2) 5" Crepe Myrtles growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees no. 66, 67 & 68

10" Pine, 11" Pine & 6" Live Oak growing on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Trees no. 69 & 71

12" Live Oak & 13" Live Oak growing in street right of way and protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 25" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$9,875.00.

Tree no. 70

15" Live Oak growing just outside of right of way on private property. Construction of proposed storm lead will need to be completed with manual labor in order to minimize impacts on root system of tree. Tree can then be protected with sidewalk on grade or root prune for walk, tree protection fence, root prune for street and clearance pruning.

Tree no. 73, 74, 76, 77 & 78

23" Sycamore, 33" Southern Red Oak, 25" Post Oak, 18" Pine & 16" Southern Red Oak growing just outside of right of way on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Trees no. 75, 79-92, 94 & 95

Spirea hedge & (16) 7" Crepe Myrtle growing in street right of way are not protected by Street Tree Ordinance. No protection required, or replacement required should they need to be removed for walk to comply with Ordinance. Clearance pruning for sidewalk would be necessary if trees are preserved.

Tree no. 93

15" Pine growing just outside right of way on private property is dead. Tree will most likely be removed before final design starts.



**Figure 7: Dead 15" Pine on private property.**

Trees no. 96, 97, 99, 100, 103 & 104

(5) 4' Sago Palms & 7" Redbud growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees no. 98, 101, 102, 105, 106-112

19" Southern Red Oak, 32" Water Oak, 21" Pine, 18" Pine, 8" Yaupon, 15" Ligustrum, 35" Water Oak & (4) 10" Crepe Myrtle growing just outside of right of way on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 113

5" Ligustrum growing in street right of way is not protected by street tree ordinance. Tree will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees no. 114-118, 120, 121, 124, 127-136

5” Ligustrum, 14” Pine, 13” Pine, 20” Pine, 16” Crepe Myrtle, (2)7” Water Oak, 25” Pine, 10” Tallow, 16” Pine, 26” Pine, 25” Pine, 17” Magnolia, 20” Pine, 26” Pine, 16” Pine, 10” Water Oak & 9” Water Oak growing just outside of right of way on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 119

13” Mulberry growing in street right of way is not protected by street tree ordinance. Tree will need to be removed for construction of proposed sidewalk. Trunk of tree leans into proposed street location and would need to be removed for traffic clearance regardless of conflict with sidewalk construction. No replacement planting required.



**Figure 8: 13” Mulberry leaning into proposed street location.**

Trees no. 122, 123, 125 & 126

(2)6” Crepe Myrtle, 3” Raintree, 5” Redbud growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.



Trees no. 137-139

16" Pine, 12" Pine & 5" Pine are growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that trees can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 140, 142-148

3' Palm, (3)20' Palms & (4)12' Palms growing in street right of way are not protected by Street Tree Ordinance. No protection required, or replacement required should they need to be removed for walk to comply with Ordinance.

Tree no. 141

23" Pine growing in street right of way is protected by Street Tree Ordinance. Tree has been significantly pruned. Approximately 1/3 to 1/2 of the tree's canopy has been removed. It appears from preliminary drawings that tree can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Tree no. 141A

16" Magnolia growing just outside of right of way on private property. Tree is thin and in poor condition with approximately 30% canopy dieback. Tree will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 149

25" American Elm growing in street right of way and protected by Street Tree Ordinance. Tree has been topped by overhead utility clearing and is in poor condition. Tree will need to be removed for proposed street and sidewalk construction. No replacement planting required due to damaged condition of tree.



**Figure 9: 25" American Elm topped for overhead utility clearance.**

Tree no. 150

16" Tallow growing in street right of way is not protected by street tree ordinance. Tree will need to be removed for construction of proposed sidewalk. No replacement planting required.

Tree no. 151

7" Live Oak growing in street right of way and protected by Street Tree Ordinance. It appears from preliminary drawings that tree can be preserved with root pruning for street, Sidewalk on grade and tree protection fencing. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 152-156

9" Live Oak, 6" Live Oak, 8" Live Oak, 10" Live Oak, 9" Live Oak growing in street right of way and protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 42" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$14,750.00.



**Figure 10: Trees 152-156 to be removed for sidewalk construction.**

Tree no. 157 & 159

Ligustrum hedge growing in street right of way is not protected by street tree ordinance. Hedge will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees no. 158, & 162-164

12" Pecan, 19" Pine, 13" Pine & 32" Water Oak growing in street right of way and protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 44" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$27,950.00.



Figure 11: Tree no. 158 - 12" Pecan & 162 – 19" Pine to be removed for sidewalk.



Figure 12: Tree no. 164 - 32" Water Oak to be removed for sidewalk.



Trees no. 165 & 166

(2) 4" Japanese Blueberry growing in street right of way are not protected by Street Tree Ordinance. No protection required, or replacement required should they need to be removed for walk to comply with Ordinance.

Tree no. 167

16" Magnolia growing on private property with 40% canopy dieback and in overall poor condition. Tree has significant exposed surface roots in outside ditch bank. Most roots appear to be desiccating and decayed from years of ditch cleaning work. Proposed Storm will need to be installed with manual labor to minimize impacts on tree roots. It appears tree can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.



**Figure 13: Roots exposed at top of bank tree no. 167.**

Tree no. 168

20" Pine growing in street right of way is protected by Street Tree Ordinance. Proposed Storm will need to be installed with manual labor to minimize impacts on tree roots. It appears tree can be preserved with root pruning for street, sidewalk on grade, tree

protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Tree no. 169

3" Sugarberry growing in street right of way is not protected by Street Tree Ordinance. No protection required, or replacement required should tree need to be removed for walk to comply with Ordinance.

Tree no. 170

26" American Elm growing in street right of way is protected by Street Tree Ordinance. Tree has 50% canopy dieback and is in overall poor condition. It appears tree can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 171-175

(5) 7" Crepe Myrtle growing on private property. Trees will not be impacted by construction in street right of way.

Trees no. 176-178, 180-182, 184, 186, 188, 189, 194, 195, & 199

Ligustrum hedges, 5" Crepe Myrtle, (4)6" Crepe Myrtle, (3) 7" Crepe Myrtle, (3) 8" Crepe Myrtle growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees no. 179, 183, 185, 187, 190-192, 196-198, 200 & 201

23" Water Oak, 15" Pine, 42" Cottonwood, 19" Pine, 25" Pine, 17" Pine, 15" Pine, 14" Willow Oak, 14" Pine, 23" Pine, 23" Pine, 18" Pine, 26" Pine growing just outside of right of way on private property. Trees will be protected with sidewalk on grade or root pruning for sidewalk, tree protection fencing, and clearance pruning for construction access.

Tree no. 193

11" Pine growing in street right of way is protected by Street Tree Ordinance. Tree will need to be removed for proposed street and sidewalk construction. Removal requires 11" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$3,625.00.



**Figure 14: 11" Pine to be removed for walk and street construction.**

Trees no. 202-204, 227-230, & 233-235

14" to 23" Water Oak trees growing just outside right of way on private property. Trees have been topped for overhead utility clearance and are planted in planters that have significantly restricted root growth. Trees are in fair to poor condition. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Tree no. 205

12" Live Oak growing on private property. Will not be impacted by construction in street right of way.

Trees no. 206 & 207

14" Live Oak & 13" Live Oak growing in street right of way are protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 27" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$10,275.00.

Trees no. 208-216, 218-223, & 225

9” to 23” Pine trees growing in street right of way are protected by Street Tree Ordinance. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees 217 & 224

9” Sugarberry & 12” Sugarberry growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Tree no. 226 & 243

14” Sugarberry & 15” Sugarberry growing just outside right of way on private property. Trees have been topped for overhead utility clearance. Trees are in fair to poor condition. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 244 & 254

15” Pine & 15” Green Ash growing in street right of way are protected by Street Tree Ordinance. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees 246

16” Shumard Oak growing in street right of way is protected by Street Tree Ordinance. Tree will need to be removed for proposed street and sidewalk construction. Removal requires 16” in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$6,450.00.

Trees 247-249, 252 & 253

13” Sycamore, 10” Sycamore, 9” Sycamore, 12” Sycamore & 15” Sugarberry growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Tree no. 250

10” Sugarberry growing in street right of way is not protected by Street Tree Ordinance. No protection required, or replacement required should tree need to be removed for walk to comply with Ordinance.

Tree no. 254

15” Green Ash growing in street right of way is protected by Street Tree Ordinance. It appears tree can be preserved with root pruning for street, sidewalk on grade, tree



protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 255, 256, 260, & 271-273

13" Pine, 17" Pine, 11" Pine, 11" Pine, 12" Pine, 15" Post Oak growing in street right of way are protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 79" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$29,625.00.

Trees no. 257, 258, 259, 261, 267-269, & 294-297

16" Green Ash, 15" Hickory, 7" Crepe Myrtle, 23" Pine, 11" Pine, 13" Pine, 10" Pine, (2)3" Crepe Myrtle, 12" Live Oak, 12" Live Oak growing just outside right of way on private property. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 262-266 & 270

11" Pine, 12" Pine, 13" Pine, 19" Pine, 10" Pine, 4" Post Oak growing in street right of way are protected by Street Tree Ordinance. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees no. 274, 282, & 285

18" Pine, 8" Sawtooth Oak, 8" Pine growing in street right of way are protected by Street Tree Ordinance. Trees will need to be removed for proposed street and sidewalk construction. Removal requires 34" in replacement planting to comply with Ordinance. Estimated removal and replacement costs are \$13,000.00.

Trees no. 275, 278, 284, 286 & 287

10" Cherrylaurel, 7" Cherrylaurel, 23" Post Oak, 8" Pine growing just outside right of way on private property. It appears trees can be preserved with root pruning for street, sidewalk on grade, tree protection fencing and clearance pruning. Final treatment will be determined by horizontal and vertical location of walk in design phase drawings.

Trees 276, 277, 279-281 & 283

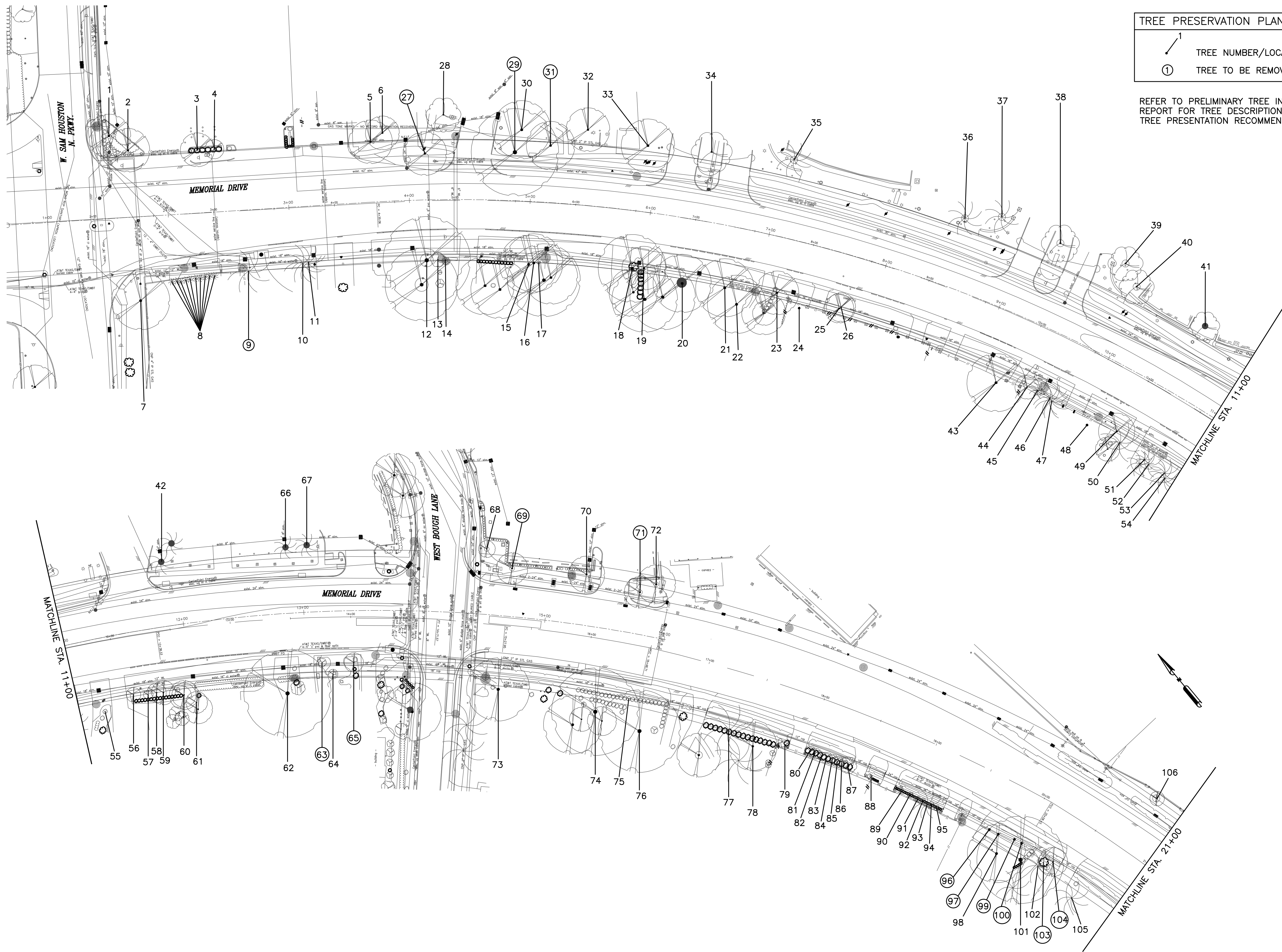
(2) 5" Cherrylaurel, (3) 5" Sugarberry, 5" Cherrylaurel growing in street right of way are not protected by street tree ordinance. Trees will need to be removed for construction of proposed sidewalk. No replacement planting required.

Trees 288-293

9" Post Oak, 8" Water Oak, 7" Post Oak, 15" Post Oak, 13" Water Oak & 12" Water Oak growing on private property. Trees will not be impacted by proposed construction in

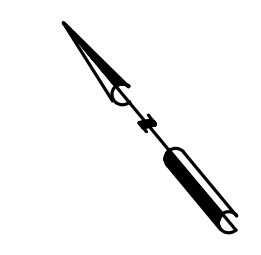
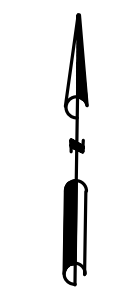
street right of way. Clearance pruning will be necessary to provide construction access and provide tree protection from construction equipment.



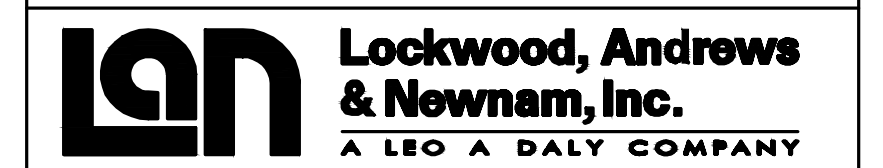


TREE PRESERVATION PLAN LEGEND	
	TREE NUMBER/LOCATION
	TREE TO BE REMOVED

REFER TO PRELIMINARY TREE INVENTORY-FINDINGS AND RECOMMENDATION REPORT FOR TREE DESCRIPTION, TREE SPECIFIC FINDINGS, AND SPECIFIC TREE PRESERVATION RECOMMENDATIONS.



MEMORIAL CITY REDEVELOPMENT AUTHORITY



**C.N. Koehl**  
Urban Forestry, Inc.

210 Stone Bush Ct. • Katy, Texas 77493  
281-391-0022 ckoehl@koehlurbanforestry.com

APPROVED:

MEMORIAL ROADWAY EXPANSION PROJECT

TREE LOCATIONS SHEET 1 OF 3

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

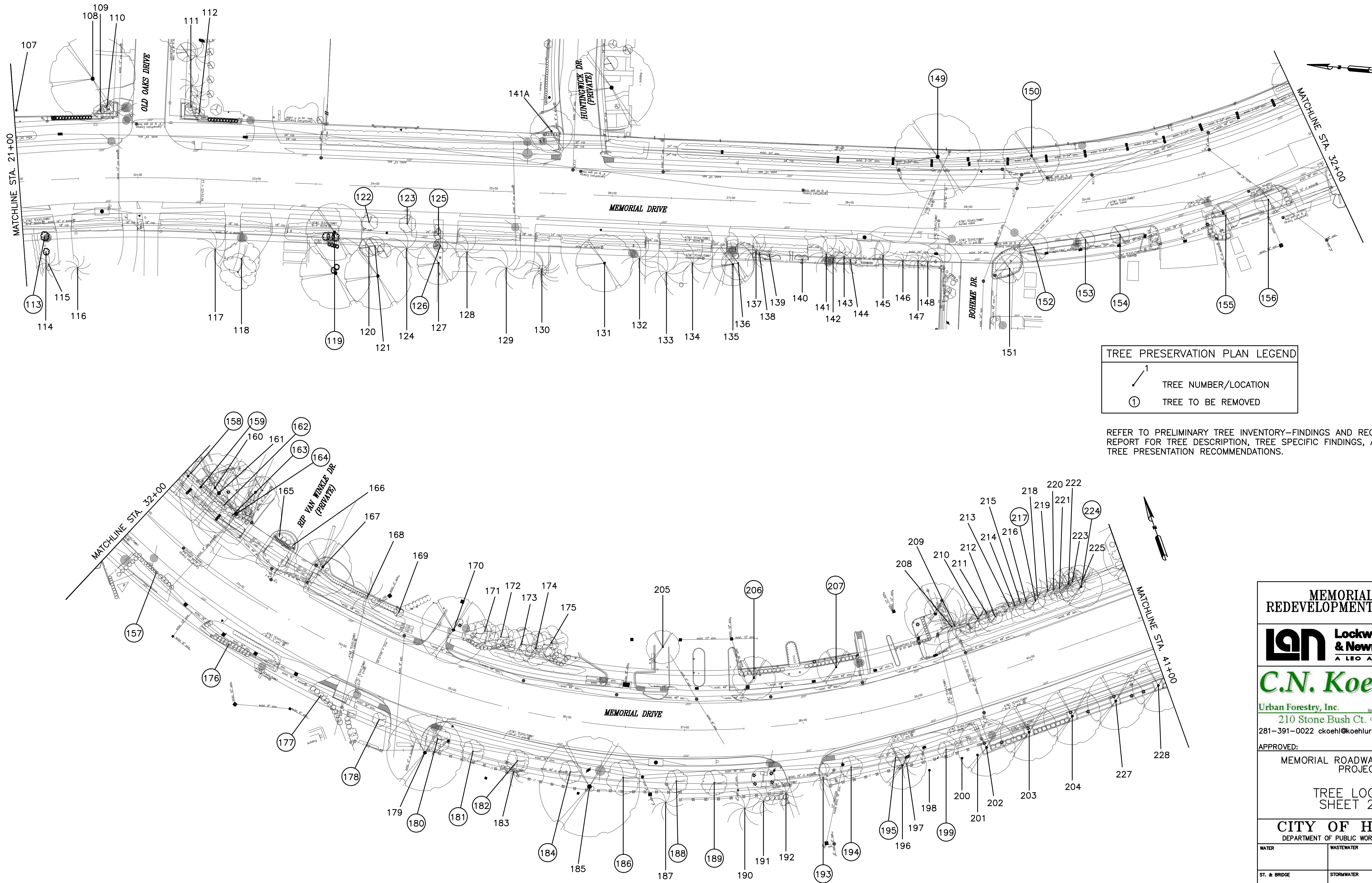
FILE NO.: FACILITY

DRAWING SCALE: CITY DWG. NO. WBS NO. T-170013-0001-3

1"=4'  
1"=40'

SHEET: OF XX





**TREE PRESERVATION PLAN LEGEND**

1 TREE NUMBER/LOCATION

① TREE TO BE REMOVED

REFER TO PRELIMINARY TREE INVENTORY-FINDINGS AND RECOMMENDATION REPORT FOR TREE DESCRIPTION, TREE SPECIFIC FINDINGS, AND SPECIFIC TREE PRESENTATION RECOMMENDATIONS.

**MEMORIAL CITY REDEVELOPMENT AUTHORITY**



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MEMORIAL ROADWAY EXPANSION PROJECT

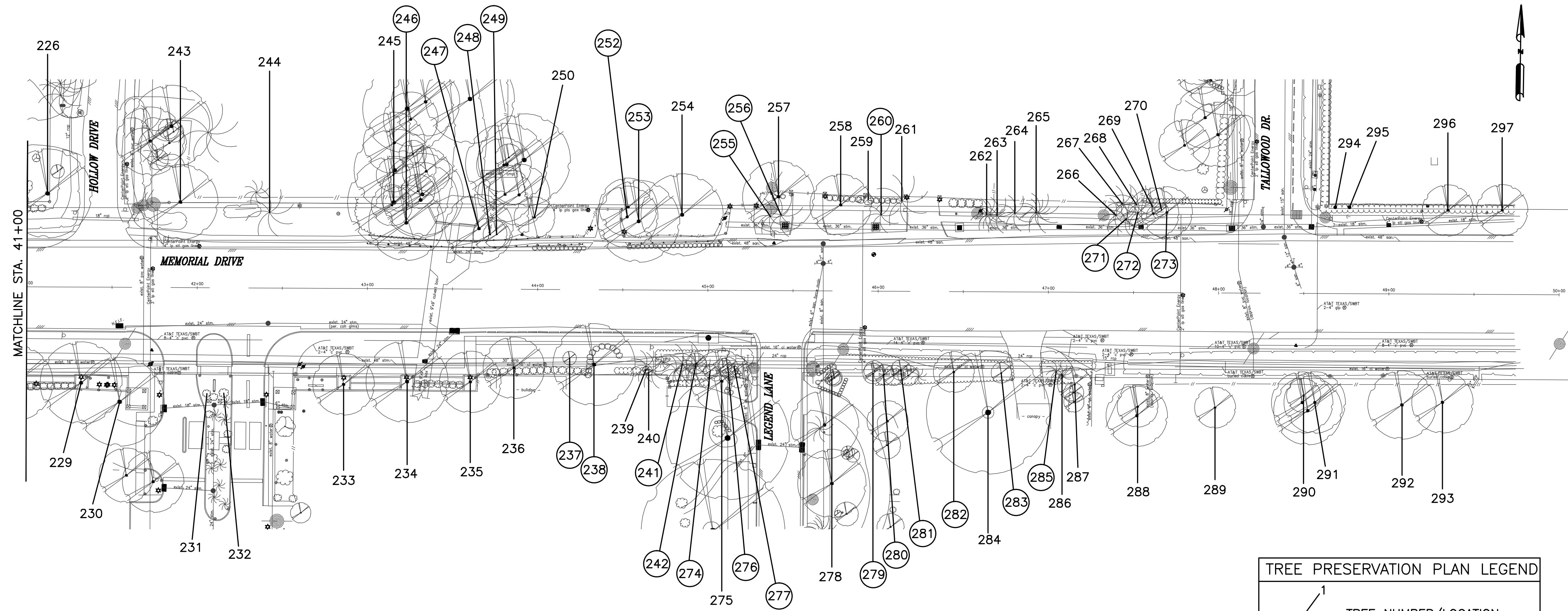
**TREE LOCATIONS SHEET 2 OF 3**

**CITY OF HOUSTON**  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: 1"=4' 1"=40'	CITY DWG. NO. WBS NO. T-170013-0001-3
SHEET: OF XX	





TREE PRESERVATION PLAN LEGEND	
	TREE NUMBER/LOCATION
	TREE TO BE REMOVED

REFER TO PRELIMINARY TREE INVENTORY-FINDINGS AND RECOMMENDATION REPORT FOR TREE DESCRIPTION, TREE SPECIFIC FINDINGS, AND SPECIFIC TREE PRESENTATION RECOMMENDATIONS.

MEMORIAL CITY  
REDEVELOPMENT AUTHORITY

**LAN** Lockwood, Andrews  
& Newnam, Inc.  
A LEO A DALY COMPANY

**C.N. Koehl**  
Urban Forestry, Inc.

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281-391-0022 ckoehl@koehlurbanforestry.com

APPROVED:

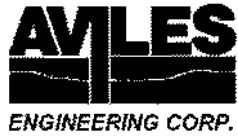
MEMORIAL ROADWAY EXPANSION  
PROJECT

TREE LOCATIONS  
SHEET 3 OF 3

CITY OF HOUSTON  
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:	FACILITY
DRAWING SCALE: 1"=4' 1"=40'	CITY DWG. NO. WBS NO. T-170013-0001-3
SHEET: OF XX	



This document is released for the purpose of interim review under the authority of Wilber L. Wang, P.E. 99226 on September 2, 2015. It is not to be used for bidding or construction

**GEOTECHNICAL INVESTIGATION  
MEMORIAL CITY REDEVELOPMENT AUTHORITY  
MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS  
FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR  
TIRZ 17 CIP No. T-1731B  
WBS NO. N-T17000-031B-4  
HOUSTON, TEXAS**

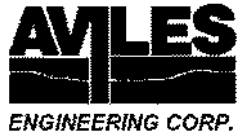
**Reported to:  
Lockwood, Andrews, and Newnam, Inc.  
Houston, Texas**

**by**

**Aviles Engineering Corporation  
5790 Windfern  
Houston, Texas 77041  
713-895-7645**

**REPORT NO. G178-14**

**September 2015**



5790 Windfern Road  
Houston, Texas 77041  
Tel: (713)-895-7645  
Fax: (713)-895-7943

September 2, 2015

Mr. Ricky Gonzalez  
Lockwood, Andrews, and Newnam, Inc.  
2925 Briarpark Drive, Suite 400  
Houston, Texas 77042

**Reference: Geotechnical Investigation  
Memorial City Redevelopment Authority  
Memorial Drive Drainage and Mobility Improvements  
TIRZ 17 CIP No. T1731B  
From West Sam Houston Parkway South to Tallowood Drive  
Houston, Texas  
WBS No.: N-T17000-031B-4  
AEC Report No. G178-14**

Dear Mr. Gonzalez,

Aviles Engineering Corporation (AEC) is pleased to present this draft report of the results of our geotechnical investigation for the above referenced project. Notice to proceed for the project was provided by Mr. Muhammad Ali, P.E., Project Manager of Lockwood, Andrews, and Newnam, Inc. (LAN), on December 12, 2014 via Task Order 1055/2 for Geotechnical Investigation Services, based on AEC proposal G2014-06-05R2, dated August 13, 2014.

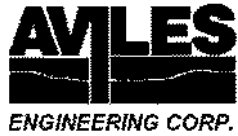
AEC appreciates the opportunity to be of service to you. Please call us if you have any questions or comments concerning this report or when we can be of further assistance.

Respectfully submitted,  
**Aviles Engineering Corporation**  
(TBPE Firm Registration No. F-42)

Wilber L. Wang, P.E.  
Senior Engineer

Shou Ting Hu, M.S.C.E., P.E.  
Principal Engineer

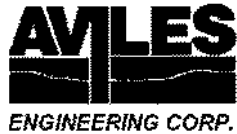
Reports Submitted: 3 Lockwood, Andrews, and Newnam, Inc.  
1 File (electronic)



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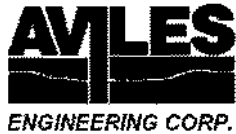
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Plate D-10	Design Parameters for Bearing Thrust Block

### APPENDIX E

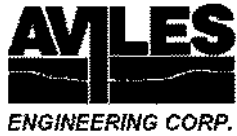
Plates E-1 to E-3	DARWin v3.0 Computer Program Outputs
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## EXECUTIVE SUMMARY

The report submitted herein presents the results of Aviles Engineering Corporation's (AEC) geotechnical investigation for the Memorial City Redevelopment Authority's (MCRA) proposed Memorial Drive Drainage and Mobility Improvements, from W. Sam Houston Parkway S. to Tallowood Drive, in Houston, Texas (Houston/Harris County Key Map Nos.: 489G, H, M, and 490J). A vicinity map is presented on Plate A-1, in Appendix A. Based on drawings (dated August 27, 2015) provided by Lockwood, Andrews, and Newnam, Inc. (LAN), the project alignment is 4,750 linear feet long. The proposed improvements include: (i) installation of approximately of 8 to 16 inch diameter waterline; (ii) installation of 24 to 48 inch diameter reinforced concrete pipe and 10 foot by 10 foot reinforced concrete box storm sewers; and (ii) reconstruction of Memorial Drive with concrete pavement. The waterlines and storm sewers will be installed by open cut method. The invert depth of the storm sewer along the alignment typically varies from approximately 17.4 to 23.8 feet.

1. Subsurface Soil Conditions: Based on the borings, subsurface soil conditions along the project alignment generally consist of approximately 6 to 21 feet of stiff to hard lean/fat clay (CL/CH) at the ground surface, underlain by medium dense to dense silty sand (SP-SM/SM) to the boring termination depths. Approximately 6 feet of clayey sand (SC) was encountered at a depth of 8 feet in Boring B-6, and approximately 0.5 to 4 feet of sandy lean clay (CL) fill was encountered at the ground surface in Borings B-1, and B-5 through B-8.
2. Subsurface Soil Properties: The subsurface clayey soils (CL/CH/SC) encountered in the borings have medium to very high plasticity, with liquid limits (LL) ranging from 26 to 58, and plasticity indices (PI) ranging from 12 to 43. The cohesive soils encountered are classified as "CL" and "CH" type soils and granular soils were classified as "SC", "SM", and "SP-SM" type soils in accordance with ASTM D 2487.
3. Groundwater Conditions: Groundwater was encountered in Boring B-9 at a depth of 23 feet below grade during drilling. Groundwater was not encountered in Borings B-1 through B-8 during drilling. Groundwater was also observed at a depth of 18.6 to 18.9 feet in the piezometer installed at Boring B-9. A detailed description of ground water readings is presented on Table 4 in Section 4.1 of this report.
4. Hazardous Materials: No signs of visual staining or odors were encountered during field drilling or during processing of the soil samples in the laboratory.
5. Geologic Hazards: A desktop study of available literature indicates that the Piney Point West fault crosses the project alignment in the vicinity of the intersection of Broken Bough Road. Limited field observations in the project area will be performed by AEC's Senior Geologist to look for evidence of faulting. A summary of the field observations will be included in AEC's final geotechnical report.
6. Design parameters and recommendations for installation of underground utilities by open cut method are presented in Section 5.2 of this report. Based on the borings and the invert depths indicated on the plan and profile drawings provided by LAN, the majority of the storm sewer trench excavations will encounter granular soils during construction.

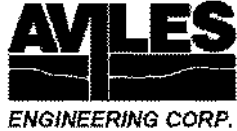


### EXECUTIVE SUMMARY (cont.)

7. Design parameters and recommendations for construction of concrete pavement are presented in Section 5.3 of this report. If the roadway is classified as a 'major collector', AEC recommends that a 10 inch thick concrete pavement with 8 inch thick lime stabilized subgrade be used for the roadway. If the roadway is classified as a 'thoroughfare', AEC recommends that a 11 inch thick concrete pavement with 8 inch thick lime stabilized subgrade be used for the roadway.

This Executive Summary is intended as a summary of the investigation and should not be used without the full text of this report.

DRAFT



**GEOTECHNICAL INVESTIGATION**  
**MEMORIAL CITY REDEVELOPMENT AUTHORITY**  
**MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS**  
**FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR**  
**TIRZ 17 CIP No. T-1731B**  
**WBS NO. N-T17000-031B-4**  
**HOUSTON, TEXAS**

**1.0 INTRODUCTION**

**1.1 General**

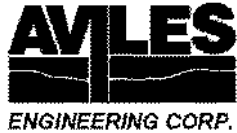
The report submitted herein presents the results of Aviles Engineering Corporation's (AEC) geotechnical investigation for the Memorial City Redevelopment Authority's (MCRA) proposed Memorial Drive Drainage and Mobility Improvements, from W. Sam Houston Parkway S. to Tallowood Drive, in Houston, Texas (Houston/Harris County Key Map Nos.: 489G, H, M, and 490J). A vicinity map is presented on Plate A-1, in Appendix A. Based on drawings (dated August 27, 2015) provided by Lockwood, Andrews, and Newnam, Inc. (LAN), the project alignment is 4,750 linear feet long. The proposed improvements include: (i) installation of approximately of 8 to 16 inch diameter waterline; (ii) installation of 24 to 48 inch diameter reinforced concrete pipe and 10 foot by 10 foot reinforced concrete box storm sewers; and (ii) reconstruction of Memorial Drive with concrete pavement. The waterlines and storm sewers will be installed by open cut method. The invert depth of the storm sewer along the alignment typically varies from approximately 17.4 to 23.8 feet.

**1.2 Purpose and Scope**

The purpose of this geotechnical investigation is to evaluate the subsurface soil conditions along the alignment and develop geotechnical engineering recommendations for design and construction of underground utilities by open cut method and concrete pavement for roadway reconstruction. The scope of this geotechnical investigation is summarized below:

1. Drilling and sampling nine geotechnical borings ranging from 25 to 35 feet below existing grade;
2. Soil laboratory testing on selected soil samples;





3. Engineering analyses and recommendations for the installation of underground utilities by open cut method, including loadings on pipes, bedding, lateral earth pressure parameters, trench stability, and backfill requirements;
4. Engineering analyses and recommendations for roadway reconstruction, including concrete pavement thickness design and subgrade preparation
5. Construction recommendations for installation of underground utilities by open cut method as well as roadway reconstruction.

## 2.0 SUBSURFACE EXPLORATION

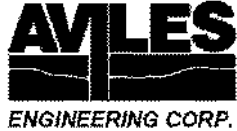
### 2.1 Soil Borings

Boring layout and depths were performed in general accordance with the City of Houston (COH) Infrastructure Design Manual (IDM). The subsurface exploration consisted of drilling and sampling a total of nine borings ranging from 25 to 35 feet below existing grade. The boring locations are shown on the Boring Location Plan on Plate A-2, in Appendix A. Total drilling footage is 260 feet. After completion of drilling, the boring locations were surveyed by Kuo & Associates, Inc. Boring survey data is presented on the boring logs. The boring designations and depths and corresponding underground utility invert depths are presented in Table 1 below.

AEC determined the boring depths prior to drilling based on a preliminary storm sewer profile provided by LAN on July 21, 2015. However, based on plan and profile drawings (dated August 27, 2015), the proposed storm sewer invert depths have increased. As a result, **Borings B-1, B-4, B-5, B-7, and B-8 do not meet the minimum boring depth requirements of the latest edition of the COH IDM. If possible, AEC recommends that the depth of these borings be increased to cover the increase in invert depths. If the boring depths are not increased, AEC will not be liable for any changed soil or groundwater conditions that may be encountered in the vicinity of these boring locations during construction.**

**Table 1. Boring Number, Station, and Depth**

Boring/ PZ No.	Boring/PZ Depth (ft)	Station	Boring Surface Elevation (ft)	Invert Elevation at Boring (ft)	Invert Depth at Boring (ft)
B-1	30	5+96.87	76.67	52.85 (10'x10' RCB)	23.82 (10'x10' RCB)
B-2	30	10+74.41	73.01	52.38 (10'x10' RCB)	20.63 (10'x10' RCB)
B-3/ PZ-1	30/20	15+52.23	71.50	51.89 (10'x10' RCB/ 48" RCP)	19.61 (10'x10' RCB/ 48" RCP)
B-4	25	20+04.90	70.43	51.44 (10'x10' RCB)	18.99 (10'x10' RCB)

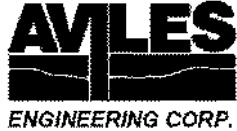


Boring/ PZ No.	Boring/PZ Depth (ft)	Station	Boring Surface Elevation (ft)	Invert Elevation at Boring (ft)	Invert Depth at Boring (ft)
B-5	25	25+04.35	68.55	50.95 (10'x10' RCB)	17.60 (10'x10' RCB)
B-6	35	30+07.15	69.69	50.04 (24" RCP Siphon)	19.65 (24" RCP Siphon)
B-7	25	35+53.12	68.72	49.51 (10'x10' RCB)	19.21 (10'x10' RCB)
B-8	25	40+07.75	66.92	49.05 (10'x10' RCB)	17.87 (10'x10' RCB)
B-9/ PZ-2	35/25	44+43.76	67.19	49.83 (10'x10' RCB)	17.36 (10'x10' RCB)

The field drilling was performed with a truck-mounted drilling rig. Borings B-1 through B-8 were advanced using dry auger method, and Boring B-9 was initially advanced using dry auger method, and then using wet rotary method once water-bearing granular soils were encountered. Undisturbed samples of cohesive soils were obtained from the borings by pushing 3-inch diameter thin-wall, seamless steel Shelby tube samplers in general accordance with ASTM D 1587. Granular soils were sampled with a 2-inch split-barrel sampler in accordance with ASTM D 1586. Standard Penetration Test resistance (N) values were recorded for the granular soils as “Blows per Foot” and are shown on the boring logs. Strength of the cohesive soils was estimated in the field using a hand penetrometer. The undisturbed samples of cohesive soils were extruded mechanically from the core barrels in the field and wrapped in aluminum foil; all samples were sealed in plastic bags to reduce moisture loss and disturbance. The samples were then placed in core boxes and transported to the AEC laboratory for testing and further study. Borings B-3 and B-9 were converted to piezometers upon completion of drilling. The remaining borings were grouted with cement-bentonite. The pavement surface was patched with non-shrink grout.

### **3.0 LABORATORY TESTING PROGRAM**

Soil laboratory testing was performed by AEC personnel. Samples from the borings were examined and classified in the laboratory by a technician under the supervision of a geotechnical engineer. Laboratory tests were performed on selected soil samples in order to evaluate the engineering properties of the foundation soils in accordance with applicable ASTM Standards. Atterberg limits, moisture contents, percent passing a No. 200 sieve, mechanical sieve analysis, and dry unit weight tests were performed on typical samples to establish the index properties and confirm field classification of the subsurface soils. Strength properties of cohesive soils were determined by means of unconfined compression (UC) and undrained-unconsolidated (UU) triaxial tests performed on undisturbed samples. The test results are presented on the boring logs. Details of the soils encountered in the borings are presented on Plates A-3



through A-11, in Appendix A. A key to the boring logs, classification of soils for engineering purposes, terms used on boring logs, and reference ASTM Standards for laboratory testing are presented on Plates A-12 through A-15, in Appendix A. Sieve analysis results are presented on Plate A-16, in Appendix A. A summary of the laboratory test results is presented on Plates A-17 through A-20, in Appendix A.

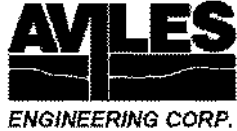
**4.0 SITE CONDITIONS**

Based on our site visit, Memorial Drive is currently a four lane (2 lanes in each direction) asphalt roadway. In general, the existing asphalt pavement surface along the project alignment appears to be in average to very poor condition. At the time of our site visit in July 2015, AEC observed rutting in the outer lanes (mostly in the outer wheel path), abundant longitudinal cracking, some transverse cracking, numerous asphalt patches, a large pothole (near the Chase Bank located at 12802 Memorial Drive), and some surface spalling (near 12827 Memorial Drive).

A summary of pavement types encountered in our borings is presented on Table 2.

**Table 2. Existing Pavement Encountered at Pavement Borings**

<b>Boring No.</b>	<b>Pavement Section</b>
B-1	3" asphalt, 12" stabilized sand and crushed shell
B-2	1.5" asphalt, 4.5" asphalt stabilized shell, 12" crushed shell and gravel
B-3	2" asphalt, 13" stabilized sand and crushed shell
B-4	1" asphalt, 11" stabilized sand and crushed shell
B-5	3" asphalt, 11" stabilized sand and crushed shell
B-6	2.5" asphalt, 4.5" asphalt stabilized shell, 8" stabilized sand and crushed shell
B-7	12" asphalt and asphalt stabilized base (base thickness not determined), 8" stabilized sand and crushed shell
B-8	13" asphalt and asphalt stabilized base (base thickness not determined), stabilized sand and crushed shell
B-9	3" asphalt, 4" asphalt stabilized shell, 8" crushed shell and gravel

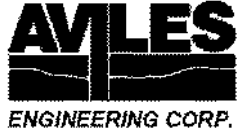


#### 4.1 Subsurface Conditions

Details of the soils encountered during drilling are presented in the boring logs. Soil strata encountered in our borings are summarized below. A generalized subsurface profile along the project alignment is presented on Plates B-1a and B-1b, in Appendix B.

<u>Boring</u>	<u>Depth (ft)</u>	<u>Description of Stratum</u>
B-1	0 - 1.3	Pavement and base: see Table 2
	1.3 - 4	Fill: very stiff, Sandy Lean Clay (CL)
	4 - 8	Stiff to very stiff, Lean Clay w/Sand (CL), with abundant silt partings
	8 - 18	Very stiff to hard, Sandy Lean Clay (CL), with abundant silt partings
	18 - 30	Medium dense, Silty Sand (SM)
B-2	0 - 1.5	Pavement and base: see Table 2
	1.5 - 2	Fill: Sandy Lean Clay (CL), with silt seams and shell
	2 - 6	Very stiff, Fat Clay w/Sand (CH)
	6 - 10	Very stiff, Sandy Fat Clay (CH)
	10 - 20	Very stiff to hard, Sandy Lean Clay (CL), with abundant silt partings
B-3	0 - 1.3	Pavement and base: see Table 2
	1.3 - 10	Very stiff, Fat Clay w/Sand (CH), with abundant silt partings
	10 - 14	Very stiff, Sandy Lean Clay (CL), with abundant silt partings
	14 - 18	Hard, Fat Clay w/Sand (CH), with abundant silt partings
	18 - 30	Medium dense, Poorly Graded Sand w/Silt (SP-SM)
B-4	0 - 1	Pavement and base: see Table 2
	1 - 8	Very stiff, Fat Clay w/Sand (CH), with abundant silt partings
	8 - 16	Very stiff to hard, Sandy Lean Clay (CL), with abundant silt partings and siltstone fragments
	16 - 25	Dense, Silty Sand (SM)
B-5	0 - 1.2	Pavement and base: see Table 2
	1.2 - 2	Fill: stiff, Lean Clay w/Sand (CL), with silt partings and shell
	2 - 12	Stiff to hard, Lean Clay w/Sand (CL), with abundant silt partings
	12 - 18	Stiff to very stiff, Sandy Lean Clay (CL), with abundant silt partings
	18 - 25	Medium dense, Poorly Graded Sand w/Silt (SP-SM)
B-6	0 - 1.3	Pavement and base: see Table 2
	1.3 - 4	Fill: firm to stiff, Sandy Lean Clay (CL), with shell
	4 - 8	Very stiff, Sandy Lean Clay (CL), with abundant silt partings
	8 - 14	Clayey Sand (SC), with abundant silt partings
	14 - 21	Stiff to very stiff, Sandy Fat Clay (CH)
	21 - 35	Medium dense to dense, Silty Sand (SM)



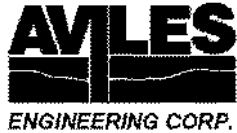


<u>Boring</u>	<u>Depth (ft)</u>	<u>Description of Stratum</u>
B-7	0 - 1.7	Pavement and base: see Table 2
	1.7 - 2	Fill: Sandy Lean Clay (CL), with sand seams and siltstone fragments
	2 - 8	Stiff to hard, Lean Clay w/Sand (CL), with abundant silt partings and siltstone fragments
	8 - 14	Very stiff to hard, Sandy Fat Clay (CH), with abundant silt partings
	14 - 20	Very stiff to hard, Sandy Lean Clay (CL), with abundant silt partings
	20 - 25	Medium dense, Silty Sand (SM)
B-8	0 - 1.5	Pavement and base: see Table 2
	1.5 - 2	Fill: Clayey Sand (SC), with shell
	2 - 10	Stiff to hard, Lean Clay w/Sand (CL), with silt partings and siltstone fragments
	10 - 18	Stiff to very stiff, Sandy Lean Clay (CL), with abundant silt partings
	18 - 20	Medium dense, Clayey Sand (SC)
	20 - 25	Medium dense, Silty Sand (SM)
B-9	0 - 1.3	Pavement and base: see Table 2
	1.3 - 4	Very stiff, Lean Clay w/Sand (CL), with abundant silt partings
	4 - 8	Very stiff to hard, Fat Clay w/Sand (CH), with abundant silt partings and siltstone fragments
	8 - 18	Stiff to very stiff, Lean Clay w/Sand (CL), with abundant silt partings
	18 - 35	Medium dense to dense, Silty Sand (SM)

A summary of granular soils encountered in the borings is presented in Table 3.

**Table 3. Granular Soils Encountered in Borings**

<b>Boring</b>	<b>Depth to Granular Soil</b>	<b>Soil Type</b>
B-1	18' to 30'	Medium dense, Silty Sand (SM)
B-2	20' to 30'	Dense, Poorly Graded Sand w/Silt (SP-SM)
B-3	18' to 30'	Medium dense, Poorly Graded Sand w/Silt (SP-SM)
B-4	16' to 25'	Dense, Silty Sand (SM)
B-5	18' to 25'	Medium dense, Poorly Graded Sand w/Silt (SP-SM)
B-6	8' to 14'	Clayey Sand (SC)
	21' to 35'	Medium dense to dense, Silty Sand (SM)
B-7	20' to 25'	Medium dense, Silty Sand (SM)
B-8	1.5' to 2'	Fill: Clayey Sand (SC)
	18' to 25'	Medium dense, Clayey/Silty Sand (SC/SM)
B-9	18' to 35'	Medium dense to dense, Silty Sand (SM)



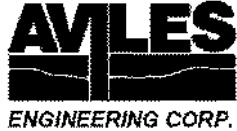
Subsurface Soil Properties: The subsurface clayey soils (CL/CH/SC) encountered in the borings have medium to very high plasticity, with liquid limits (LL) ranging from 26 to 58, and plasticity indices (PI) ranging from 12 to 43. The cohesive soils encountered are classified as “CL” and “CH” type soils and granular soils were classified as “SC”, “SM”, and “SP-SM” type soils in accordance with ASTM D 2487. High plasticity clays can undergo significant volume changes due to seasonal changes in moisture contents. “CH” soils undergo significant volume changes due to seasonal changes in soil moisture contents. “CL” type soils with lower LL (less than 40) and PI (less than 20) generally do not undergo significant volume changes with changes in moisture content. However, “CL” soils with LL approaching 50 and PI greater than 20 essentially behave as “CH” soils and could undergo significant volume changes.

Groundwater Conditions: Groundwater was encountered in Boring B-9 at a depth of 23 feet below grade during drilling. Groundwater was not encountered in Borings B-1 through B-8 during drilling. After completion of drilling, Borings B-3 and B-9 were converted to piezometers. Piezometer installation details are presented on Plates B-2 and B-3, in Appendix B. Detailed groundwater levels are summarized in Table 4.

**Table 4. Groundwater Depths below Existing Ground Surface**

Boring/PZ No.	Date Drilled	Boring/PZ Depth (ft)	Groundwater Depth (ft)	Boring Cave-in Depth (ft)	Groundwater Depth in Piezometer (ft)
B-1	8/4/15	30	Dry (Drilling)	-	-
B-2	8/8/15	30	Dry (Drilling)	-	-
B-3/ PZ-1	8/3/15	30/20	Dry (Drilling)	-	Dry (8/6/15) Dry (9/2/15)
B-4	8/3/15	25	Dry (Drilling)	-	
B-5	8/3/15	25	Dry (Drilling)	-	
B-6	8/4/15	35	Dry (Drilling)	-	
B-7	8/5/15	25	Dry (Drilling)	-	
B-8	8/5/15	25	Dry (Drilling)	-	
B-9/ PZ-2	8/4/15	35/25	23 (Drilling)	18.3 (Drilling)	18.9 (8/6/15) 18.6 (9/2/15)

The information in this report summarizes conditions found on the dates the borings were drilled. It should be noted that our groundwater observations are short-term; groundwater depths and subsurface soil moisture contents will vary with environmental variations such as frequency and magnitude of rainfall and



the time of year when construction is in progress.

#### **4.2 Hazardous Materials**

No signs of visual staining or odors were encountered during field drilling or during processing of the soil samples in the laboratory.

#### **4.3 Geologic Conditions**

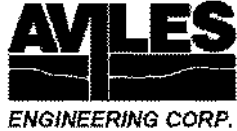
AEC performed a preliminary fault investigation, which included a review of available literature, aerial photographs, public maps, and limited field observations. According to the published maps "*Principal Active Faults of the Houston Area (after O'Neill and Van Siclen, May 1984)*", and "*Principal Faults in the Houston, Texas, Metropolitan Area (Shah and Lanning-Rush 2005)*", the Piney Point West fault crosses the project alignment in the vicinity of Memorial Drive and the intersection of Broken Bough Drive.

AEC's Senior Geologist will visit the site to perform limited field observations to attempt to identify evidences of faulting along the alignment. These observations will be included in the final geotechnical report.

Limitations: The preliminary fault investigation provided in this report is limited to a review of literature, aerial photographs and maps and our limited field observations, and distances are scaled from maps. Faults may exist in the project area or surrounding area due to the following reasons: not observed during the reconnaissance due to limitations of the scope of work and cost; the presence of obscuring vegetation and environmental features; modification of the land surface by human activities; and lack of documentation in the literature. Faults may also be present below ground but do not currently have surface expressions. Identification of these faults is beyond the scope of work for this project. The observations made during the fault reconnaissance represent conditions at the time of the reconnaissance.

#### **4.4 Subsurface Variations**

It should be emphasized that: (i) at any given time, groundwater depths can vary from location to location, and (ii) at any given location, groundwater depths can change with time. Groundwater depths will vary



with seasonal rainfall and other climatic/environmental events. Subsurface conditions may vary away from and in between the boring locations.

Clay soils in the Houston area typically have secondary features such as slickensides and contain sand/silt seams/lenses/layers/pockets. It should be noted that the information in the boring logs is based on 3-inch diameter soil samples. Samples were obtained continuously at intervals of 2 feet from the ground surface to a depth of 20 feet in the borings, then at intervals of 5 feet thereafter to the boring termination depths. A detailed description of the soil secondary features may not have been obtained due to the small sample size and sampling interval between the samples. Therefore, while a boring log shows some soil secondary features, it should not be assumed that the features are absent where not indicated on the boring logs.

## **5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS**

Based on drawings (dated August 27, 2015) provided by LAN, the project alignment is 4,750 linear feet long. The proposed improvements include: (i) installation of approximately of 8 to 16 inch diameter waterline; (ii) installation of 24 to 48 inch diameter reinforced concrete pipe and 10 foot by 10 foot reinforced concrete box storm sewers; and (ii) reconstruction of Memorial Drive with concrete pavement. The waterlines and storm sewers will be installed by open cut method. The invert depth of the storm sewer along the alignment typically varies from approximately 17.4 to 23.8 feet.

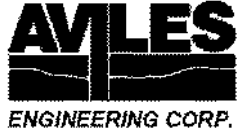
### **5.1 Geotechnical Parameters for Underground Utilities**

Recommended geotechnical parameters for the subsurface soils along the alignment to be used for design of underground utilities are presented on Plates C-1 and C-2, in Appendix C. The design values are based on the results of field and laboratory test data on individual boring logs as well as our experience. It should be noted that because of the variable nature of soil stratigraphy, soil types and properties along the alignment or at locations away from a particular boring may vary substantially.

### **5.2 Installation of Underground Utilities by Open-Cut Method**

Waterlines and storm sewers installed by open cut method should be designed and installed in accordance with Sections 02511 and 02631 of the latest edition of the City of Houston Standard Construction





Specifications (COHSCS).

5.2.1 Loadings on Pipes

Underground utilities support the weight of the soil and water above the crown, as well as roadway traffic and any structures that exist above the utilities.

Earth Loads: For underground utilities to be installed using open cut methods, the vertical soil load  $W_e$  can be calculated as the larger of the two values from Equations (1) and (3):

$$W_e = C_d \gamma B_d^2 \quad \text{.....Equation (1)}$$

$$C_d = [1 - e^{-2K\gamma(H/B_d)}] / (2K\gamma) \quad \text{.....Equation (2)}$$

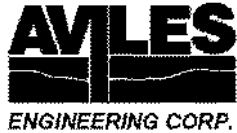
$$W_e = \gamma_e H \quad \text{.....Equation (3)}$$

- where:
- $W_e$  = trench fill load, in pounds per linear foot (lb/ft);
  - $C_d$  = trench load coefficient, see Plate C-3, in Appendix C;
  - $\gamma$  = effective unit weight of soil over the conduit, in pounds per cubic foot (pcf);
  - $B_d$  = trench width at top of the conduit  $< 1.5 B_c$  (ft);
  - $B_c$  = outside diameter of the conduit (ft);
  - $H$  = variable height of fill (ft);  
 when the height of fill above the top of the conduit  $H_c > 2 B_d$ ,  $H = H_h$  (height of fill above the middle of the conduit). When  $H_c < 2 B_d$ ,  $H$  varies over the height of the conduit; and
  - $K\gamma$  = 0.1650 maximum for sand and gravel,  
 0.1500 maximum for saturated top soil,  
 0.1300 maximum for ordinary clay,  
 0.1100 maximum for saturated clay.

When underground conduits are located below groundwater, the total vertical dead loads should include the weight of the projected volume of water above the conduits.

Traffic Loads: The vertical stress on top of an underground conduit,  $p_L$  (psf), resulting from traffic loads (from a HS-20 truck) can be obtained from Plate C-4, in Appendix C. The live load on top of the underground conduit can be calculated from Equation (4):

$$W_L = p_L B_c \quad \text{.....Equation (4)}$$



where:  $W_L$  = live load on the top of the conduit (lb/ft);  
 $p_L$  = vertical stress (on the top of the conduit) resulting from traffic loads (psf);  
 $B_c$  = outside diameter of the conduit, (ft);

Lateral Loads: The lateral soil pressure  $p_l$  can be calculated from Equation (5); hydrostatic pressure should be added, if applicable.

$$p_l = 0.5 (\gamma H_h + p_s) \quad \text{.....Equation (5)}$$

where:  $H_h$  = height of fill above the center of the conduit (ft);  
 $\gamma$  = effective unit weight of soil over the conduit (pcf);  
 $p_s$  = vertical pressure on conduit resulting from traffic and/or construction equipment (psf).

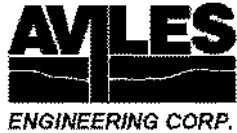
### 5.2.2 Trench Stability

Cohesive soils in the Houston area contain many secondary features which affect trench stability, including sand seams and slickensides. Slickensides are shiny weak failure planes which are commonly present in fat clays; such clays often fail along these weak planes when they are not laterally supported, such as in an open excavation. The Contractor should not assume that slickensides and sand seams/layers/pockets are absent where not indicated on the logs.

The Contractor should be responsible for designing, constructing and maintaining safe excavations. The excavations should not cause any distress to existing structures.

Trenches 20 feet and Deeper: The Occupational Safety and Health Administration (OSHA) requires that shoring or bracing for trenches 20 feet and deeper be specifically designed by a licensed professional engineer.

Trenches Less than 20 Feet Deep: Trench excavations that are less than 20 feet deep may be shored, sheeted and braced, or laid back to a stable slope for the safety of workers, the general public, and adjacent structures, except for excavations which are less than 5 feet deep and verified by a competent person to have no cave-in potential. The excavation and trenching should be in accordance with OSHA Safety and Health Regulations, 29 CFR, Part 1926. Recommended OSHA soil types for trench design for existing soils can be found on Plates C-1 and C-2, in Appendix C. Fill soils are considered OSHA Class ‘C’; submerged cohesive soils should also be considered OSHA Class ‘C’, unless they are dewatered first.



Critical Height is defined as the height a slope will stand unsupported for a short time; in cohesive soils, it is used to estimate the maximum depth of open-cuts at given side slopes. Critical Height may be calculated based on the soil cohesion. Values for various slopes and cohesion are shown on Plate D-1, in Appendix D. Cautions listed below should be exercised in use of Critical Height applications:

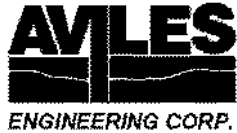
1. No more than 50 percent of the Critical Height computed should be used for vertical slopes. Unsupported vertical slopes are not recommended where granular soils or soils that will slough when not laterally supported are encountered within the excavation depth.
2. If the soil at the surface is dry to the point where tension cracks occur, any water in the crack will increase the lateral pressure considerably. In addition, if tension cracks occur, no cohesion should be assumed for the soils within the depth of the crack. The depth of the first waler should not exceed the depth of the potential tension crack. Struts should be installed before lateral displacement occurs.
3. Shoring should be provided for excavations where limited space precludes adequate side slopes, e.g., where granular soils will not stand on stable slopes and/or for deep open cuts.
4. All excavation, trenching and shoring should be designed and constructed by qualified professionals in accordance with OSHA requirements.

The maximum (steepest) allowable slopes for OSHA Soil Types for excavations less than 20 feet are presented on Plate D-2, in Appendix D.

If limited space is available for the required open trench side slopes, the space required for the slope can be reduced by using a combination of bracing and open cut as illustrated on Plate D-3, in Appendix D. Guidelines for bracing and calculating bracing stress are presented below.

Computation of Bracing Pressures: The following method can be used for calculating earth pressure against bracing for open cuts. Lateral pressure resulting from construction equipment, traffic loads, or other surcharge should be taken into account by adding the equivalent uniformly distributed surcharge to the design lateral pressure. Hydrostatic pressure, if any, should also be considered. The active earth pressure at depth  $z$  can be determined by Equation (6). The design soil parameters for trench bracing design are presented on Plates C-1 and C-2, in Appendix C.

$$p_a = (q_s + \gamma h_1 + \gamma' h_2) K_a - 2c \sqrt{K_a} + \gamma_w h_2 \quad \text{.....Equation (6)}$$



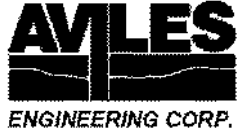
where:  $p_a$  = active earth pressure (psf);  
 $q_s$  = uniform surcharge pressure (psf);  
 $\gamma$   $\dot{\gamma}$  = wet unit weight and buoyant unit weight of soil (pcf);  
 $h_1$  = depth from ground surface to groundwater table (ft);  
 $h_2$  =  $z-h_1$ , depth from groundwater table to the point under consideration (ft);  
 $z$  = depth below ground surface for the point under consideration (ft);  
 $K_a$  = coefficient of active earth pressure;  
 $c$  = cohesion of clayey soils (psf);  $c$  can be omitted conservatively;  
 $\gamma$  = unit weight of water, 62.4 pcf.

Pressure distribution for the practical design of struts in open cuts for clays and sands are illustrated on Plates D-4 through D-6, in Appendix D.

Bottom Stability: In open-cuts, it is necessary to consider the possibility of the bottom failing by heaving, due to the removal of the weight of excavated soil. Heaving typically occurs in soft plastic clays when the excavation depth is sufficiently deep enough to cause the surrounding soil to displace vertically due to bearing capacity failure of the soil beneath the excavation bottom, with a corresponding upward movement of the soils in the bottom of the excavation. In fat and lean clays, heave normally does not occur unless the ratio of Critical Height to Depth of Cut approaches one. In very sandy and silty lean clays and granular soils, heave can occur if an artificially large head of water is created due to installation of impervious sheeting while bracing the cut. This can be mitigated if groundwater is lowered below the excavation by dewatering the area. Guidelines for evaluating bottom stability in clay soils are presented on Plate D-7, in Appendix D.

Based on the invert depths presented on Table 1 in Section 2.1 of this report and the depth to granular soils presented on Table 3 in Section 4.1 of this report, AEC anticipates that open cut excavations for storm sewers will encounter granular soils within the trench or box/pipe bedding zone for the entire project alignment (Borings B-1 through B-9), and will encounter groundwater within the trench or box/pipe bedding zone in the vicinity of Boring B-9. If the excavation extends below groundwater and the soils at or near the bottom of the excavation are mainly sands or silts, the bottom can fail by blow-out (boiling) when a sufficient hydraulic head exists. The potential for boiling or in-flow of granular soils increases where the groundwater is pressurized. To reduce the potential for boiling of excavations terminating in granular soils below pressurized groundwater, the groundwater table should be lowered at least 5 feet below the excavation in accordance with Section 01578 of the latest edition of the City of Houston Standard General Requirement (COHSGR).





Calcareous nodules, silt/sand seams, and fat clays with slickensides were encountered in some of the borings. These secondary structures may become sources of localized instability when they are exposed during excavation, especially when they become saturated. Such soils have a tendency to slough or cave in when not laterally confined, such as in trench excavations. The Contractor should be aware of the potential for cave-in of the soils. Low plasticity soils (silts and clayey silts) will lose strength and may behave like granular soils when saturated.

5.2.3 Thrust Force Design Recommendations

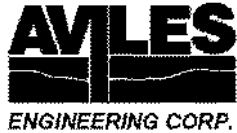
Thrust forces are generated in pressure pipes, typically as a result of changes in pipe diameter, pipe direction or at the termination point of the pipes. The pipes could disengage at the joints if the forces are not balanced and if the pipe restraint is not adequate. Various methods of thrust restraint are used including thrust blocks, restrained joints, encasement, and tie-rods.

Thrust restraint design procedure based on the 2008 American Water Works Association (AWWA) Manuals “Pressurized Concrete Pipe (M9)” and “Steel Water Pipe (M11)” is discussed below. Plate D-8, in Appendix D shows the force diagram generated by flow in a bend in a pipe and also gives the equation for computing the thrust force. An example computation of a thrust force for a given surge pressure and a bend angle is presented on Plate D-9, in Appendix D.

Frictional Resistance: The unbalanced force due to changes in grade and alignment can be resisted by frictional force  $F_R$ , between the pipe and the surrounding soil. The resisting frictional force per linear foot of pipe against soil can be calculated from Equation (7):

$$F_R = f (2W_e + W_w + W_p) \quad \text{.....Equation (7)}$$

- where:  $f$  = Coefficient of friction between pipe and soil;  
 $W_e$  = Weight of soil over pipe (lb/ft);  
 $W_w$  = Weight of water inside the pipe (lb/ft);  
 $W_p$  = Weight of pipe (lb/ft).



The value of the frictional resistance depends on the material in contact with the backfill and the soil used in the backfill. For a ductile iron pipe or steel pipe with crushed stone or compacted sand backfill, an allowable coefficient of friction of 0.3 can be used. To account for submerged conditions, a soil unit weight of 60 pcf should be used to compute the weight of compacted backfill on the pipe.

Thrust Blocks: Thrust blocks utilize passive earth pressures to resist forces generated by changes in direction or diameter of pressurized pipes. Passive earth pressure can be calculated using Equation (8); we recommend that a factor safety of 2.0 be used when using passive earth pressure for design of thrust blocks. The design soil parameters for thrust block design are presented on Plates C-1 and C-2, in Appendix C. Design parameters for bearing thrust blocks are presented on Plate D-10, in Appendix D.

$$p_p = \gamma K_p + 2c(K_p)^{1/2} \quad \text{.....Equation (8)}$$

- where,  $p_p$  = passive earth pressure (psf);
- $\gamma$  = wet unit weight of soil (pcf);
- $z$  = depth below ground surface for the point under consideration (ft);
- $K_p$  = coefficient of passive earth pressure;
- $c$  = cohesion of clayey soils (psf).

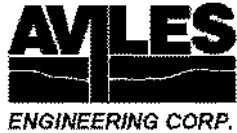
#### 5.2.4 Bedding and Backfill

Trench excavation, pipe embedment material, and backfill for the proposed waterlines and storm sewers should be in general accordance with Section 02317 of the latest edition of the COHSCS.

### 5.3 **Pavement Reconstruction**

Based on drawings provided by LAN, Memorial Drive is currently a 4 lane asphalt roadway (2 lanes in each direction), that will be reconstructed with concrete pavement. The reconstructed roadway will typically vary from 4 to 5 lanes. The right of way (ROW) of the project alignment is 100 feet. Pavement profile drawings were not available at the time this report was prepared. AEC assumes that the new pavement will be placed at or near existing grade.

The pavement design recommendations developed below are in accordance with the “AASHTO Guide for Design of Pavement Structures,” 1993 edition.



5.3.1 Estimation of Traffic Loading

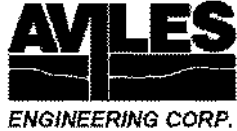
COH Infrastructure Design Manual Requirements: The latest edition of Chapter 10 of the COH IDM requires that concrete pavement have a 28 day compressive strength of 4,000 psi and a minimum reinforcing steel yield strength of 60,000 psi. The minimum design life span of the concrete pavement is 50 years. Minimum concrete and subgrade thickness is dependent on the classification of the roadway. A ‘collector’ requires a minimum concrete slab thickness of 9 inches and a minimum stabilized subgrade thickness of 6 inches for granular soil and a minimum thickness of 8 inches for cohesive soil. A ‘thoroughfare’ requires a minimum concrete slab thickness of 11 inches and a minimum stabilized subgrade thickness of 8 inches.

Traffic Volume: Turning movement counts along the project alignment were provided to AEC by LAN. The turning movement count data is for AM and PM peak hours, and includes counts for 2015, projected 2016 (assuming the improvements are constructed), and projected 2030 traffic levels. AEC selected the most critical turning movement counts (averaged over each intersection along the alignment) and added the AM and PM peak counts together. AEC assumed that the AM and PM peak hour counts are approximately 20 percent of the daily vehicle count along the alignment. Based on the turning movement counts provided, AEC estimated that the 24 hour traffic volume for 2015 was 18,655 vehicles per day (vpd), the 2016 traffic volume to be 20,565 vpd, and the 2030 traffic volume to be 23,240 vpd. AEC should be notified if different traffic count information should be used for design, so that our recommendations can be updated as necessary.

Estimate Anticipated Traffic Loads: Pavement design is based on the anticipated design number of 18-kip Equivalent Single Axle Loads (ESAL) the pavement is subjected to during its design life. The equation to calculate the number of 18-kip ESAL repetitions to use for pavement design is presented in Equation (9). Assumptions made by AEC to estimate 18-kip ESAL repetitions are presented on Table 5.

$$18\text{-kip ESAL} = (\text{ADT})(T)(T_f)(D)(L)(G)(Y)(365) \quad \text{.....Equation (9)}$$

- where: ESAL = 18-kip Equivalent Single-Axle Load repetitions;
- ADT = Average Daily Traffic, vehicles per day;
- T = Percent of heavy trucks;
- T<sub>f</sub> = Truck factor;
- D = Directional factor;
- L = Lane factor;



G = Growth factor;  
 Y = Design life, in years.

**Table 5. Parameters for Estimation of Traffic Loads for Memorial Drive**

Parameters	Between Sam Houston Parkway and Tallowood
Average Daily Traffic (ADT)	18,655 vpd (2015)
Percent Heavy Trucks (T)	2% (assumed)
Truck factor ( $T_f$ )	1.5 (assumed)
Directional factor (D)	0.5 (2 lanes in each direction)
Lane factor (L)	1.0 (2 lanes in each direction)
Total Growth Rate Factor (G)	1.41 (1.4% annual growth rate from 2015 to 2030)
Design life (Y)	50 years (required by COH IDM)
Estimated 18-kip ESAL Loading over Design Life	7,200,597

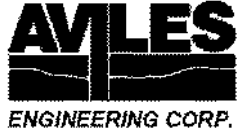
AEC notes that calculated number of 18-kip ESAL repetitions is highly sensitive to parameters such as design life, percent heavy trucks, truck factor, and traffic volume growth rate in pavement design. Differences between assumed and actual traffic parameters can have significant effects on overall pavement thickness design and ultimate roadway performance. AEC should be notified if different traffic loads or design parameters are required for pavement design at the site so that our analysis can be updated accordingly.

5.3.2 Rigid Pavement

Rigid pavement design is based on the anticipated design number of 18-kip ESALs the pavement is subjected to during its design life. The parameters that were used in computing the rigid pavement section are as follows:

Overall Standard Deviation ( $S_0$ )	0.35
Initial Serviceability ( $P_0$ )	4.5
Terminal Serviceability ( $P_t$ )	2.0
Reliability Level (R)	95%
Overall Drainage Coefficient ( $C_d$ )	1.2 (curb and gutter)
Load Transfer Coefficient (J)	3.2
Loss of Support Category (LS)	1.2
Roadbed Soil Resilient Modulus ( $M_R$ )	3,000 psi





Elastic Modulus ( $E_{sb}$ ) of Stabilized Soils	30,000 psi
Composite Effective Modulus of Subgrade Reaction (k)	74 pci
Concrete Compressive Strength ( $f'_c$ )	4,000 psi (at 28 days)
Mean Concrete Modulus of Rupture ( $S'_c$ )	600 psi (at 28 days)
Concrete Elastic Modulus ( $E_c$ )	$3.6 \times 10^6$ psi

**Table 6. Recommended Rigid Pavement Section for Memorial Drive**

Pavement Layer	‘Major Collector’	‘Thoroughfare’
Portland Cement Concrete	10	11
Lime stabilized Subgrade	8	8

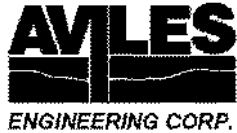
Note: Lime stabilized subgrade recommendations are presented in Section 5.3.4 of this report.

Based on the estimated traffic volume and a 100 foot wide ROW, it appears that Memorial Drive can be classified as either a ‘major collector’ or a ‘thoroughfare’, based on the COH Major Thoroughfare and Freeway Plan (MTFP). AEC notes that the latest edition of the IDM requires a minimum concrete thickness of 9 inches for a ‘collector’ and a minimum concrete thickness of 11 inches for a ‘thoroughfare’.

AEC used the DARWin v3.0 computer program to perform rigid pavement design. Outputs from the DARWin program are presented on Plates E-1 through E-3, in Appendix E. Based on the DARWin program, a 9.7 inch thick concrete pavement will be required to sustain the estimated design 18-kip ESAL loading of 7,200,59 (see Plate E-1, in Appendix E). The design engineer should verify whether the proposed pavement section will provide enough 18-kip ESALs for the anticipated amount of site traffic. AEC should be notified if different standards or constants are required for pavement design at the site, so that our recommendations can be updated accordingly.

Major Collector: If Memorial Drive is classified as a ‘major collector’, the pavement along Memorial Drive between Sam Houston Parkway and Tallowood Drive should be 10 inch thick concrete and 8 inch thick lime stabilized subgrade. Given the above design parameters, a 10 inch thick concrete pavement section should sustain 8,832,161 repetitions of 18-kip ESALs (see Plate E-2, in Appendix E), which meets or exceeds the design 18-kip ESAL loading presented in Table 5 above.

Thoroughfare: If Memorial Drive is classified as a ‘thoroughfare’, the pavement along Memorial Drive between Sam Houston Parkway and Tallowood Drive should be 11 inch thick concrete and 8 inch thick lime stabilized subgrade. Given the above design parameters, a 11 inch thick concrete pavement section



should sustain 16,537,788 repetitions of 18-kip ESALs (see Plate E-3, in Appendix E), which meets or exceeds the design 18-kip ESAL loading presented in Table 5 above.

Concrete Pavement: Portland Cement Concrete (PCC) pavement should be constructed in accordance with Section 02751 of the latest edition of the COHSCS. AEC notes that there is a discrepancy between the requirements of the latest edition of the COHSCS and the latest edition of the COH IDM. Chapter 10 of the latest edition of the COH IDM requires a minimum 28-day concrete compressive strength of 4,000 psi to be used for concrete pavement design. However, according to Section 02751, concrete mix design has a required flexural strength of 600 psi at 28 days and field testing shall confirm a minimum concrete compressive strength of 3,500 psi at 28 days. In regards to this discrepancy, AEC recommends that the concrete mix design be performed to achieve a concrete compressive strength of 4,000 psi at 28 days, and also meets a minimum concrete flexural strength of 500 psi at 7 days and 600 psi at 28 days.

5.3.3 Reinforcing Steel

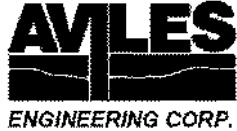
Reinforcing steel should be in accordance with Section 02751 of the latest edition of the COHSCS. Reinforcing steel is required to control pavement cracks, deflections across pavement joints and resist warping stresses in rigid pavements. The cross-sectional area of steel ( $A_s$ ) required per foot of slab width can be calculated as follows (for both longitudinal and transverse steel).

$$A_s = FLW/(2f_s) \quad \dots\dots\dots \text{Equation (10)}$$

- where:  $A_s$  = Required cross-sectional area of reinforcing steel per foot width of pavement, in<sup>2</sup>
- $F$  = Coefficient of resistance between slab and subgrade,  $F = 1.8$  for stabilized soil
- $L$  = Distance between free transverse joints or between free longitudinal edges, ft.
- $W$  = Weight of pavement slab per foot of width, lbs/ft
- $f_s$  = Allowable working stress in steel,  $0.75 \times$  (yield strength), psi  
i.e.  $f_s = 45,000$  psi for Grade 60 steel.

5.3.4 Pavement Subgrade Preparation

Roadway grading and fill should be performed in general accordance with Section 02315 of the latest edition of the COHSCS. Existing pavement should be demolished in accordance with Section 02221 of the latest edition of the COHSCS. Where possible, subgrade preparation should extend a minimum of 2 feet beyond the paved area perimeters. After demolition of existing pavement, we recommend that a competent



soil technician inspect the exposed subgrade to determine if there are any unsuitable soils or other deleterious materials. Excavate and dispose of unsuitable soils and other deleterious materials which will not consolidate; the excavation depth should be increased when inspection indicates the presence of organics and deleterious materials to greater depths. Unsuitable soil is defined in Section 02319 of the latest edition of the COHSCS. The exposed soils should be proof-rolled (see below) to identify and remove any weak, compressible, or other unsuitable materials; such over-excavations should be backfilled in general accordance with Section 02315 of the latest edition of the COHSCS. Proof rolling should be performed with a pneumatic tire roller (or using equivalent compaction equipment), with a loaded weight between 25 and 50 tons. At least two coverages should be made with the proof-roller, and offset each trip of the roller by at most 1 tire width. Rollers should make passes at a speed between 2 and 6 miles per hour.

Scarify areas to be filled to a depth of 4 inches to bond existing and new materials, and then mix with the first fill layer in accordance with Section 02315 of the latest edition of the COHSCS. Cut and pulverize material to bottom of subgrade, then stabilize the subgrade with at least 6 percent hydrated lime by dry soil weight. Lime stabilization shall be performed in accordance with Section 02336 of the latest edition of the COHSCS. The stabilized soils should be compacted to 95 percent of their ASTM D 698 (Standard Proctor) dry density at a moisture content ranging from optimum to 3 percent above optimum.

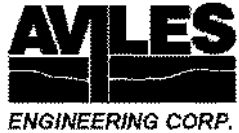
## **6.0 CONSTRUCTION CONSIDERATIONS**

### **6.1 Site Preparation**

To mitigate site problems that may develop following prolonged periods of rainfall, it is essential to have adequate drainage to maintain a relatively dry and firm surface prior to starting any work at the site. Adequate drainage should be maintained throughout the construction period. Methods for controlling surface runoff and ponding include proper site grading, berm construction around exposed areas, and installation of sump pits with pumps.

### **6.2 Groundwater Control**

The need for groundwater control will depend on the depth of excavation relative to the groundwater depth at the time of construction. In the event that there is heavy rain prior to or during construction, the



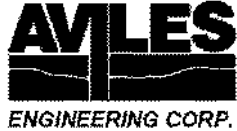
groundwater table may be higher than indicated in this report; higher seepage is also likely and may require a more extensive groundwater control program. In addition, groundwater may be pressurized in certain areas of the alignment, requiring further evaluation and consideration of the excess hydrostatic pressures. Groundwater control should be in general accordance with Section 01578 of the latest edition of the COHSGR.

The Contractor should be responsible for selecting, designing, constructing, maintaining, and monitoring a groundwater control system and adapt his operations to ensure the stability of the excavations. Groundwater information presented in Section 4.1 and elsewhere in this report, along with consideration for potential environmental and site variation between the time of our field exploration and construction, should be incorporated in evaluating groundwater depths. The following recommendations are intended to guide the Contractor during design and construction of the dewatering system.

In cohesive soils seepage rates are lower than in granular soils and groundwater is usually collected in sumps and channeled by gravity flow to storm sewers. If cohesive soils contain significant secondary features, seepage rates will be higher. This may require larger sumps and drainage channels, or if significant granular layers are interbedded within the cohesive soils, methods used for granular soils may be required. Where it is present, pressurized groundwater will also yield higher seepage rates.

Groundwater for excavations within saturated sands can be controlled by the installation of wellpoints. The practical maximum dewatering depth for well points is about 15 feet. When groundwater control is required below 15 feet, possible ground water control measures include: (i) deep wells with turbine or submersible pumps; (ii) multi-staged well points; or (iii) water-tight sheet pile cut-off walls. Generally, the groundwater depth should be lowered at least 5 feet below the excavation bottom (in accordance with Section 01578 of the latest edition of the COHSGR) to be able to work on a firm surface when water-bearing granular soils are encountered.

Extended and/or excessive dewatering can result in settlement of existing structures in the vicinity; the Contractor should take the necessary precautions to minimize the effect on existing structures in the vicinity of the dewatering operation. We recommend that the Contractor verify the groundwater depths and seepage rates prior to and during construction and retain the services of a dewatering expert (if necessary) to assist him in identifying, implementing, and monitoring the most suitable and cost-effective method of controlling



groundwater.

For open cut construction in cohesive soils, the possibility of bottom heave must be considered due to the removal of the weight of excavated soil. In lean and fat clays, heave normally does not occur unless the ratio of Critical Height to Depth of Cut approaches one. In silty clays, heave does not typically occur unless an artificially large head of water is created through the use of impervious sheeting in bracing the cut. Guidelines for evaluating bottom stability are presented in Section 5.2.2 of this report.

### **6.3 Construction Monitoring**

Pavement construction and subgrade preparation, as well as excavation, bedding, and backfilling of underground utilities should be monitored by qualified geotechnical professionals to check for compliance with project documents and changed conditions, if encountered. AEC should be allowed to review the design and construction plans and specifications prior to release to check that the geotechnical recommendations and design criteria presented herein are properly interpreted.

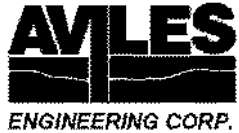
### **6.4 Monitoring of Existing Structures**

Existing structures in the vicinity of the proposed alignment should be closely monitored prior to, during, and for a period after excavation. Several factors (including soil type and stratification, construction methods, weather conditions, other construction in the vicinity, construction personnel experience and supervision) may impact ground movement in the vicinity of the alignment. We therefore recommend that the Contractor be required to survey and adequately document the condition of existing structures in the vicinity of the proposed alignments.

## **7.0 LIMITATIONS**

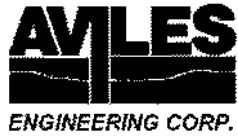
The information contained in this report summarizes conditions found on the dates the borings were drilled. The attached boring logs are true representations of the soils encountered at the specific boring locations on the dates of drilling. Reasonable variations from the subsurface information presented in this report should be anticipated. If conditions encountered during construction are significantly different from those presented in this report; AEC should be notified immediately.





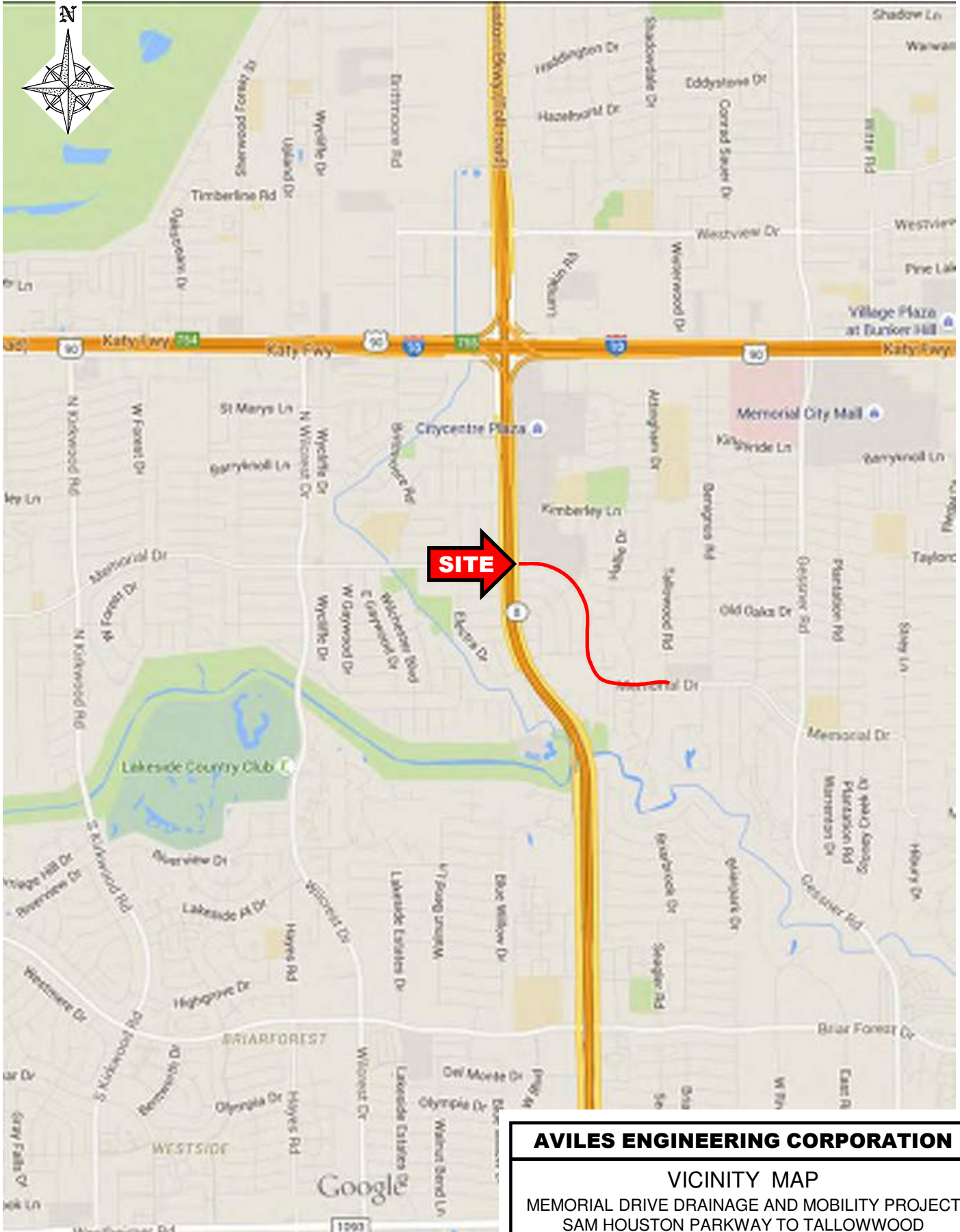
This investigation was performed using the standard level of care and diligence normally practiced by recognized geotechnical engineering firms in this area, presently performing similar services under similar circumstances. This report is intended to be used in its entirety. The report has been prepared exclusively for the project and location described in this report. If pertinent project details change or otherwise differ from those described herein, AEC should be notified immediately and retained to evaluate the effect of the changes on the recommendations presented in this report, and revise the recommendations if necessary. The recommendations presented in this report should not be used for other structures located along these alignments or similar structures located elsewhere, without additional evaluation and/or investigation.

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## APPENDIX A

Plate A-1	Vicinity Map
Plate A-2	Boring Location Plan
Plates A-3 to A-11	Boring Logs
Plate A-12	Key to Symbols
Plate A-13	Classification of Soils for Engineering Purposes
Plate A-14	Terms Used on Boring Logs
Plate A-15	ASTM & TXDOT Designation for Soil Laboratory Tests
Plate A-16	Sieve Analysis Results
Plates A-17 to A-20	Summary of Lab Data

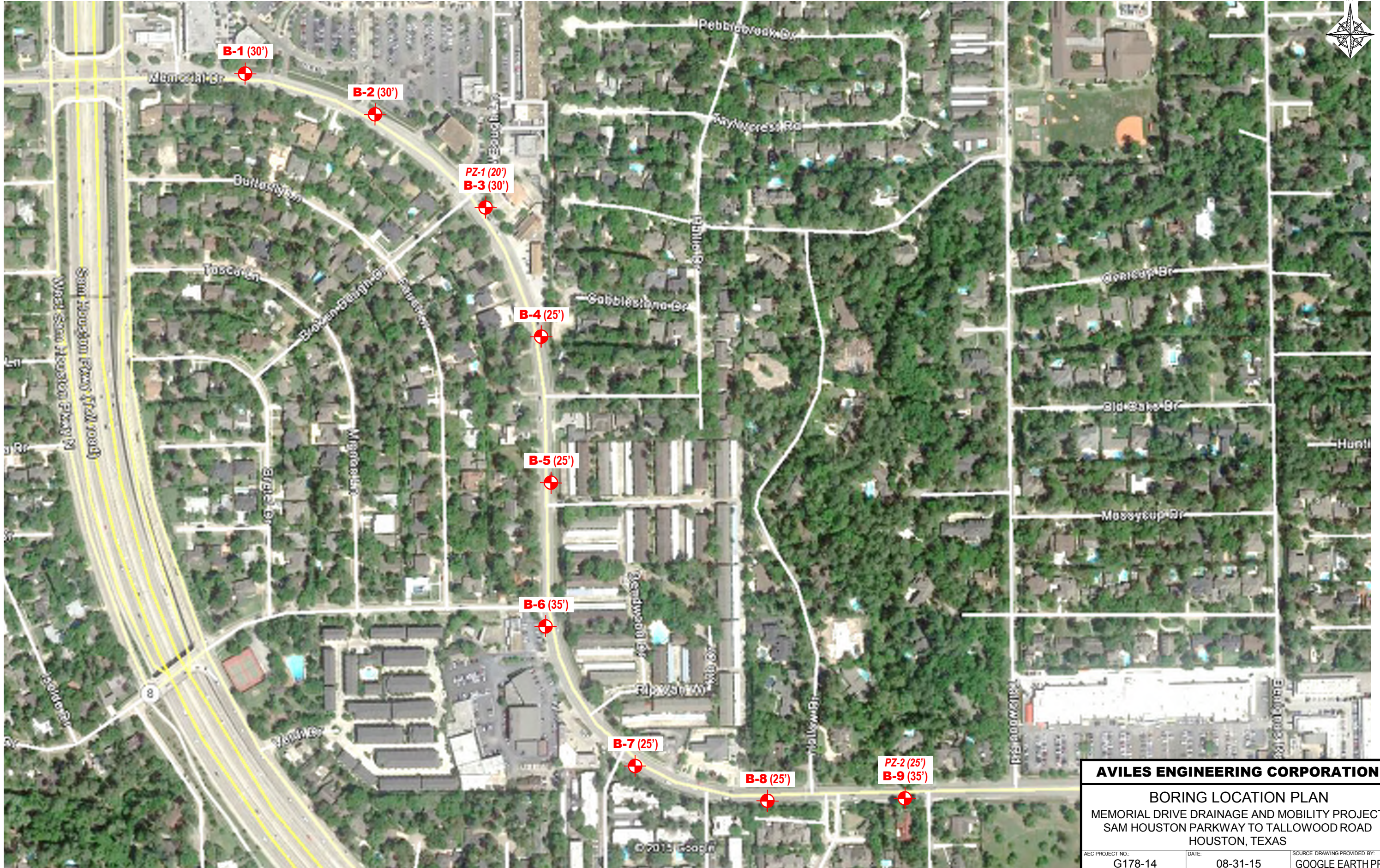


**AVILES ENGINEERING CORPORATION**

VICINITY MAP  
MEMORIAL DRIVE DRAINAGE AND MOBILITY PROJECT  
SAM HOUSTON PARKWAY TO TALLOWOOD  
HOUSTON, TEXAS

AEC PROJECT NO.:	DATE:	SOURCE DRAWING PROVIDED BY:
G178-14	08-28-15	GOOGLE MAPS
APPROX. SCALE:	DRAFTED BY:	PLATE NO.:
N.T.S.	WLW	PLATE A-1





NOTE: BORING LOCATIONS ARE APPROXIMATE.

<b>AVILES ENGINEERING CORPORATION</b>		
BORING LOCATION PLAN		
MEMORIAL DRIVE DRAINAGE AND MOBILITY PROJECT SAM HOUSTON PARKWAY TO TALLOWOOD ROAD HOUSTON, TEXAS		
AEC PROJECT NO: G178-14	DATE: 08-31-15	SOURCE DRAWING PROVIDED BY: GOOGLE EARTH PRO
APPROX. SCALE: 1" = 300'	DRAFTED BY: BpJ	PLATE NO.: PLATE A-2





PROJECT: **Memorial Drive Drainage & Mobility Project**

**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-1**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/4/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %				PLASTICITY INDEX				SHEAR STRENGTH, TSF				
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX
				Survey Coordinates (TSPC, Surface): Easting: 3059696.298 Northing: 13846388.33 Elevation: 73.67																
0				Pavement: 3" asphalt																
				Base: 12" stabilized sand and crushed shell		67		14	26	14	12									
				Fill: very stiff, dark gray Sandy Lean Clay (CL)				19												
70				-with siltstone fragments and calcareous nodules 1'-2'				115	15											
				-gray and tan, with silt pockets 2'-4'																
5				Stiff to very stiff, tan Lean Clay w/Sand (CL), with abundant silt partings and ferrous stains		76		14	44	14	30									
				-with calcareous nodules 4'-6'																
65				Very stiff to hard, tan and light gray Sandy Lean Clay (CL), with abundant silt partings				115	13											
				-with ferrous stains 8'-14'																
				-tan, light gray, and red 12'-14'																
60						58		19	46	15	31									
15								15												
55				Medium dense, tan and light gray Silty Sand (SM)		26	15	7												
50				-moist at 23'		23		8												
25																				
45				-with clay partings 28'-30'																
30				Termination Depth = 30 feet		22		10												
40																				
35																				

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

0.5 1 1.5 2

BORING DRILLED TO **30** FEET WITHOUT DRILLING FLUID  
 WATER ENCOUNTERED AT **n/a** FEET WHILE DRILLING   
 WATER LEVEL AT **n/a** FEET AFTER **COMPLETE**   
 DRILLED BY **Van & Sons** DRAFTED BY **WLW** LOGGED BY **BPJ**







PROJECT: **Memorial Drive Drainage & Mobility Project**

**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-3**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/3/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SHEAR STRENGTH, TSF							
												0.5	1	1.5	2				
	0			Pavement: 2" asphalt															
	70			Base: 13" stabilized sand and crushed shell				18											
				Very stiff, gray and tan Fat Clay w/Sand (CH), with abundant silt partings and ferrous stains			117	17											
	5						80	16	53	15	38								
	65			-with abundant siltstone fragments and calcareous nodules 6'-10'				20											
	10						106	24											
	60			Very stiff, tan and light gray Sandy Lean Clay (CL), with abundant silt partings -with ferrous stains 10'-12'			67	16	43	13	30								
	15							16											
	55			Hard, tan and light gray Fat Clay w/Sand (CH), with abundant silt partings and ferrous stains			118	14											
	15						83	15	53	16	37								
	20			Medium dense, light gray Poorly Graded Sand w/Silt (SP-SM)		23		10											
	50																		
	25					20		10											
	45																		
	30			-light gray and tan 28'-30'		26	11	9											
	40			Termination Depth = 30 feet															
	35																		

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

BORING DRILLED TO **30** FEET WITHOUT DRILLING FLUID  
 WATER ENCOUNTERED AT **n/a** FEET WHILE DRILLING   
 WATER LEVEL AT **n/a** FEET AFTER **COMPLETE**   
 DRILLED BY **Van & Sons** DRAFTED BY **WLW** LOGGED BY **BPJ**



PROJECT: **Memorial Drive Drainage & Mobility Project**

**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-4**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/3/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %				PLASTICITY INDEX		SHEAR STRENGTH, TSF					
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX		
70	0			Survey Coordinates (TSPC, Surface): Easting: 3060728.295 Northing: 13845531.661 Elevation: 70.43  Pavement: 1" asphalt Base: 11" stabilized sand and crushed shell Very stiff, light gray and tan Fat Clay w/ Sand (CH), with abundant silt partings and siltstone fragments -with calcareous nodules 4'-8'				14											
65	5			Very stiff to hard, light gray and tan Sandy Lean Clay (CL), with abundant silt partings and calcareous nodules -with siltstone fragments 10'-14'	75	107	19	56	14	42									
60	10				61	123	13	43	13	30									
55	15			Dense, tan Silty Sand (SM) -with clay seams 16'-18' -light gray and tan 18'-20'	37	14	5												
50	20				47		19												
45	25			Termination Depth = 25 feet	35		4												

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

BORING DRILLED TO 25 FEET WITHOUT DRILLING FLUID

WATER ENCOUNTERED AT n/a FEET WHILE DRILLING

WATER LEVEL AT n/a FEET AFTER COMPLETE

DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ



PROJECT: **Memorial Drive Drainage & Mobility Project**

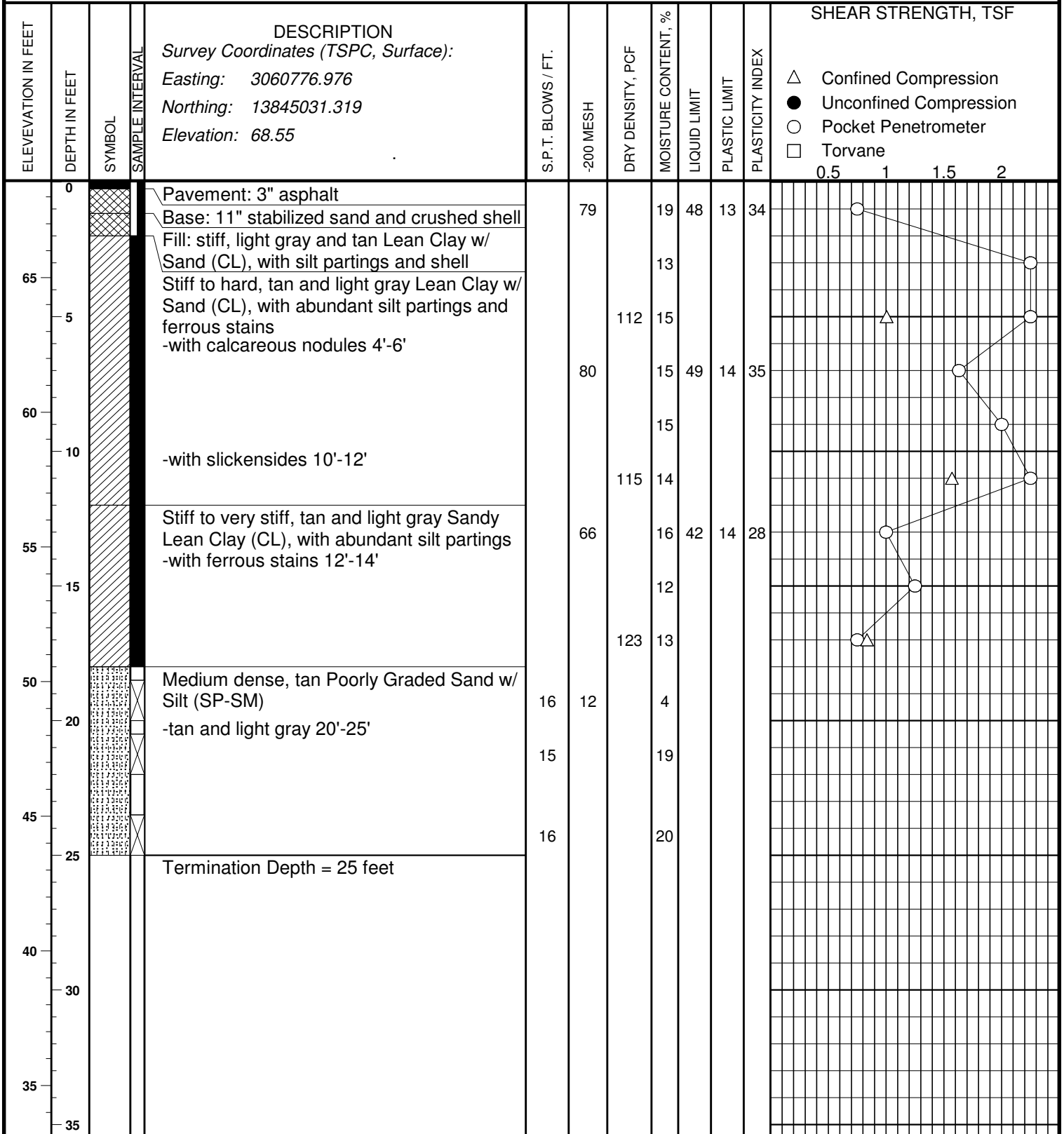
**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-5**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/3/15**



BORING DRILLED TO 25 FEET WITHOUT DRILLING FLUID  
 WATER ENCOUNTERED AT n/a FEET WHILE DRILLING   
 WATER LEVEL AT n/a FEET AFTER **COMPLETE**   
 DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ





PROJECT: **Memorial Drive Drainage & Mobility Project**

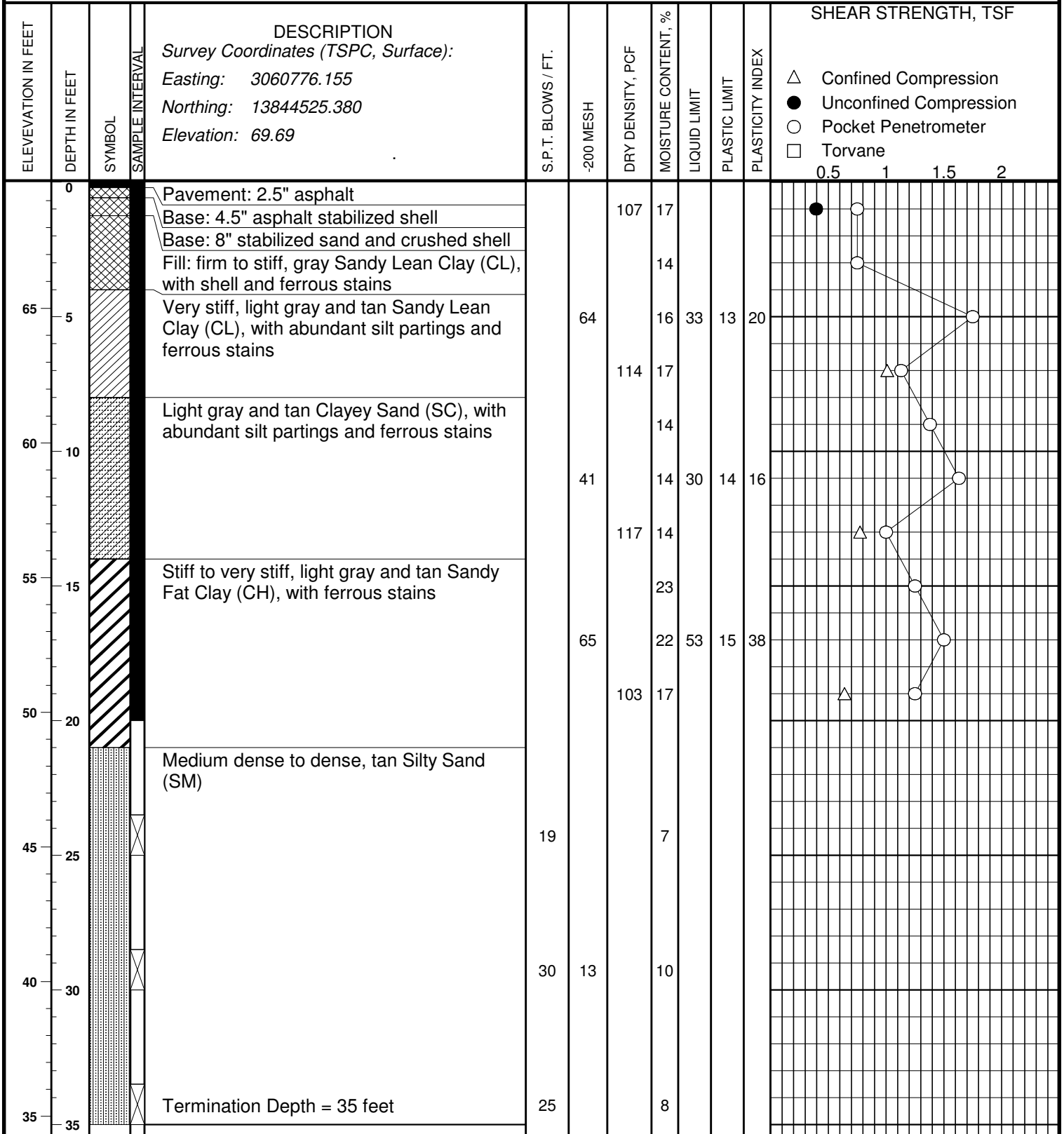
**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-6**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/4/15**



BORING DRILLED TO 35 FEET WITHOUT DRILLING FLUID  
 WATER ENCOUNTERED AT n/a FEET WHILE DRILLING   
 WATER LEVEL AT n/a FEET AFTER **COMPLETE**   
 DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ



PROJECT: **Memorial Drive Drainage & Mobility Project**

**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-7**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/5/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %				PLASTICITY INDEX	SHEAR STRENGTH, TSF					
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PLASTICITY INDEX		0.5	1	1.5	2		
0	0			Pavement: 12" asphalt and asphalt stabilized base (base thickness not determined)		54	14	35	14	21								
65	0			Base: 8" stabilized sand and crushed shell			113	15										
5	0			Fill: gray Sandy Lean Clay (CL), with sand seams and siltstone fragments				14										
60	5			Stiff to hard, tan and light gray Lean Clay w/ Sand (CL), with abundant silt partings, siltstone fragments, calcareous nodules, and ferrous stains		79	12	43	13	30								
60	10			Very stiff to hard, tan and light gray Sandy Fat Clay (CH), with abundant silt partings and ferrous stains			115	13										
55	10			-with siltstone fragments 12'-14'		54	13	54	16	38								
55	15			Very stiff to hard, tan and light gray Sandy Lean Clay (CL), with abundant silt partings -with fat clay pockets 14'-16'			130	12										
50	15			-with siltstone fragments and calcareous nodules 18'-20'				11										
50	20			Medium dense, tan and light gray Silty Sand (SM)		63	11	46	14	32								
45	20																	
45	25			Termination Depth = 25 feet	21			13										

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

BORING DRILLED TO 25 FEET WITHOUT DRILLING FLUID

WATER ENCOUNTERED AT n/a FEET WHILE DRILLING

WATER LEVEL AT n/a FEET AFTER COMPLETE

DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ



PROJECT: **Memorial Drive Drainage & Mobility Project**

ENGINEERING CORP.  
GEOTECHNICAL ENGINEERS

BORING **B-8**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Dry Auger**

DATE **8/5/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %				PLASTICITY INDEX				SHEAR STRENGTH, TSF				
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX	PLASTICITY INDEX
				Survey Coordinates (TSPC, Surface): Easting: 3061549.650 Northing: 13843993.500 Elevation: 66.92																
0	0			Pavement: 13" asphalt and asphalt stabilized base (base thickness not determined)																
65	65			Base: stabilized sand and crushed shell		42														
				Fill: dark gray Clayey Sand (SC), with shell and calcareous nodules																
5	5			Stiff to hard, tan and light gray Lean Clay w/ Sand (CL), with silt partings, siltstone fragments, and calcareous nodules -with ferrous stains 6'-10'			109	16												
60	60					77		15	38	13	25									
10	10			Stiff to very stiff, light gray and tan Sandy Lean Clay (CL), with abundant silt partings -with fat clay pockets and calcareous nodules 10'-12' -with siltstone fragments 12'-14' and ferrous stains 12'-16'																
55	55					56		19	46	13	33									
15	15																			
50	50			Medium dense, light gray Clayey Sand (SC), moist		23	38	17												
20	20			Medium dense, light gray Silty Sand (SM), moist																
45	45																			
25	25			Termination Depth = 25 feet		25		17												

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

0.5 1 1.5 2

BORING DRILLED TO 25 FEET WITHOUT DRILLING FLUID

WATER ENCOUNTERED AT n/a FEET WHILE DRILLING

WATER LEVEL AT n/a FEET AFTER COMPLETE

DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ



PROJECT: **Memorial Drive Drainage & Mobility Project**

**ENGINEERING CORP.**  
GEOTECHNICAL ENGINEERS

BORING **B-9**

COH WBS No. **N-T17000-031B-4**

TYPE **4" Wet Rotary**

DATE **8/4/15**

ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLE INTERVAL	DESCRIPTION	S.P.T. BLOWS / FT.	-200 MESH	DRY DENSITY, PCF	MOISTURE CONTENT, %				SHEAR STRENGTH, TSF								
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX										
				Survey Coordinates (TSPC, Surface): Easting: 3061985.074 Northing: 13844016.062 Elevation: 67.19																
0				Pavement: 3" asphalt																
	65			Base: 4" asphalt stabilized shell		77		17	31	14	17									
				Base: 8" stabilized sand and crushed shell																
	5			Very stiff, dark gray and tan Lean Clay w/ Sand (CL), with abundant silt partings and ferrous stains																
				-tan and light gray, with siltstone fragments and calcareous nodules 2'-4'			116	13												
	60			Very stiff to hard, tan and light gray Fat Clay w/Sand (CH), with abundant silt partings, siltstone fragments, calcareous nodules, and ferrous stains		84		15	51	14	37									
	10			Stiff to very stiff, tan and light gray Lean Clay w/Sand (CL), with abundant silt partings and ferrous stains																
	55			-with siltstone fragments 8'-12'																
	15																			
	50			-with silt pockets 16'-18'																
	20			Medium dense to dense, light gray Silty Sand (SM)		28	17													
				-boring caved at 18.3' during drilling																
	45																			
				-wet at 23'																
	25					32														
	40																			
				-light gray and tan 28'-30'																
	30					31														
	35																			
				Termination Depth = 35 feet		30	14													

- △ Confined Compression
- Unconfined Compression
- Pocket Penetrometer
- Torvane

0.5 1 1.5 2

BORING DRILLED TO 25 FEET WITHOUT DRILLING FLUID  
 WATER ENCOUNTERED AT 23 FEET WHILE DRILLING   
 WATER LEVEL AT n/a FEET AFTER n/a   
 DRILLED BY Van & Sons DRAFTED BY WLW LOGGED BY BPJ

# KEY TO SYMBOLS

Symbol Description

## Strata symbols



Paving



Fill



Low plasticity  
clay



Silty sand



High plasticity  
clay



Poorly graded sand  
with silt



Clayey sand

## Misc. Symbols



Pocket Penetrometer



Confined Compression



Unconfined Compression



Water table depth  
during drilling

## Soil Samplers



Auger



Undisturbed thin wall  
Shelby tube



Standard penetration test



MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL NAMES	
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (Less than 50% of coarse fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)		
		GW	Well-graded gravel, well-graded gravel with sand	
		GP	Poorly-graded gravel, poorly-graded gravel with sand	
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart	GM
	Limits plot above "A" line & hatched zone on plasticity chart		GC	Clayey gravel, clayey gravel with sand
	SANDS (50% or more of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)		
		SW	Well-graded sand, well-graded sand with gravel	
		SP	Poorly-graded sand, poorly-graded sand with gravel	
SANDS WITH FINES (More than 12% passes No. 200 sieve)		Limits plot below "A" line & hatched zone on plasticity chart	SM	Silty sand, silty sand with gravel
	Limits plot above "A" line & hatched zone on plasticity chart	SC	Clayey sand, clayey sand with gravel	
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS AND CLAYS (Liquid Limit Less Than 50%)		ML	Silt, silt with sand, silt with gravel, sandy silt, gravelly silt
			CL	Lean clay, lean clay with sand, lean clay with gravel, sandy lean clay, gravelly lean clay
			OL	Organic clay, organic clay with sand, sandy organic clay, organic silt, sandy organic silt
	SILTS AND CLAYS (Liquid Limit 50% or More)		MH	Elastic silt, elastic silt with sand, sandy elastic silt, gravelly elastic silt
			CH	Fat clay, fat clay with sand, fat clay with gravel, sandy fat clay, gravelly fat clay
			OH	Organic clay, organic clay with sand, sandy organic clay, organic silt, sandy organic silt

NOTE: Coarse soils between 5% and 12% passing the No. 200 sieve and fine-grained soils with limits plotting in the hatched zone of the plasticity chart are to have dual symbols.

**PLASTICITY CHART**

LIQUID LIMIT (LL)

Equation of A-Line: Horizontal at PI=4 to LL=25.5, then  $PI=0.73(LL-20)$   
Equation of U-Line: Vertical at LL=16 to PI=7, then  $PI=0.9(LL-8)$

**DEGREE OF PLASTICITY OF COHESIVE SOILS**

Degree of Plasticity	Plasticity Index
None .....	0 - 4
Slight .....	5 - 10
Medium .....	11 - 20
High .....	21 - 40
Very High.....	>40

**SOIL SYMBOLS**

	Fill		Sand
	Clay (CH)		Silt
	Clay (CL)		

TERMS USED ON BORING LOGS

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

	6"	3"	3/4"	#4	#10	#40	#200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE			
	152	76.2	19.1	4.76	2.00	0.420	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

STRENGTH OF COHESIVE SOILS

<u>Consistency</u>	Undrained Shear Strength, Kips per Sq. ft.
Very Soft .....	less than 0.25
Soft .....	0.25 to 0.50
Firm .....	0.50 to 1.00
Stiff .....	1.00 to 2.00
Very Stiff .....	2.00 to 4.00
Hard .....	greater than 4.00

RELATIVE DENSITY OF COHESIONLESS  
SOILS FROM STANDARD PENETRATION TEST

Very Loose .....	<4 bpf
Loose .....	5-10 bpf
Medium Dense .....	11-30 bpf
Dense .....	31-50 bpf
Very Dense .....	>50 bpf

SPLIT-BARREL SAMPLER DRIVING RECORD

Blows per Foot	Description
25 .....	25 blows driving sampler 12 inches, after initial 6 inches of seating.
50/7" .....	50 blows driving sampler 7 inches, after initial 6 inches of seating.
Ref/3" .....	50 blows driving sampler 3 inches, during initial 6-inches seating interval.

NOTE: To avoid change to sampling tools, driving is limited to 50 blows during or after seating interval.

DRY STRENGTH ASTM D2488

None	Dry specimen crumbles into powder with mere pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces or crumbles with considerable pressure
High	Dry specimen cannot be broken with finger pressure, it can be broken between thumb and hard surface
Very High	Dry specimen cannot be broken between thumb and hard surface

MOISTURE CONDITION ASTM D2488

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the easiness of breaking along these planes.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil types.
Interlayered	Soil sample composed of alternating layers of different soil types.
Intermixed	Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of calcium material.

**ASTM & TXDOT DESIGNATION FOR SOIL LABORATORY TESTS**

<b>NAME OF TEST</b>	<b>ASTM TEST DESIGNATION</b>	<b>TXDOT TEST DESIGNATION</b>
Moisture Content	D 2216	Tex-103-E
Specific Gravity	D 854	Tex-108-E
Sieve Analysis	D 421 D 422	Tex-110-E (Part 1)
Hydrometer Analysis	D 422	Tex-110-E (Part 2)
Minus No. 200 Sieve	D 1140	Tex-111-E
Liquid Limit	D 4318	Tex-104-E
Plastic Limit	D 4318	Tex-105-E
Shrinkage Limit	D 427	Tex-107-E
Standard Proctor Compaction	D 698	Tex-114-E
Modified Proctor Compaction	D 1557	Tex-113-E
Permeability (constant head)	D 2434	-
Consolidation	D 2435	-
Direct Shear	D 3080	-
Unconfined Compression	D 2166	-
Unconsolidated-Undrained Triaxial	D 2850	Tex-118-E
Consolidated-Undrained Triaxial	D 4767	Tex-131-E
Pinhole Test	D 4647	-
California Bearing Ratio	D 1883	-
Unified Soil Classification System	D 2487	Tex-142-E

# AVILES ENGINEERING CORPORATION

Consulting Engineers - Geotechnical, Construction Materials Testing, Environmental

## GRAIN SIZE ANALYSIS - SIEVE

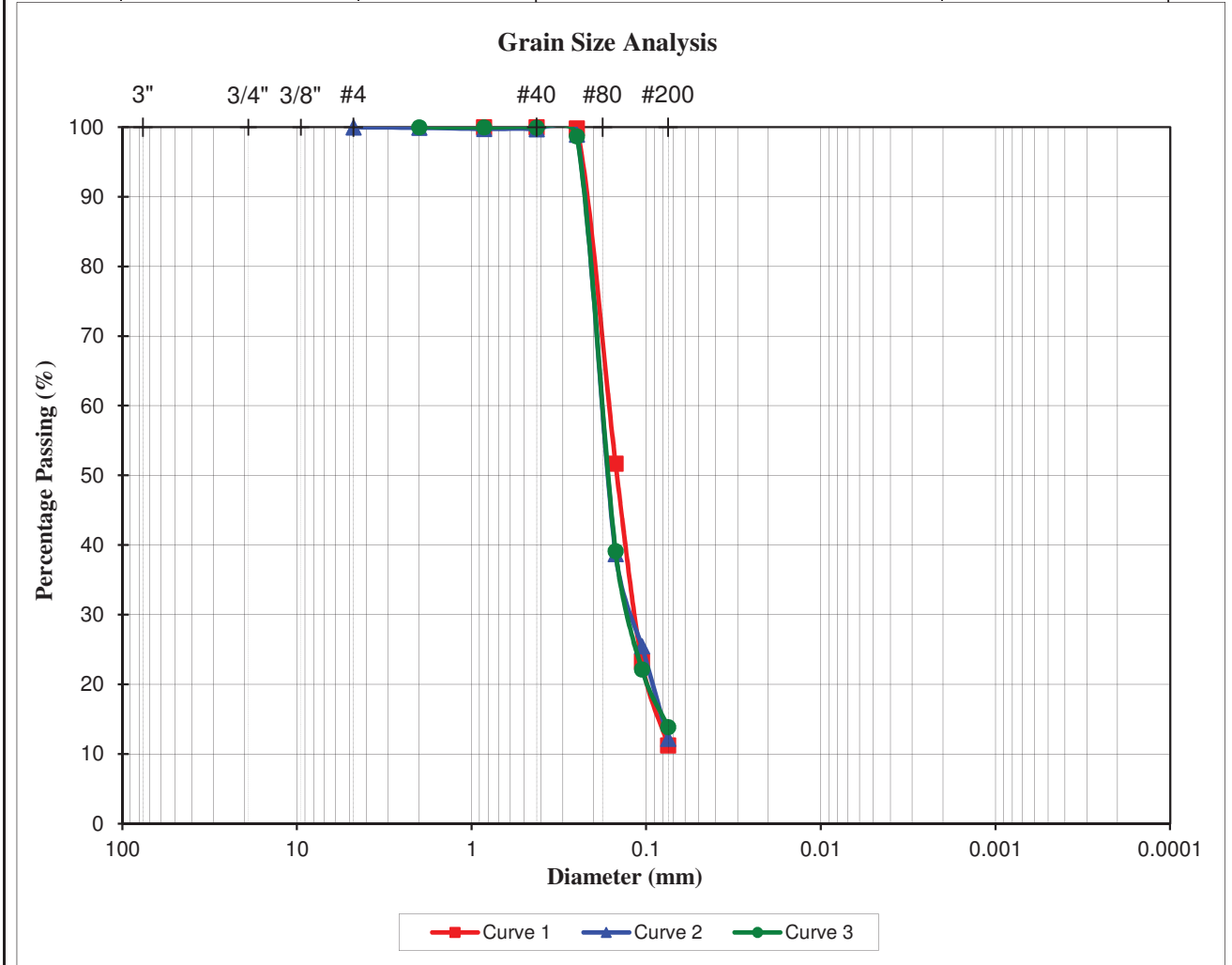
**Project :** Memorial Drive Drainage and Mobility Project

**Job No.:** G178-14

**Location of Project:** Houston, Texas

**Date of Testing:**

		Sand			
	Gravel	Coarse to Medium	Fine	Silt	Clay



<u>Curve</u>	<u>Boring</u>	<u>Depth (ft)</u>	<u>Soil Description</u>	<u>Cu</u>	<u>Cc</u>
1	B-2	23-25	Poorly Graded Sand w/Silt (SP-SM)	N/A	N/A
2	B-5	18-20	Poorly Graded Sand w/Silt (SP-SM)	N/A	N/A
3	B-9	33-35	Silty Sand (SM)	N/A	N/A

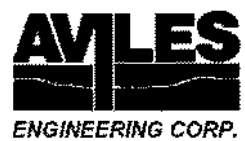
SUMMARY OF TEST RESULTS					Project Name: Memorial Drive Drainage and Mobility Project											
					WBS Number: N-T17000-031B-3											
Aviles Engineering Corporation					AEC Project Number: G178-14											
Boring No.	Sample				SPT (blows/ft)	Water Content (%)	Dry Density (pcf)	Atterberg Limits			Percent Passing Sieve #200 (%)	Shear Strength (tsf)				Type of Material
	No.	Depth (ft)		Type				LL (%)	PL (%)	PI (%)		Unconfined Compression	UU (confining pressure, psi)	Torvane	Pocket Penetrometer	
		Top	Bottom													
B-1	1	0.0	2.0	AG		13.8		26	14	12	67.0				Fill: CL	
	2	2.0	4.0	UD		18.6								2.50	Fill: CL	
	3	4.0	6.0	UD		14.7	115.0						1.76 (3)	2.50	CL	
	4	6.0	8.0	UD		14.3		44	14	30	75.9				3.25	CL
	5	8.0	10.0	UD		15.1									4.50	CL
	6	10.0	12.0	UD		12.8	115.4						3.31 (7)		4.50	CL
	7	12.0	14.0	UD		19.4		46	15	31	58.4				4.50	CL
	8	14.0	16.0	UD		15.3									4.50	CL
	9	16.0	18.0	UD		14.4	111.3						3.15 (11)		4.50	CL
	10	18.5	20.0	SS	26	7.1		15			15.1					SM
	11	23.5	25.0	SS	23	7.5										SM
	12	28.5	30.0	SS	22	9.8										SM
B-2	1	0.0	2.0	AG		15.7									Fill: CL	
	2	2.0	4.0	UD		16.4		58	15	43	78.5			3.25	CH	
	3	4.0	6.0	UD		15.7	119.0						3.30 (3)	3.00	CH	
	4	6.0	8.0	UD		17.1								2.75	CH	
	5	8.0	10.0	UD		13.2		58	15	43	63.1			3.50	CH	
	6	10.0	12.0	UD		14.0	117.5						3.03 (7)	3.25	CL	
	7	12.0	14.0	UD		13.2								3.75	CL	
	8	14.0	16.0	UD		13.1		34	13	21	59.5			3.75	CL	
	9	16.0	18.0	UD		13.2	118.1						4.93 (11)	4.50	CL	
	10	18.0	20.0	UD		12.6								4.50	CL	
	11	23.5	25.0	SS	30	6.1					11.3					SP-SM
	12	28.5	30.0	SS	36	9.8										SP-SM
B-3	1	0.0	2.0	UD		18.3								2.75	CH	
	2	2.0	4.0	UD		16.6	116.6					2.84		3.00	CH	
	3	4.0	6.0	UD		15.6		53	15	38	80.4			4.00	CH	
	4	6.0	8.0	UD		19.7								3.25	CH	
	5	8.0	10.0	UD		23.9	105.9						2.22 (6)	3.50	CH	
	6	10.0	12.0	UD		16.2		43	13	30	67.0			4.00	CL	
	7	12.0	14.0	UD		15.6								3.50	CL	
	8	14.0	16.0	UD		14.1	118.3						4.09 (10)	4.50	CH	
	9	16.0	18.0	UD		15.1		53	16	37	83.3			4.50	CH	
	10	18.5	20.0	SS	23	9.9										SP-SM
Legend	UD = UnDisturbed sample, extruded in field SS = Split Spoon sample AG = Auger Cuttings SPT = Standard Penetration Test						LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index UU = Triaxial Compression				Notes:					



SUMMARY OF TEST RESULTS					Project Name: Memorial Drive Drainage and Mobility Project											
					WBS Number: N-T17000-031B-3											
Aviles Engineering Corporation					AEC Project Number: G178-14											
Boring No.	Sample				SPT (blows/ft)	Water Content (%)	Dry Density (pcf)	Atterberg Limits			Percent Passing Sieve #200 (%)	Shear Strength (tsf)				Type of Material
	No.	Depth (ft)		Type				LL (%)	PL (%)	PI (%)		Unconfined Compression	UU (confining pressure, psi)	Torvane	Pocket Penetrometer	
		Top	Bottom													
B-3	11	23.5	25.0	SS	20	9.7									SP-SM	
	12	28.5	30.0	SS	26	8.7				11.3					SP-SM	
B-4	1	0.0	2.0	AG		14.0								3.50	CH	
	2	2.0	4.0	UD											<Sample Missing>	
	3	4.0	6.0	UD		19.5	107.3	56	14	42	75.0	2.87		3.50	CH	
	4	6.0	8.0	UD		7.8								4.50	CH	
	5	8.0	10.0	UD		12.7	122.8						4.91 (6)	4.00	CL	
	6	10.0	12.0	UD		14.3		43	13	30	60.7			3.50	CL	
	7	12.0	14.0	UD		11.2								4.50	CL	
	8	14.0	16.0	UD		10.8	117.8						3.28 (10)	3.50	CL	
	9	16.5	18.0	SS	37	5.2					13.7				SM	
	10	18.5	20.0	SS	47	19.1									SM	
	11	23.5	25.0	SS	35	4									SM	
B-5	1	0.0	2.0	AG		19.2		48	14	34	79.0			1.50	Fill: CL	
	2	2.0	4.0	UD		12.7								4.50	CL	
	3	4.0	6.0	UD		14.5	112.4						2.01 (3)	4.50	CL	
	4	6.0	8.0	UD		15.3		49	14	35	80.0			3.25	CL	
	5	8.0	10.0	UD		15.3								4.00	CL	
	6	10.0	12.0	UD		14.5	114.5						3.14 (7)	4.50	CL	
	7	12.0	14.0	UD		16.3		42	14	28	66.0			2.00	CL	
	8	14.0	16.0	UD		11.9								2.50	CL	
	9	16.0	18.0	UD		13.0	122.9						1.67 (11)	1.50	CL	
	10	18.5	20.0	SS	16	4.3					12.0				SP-SM	
	11	20.5	22.0	SS	15	18.7									SP-SM	
	12	23.5	25.0	SS	16	20.0									SP-SM	
B-6	1	0.0	2.0	UD		16.9	106.5					0.79		1.50	Fill: CL	
	2	2.0	4.0	UD		13.5								1.50	Fill: CL	
	3	4.0	6.0	UD		16.3		33	13	20	64.0			3.50	CL	
	4	6.0	8.0	UD		17.3	114.3						2.02 (5)	2.25	CL	
	5	8.0	10.0	UD		14.3								2.75	SC	
	6	10.0	12.0	UD		14.0		30	14	16	41.0			3.25	SC	
	7	12.0	14.0	UD		14.2	117.2						1.55 (9)	2.00	SC	
	8	14.0	16.0	UD		23.1								2.50	CH	
Legend	UD = UnDisturbed sample, extruded in field SS = Split Spoon sample AG = Auger Cuttings SPT = Standard Penetration Test						LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index UU = Triaxial Compression				Notes:					

SUMMARY OF TEST RESULTS					Project Name: Memorial Drive Drainage and Mobility Project											
					WBS Number: N-T17000-031B-3											
Aviles Engineering Corporation					AEC Project Number: G178-14											
Boring No.	Sample				SPT (blows/ft)	Water Content (%)	Dry Density (pcf)	Atterberg Limits			Percent Passing Sieve #200 (%)	Shear Strength (tsf)				Type of Material
	No.	Depth (ft)		Type				LL (%)	PL (%)	PI (%)		Unconfined Compression	UU (confining pressure, psi)	Torvane	Pocket Penetrometer	
		Top	Bottom													
B-6	9	16.0	18.0	UD		21.9		53	15	38	64.8				3.00	CH
	10	18.0	20.0	UD		17.4	102.9						1.28 (13)		2.50	CH
	11	23.5	25.0	SS	19	6.7										SM
	12	28.5	30.0	SS	30	9.7					12.5					SM
	13	33.5	35.0	SS	25	7.5										SM
B-7	1	0.0	2.0	AG		14.2		35	14	21	53.7					Fill: CL
	2	2.0	4.0	UD		15.1	113.2					1.39			2.75	CL
	3	4.0	6.0	UD		13.8									4.50	CL
	4	6.0	8.0	UD		11.7		43	13	30	78.9				4.50	CL
	5	8.0	10.0	UD		13.5	115.0						2.70 (6)		4.25	CH
	6	10.0	12.0	UD		9.7									4.50	CH
	7	12.0	14.0	UD		12.9		54	16	38	54.4				4.50	CH
	8	14.0	16.0	UD		12.2	129.9						4.37 (10)		4.25	CL
	9	16.0	18.0	UD		10.9									3.75	CL
	10	18.0	20.0	UD		11.0		46	14	32	63.5				4.25	CL
	11	23.5	25.0	SS	21	13.3										SM
B-8	1	0.0	2.0	AG		14.6		39	14	25	42.0					Fill: SC
	2	2.0	4.0	UD		13.8									4.50	CL
	3	4.0	6.0	UD		15.7	108.6						1.37 (3)		2.50	CL
	4	6.0	8.0	UD		15.4		38	13	25	76.7				3.50	CL
	5	8.0	10.0	UD		13.5									3.50	CL
	6	10.0	12.0	UD		18.6	104.1						2.56 (7)		3.00	CL
	7	12.0	14.0	UD		19.3		46	13	33	55.7				3.00	CL
	8	14.0	16.0	UD		20.9									4.00	CL
	9	16.0	18.0	UD		21.7	103.2						1.86 (11)		3.00	CL
	10	18.5	20.0	SS	23	17.4					38.0					SC
	11	23.5	25.0	SS	25	17.5										SM
B-9	1	0.0	2.0	UD		16.9		31	14	17	76.8				2.25	CL
	2	2.0	4.0	UD		14.3									3.75	CL
	3	4.0	6.0	UD		13.0	116.4						3.04 (3)		4.50	CH
	4	6.0	8.0	UD		15.0		51	14	37	83.8				4.50	CH
	5	8.0	10.0	UD		16.3									3.75	CL
	6	10.0	12.0	UD		16.2	116.8						3.18 (7)		3.00	CL
Legend	UD = UnDisturbed sample, extruded in field SS = Split Spoon sample AG = Auger Cuttings SPT = Standard Penetration Test						LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index UU = Triaxial Compression					Notes:				





## **APPENDIX B**

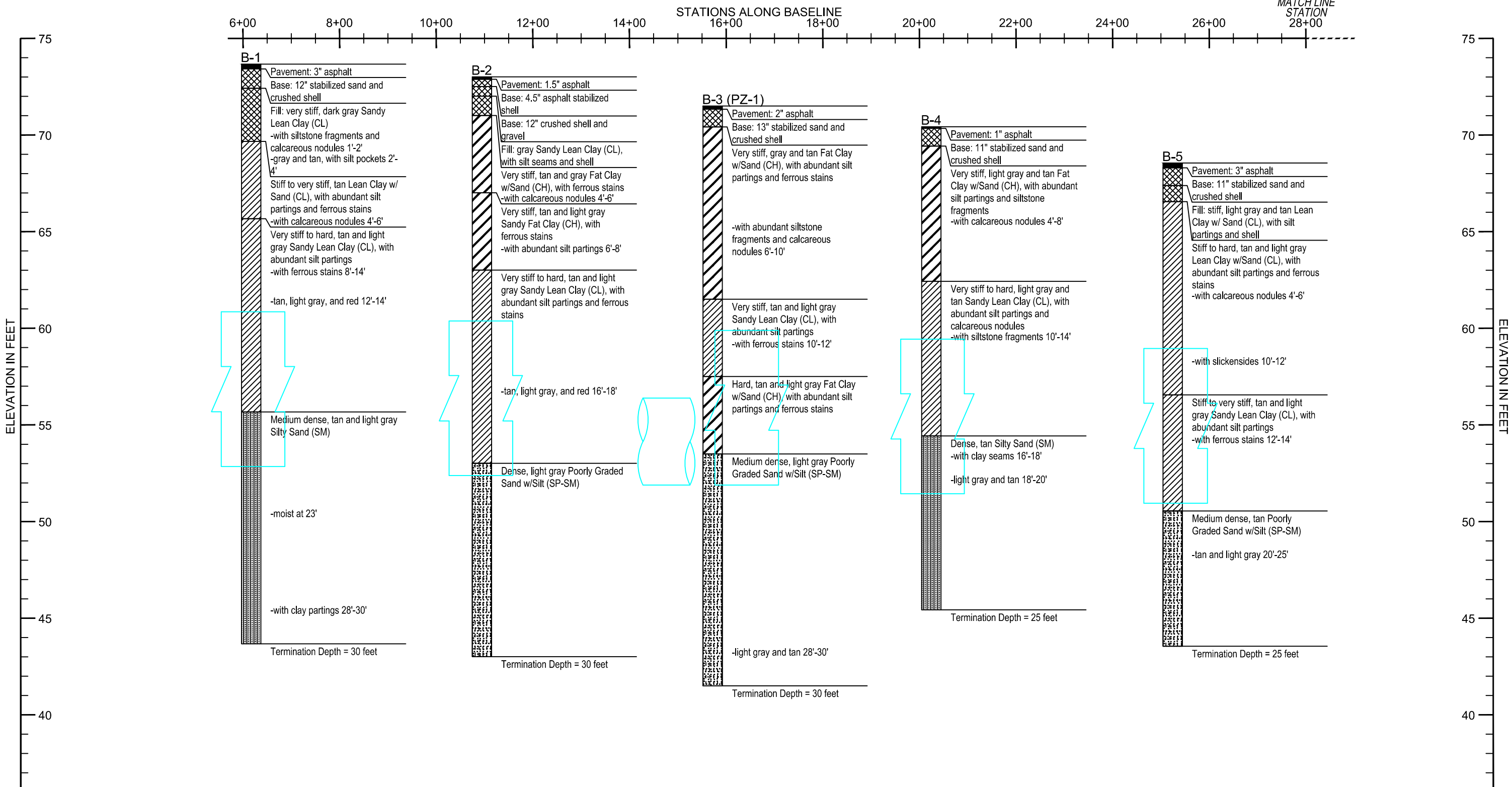
Plates B-1a to B-1b  
Plates B-2 to B-3

Generalized Soil Profiles  
Piezometer Installation Details

WEST

# GENERALIZED SOIL PROFILE ALONG MEMORIAL DRIVE

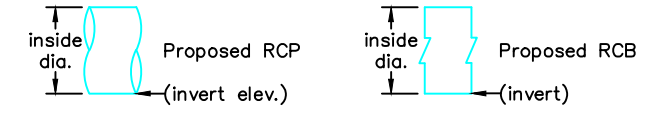
SOUTH



**LEGEND:**

- Paving
- Fill
- Poorly Graded sand with silt
- High plasticity clay
- Low plasticity clay
- Depth of water first encountered during drilling
- Depth of water in piezometer 8/6/15
- Clayey sand
- Silty sand
- Depth of water ~15 min. after initial encounter

**NOTE:**  
SOIL STRATIGRAPHY AND SECONDARY SOIL STRUCTURE (SUCH AS SEAMS, LAYERS, OR POCKETS OF SANDS, SILTS, SLICKENSIDES, AND FISSURES) THAT ARE DIFFERENT FROM WHAT WERE IDENTIFIED IN THE ACTUAL BORINGS MAY EXIST AWAY FROM THESE BORINGS.



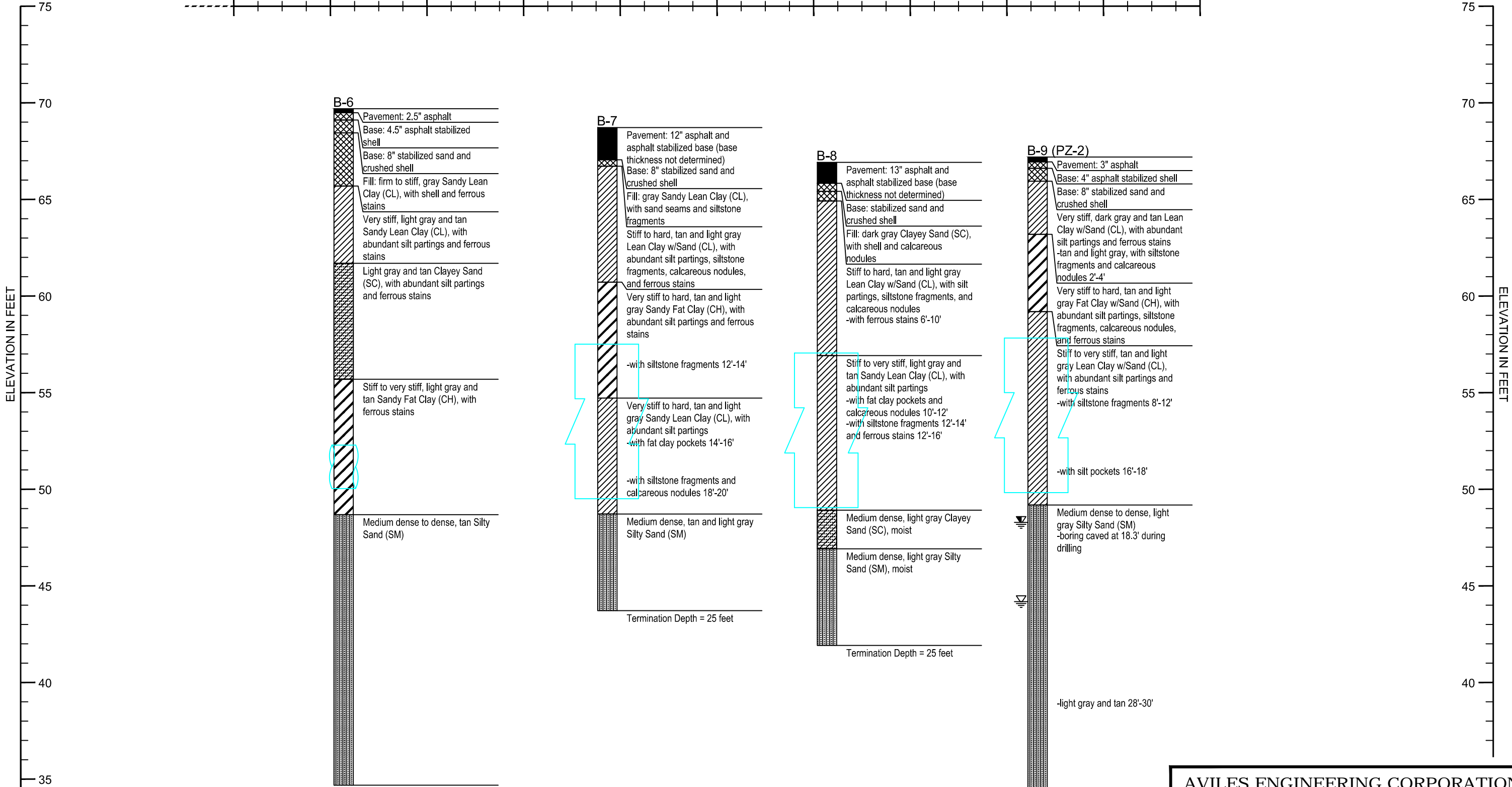
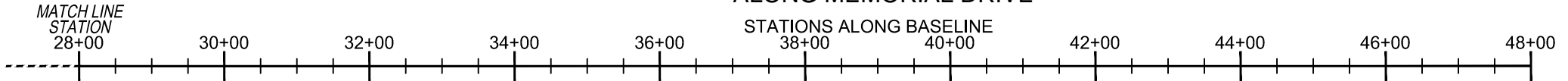
<b>AVILES ENGINEERING CORPORATION</b>		
<b>GENERALIZED SOIL PROFILE</b>		
MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR TIRZ 17 CIP NO. T-1731B, WBS NO. N-T17000-031B-4, HOUSTON, TEXAS		
AEC PROJECT NO.: <b>G178-14</b>	DATE: <b>08-31-15</b>	SOURCE DRAWING PROVIDED BY: AVILES ENGINEERING CORP.
VERTICAL SCALE: 1" = 5'	DRAFTED BY: <b>BpJ</b>	PLATE NO.: <b>PLATE B-1a</b>
HORIZONTAL SCALE: 1" = 200'		



GENERALIZED SOIL PROFILE  
ALONG MEMORIAL DRIVE

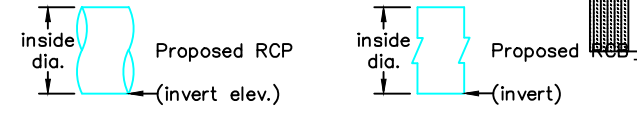
NORTH

EAST



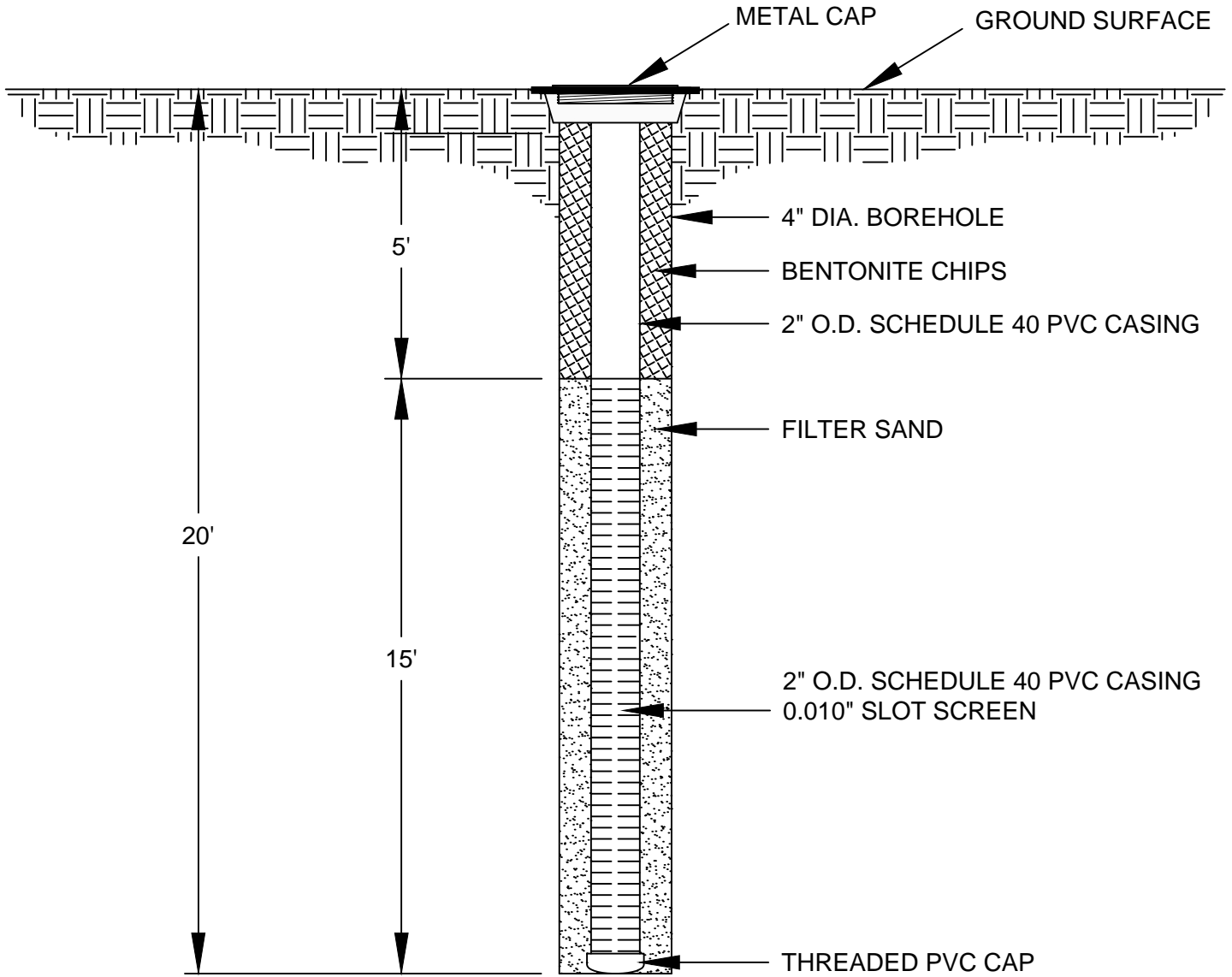
LEGEND:

- Paving
- Fill
- Poorly Graded sand with silt
- High plasticity clay
- Low plasticity clay
- Depth of water first encountered during drilling
- Clayey sand
- Silty sand
- Depth of water ~15 min. after initial encounter



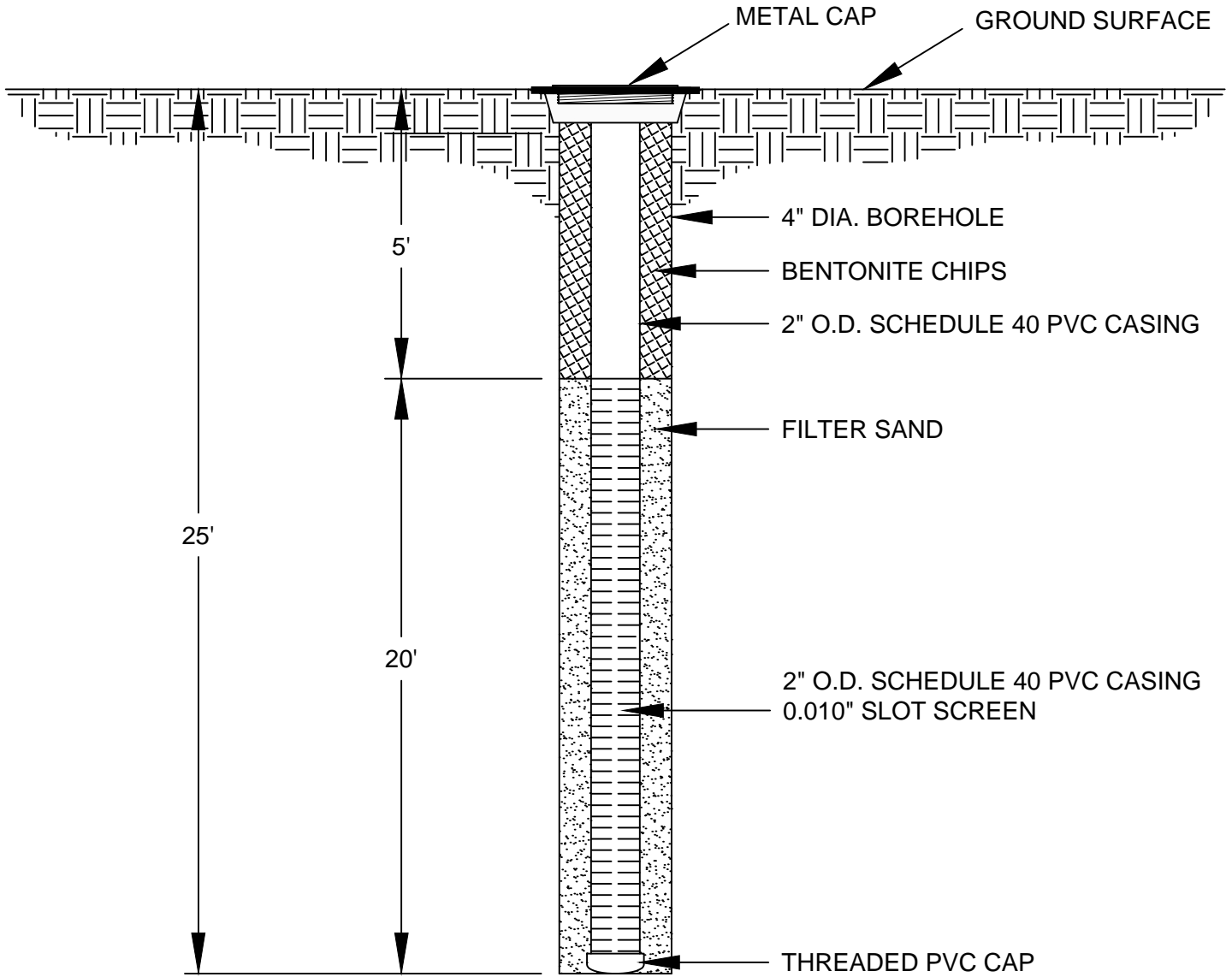
NOTE:  
SOIL STRATIGRAPHY AND SECONDARY SOIL STRUCTURE (SUCH AS SEAMS, LAYERS, OR POCKETS OF SANDS, SILTS, SLICKENSIDES, AND FISSURES) THAT ARE DIFFERENT FROM WHAT WERE IDENTIFIED IN THE ACTUAL BORINGS MAY EXIST AWAY FROM THESE BORINGS.

<b>AVILES ENGINEERING CORPORATION</b>		
<b>GENERALIZED SOIL PROFILE</b>		
MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR TIRZ 17 CIP NO. T-1731B, WBS NO. N-T17000-031B-4, HOUSTON, TEXAS		
AEC PROJECT NO.: <b>G178-14</b>	DATE: <b>08-31-15</b>	SOURCE DRAWING PROVIDED BY: AVILES ENGINEERING CORP.
VERTICAL SCALE: 1" = 5'	DRAFTED BY: <b>BpJ</b>	PLATE NO.: <b>PLATE B-1b</b>
HORIZONTAL SCALE: 1" = 200'		



GROUNDWATER DEPTH FROM SURFACE:	DATE MEASURED:
N/A (DRY)	8/6/2015
N/A (DRY)	9/2/2015

<b>AVILES ENGINEERING CORPORATION</b>		
<b>PIEZOMETER INSTALLATION DETAILS BORING B-3 (PZ-1)</b>		
MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR TIRZ 17 CIP NO. T-1731B, WBS NO. N-T17000-031B-4, HOUSTON, TEXAS		
AEC PROJECT NO.:	DATE:	SOURCE DWG. BY:
G178-14	08-31-15	AVILES ENGINEERING CORP.
SCALE:	DRAWN BY:	PLATE NO.:
N.T.S.	BpJ	PLATE B-2



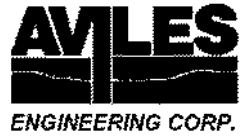
GROUNDWATER DEPTH FROM SURFACE:	DATE MEASURED:
18.9 FT	8/6/2015
18.6 FT	9/2/2015

**AVILES ENGINEERING CORPORATION**

**PIEZOMETER INSTALLATION DETAILS  
BORING B-9 (PZ-2)**

MEMORIAL DRIVE DRAINAGE AND MOBILITY IMPROVEMENTS  
FROM W. SAM HOUSTON PARKWAY S. TO TALLOWOOD DR  
TIRZ 17 CIP NO. T-1731B, WBS NO. N-T17000-031B-4, HOUSTON, TEXAS

AEC PROJECT NO.:	DATE:	SOURCE DWG. BY:
G178-14	08-31-15	AVILES ENGINEERING CORP.
SCALE:	DRAWN BY:	PLATE NO.:
N.T.S.	BpJ	PLATE B-3



## APPENDIX C

Plates C-1 to C-2	Recommended Geotechnical Design Parameters
Plate C-3	Load Coefficients for Pipe Loading
Plate C-4	Live Loads on Pipe Crossing Under Roadway

**G178-14 MEMORIAL DRIVE DRAINAGE MOBILITY IMPROVEMENTS  
SOIL PARAMETERS FOR UNDERGROUND UTILITIES**

Boring	Depth (ft)	Soil Type	$\gamma$ (pcf)	$\gamma'$ (pcf)	OSHA Type	E'n (psi)	Short-Term					Long-Term				
							C (psf)	$\phi$ (deg)	K <sub>a</sub>	K <sub>0</sub>	K <sub>p</sub>	C' (psf)	$\phi'$ (deg)	K <sub>a</sub>	K <sub>0</sub>	K <sub>p</sub>
B-1	0-4	Fill: very stiff CL	120	58	C	600	1500	0	1.00	1.00	1.00	150	18	0.53	0.69	1.89
	4-8	Stiff to very stiff CL	132	70	B	600	1800	0	1.00	1.00	1.00	175	18	0.53	0.69	1.89
	8-18	Very stiff to hard CL	130	68	B	1000	3200	0	1.00	1.00	1.00	300	18	0.53	0.69	1.89
	18-30	Medium dense SM	120	58	C (18-20)	1000	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
B-2	0-2	Fill: CL	120	58	C	300	1000	0	1.00	1.00	1.00	100	18	0.53	0.69	1.89
	2-10	Very stiff CH	138	76	B	1000	2500	0	1.00	1.00	1.00	250	16	0.57	0.72	1.76
	10-20	Very stiff to hard CL	133	71	B	1000	3000	0	1.00	1.00	1.00	300	18	0.53	0.69	1.89
	20-30	Dense SP-SM	125	63	n/a	1000	0	32	0.31	0.47	3.25	0	32	0.31	0.47	3.25
B-3	0-4	Very stiff CH	137	75	B	1000	2700	0	1.00	1.00	1.00	250	16	0.57	0.72	1.76
	4-10	Very stiff to hard CH	131	69	B	1000	2200	0	1.00	1.00	1.00	200	16	0.57	0.72	1.76
	10-18	Very stiff to hard CL/CH	135	73	B	1000	3200	0	1.00	1.00	1.00	300	16	0.57	0.72	1.76
	18-30	Medium dense SP-SM	120	58	C (18-20)	1000	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
B-4	0-4	Very stiff CH	120	58	B	600	2000	0	1.00	1.00	1.00	200	16	0.57	0.72	1.76
	4-8	Very stiff CH	127	65	B	1000	2800	0	1.00	1.00	1.00	275	16	0.57	0.72	1.76
	8-16	Very stiff to hard CL	131	69	B	1000	3200	0	1.00	1.00	1.00	300	18	0.53	0.69	1.89
	16-25	Dense SM	125	63	C (16-20)	1000	0	32	0.31	0.47	3.25	0	32	0.31	0.47	3.25
B-5	0-2	Fill: stiff CL	120	58	C	300	750	0	1.00	1.00	1.00	75	18	0.53	0.69	1.89
	2-8	Stiff to hard CL	129	67	B	600	2000	0	1.00	1.00	1.00	200	18	0.53	0.69	1.89
	8-12	Very stiff to hard CL	131	69	B	1000	3000	0	1.00	1.00	1.00	300	18	0.53	0.69	1.89
	12-18	Stiff to very stiff CL	139	77	B	600	1600	0	1.00	1.00	1.00	150	18	0.53	0.69	1.89
	18-25	Medium dense SP-SM	120	58	C (18-20)	600	0	28	0.36	0.53	2.77	0	28	0.36	0.53	2.77
B-6	0-2	Fill: firm to stiff CL	125	63	C	300	800	0	1.00	1.00	1.00	75	18	0.53	0.69	1.89
	2-8	Very stiff CL	133	71	B	600	2000	0	1.00	1.00	1.00	200	18	0.53	0.69	1.89
	8-14	SC	133	71	C	600	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
	14-21	Stiff to very stiff CH	121	59	B (14-20)	600	1200	0	1.00	1.00	1.00	100	16	0.57	0.72	1.76



**G178-14 MEMORIAL DRIVE DRAINAGE MOBILITY IMPROVEMENTS  
SOIL PARAMETERS FOR UNDERGROUND UTILITIES**

Boring	Depth (ft)	Soil Type	$\gamma$ (pcf)	$\gamma'$ (pcf)	OSHA Type	E'n (psi)	Short-Term					Long-Term				
							C (psf)	$\phi$ (deg)	K <sub>a</sub>	K <sub>0</sub>	K <sub>p</sub>	C' (psf)	$\phi'$ (deg)	K <sub>a</sub>	K <sub>0</sub>	K <sub>p</sub>
B-6	21-35	Medium dense SM	120	58	n/a	1000	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
B-7	0-2	Fill: CL	120	58	C	300	750	0	1.00	1.00	1.00	75	18	0.53	0.69	1.89
	2-8	Stiff to very stiff CL	130	68	B	600	1400	0	1.00	1.00	1.00	125	18	0.53	0.69	1.89
	8-14	Very stiff to hard CH	130	68	B	1000	2700	0	1.00	1.00	1.00	250	16	0.57	0.72	1.76
	14-20	Very stiff to hard CL	145	83	B	1000	3200	0	1.00	1.00	1.00	300	18	0.53	0.69	1.89
	20-25	Medium dense SM	120	58	n/a	1000	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
B-8	0-2	Fill: SC	120	58	C	300	0	28	0.36	0.53	2.77	0	28	0.36	0.53	2.77
	2-6	Stiff to hard CL	126	64	B	600	1400	0	1.00	1.00	1.00	125	18	0.53	0.69	1.89
	6-14	Very stiff CL	124	62	C	1000	2500	0	1.00	1.00	1.00	250	18	0.53	0.69	1.89
	14-18	Stiff to very stiff CL	103	41	B	600	1800	0	1.00	1.00	1.00	175	18	0.53	0.69	1.89
	18-25	Medium dense SC/SM	120	58	C (18-20)	1000	0	30	0.33	0.50	3.00	0	30	0.33	0.50	3.00
B-9	0-4	Stiff to very stiff CL	120	58	B	600	1500	0	1.00	1.00	1.00	150	18	0.53	0.69	1.89
	4-8	Very stiff to hard CH	131	69	B	1000	3000	0	1.00	1.00	1.00	300	16	0.57	0.72	1.76
	8-14	Very stiff CL	136	74	B	1000	2800	0	1.00	1.00	1.00	250	18	0.53	0.69	1.89
	14-18	Stiff to very stiff CL	131	69	B	600	1600	0	1.00	1.00	1.00	150	18	0.53	0.69	1.89
	18-35	Medium dense to dense SM	120	58	C (18-20)	1000	0	32	0.31	0.47	3.25	0	32	0.31	0.47	3.25

(1)  $\gamma$  = Unit weight for soil above water level,  $\gamma'$  = Buoyant unit weight for soil below water level. E'n = Soil modulus for native soils;

(2) C = Soil ultimate cohesion for short term (upper limit of 3,600 psf for design purposes),  $\phi$  = Soil friction angle for short term;

(3) C' = Soil ultimate cohesion for long term (upper limit of 300 psf for design purposes),  $\phi'$  = Soil friction angle for long term;

(4) K<sub>a</sub> = Coefficient of active earth pressure, K<sub>0</sub> = Coefficient of at-rest earth pressure, K<sub>p</sub> = Coefficient of passive earth pressure;

(5) CL = Lean Clay, CH = Fat Clay, SC= Clayey Sand, SM = Silty Sand, SP-SM = Poorly Graded Sand w/Silt;

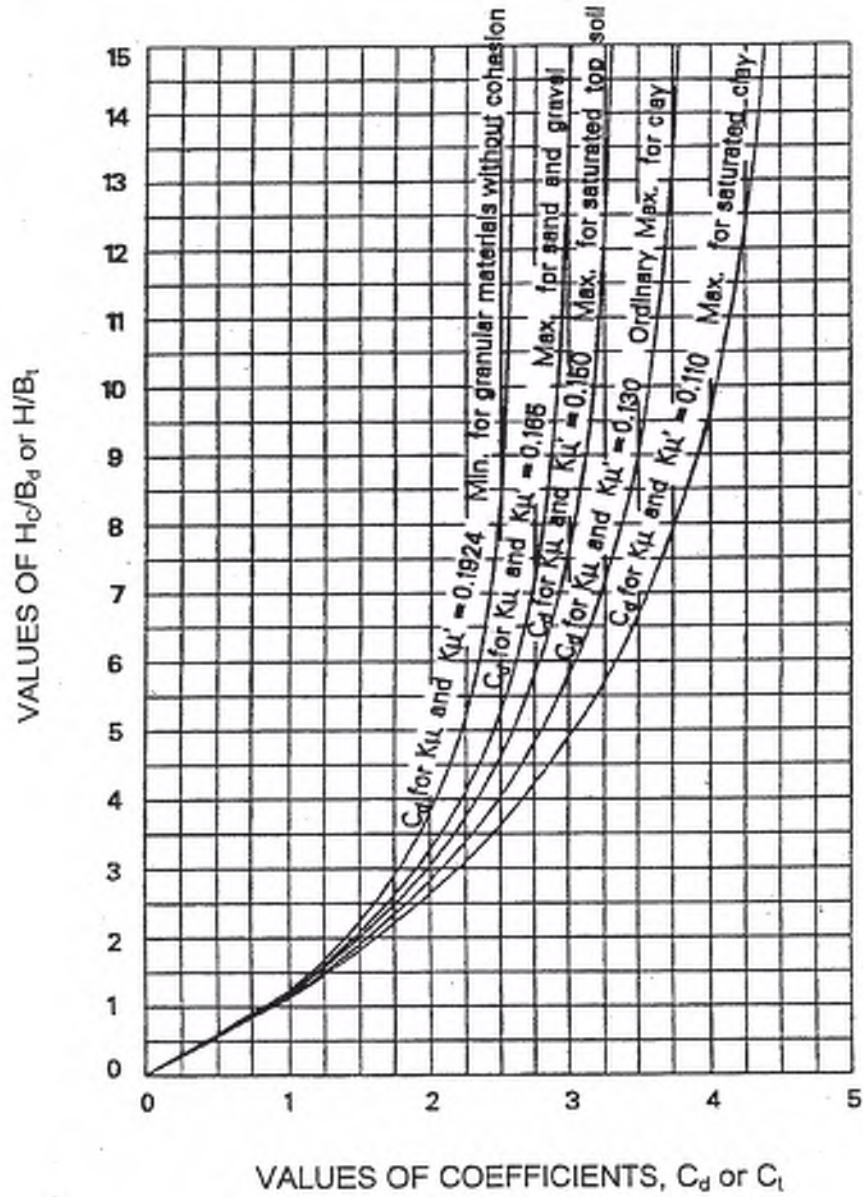
(6) OSHA Soil Types for soils in the top 20 feet below grade:

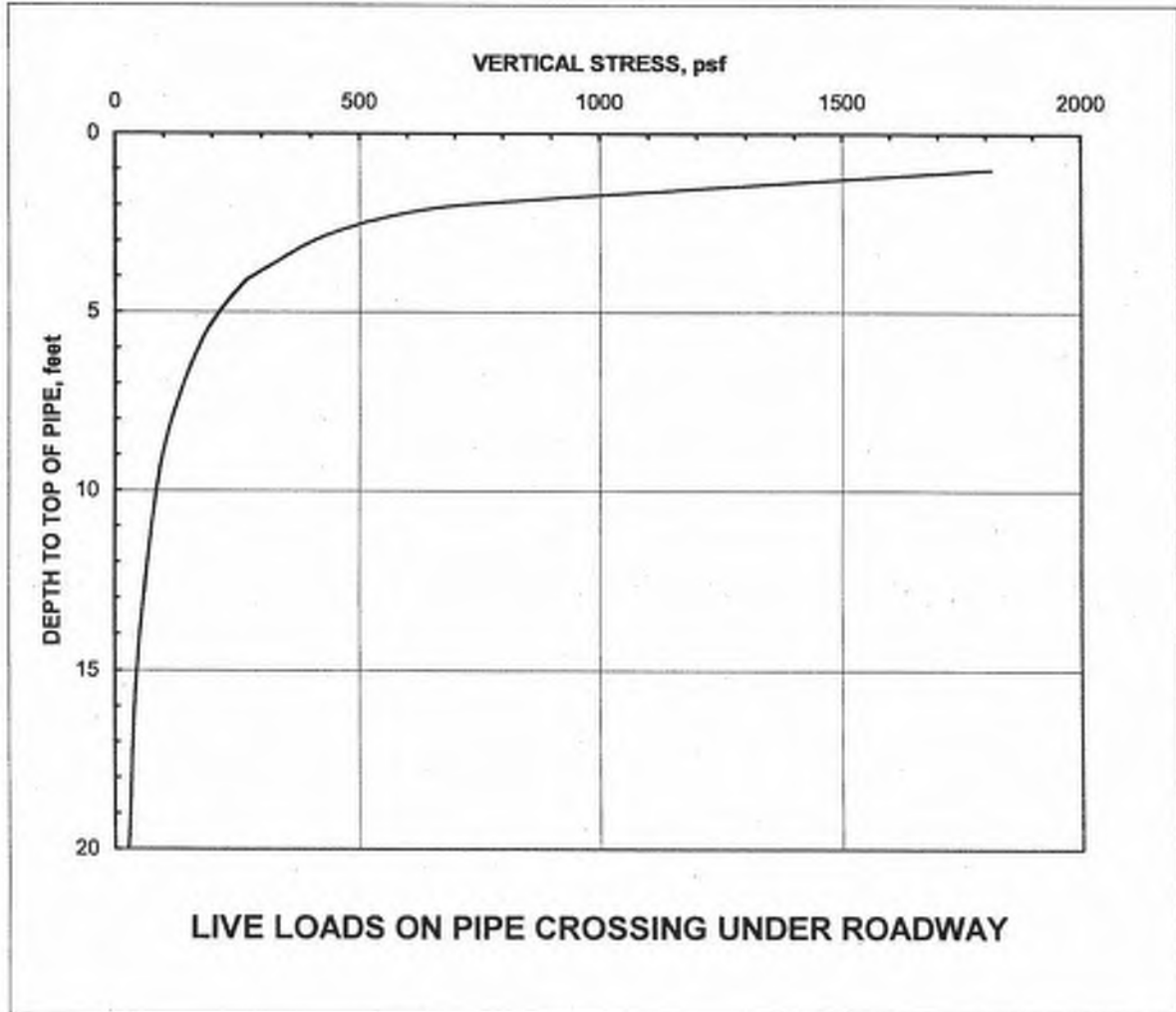
A: cohesive soils with qu = 1.5 tsf or greater (qu = Unconfined Compressive Strength of the Soil)

B: cohesive soils with qu = 0.5 tsf or greater

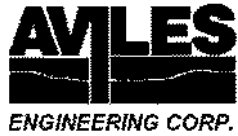
C: cohesive soils with qu = less than 0.5 tsf, fill materials, or granular soil

C\*: submerged cohesive soils; dewatered cohesive soils can be considered OSHA Type C.





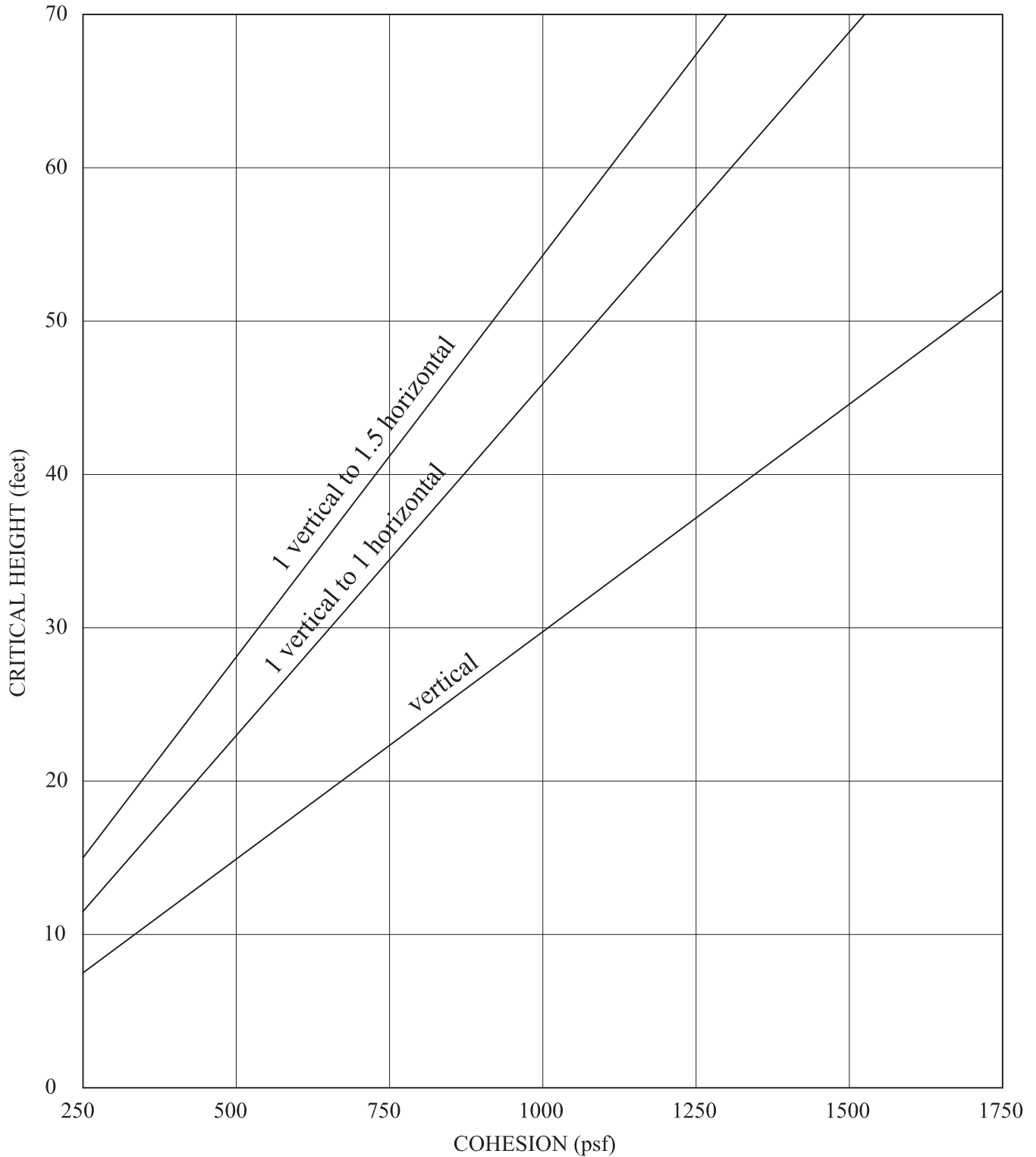
Note: 1. The vertical stress was estimated using AASHTO HS20 truck axle loadings on paved surfaces (Reference: ASCE 15-98, "Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations").  
2. Single truck passing.



## **APPENDIX D**

Plate D-1	Critical Heights of Cut Slopes in Nonfissured Clays
Plate D-2	Maximum Allowable Slopes
Plate D-3	A Combination of Bracing and Open Cuts
Plate D-4	Lateral Pressure Diagrams for Open Cuts in Cohesive Soil-Long Term Conditions
Plate D-5	Lateral Pressure Diagrams for Open Cuts in Cohesive Soil-Short Term Conditions
Plate D-6	Lateral Pressure Diagrams for Open Cuts in Sand
Plate D-7	Bottom Stability for Braced Excavation in Clay
Plate D-8	Thrust Force Calculation
Plate D-9	Thrust Force Example Calculation
Plate D-10	Design Parameters for Bearing Thrust Block

### Critical Heights of Cut Slopes in Nonfissured Clays



*Note: The charts are calculated based on NAVFAC DM7.1, Page 7.1-319, assuming the critical circles are toe circles, and wet unit weight of soils = 125pcf.*



## MAXIMUM ALLOWABLE SLOPES

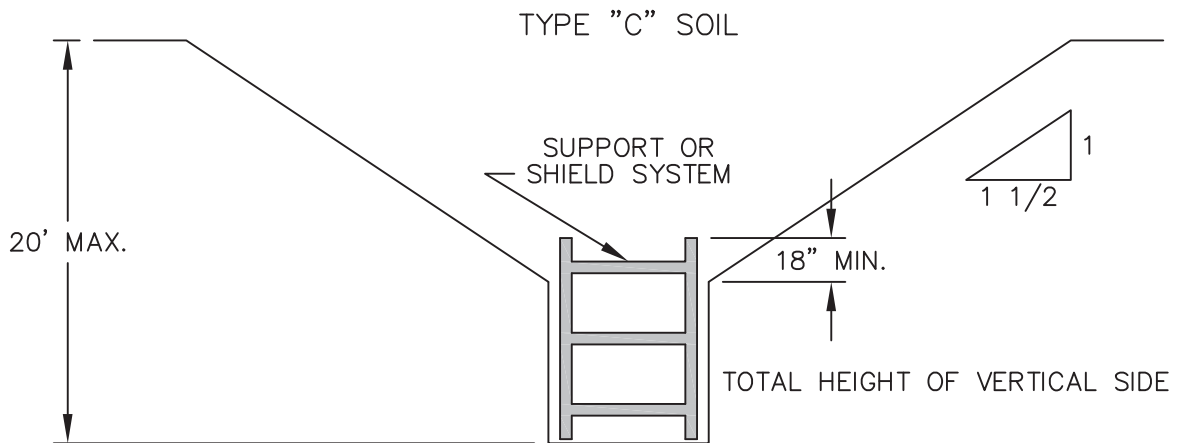
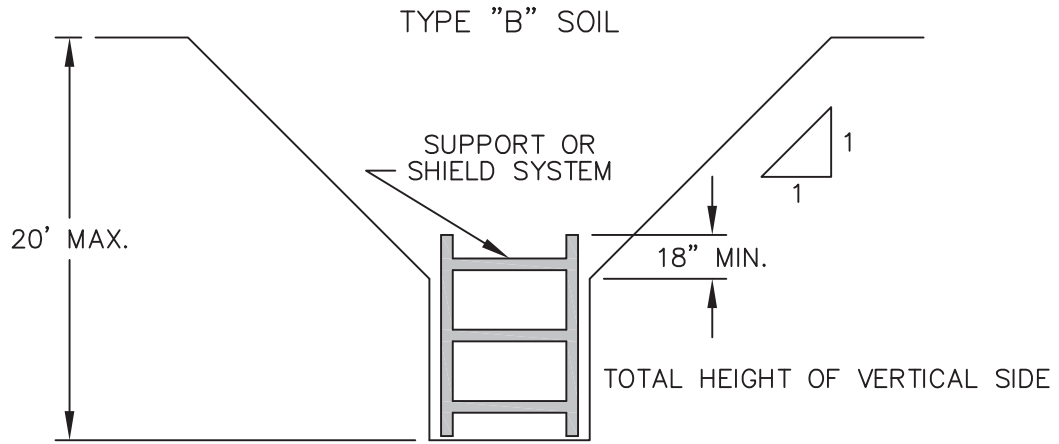
TYPE A SOILS	<p style="text-align: center;">12' MAX. 0.5 (H) : 1 (V)</p>	<p style="text-align: center;">20' MAX. 0.75 (H) : 1 (V)</p>
TYPE B SOILS	N/A	<p style="text-align: center;">20' MAX. 1 (H) : 1 (V)</p>
TYPE C SOILS	N/A	<p style="text-align: center;">20' MAX. 1.5 (H) : 1 (V)</p>
	SHORT TERM	LONG TERM

**NOTES:**

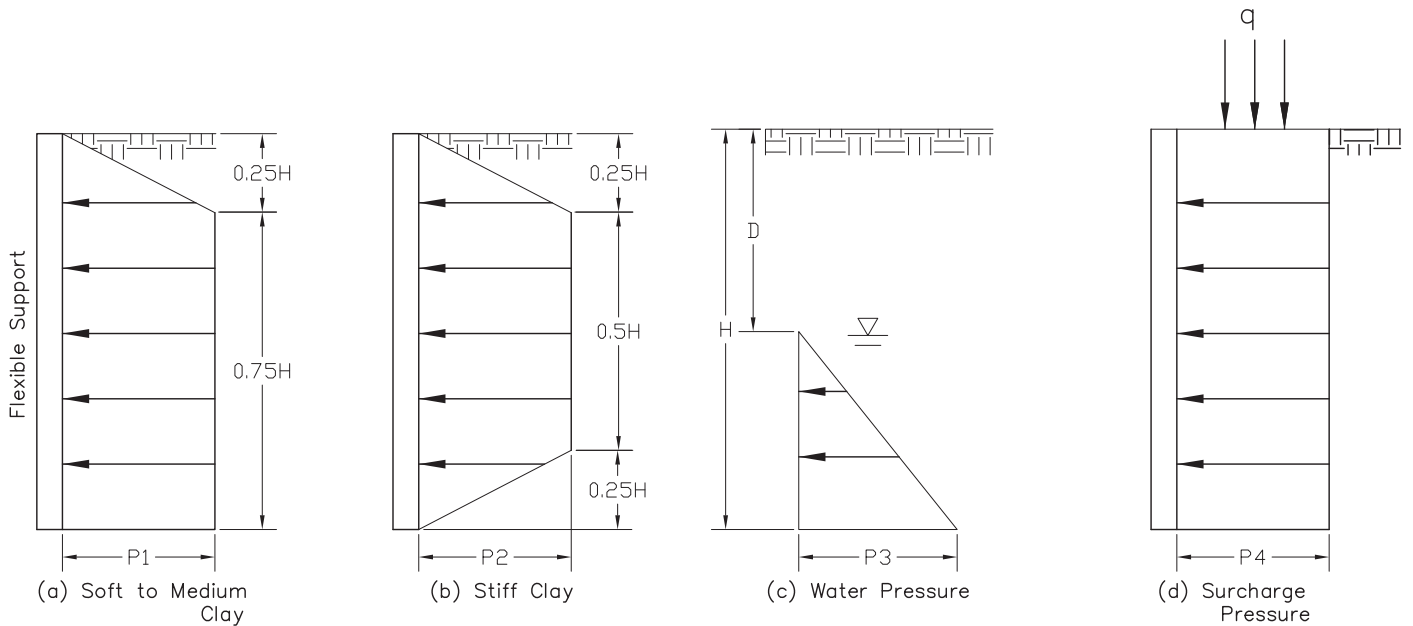
(1) For Type A soils, a short term maximum allowable slope of 0.5 (H) : 1 (V) is allowed in excavations that are 12 feet or less in depth; short term (24 hours or less) maximum allowable slopes for excavations greater than 12 feet in depth shall be 0.75 (H) : 1 (V).

(2) Maximum depth for above slopes is 20 feet. For slopes deeper than 20 feet, trench protection should be designed by the Contractor's professional engineer.

### A COMBINATION OF BRACING AND OPEN CUTS



## LATERAL PRESSURE DIAGRAMS FOR OPEN CUTS IN COHESIVE SOIL - LONG TERM CONDITIONS



### Empirical Pressure Distributions

Where:

$H$  = Total excavation depth, feet

$D$  = Depth to water table, feet

$P_1$  = Lateral earth pressure =  $\gamma H - 4C$ , psf

$P_2$  = Lateral earth pressure =  $0.4\gamma H$ , psf

$P_3$  = Water pressure =  $\gamma_w (H - D)$ , psf

$P_4$  = Lateral earth pressure caused by surcharge =  $qK_a$ , psf

$\gamma$  = Effective unit weight of soil, pcf

$\gamma_w$  = Unit weight of water, pcf

$C$  = Drained shear strength or cohesion, psf

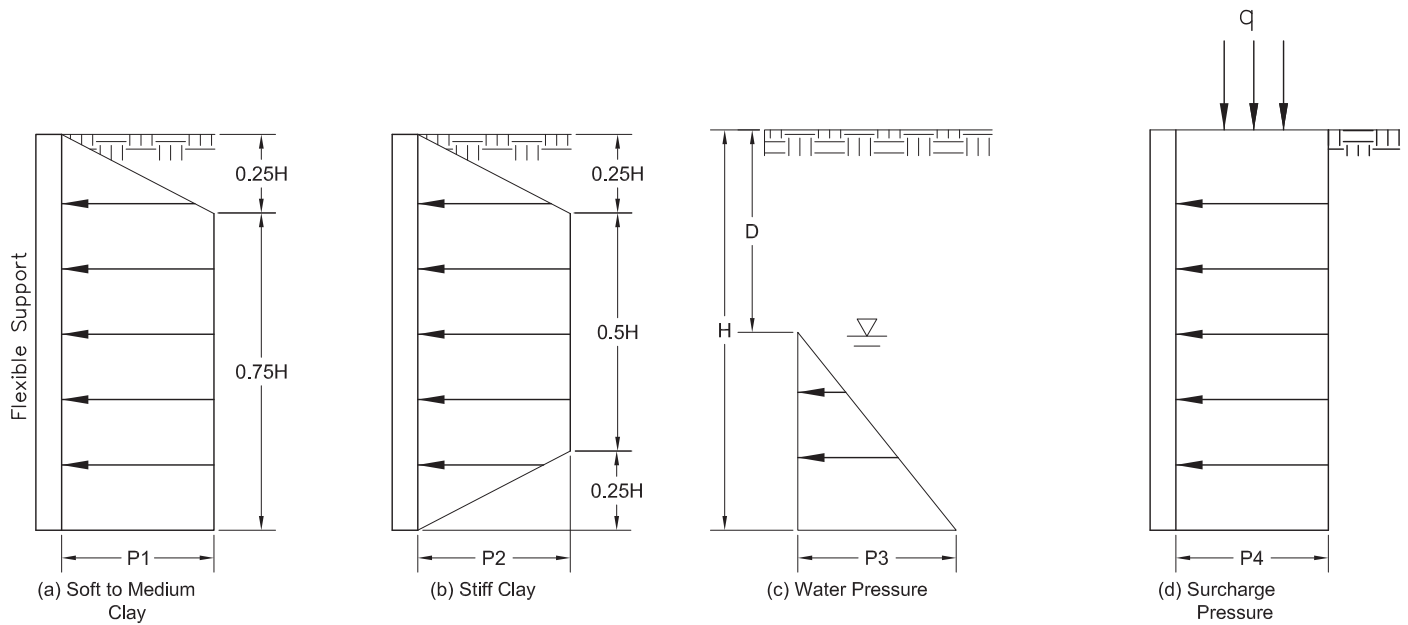
$K_a$  = Coefficient of active earth pressure

Notes:

1. All pressures are additive.
2. No safety factors are included.
3. For use only during long term construction.
4. If  $\gamma H/C < 4$ , use section (b),  
If  $4 < \gamma H/C < 6$ , use larger of section (a) or (b),  
If  $\gamma H/C > 6$ , use section (a).

Reference: Peck, R.B. (1969), "Deep Excavation and Tunneling in soft Ground", 7th ICSMFE, State of art volume, pp. 225-290.

**LATERAL PRESSURE DIAGRAMS**  
FOR OPEN CUTS IN COHESIVE SOIL - SHORT TERM CONDITIONS



Empirical Pressure Distributions

Where:

H = Total excavation depth, feet

D = Depth to water table, feet

P1 = Lateral earth pressure =  $\gamma H - 4S_u$ , psf

P2 = Lateral earth pressure =  $0.2\gamma H$ , psf

P3 = Water pressure =  $\gamma_w (H - D)$ , psf

P4 = Lateral earth pressure caused by surcharge =  $qK_a$ , psf

$\gamma$  = Effective unit weight of soil, pcf

$\gamma_w$  = Unit weight of water, pcf

$S_u$  = Undrained shear strength =  $q_u/2$ , psf

$q_u$  = Unconfined compressive strength, psf

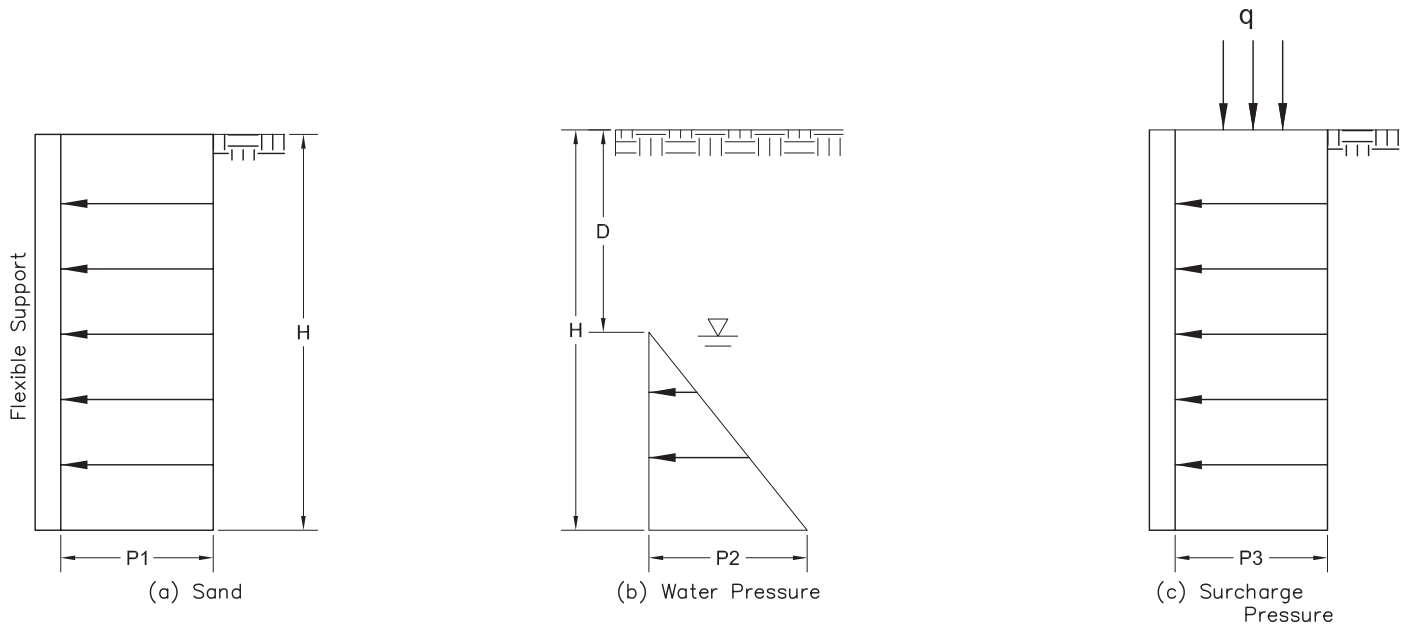
$K_a$  = Coefficient of active earth pressure

Notes:

1. All pressures are additive.
2. No safety factors are included.
3. For use only during short term construction.
4. If  $\gamma H/S_u < 4$ , use section (b),  
If  $4 < \gamma H/S_u < 6$ , use larger of section (a) or (b),  
If  $\gamma H/S_u > 6$ , use section (a).

Reference: Peck, R.B. (1969), "Deep Excavation and Tunneling in soft Ground", 7th ICSMFE, State of art volume, pp. 225-290.

**LATERAL PRESSURE DIAGRAMS  
FOR OPEN CUTS IN SAND**



Empirical Pressure Distributions

Where:

H = Total excavation depth, feet

D = Depth to water table, feet

P1 = Lateral earth pressure =  $0.65 \cdot \gamma H K_a$ , psf

P2 = Water pressure =  $\gamma_w (H - D)$ , psf

P3 = Lateral earth pressure caused by surcharge =  $q K_a$ , psf

$\gamma$  = Effective unit weight of soil, pcf

$\gamma_w$  = Unit weight of water, pcf

$K_a$  = Coefficient of active earth pressure =  $(1 - \sin \phi) / (1 + \sin \phi)$

$\phi$  = Drained friction angle

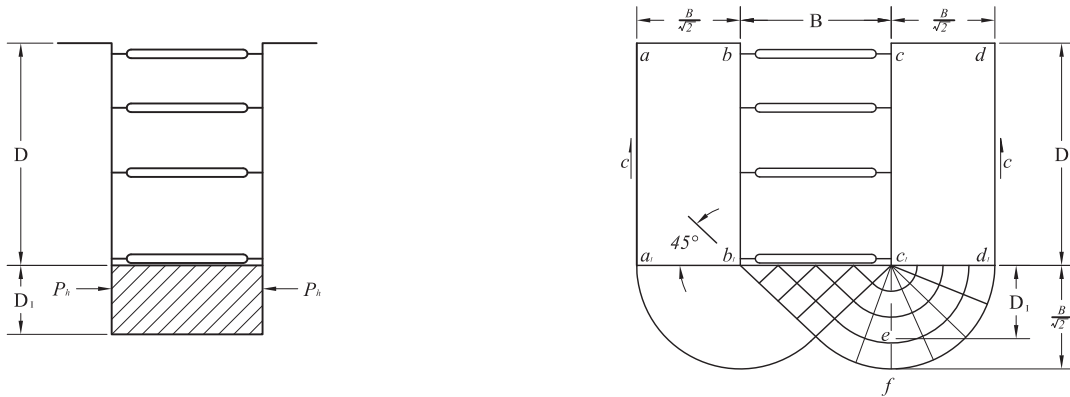
Notes:

1. All pressures are additive.
2. No safety factors are included.

Reference: Peck, R.B. (1969), "Deep Excavation and Tunneling in soft Ground", 7th ICSMFE, State of art volume, pp. 225-290.



## BOTTOM STABILITY FOR BRACED EXCAVATION IN CLAY



Factor of Safety against bottom of heave,

$$F.S = \frac{N_c C}{(\gamma D + q)}$$

- where,  $N_c$  = Coefficient depending on the dimension of the excavation (see Figure at the bottom)  
 $C$  = Undrained shear strength of soil in zone immediately around the bottom of the excavation,  
 $\gamma$  = Unit weight of soil,  
 $D$  = Depth of excavation,  
 $q$  = Surface surcharge.

If  $F.S < 1.5$ , sheeting should be extended further down to achieve stability

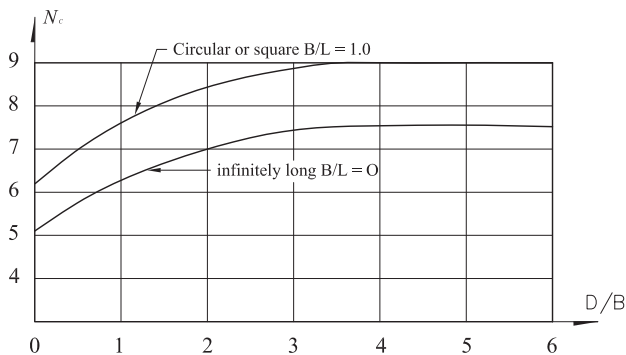
$$\text{Depth of Buried Length, } (D_1) = \frac{1.5(\gamma D + q) - N_c C}{(C/B) - 0.5\gamma} ; D_1 \geq 5 \text{ ft.}$$

Pressure on buried length,  $P_h$ :

$$\text{For } D_1 < 0.47B ; P_h = 1.5 D_1 (\gamma D - 1.4 CD/B - 3.14C)$$

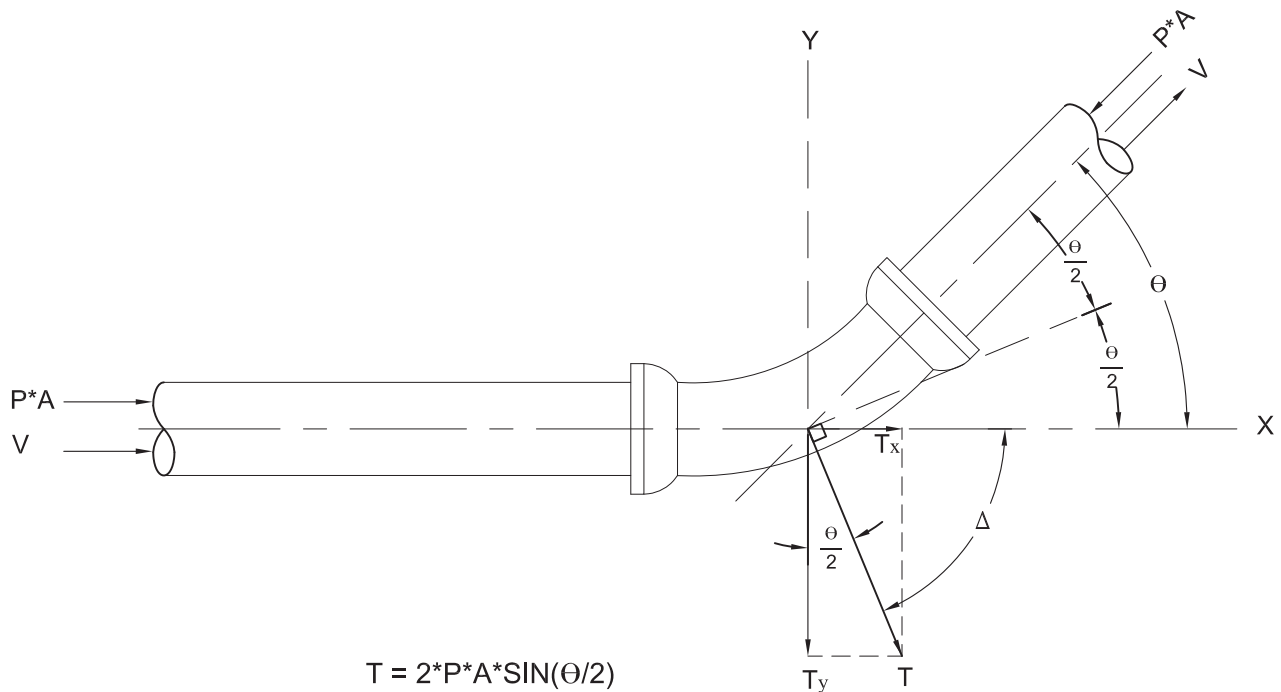
$$\text{For } D_1 > 0.47B ; P_h = 0.7 (\gamma DB - 1.4 CD - 3.14CB)$$

where;  $B$  = width of excavation



$$N_c \text{ rectangular} = (0.84 + 0.16B/L) N_c \text{ square}$$

## THRUST FORCE CALCULATION



$$T = 2 * P * A * \sin(\theta/2)$$

$$T_x = P * A * (1 - \cos\theta)$$

$$T_y = P * A * \sin\theta$$

$$\Delta = (90 - \theta/2)$$

Where:

T = resultant thrust force

$T_x$  = thrust force component along the X axis

$T_y$  = thrust force component along the Y axis

P = maximum sustained pressure

A = cross-sectional area of pipe =  $(\pi/4) * (D)^2$

D = inside diameter conduit

$\theta$  = angle of bend

$\Delta$  = angle between X axis and T

V = fluid velocity

## THRUST FORCE EXAMPLE CALCULATION

### Trust Force Example Calculation

$$T = 2 * P * A * \sin(\theta/2)$$

$$T_x = P * A * \sin(1 - \cos\theta)$$

$$T_y = P * A * \sin \theta$$

Where:

T = resultant thrust force

T<sub>x</sub> = thrust force component along the X axis

T<sub>y</sub> = thrust force component along the Y axis

P = maximum sustained pressure

A = cross-section area of pipe =  $(\pi/4) * (D)^2$

D = inside diameter of conduit

U = angle of bend

Given: D = 24", P = 200 psi,  $\theta = 60^\circ$

Find: T, T<sub>x</sub> and T<sub>y</sub>

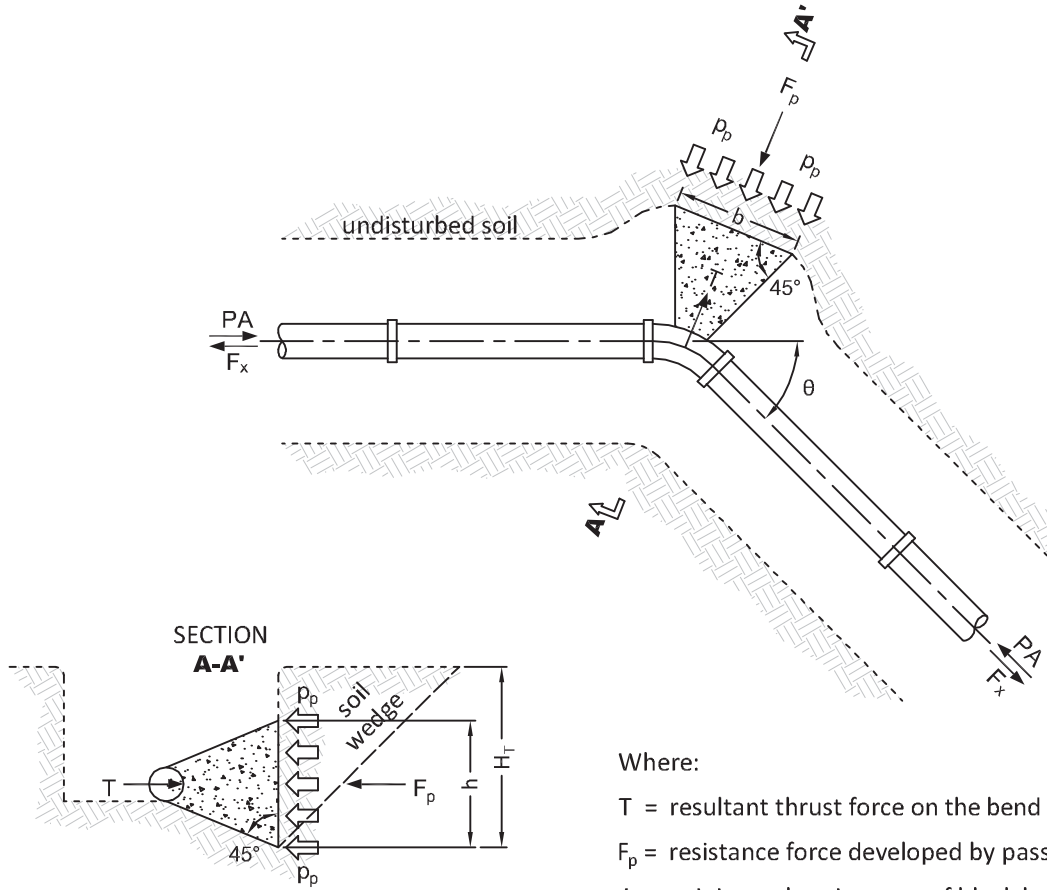
$$A = (\pi/4) * (24)^2 = 452.39 \text{ in}^2$$

$$T = 2 * 200 * 452.39 * \sin(60/2) = 90,478 \text{ lb}$$

$$T_x = 200 * 452.39 * (1 - \cos 60) = 45,239 \text{ lb}$$

$$T_y = 200 * 452.39 * \sin 60 = 78,356 \text{ lb}$$

## DESIGN PARAMETERS FOR BEARING THRUST BLOCK



Where:

$T$  = resultant thrust force on the bend

$F_p$  = resistance force developed by passive soil pressure

$A_b$  = minimum bearing area of block base

$h$  = height of thrust block

$b$  = width of thrust block

$A$  = pipe cross-sectional area

$\theta$  = bend deflection angle

$p_p$  = passive soil pressure

$H_T$  = depth to bottom of block

$\gamma$  = soil unit weight

$K_p$  = coefficient of passive earth pressure

$\phi$  = soil internal friction angle

$C$  = soil cohesion

$F_s$  = factor of safety (usually 1.5)

$H_c$  = mean depth from ground surface to the plane of resistance (center of bearing area of a thrust block)

$p$  = maximum sustained pressure

$F_x$  = conduit frictional resistance per unit length

Required Bearing Area:

$$A_b = hb = \frac{F_s 2PA \sin \frac{\theta}{2}}{p_p}$$

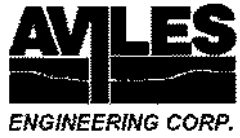
Required Block Width:

$$b = \frac{2F_s PA \sin \frac{\theta}{2}}{h p_p}$$

Where:

$$p_p = \gamma H_c K_p + 2C \sqrt{K_p}$$

$$K_p = \tan^2 \left( 45^\circ + \frac{\phi}{2} \right)$$



## **APPENDIX E**

Plates E-1 to E-3

DARWin v3.0 Computer Program Output



# 1993 AASHTO Pavement Design

## DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare  
Computer Software Product  
Aviles Engineering Corporation

### Rigid Structural Design Module

Memorial Drive, based on turning movement counts

#### Rigid Structural Design

Pavement Type	JRCP
18-kip ESALs Over Initial Performance Period	7,200,597
Initial Serviceability	4.5
Terminal Serviceability	2.5
28-day Mean PCC Modulus of Rupture	600 psi
28-day Mean Elastic Modulus of Slab	3,600,000 psi
Mean Effective k-value	74 psi/in
Reliability Level	95 %
Overall Standard Deviation	0.35
Load Transfer Coefficient, J	3.2
Overall Drainage Coefficient, Cd	1.2
Calculated Design Thickness	9.69 in

#### Effective Modulus of Subgrade Reaction

<u>Period</u>	<u>Description</u>	<u>Roadbed Soil Resilient Modulus (psi)</u>	<u>Base Elastic Modulus (psi)</u>
1	1	3,000	30,000
Base Type	stabilized subgrade		
Base Thickness	8 in		
Depth to Bedrock	100 ft		
Projected Slab Thickness	9 in		
Loss of Support Category	1		
Effective Modulus of Subgrade Reaction	74 psi/in		

# 1993 AASHTO Pavement Design

## DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare  
Computer Software Product  
Aviles Engineering Corporation

### Rigid Structural Design Module

Memorial Drive, rounded up to 10" pavement, based on turning movement counts

#### Rigid Structural Design

Pavement Type	JRCP
Slab Thickness for Performance Period Traffic	10 in
Initial Serviceability	4.5
Terminal Serviceability	2.5
28-day Mean PCC Modulus of Rupture	600 psi
28-day Mean Elastic Modulus of Slab	3,600,000 psi
Mean Effective k-value	74 psi/in
Reliability Level	95 %
Overall Standard Deviation	0.35
Load Transfer Coefficient, J	3.2
Overall Drainage Coefficient, Cd	1.2
18-kip ESALs Over Initial Performance Period	8,832,161

#### Effective Modulus of Subgrade Reaction

<u>Period</u>	<u>Description</u>	<u>Roadbed Soil Resilient Modulus (psi)</u>	<u>Base Elastic Modulus (psi)</u>
1	1	3,000	30,000
Base Type	stabilized subgrade		
Base Thickness	8 in		
Depth to Bedrock	100 ft		
Projected Slab Thickness	10 in		
Loss of Support Category	1		
Effective Modulus of Subgrade Reaction	74 psi/in		

# 1993 AASHTO Pavement Design

## DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare  
Computer Software Product  
Aviles Engineering Corporation

### Rigid Structural Design Module

Memorial Drive, 11" minimum thoroughfare thickness required by IDM

#### Rigid Structural Design

Pavement Type	JRCP
Slab Thickness for Performance Period Traffic	11 in
Initial Serviceability	4.5
Terminal Serviceability	2.5
28-day Mean PCC Modulus of Rupture	600 psi
28-day Mean Elastic Modulus of Slab	3,600,000 psi
Mean Effective k-value	74 psi/in
Reliability Level	95 %
Overall Standard Deviation	0.35
Load Transfer Coefficient, J	3.2
Overall Drainage Coefficient, Cd	1.2
18-kip ESALs Over Initial Performance Period	16,537,788

#### Effective Modulus of Subgrade Reaction

<u>Period</u>	<u>Description</u>	<u>Roadbed Soil Resilient Modulus (psi)</u>	<u>Base Elastic Modulus (psi)</u>
1	1	3,000	30,000
Base Type	stabilized subgrade		
Base Thickness	8 in		
Depth to Bedrock	100 ft		
Projected Slab Thickness	11 in		
Loss of Support Category	1		
Effective Modulus of Subgrade Reaction	74 psi/in		

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**PHASE I ENVIRONMENTAL SITE ASSESSMENT  
TIRZ 17 RECONSTRUCTION OF  
MEMORIAL DRIVE BETWEEN  
WEST SAM HOUSTON PARKWAY AND  
TALLOWOOD ROAD  
HOUSTON, TEXAS**

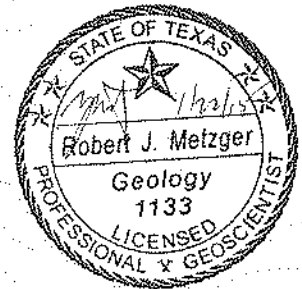
**Volume 1 of 2**

**Prepared for:  
Lockwood, Andrews, and Newnam, Inc.  
2925 Briarpark Drive, Suite 400  
Houston, Texas 77042**

**Prepared by**

**Aviles Engineering Corporation  
5790 Windfern Road  
Houston, Texas 77041  
Phone: (713) 895-7645  
Fax: (713) 895-7943  
AEC Project No. E112-14**

**Date: April 22, 2015**



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## APPENDICES

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- Appendix A: Site Maps, Figures, and General Information
- Appendix B: Environmental Records Documentation (GeoSearch Results)
- Appendix C: Regulatory Agency Record Search Documentation
- Appendix D: Physical Setting Source Documentation
- Appendix E: Historical Research Documentation
- Appendix F: Harris County Appraisal District Search Results
- Appendix G: Photographs
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- Appendix I: Resume

## 1.0 EXECUTIVE SUMMARY

Lockwood, Andrews, and Newnam, Inc. requested a Phase I Environmental Site Assessment (ESA-I) for the reconstruction of Memorial Drive between the West Sam Houston Parkway and approximately 100 feet east of Tallowood Drive in western Harris County, Texas (Subject Right-of-Way).

AVILES ENGINEERING CORPORATION (AEC) has conducted an ESA-I of the Subject Right-of-Way in general accordance with the guidelines contained in the American Society for Testing and Materials (ASTM) Designation E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E1527-13) as modified by Chapter 11 of the City of Houston, Department of Public Works and Engineering Infrastructure Design Manual (July 2012) for conducting ESA-I's on construction projects in City rights-of-way.

The purpose of this ESA-I was to identify recognized environmental conditions in connection with the Project Alignment. As defined in ASTM E1527-13, the term recognized environmental conditions means "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."

The ESA-I included records reviews, site reconnaissance, and interviews. This report was prepared to document the ESA-I investigation and results.

This ESA-I identified the following RECs in connection with the Subject Right-of-Way.

- REC 1: Chevron LPST site/Wheatley Investments at 12860 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 2: The contaminant plume associated with leaks from Your Valet Cleaners at 614 West Bough Lane and A-1 Cleaners LPST and VCP site at 12754 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 3: Sprint PCS Tower IOP site at 608 West Bough Lane (refer to Figure 5a in Appendix A).
- REC 4: Mobil gas station at 12802 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 5: The contaminant plume associated with Conoco 43059 at 12699 Memorial Drive LPST site (refer to Figure 5b in Appendix A).
- REC 6: Alexan Memorial Bend Apartments IOP site at 12667 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 7: The contaminant plume associated with the MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners VCP and IHWCA site at 12534 Memorial Drive and the Memorial Green VCP site at 12601 Memorial Drive (refer to Figure 5a in Appendix A).

Research during the ESA-I revealed that the West Piney Point Fault crosses the western portion of the Subject Right-of-Way. Evidence of the fault was not found in during the site reconnaissance.

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

AEC recommends that a Phase II Environmental Site Assessment be conducted in the Subject Right-of-Way with soil borings drilled to 5 feet below the maximum depth of construction along the Memorial Drive Subject Right-of-Way. Some of the soil borings should be converted to a temporary monitor wells. Soil samples and a groundwater sample should be collected and analyzed for the following:

- REC 1: benzene, toluene, ethylbenzene, and total xylenes (BTEX); methyl tertiary butyl ether (MTBE); and total petroleum hydrocarbons (TPH 1005).
- REC 2: volatile organic compounds, BTEX, MTBE, and TPH 1005, Resource Conservation and Recovery Act (RCRA) 8 metals.
- REC 3: VOCs, TPH 1005, and RCRA 8 metals
- REC 4: BTEX, MTBE, TPH 1005, and RCRA metals.
- REC 5: BTEX, MTBE, and TPH 1005.
- REC 6: VOCs, and TPH 1005.
- REC 7: VOCs

AEC also recommends that a qualified firm conduct a Phase I fault study for the Subject Right-of-Way since based on literature research a mapped fault is located near the western end of the Subject Right-of-Way.

## **2.0 INTRODUCTION**

### **2.1 Project Location**

Lockwood, Andrews, and Newnam, Inc. requested a Phase I Environmental Site Assessment (ESA-I) for the reconstruction of Memorial Drive between the West Sam Houston Parkway and approximately 100 feet east of Tallowood Road in western Harris County, Texas (Subject Right-of-Way). The Subject Right-of-Way will also extend approximately 100 feet into each of the following side streets:

- West Sam Houston Parkway North (Beltway 8) northbound feeder road,
- West Bough Lane,
- Broken Bough Drive,
- Old Oaks Drive,
- Huntingwick Drive,
- Boheme Drive,
- Memorial Bend Drive,
- Hollow Drive,
- Somerset Place,
- Legend Lane, and
- Tallowood Road.

Figure 1 shows a site vicinity map and Figure 2 shows a map with the project limits which LAN provided Aviles Engineering Corporation (AEC; refer to Appendix A). Table 1 in Appendix A shows the limits of the Subject Right-of-Way and Figure 3 shows the location of the Subject Right-of-Way on an aerial photograph (refer to Appendix A).

## 2.2 Purpose

The purpose of this ESA-I was to identify recognized environmental conditions (RECs) in connection with the Subject Right-of-Way. As defined in ASTM E1527-13, the term recognized environmental conditions means “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

## 2.3 Scope of Services

AEC performed this ESA-I in general accordance with the guidelines contained in ASTM E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E1527-13), as modified by Chapter 11 of the City of Houston, Department of Public Works and Engineering Infrastructure Design Manual (July 2012) for conducting ESA-I's on construction projects in City rights-of-way.

The following scope of services was performed in completing this ESA-I of the Project Alignment:

- Records Review,
- Site Reconnaissance,
- Interviews.

This report was prepared to document the ESA-I investigation and results.

## 2.4 Special Terms and Conditions

No special terms and conditions were agreed to for this ESA-I.

## 2.5 Authorization

A proposal for an ESA-I for the Subject Right-of-Way, which was requested by Mr. Ricky Gonzalez, P.E., Project Coordinator at LAN was prepared and submitted by AEC on December 15, 2014. Notification to proceed was given in an email from Mr. Gonzalez on March 3, 2015 and the authorization and notice to proceed was signed by Mr. Muhammad M. Ali, P.E., and Project Manager on February 27, 2015.

## 2.6 Limiting Conditions, Deviations, Exceptions, and Significant Assumptions

The information and conclusions provided in this report are based on a general knowledge of the Subject Right-of-Way and surrounding region, information provided by LAN, Inc., regulatory agency data, historical information, site reconnaissance findings, and interviews. The site reconnaissance observations in this report summarize conditions as found on the dates the AEC Environmental Professional visited and observed the Subject Right-of-Way and surrounding area. This study has attempted to identify RECs in connection with the Subject Right-of-Way; however, there is a possibility that sources of information have gone undetected because of the limitations of this study, inaccuracy of database records, or the presence of undetected and unreported environmental releases. All discovered information has been disclosed and a good faith effort has been made to consult pertinent sources and appropriately evaluate the information.

This ESA-I was performed in general accordance with ASTM E1527-13. The ESA-I was limited to information that is “reasonably ascertainable” and “practically reviewable” in accordance with

ASTM E1527-13, considering the time and cost associated with the assessment. AEC cannot guarantee the completeness or accuracy of the regulatory agency files and site listings and cannot guarantee that not finding indicators of hazardous substances or petroleum products means that these materials do not exist on the Subject Right-of-Way. AEC cannot be responsible for failure to disclose RECs that may exist on or near the Subject Right-of-Way, but were not identified due to limiting the assessment to information that is "reasonably ascertainable" and "practically reviewable".

This investigation was performed using the standard level of care and diligence normally practiced by recognized professional environmental and engineering firms in this area presently performing similar services under similar circumstances. This report is intended to be used in its entirety. It has been prepared exclusively for the Subject Right-of-Way. If the location or area of the Subject Right-of-Way changes or otherwise differs from the descriptions contained herein, AEC should be immediately notified and retained to evaluate the effect of the changes on the conclusions presented in this report, and to revise them if necessary. The conclusions presented in this report should not be relied upon for other properties or sites without additional evaluation and/or investigation. This document is not intended to constitute or substitute for legal counsel or guidance in connection with decisions regarding property acquisition or regulatory actions.

### **3.0 USER PROVIDED INFORMATION**

Mr. Ricky Gonzalez of LAN provided general site information and maps showing the location of the Subject Right-of-Way. LAN also provided approximate elevations of the base of proposed storm sewers (the deepest utilities) for the project.

### **4.0 RECORDS REVIEW**

#### **4.1 Standard Environmental Records**

Mr. Robert Metzger of AEC submitted a request on March 3, 2015, to GeoSearch L.P. (GeoSearch) to conduct a search of standard environmental records for the Project Alignment. The results of the search were received from GeoSearch on March 5, 2015. GeoSearch conducted a search of environmental agency database records (standard environmental record sources as per ASTM E1527-13) to help identify any recognized environmental conditions (RECs) in connection with the Project Alignment and the surrounding area. The database records contain information on environmental incidents, conditions, notifications, and registrations reported to the United States Environmental Protection Agency (EPA), the Texas Commission on Environmental Quality (TCEQ), and other appropriate federal, state, local, and tribal agencies. The GeoSearch Radius Report is contained in Appendix B. The search radii from the Project Alignment were in accordance with the ASTM E1527-13 minimum search distances. Database records from a total of 22 sites were retrieved.

The environmental records identified below are those within a reduced search radius of 500 feet from the Subject Right-of-Way, except for Industrial and Hazardous Waste Sites and Industrial and Hazardous Waste Corrective Action Sites which must maintain a one mile search radius. The search radius has been reduced in accordance with ASTM E1527-13 due to the unlikelihood of a source of contamination beyond that distance impacting the Project Alignment based on geology



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and hydrology of the area. The numbers in the below chart correspond to the numbers on the radius map on page 11 of the GeoSearch Radius Report (Appendix B) and to the records of the report on pages 17 through 167.

<b>Radius Report Map ID No. and Site Name &amp; Location</b>	<b>Database Summary</b>
1. Walgreen 3328 at 12850 Memorial Drive (refer to Figure 4a, Number 18; Section 4.2; and Site Reconnaissance, Section 5.0).	<b>Industrial and Hazardous Waste Sites (IHW):</b> Inactive small quantity generator of non-industrial and/or municipal wastes. Waste included fixer used in photo processing. <b>Facility Registry System (FRSTX):</b> Registered with the Resource Conservation and Recovery Act Information System (RCRAINFO). No Standard Industrial Classification (SIC) or North American Industry Classification (NAICS) reported.
1. Town and Country Village Shopping Center Dry Cleaners at 12850 Memorial Drive (refer to Figure 4a, Number 18; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). The location of the dry cleaners was not found during the site reconnaissance.	<b>Innocent Owner/Operator Database (IOP):</b> Contaminated groundwater with volatile organic compounds and chlorinated solvents. <b>State Institutional/Engineering Control Sites (SIEC01):</b> Enrolled in Voluntary Cleanup Program. Soils and groundwater contaminated with chlorinated solvents by dry cleaners. Pump and treat and vapor extraction remediation on site. Site conditionally closed in July 1997 with controls. Controls include using area for non-residential land, no groundwater use allowed, and operation and maintenance of remediation systems. <b>Voluntary Cleanup Program (VCP):</b> Refer to SIEC01 above. <b>Groundwater Contamination Cases (GWCC):</b> Enrolled in VCP for cleanup of metals contamination.
1. Town and Country Village Shopping Center at 12850 Memorial Drive (refer to Figure 4a, Number 18; Section 4.2; and Site Reconnaissance, Section 5.0).	<b>FRSTX:</b> Registered with Texas Commission on Environmental Quality Central (TCEQ) Agency Registry. No SIC or NAICS reported.
1. Randall's Food Store #1066 at 12850 Memorial Drive, Suite 1000 (refer to Figure 4a, Number 18; Section 4.2 and Site Reconnaissance, Section 5.0).	<b>FRSTX:</b> Registered with RCRAINFO. No SIC data reported. NAICS 44511: Supermarket and Other Grocery (Except Convenience) Stores. <b>Resource Conservation &amp; Recovery Act-Generator Facilities (RCRAGR06):</b> Waste generator of nicotine, salts, pyridine, 3-(1-methyl-2-pyrrolidinyl)-(S)-. No violations reported.
1. Oklahoma Installation Company (Dillards Department Store) at 570 Town & Country Village. The facility	<b>FRSTX:</b> Registered with RCRAINFO. No SIC or NAICS data reported.

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Radius Report Map ID No. and Site Name & Location	Database Summary
and address were not found during the site reconnaissance. (refer to Section 4.2 and Site Reconnaissance, Section 5.0).	<b>Resource Conservation &amp; Recovery Act-Generator Facilities (RCRAGR06):</b> Waste generator of ignitable waste and various hazardous non-halogenated solvents. No violations reported.
2. Post Oak Cleaners at 12645 Memorial Drive, Suite G (refer to Figure 4b, Number 39; Section 4.2; and Site Reconnaissance, Section 5.0).	<b>Dry Cleaner Registration Database (DCR):</b> Drop station registration.
3. Pilgrims Cleaners, Pilgrim Town & Country Cleaner, and A-1 Cleaners at 12754 Memorial Drive (refer to Figure 4a, Number 22; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0).	<b>IHW:</b> Inactive small quantity non-industrial and/or municipal generator of waste. Waste generated included perc sludge, perc filters, and other unidentified wastes.
3. Pilgrim Town & County Cleaner at 12754 Memorial Drive (refer to Figure 4a, Number 22; Section 4.2).	<b>IHW:</b> Inactive conditionally exempt small quantity non-industrial and/or municipal generator of waste. Waste types not specified.
3. A-1 Cleaners at 12754 Memorial Drive (refer to Figure 4a, Number 22; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0).	<b>Leaking Petroleum Storage Tanks (LPST):</b> LPST 113777. One steel and another underground gasoline tank installed in 1987 were removed from the ground in 1998. Assessment was incomplete, no apparent receptors impacted. Case closed in 1998. <b>Petroleum Storage Tanks (PSTs):</b> Refer to LPST above. <b>VCP:</b> LPST 113777. Soils and groundwater impacted. Site is in investigation phase. <b>DCR:</b> Drop station registration.
4. Alexan Memorial Bend Apartments at 12667 Memorial Drive (refer to Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). Neither this location nor the address were found during the site reconnaissance, but the general area of the former business was identified as near Figure 4b, Numbers 39-42 and 82-83.	<b>IOP:</b> Soil and groundwater impacted by volatile organic compounds and total petroleum hydrocarbons.
5. Conoco 43059 at 12699 Memorial Drive (refer to Figure 4b, Numbers 46 and 47; Section 4.2; and Site Reconnaissance). The Conoco station was not observed during the site reconnaissance. Instead, Tres Market	<b>LPST:</b> LPST 104023. Two 10,000-gallon fiberglass reinforced plastic (FRP) kerosene underground storage tanks installed in 1982 were removed from the ground in 1992. One-6,000 gallon FRP kerosene underground storage tank installed in 1959 was removed from the ground in

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<b>Radius Report Map ID No. and Site Name &amp; Location</b>	<b>Database Summary</b>
Pantry and Memorial Food Store are now located at 12699 Memorial Drive.	1987. One-10,000 gallon FRP gasoline underground storage tank installed in 1987 was removed from the ground in 1992. One 6,000-gallon steel diesel underground storage tank installed in 1959 was removed in 1987. One 550-gallon steel used oil tank installed in 1987 was removed from the ground in 1990. Groundwater was impacted with no apparent threats or impacts to receptors. Case closed in 1992. PSTs: See LPST information above.
5. Post Oak Cleaners at 12699 Memorial Drive (refer to Figure 4b, Numbers 46 and 47; Section 4.2; and Site Reconnaissance, Section 5.0). The cleaners is no longer at this address.	<b>DCR:</b> Drop station registration.
6. Wheatley Investments at 12860 Memorial Drive (refer to Figure 4a, Number 16; Section 4.2; and Site Reconnaissance, Section 5.0).	<b>PSTs:</b> Active site. Three 12,000-gallon FRP gasoline underground storage tanks (USTs) installed in 1995 are in use; three 10,000-gallon FRP gasoline USTs installed in 1987 were removed from the ground in 1995; one 550-gallon used oil UST installed in 1966 was removed from the ground in 1987; one 1,000-gallon FRP used oil UST installed in 1987 was removed from the ground in 1995; one 10,000-gallon FRP gasoline UST installed in 1977 was removed from the ground in 1987; two 12,000-gallon steel gasoline UST installed in 1966 were removed from the ground in 1987.
6. Chevron 60108123 at 12860 Memorial Drive (refer to Figure 4a, Number 16; Section 4.2; and Site Reconnaissance, Section 5.0).	<b>LPST:</b> LPSTs 091934 and 116132. 1) LPST 091934: Groundwater impacted, no apparent threats or impacts to receptors. Final concurrence pending documentation of well plugging (Site reconnaissance revealed the wells are plugged.). 2) LPST 116132: Assessment incomplete, no apparent receptors impacted. Final concurrence pending documentation of well plugging. PST information is the same as Wheatley Investments above (Site reconnaissance revealed the wells are plugged.).
7. Sprint PCS Tower Site (HO54XC698/Leonard) at 608 West Bough Lane (refer to Figure 4a, Number 58; Section 4.2; Site	<b>IOP:</b> Groundwater contaminated with volatile organic compounds.

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Radius Report Map ID No. and Site Name & Location	Database Summary
Reconnaissance, Section 5.0 and Interviews, Section 6.0).	
8. MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners at 12534 Memorial Drive (refer to Figure 4b, Number 32; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0).	<p><b>DCR:</b> Drop station registration.</p> <p><b>Industrial and Hazardous Waste Corrective Action Site (IHWCA):</b> Inactive status, No other information reported.</p> <p><b>VCP:</b> Soil and groundwater contaminated by chlorinated solvents from dry cleaner. Municipal Settings Designation (MSD) approved. Certificate of Completion issue October 2012.</p> <p><b>Affected Property Assessment Reports (APAR):</b> Enrolled in VCP. Active Investigation Phase.</p>
9. Pilgram Wycliffe at 12647 Memorial Drive (refer to Site Reconnaissance, Figure 4b, Number 83; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). Gulf States Laundry Machinery Company is currently located at this address.	<b>IHW:</b> Conditionally Exempt Small Quantity Generator of non-industrial and/or municipal wastes. Registration inactivated because facility was registered prior to 1994 and no waste activity was reported in 1994 through 1996. No waste records.
9. Pilgrim Cleaners at 12647 Memorial Drive (refer to Site Reconnaissance, Figure 4b, Number 83; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). Gulf States Laundry Machinery Company is currently located at this address.	<b>IHW:</b> Conditionally Exempt Small Quantity Generator of non-industrial and/or municipal wastes. Inactive. Waste descriptions not reported.
10. Your Valet Cleaners at 614 West Bough Lane (refer to Figure 4a, Number 63; Section 4.2; Site Reconnaissance, Section 5.0 and Interviews, Section 6.0). Your Valet Cleaners and the address 614 West Bough Lane were not found during the site reconnaissance, but the location of the address was identified during interviews.	<b>IHW:</b> Small Quantity Generator of non-industrial and/or municipal wastes. Registration inactivated because there were only 6-digit waste codes on the NOR and no waste activity was reported in 1994 through 1996. No waste records.
11. Memorial Green at 12601 Memorial Drive (refer to Figure 4a, Number 34; Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0).	<b>VCP:</b> Groundwater contaminated with volatile organic compounds. Site is vacant and in investigation phase.
12. CVS Pharmacy #6752 at 12502 Memorial Drive (refer to Figure 4b,	<b>RCRAGR06:</b> Generator of ignitable hazardous waste, corrosive waste, 2H-1-benzopyran-2-one, 4-

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Number 32; Section 4.2 and Site Reconnaissance, Section 5.0).	hydroxy-3-(3-oxo-1-phenylbutyl)-, salts, warfarin, 1,2-benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]- (R), epinephrine, nicotine and salts, pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, 1,2,3-propanetriol, trinitrate (R), and nitroglycerine (R). No violations reported.
13. Pilgrims Cleaners 128 at 650 West Bough Lane, Suite 116 (refer to Figure 4a, Number 65; Section 4.2; and Site Reconnaissance, Section 5.0). Sessions Music now occupies this address.	<b>DCR:</b> Drop station registration.
16. Texaco at 12859 Kimberly Lane (refer to Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). The site is beyond 500 feet from the Subject Right-of-Way and Wells Fargo Bank now occupies this address. The location is to the north Figure 4a, Number 56.	<b>LPST:</b> The groundwater was impacted, but no apparent threats or impacts to receptors. Casc was closed May 6, 1988. <b>PST:</b> Four 6,000-gallon steel gasoline storage tank installed in 1967 were removed from the ground in 1990. Three 9,684-gallon FRP gasoline storage tank installed in 1990 were removed from the ground in 2006. One 550-gallon FRP used oil storage tank installed in 1990 was removed from the ground in 2004. One 550-gallon FRP gasoline storage tank installed in 1967 was removed from the ground in 1990. <b>IHW:</b> Inactive Small Quantity Generator of non-industrial and/or municipal wastes. Periodic or occasional generator of tank water bottoms from condensation and con (meaning not defined in records).
17. CO Polydoros & Associates at 12727 Kimberly Drive (refer to Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). The site is beyond 500 feet from the Subject Right-of-Way. The location is to the northeast of Figure 4a, Number 56. A Medical Center was observed at this address during the site reconnaissance.	<b>IHW:</b> Conditionally Exempt Small Quantity Generator of non-industrial and/or municipal wastes. Inactive. Waste descriptions not reported.
18. Mobil Service Station 12-BLY at 770 West Sam Houston Parkway North #100 (refer to Section 4.2; Site Reconnaissance, Section 5.0; and Interviews, Section 6.0). The site is beyond 500 feet from the Subject Right-of-Way. The Mobil Service	<b>LPST:</b> Groundwater was impacted but no apparent threats or impacts to receptors. Last entry in records is for groundwater monitoring, May 1988. <b>PST:</b> One 5,000-gallon steel gasoline and two 8,000-gallon steel gasoline storage tanks installed in 1970 were removed from the ground in 1988. One 12,000-gallon and two 10,000-gallon FRP



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Radius Report Map ID No. and Site Name & Location	Database Summary
<p>Station was not found during the site reconnaissance. The address is now occupied by la Madeleine restaurant.</p>	<p>gasoline storage tanks installed in 1989 were removed from the ground in 1998. One tank of unknown volume, material, and contents installed in 1987 was removed from the ground in 1987. One 12,000-gallon and two 10,000-gallon FRP empty storage tank installed in January 1988 were removed from the ground in January 1988. One 550-gallon steel used oil storage tank installed in 1970 was removed from the ground in 1988. One 1,000-gallon FRP empty storage tank installed in 1988 was removed from the ground in 1988. One 1,000-gallon FRP used oil storage tank installed in 1989 was removed from the ground in 1998. <b>IHW:</b> Small Quantity Generator of non-industrial and/or municipal wastes. Registration inactivated because there were only 6-digit waste codes on the NOR and no waste activity was reported in 1994 through 1996. No waste records were given.</p>
<p>18. Shell Oil at 12860 Kimberly Lane (refer to Section 4.2; and Site Reconnaissance, Section 5.0). The site is beyond 500 feet from the Subject Right-of-Way. The service station and address were not found during the site reconnaissance, but the address would have been where the current la Madeleine restaurant is located.</p>	<p><b>PST:</b> Same as Mobil Service Station above.</p>
<p>20. Weatherford US Houston at 10802 Katy Freeway (refer to Section 4.2 and Site Reconnaissance, Section 5.0). The site is beyond 500 feet from the Subject Right-of-Way. The facility and address were not found during the site reconnaissance.</p>	<p><b>Industrial and Hazardous Waste Corrective Action Sites (IHWCA):</b> Active site. No other information reported.</p>
<p>21. Fluorocarbon Plastic &amp; Rubber Production at 10420 Katy Freeway (refer to Section 4.2 and Site Reconnaissance, Section 5.0). The site is beyond 500 feet from the Subject Right-of-Way. The facility and address were not found during the site reconnaissance.</p>	<p><b>IHWCA:</b> Inactive site. No other information reported.</p>
<p>22. Spring Branch Service Center at 10310 Katy Freeway (refer to Section</p>	<p><b>IHWCA:</b> Inactive site. No other information reported.</p>

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4.2 and Site Reconnaissance, Section 5.0). The site is beyond 500 feet from the Subject Right-of-Way. The facility and address were not found during the site reconnaissance.	

**4.2 Regulatory Agency Files and Records**

ASTM E1527-13 states that a regulatory agency file and record review should be conducted for the property (Subject Right-of-Way) and adjoining properties if any of these were identified in the standard environmental record review (refer to Section 4.1 above) unless justification is given by the environmental professional for not conducting the regulatory agency file and record review. An on-line records search on the Texas Commission on Environmental Quality (TCEQ) website was performed for each of the above entries and a visit to the TCEQ office Houston was made to review additional records (Refer to Appendix C for records containing applicable information).

The Walgreens 3328 at the Town and Country Village Shopping Center at 12850 Memorial Drive has an inactive Industrial and Hazardous Waste Solid Registration for one time or intermittent generation of used fixer for photograph processing. The waste was managed off site only.

The Town and Country Village Shopping Center Dry Cleaners at 12850 Memorial Drive is currently enrolled in the Voluntary Cleanup Program (VCP ID Number 152). The release was from the former "Your Valet Cleaners". The soils and groundwater including at two offsite monitoring wells were contaminated by cis-1, 2-dichloroethylene, tetrachloroethylene, trichloroethylene, and vinyl chloride. Cis-1, 2-dichloroethylene, tetrachloroethylene, and trichloroethylene concentrations required remediation. The site also had an underground injection control permit for remediation injection wells which began on January 28, 2005. The injection zone is from approximately 25 feet to 44 feet depth and the rate of injection was 20 gallons per minute. An unspecified chemical was being injected for remediation. According to a letter from the TCEQ dated April 23, 2009, 88 monitoring and recovery wells were located onsite at that time and 18 injection wells were located along Memorial Drive. An Innocent Owner/Operator Certificate was issued for this site on September 12, 2012 and a VCP Certificate of Completion with restrictive use covenant was issued in January 2015. The restrictive covenant states that use and exposure to the groundwater at the site is prohibited.

No records were found for the Town and Country Village Shopping Center at 12850 Memorial Drive.

No records were found for the Randall's Food Store at 12850 Memorial Drive, Suite 1000.

No records were found for either the Oklahoma Installation Company or Dillards Department Store at 570 Town and Country Village.

The on-line records search confirmed that the Post Oak Cleaners at 12645 Memorial Drive, Suite G is a drop station for dry cleaning.

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LPST 113777 located at A-1 Cleaners at 12754 Memorial Drive resulted from the leak of gasoline and diesel fuel from two underground storage tanks (USTs) at the site. A 1-inch hole was observed in one of the tanks during its removal on December 1, 1998. Soil samples were collected from the native soil at the base of each tank and the side walls of the tank pit and analyzed for benzene, toluene, ethyl benzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH) and total lead. The benzene concentrations exceeded Texas Natural Resource Conservation Commission (TNRCC; forerunner of TCEQ) leaking petroleum storage tank (LPST) Action Levels. The case was closed March 1999 by the TNRCC with contamination in place because the site is 100% paved, no phase separated hydrocarbons (PSH) was observed during the tank removals, groundwater was not encountered during the tank removals, and benzene exceedances in soil samples were at 13 feet in the tank pit, but soil samples at 15 feet was below action levels.

A-1 Cleaners entered the VCP program August 2003 for a release of tetrachloroethylene from the dry cleaners. The tetrachloroethylene and its degradation byproducts of cis-1, 2-dichloroethene, trichloroethylene, and vinyl chloride have contaminated the soil and groundwater. In addition, BTEX has also contaminated the soil and groundwater. Concentrations of many of these contaminants are above TCEQ acceptable levels. The contaminant plume has moved off site beneath a residential neighbor (records did not indicate which direction). Five underground injection wells were installed for remediation. The injection zone is from 5 feet to 200 feet deep and the injection rate is less than 10 pounds per square inch (psi). As of March 4, 2015, the groundwater/media was being monitored. This site also has a drop station registration and had an IHW registration for disposal of tetrachloroethylene sludge and filters. The waste was managed only off-site.

No records were found for Pilgrim Town & Country Cleaner and Pilgrim's Cleaners at 12754 Memorial Drive, but these were at the same location as the A-1 Cleaners.

No records were found for the Alexan Memorial Bend Apartments at 12667 Memorial Drive.

Conoco 43059 at 12699 Memorial Drive became a registered LPST site in August of 1992. Phase-separated hydrocarbons (PSH) were found floating on the groundwater (amount unknown) and as much as practical was recovered between December 1993 and September 1997. Remediation was performed at this site through the use of a dual phase extraction system (DPE). The system had seven recovery wells with pneumatic submersible pumps, oil/water separator, air stripper, and blowers. The remediation system was dismantled in 2006. A total of 30 monitor and recovery wells were once located at the site. TCEQ closed the project, but the date is unknown. The site closure report to the TCEQ is dated August 28, 2007.

Post Oak Cleaners at 12699 Memorial Drive had a drop station dry cleaners registration in 2003 and 2004. The facility was no longer in operation at this address at the time of the site reconnaissance (refer to Section 5.2 Numbers 46 and 47).

LPST 091934 and LPST 116132 are located at the Wheatley Investments/Chevron 60108123 service station at 12860 Memorial Drive. LPST 091934 was registered June 10, 1998 after

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hydrocarbons were reported to be present in storm drains adjacent to the site. During the assessment, PSH was encountered on the groundwater in one monitor well and recovered to the extent practical. Benzene, BTEX, and TPH concentrations in soil and groundwater and methyl tertiary butyl ether (MTBE) in groundwater at the site exceeded action levels. A pump and treat remediation system operated at this site from February 1990 to October 1995. In November 2003, 0.81 feet of PSH was observed in a monitor well and LPST 116132 was assigned. Product fingerprinting showed the PSH was weathered and did not indicate a new release but rather from the original release, so LPST 091934 was reopened and LPST 116132 was cross reference to the case. Depth to groundwater at the site ranged from 22 feet to 33 feet below top of well casing and the groundwater gradient was generally to the north and west. Multiple dual phase extraction (MDPE) was used in 2005 and 2006 for remediation. The case was closed in 2009. An enforcement order was issued by the TCEQ on March 9, 2014 for this site for failure to monitor the USTs for releases at least once every month.

At the Sprint PCS Tower Site at 608 West Bough Lane, the groundwater was contaminated with tetrachloroethylene. An Innocent Owner Certificate was issued October 26, 2001. No other records were found.

The release at MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners at 12534 Memorial Drive contaminated soils with chlorinated solvents. The site case was under Industrial and Hazardous Waste Corrective Action (IHCWA) until it became inactive in June 2011. The site was enrolled in the VCP in July 2004. A Municipal Settings Designation (MSD) was applied for in 2012. A VCP certificate of completion was issued on October 11, 2012. A revised MSD with additional properties was applied for in June of 2014. In a letter from the TCEQ dated June 10, 2014, the consultant was advised to evaluate the potential for vapor intrusion from the contaminated groundwater into a residential property. In a letter from the TCEQ dated August 27, 2014, requested that the well owners within a 5-mile radius be notified of changes in the Municipal Settings Designation certificate. The site is still an active case.

Pilgram Wycliffe and Pilgrim Cleaners at 12647 Memorial Drive each had industrial and hazardous waste (IHW) registrations (facilities no longer at this address, refer to Section 5.2. Number 83). No specific information about the waste could be found.

Your Valet Cleaners at 614 West Bough Lane had industrial and hazardous waste registrations (the facility no longer exists, refer to Section 5.2.3). No specific information about the waste could be found.

Groundwater at Memorial Green, a vacant property at 12502 Memorial Drive, is contaminated with volatile organic compounds (VOCs). This site has been enrolled in the VCP since October 2014 and is currently an active case. No other records were found.

No records were found for CVS Pharmacy #6752 at 12502 Memorial Drive, a generator of various hazardous waste.

Pilgrim Cleaners 128 at 650 West Bough Lane had a dry cleaner drop station registration/certification until 2008 (the facility no longer exists, refer to Section 5.2., Number 65).

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The TCEQ IHW registration number for the Texaco gasoline station at 12859 Kimberly Lane was queried. Records for Shell 101101 gasoline station were shown. The Shell station used to be the Texaco station. The Shell station has an inactive IHW registration for periodic or occasional generator of tank water bottoms from condensation and contaminated soil during tank replacement. Neither the Texaco nor the Shell station currently exists (refer to Section 5.2.4).

No additional information was found during the TCEQ records search for CO Polydoros & Associates beyond that provided in the GeoSearch records search. The facility no longer exists (refer to Section 5.2.4).

Mobil Oil 00BLY at 12860 Kimberly Lane and West Belt had active miscellaneous storage containers with IHW Solid Waste Registration (the facility no longer exists, refer to Section 5.2.4). Waste material was not recorded. The facility also had an air permit for a soil and groundwater remediation system. No details were given about the types of contamination. This site also had a LPST registration, however it is greater than 500 feet and so the details of the LPST are not presented here.

Shell Oil gasoline station at 12860 Kimberly Lane is a petroleum storage tank site. The site is located greater than 500 feet from the Subject Right-of-Way, therefore a TCEQ records search was not performed.

Weatherford US Houston at 10802 Katy Freeway entered the VCP program (VCP #1137) in 2000. Soil and groundwater were contaminated by chlorinated solvents and VOCs. A response action plan and a response action completion report were prepared. A notice of deficiency was issued by the TCEQ in October 2005 and Weatherford US Houston withdrew from the VCP program in March 2007. Weatherford US Houston ceased to operate in December 1991 and was enrolled in the IHW Corrective Action Program in 1994 and was still active in the program as of February 2015. The facility had two tanks and a container storage area which had an industrial and hazardous waste solid waste registration. The manufacturer had industrial hazardous waste registrations for varsol, oil, hydraulic and cutting oil, plant refuse, general miscellaneous trash, metal scrap, and some other unidentified waste codes. Soils were contaminated by chlorinated solvents, including methylene chloride, volatile and semivolatile organic compounds, BTEX, and concentrations of trichloroethylene required remediation or other type of remedy. A letter dated January 26, 2015 indicated that nine monitor wells were placed in the upper groundwater bearing unit (GWBU) between approximately 24 feet to 45 feet and 10 monitor wells were placed in the second GWBU between approximately 58 feet to 70 feet. The first GWBU is contaminated with tetrachloroethane (PCE), trichloroethene (TCE), cis-1, 2 dichloroethene (cis-DCE), trans-1, 2-dichloroethene (trans-DCE), 1, 1 dichloroethene (1, 1 DCE) and vinyl chloride (VC). One or more of these contaminant concentrations exceeded applicable TCEQ limits in each of the wells except one. PCE, TCE, 1, 1 DCE and VC exceed acceptable limits in three wells screened in the second GWBU. Other volatile and semivolatile organic compounds were present in the groundwater. The plume extent in the upper GWBU is estimated to be approximately 100 feet offsite (no well control). The plume in the second GWBU is estimated to be 350 feet offsite (no well control). The groundwater gradient is to the south to southwest. Groundwater and soil analytical results, groundwater elevations, and groundwater gradient maps are included in Appendix C. The TCEQ



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concluded that the second GWBU has not been delineated vertically or laterally. Groundwater remediation included injection wells with injection of molasses and soy oil. The consultant recommended an MSD designation for the site, but no application had been submitted by January 2015. The site is currently undergoing groundwater/media monitoring. Three USTS (one was a 10,000-gallon tank) were also removed from the site in November 1991. Approximately 4.5 feet of PSH was found in one monitor well in 1996. The site also had a wastewater permit which expired (unknown date). No other information was found concerning the permit.

Fluorocarbon Plastic & Rubber Production at 10420 Kay Freeway operated from 1962 to 1985 and was enrolled in the IHWCA Program and currently has an inactive status. The facility had IHW registrations for general plant refuse, sump sludges containing miscellaneous chemicals and organic acids (acetic, formic, propionic, and butyric), some of which was disposed on site. Soils were contaminated with methylene chloride, chlorinated hydrocarbons, acetone, 2-butanone, TPH, and the upper GWBU (approximately 10 feet to 18 feet) was contaminated with methylene chloride, oil and grease, trichloroethylene, and some other volatile organic compounds (summary of analytical results are included in Appendix C). According to reports in the TCEQ files, groundwater gradient is to the southeast, but no offsite migration has occurred. Contaminated soils were excavated and disposed. On-site structures were demolished, pressure washed, and disposed. Contaminated groundwater was removed and treated with activated carbon and re-injected into the GWBU. The company also has an inactive status transporter IHW registration. No other details were provided in the records.

Spring Branch Service Center owned by Houston Lighting & Power Company at 10310 Katy Freeway enrolled in the IHW Corrective Action Program in May 1996 for the closure of waste management units. Soils were contaminated by metals and total petroleum hydrocarbons. Contaminated soils were excavated from the site. Closure of the units were approved in July 2011. The records did not indicate whether remediation took place at the site. The site had IHW registrations for the following waste management units: waste oil collection tank, car wash sump, drum storage area, polychlorinated biphenyls (PCB) storage area, bins, and a lift rack sump. Waste descriptions included rags contaminated with solvents, paint, and oily residues; spent solvents; liquid paint waste; waste diesel; waste gasoline; metal grinding waste; machine coolant; paint waste; asbestos; hydrocarbon-contaminated soils; mineral oil contaminated soils; blast grit; Resource Conservation and Recovery Act (RCRA) empty plastic or fiber containers; lift rack sump sludge; spent antifreeze; waste grease; vehicle wash rack sludge; waste oil; spent roofing materials; floorsweep materials; metal grinding wastes; used carbon zinc batteries; hydrocarbon-contaminated rags and absorbent material; Class 2 empty metal containers, fiber, or plastic containers; miscellaneous plant trash; creosote treated wood; penta treated wood; padcrete; reacted poly set; medical wastes; PCB-contaminated containers; PCB capacitors; non-PCB capacitors; PCB-contaminated oil; PCB-contaminated soil and debris; and waste naphtha.

Spring Branch Service Center also has had three different LPSTs, but these were located almost one mile from the Subject Right-of-Way and therefore details are not presented here. A 10,000-gallon steel empty tank was removed from the ground at Spring Branch Service Center in June 2007. The site also had a storm water permit to discharge water into Rummel Creek.

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Spring Branch Service Center was enrolled in the VCP in November 2007. A Remedial Action Completion Report was submitted in April 2008 and the VCP activity has been inactive since that time. Soils were contaminated by metals, semi-volatile organics, and TPH. Groundwater was contaminated by metals, semi-volatile organics, TPH, and VOCs. Arsenic and naphthalene concentrations in soil and groundwater required remediation or other remedy. The type and amount of remediation at the site and whether performed are unknown.

#### **4.3 Additional Environmental Records**

A request for information on spills, releases, other incidents, and emergency responses involving hazardous materials and/or petroleum products at the Subject Right-of-Way and its vicinity (Key Map Cells 489G, 489H, and 489M) was emailed on March 3, 2015 to the City of Houston Fire Department (refer to Appendix C). A response was received on March 6, 2015 (refer to Appendix C). The following records are for locations within 500 feet of the Subject Right-of-Way:

- A turn around (false alarm) at 12850 Memorial Drive.
- A turn around (false alarm) at 12500 Memorial Drive.
- 30 gallons of diesel released at 12516 Memorial Drive (in the Lantern Lane Shopping Center nearly 500 feet from Subject Right-of-Way).

Mr. Metzger did not request records from the Harris County Public Health and Environmental Services (HCPHES). In a telephone conversation to Ms. Evelyn Phillips of HCPHES on December 18, 2014, she stated that most of the information the HCPHES has concerns grease traps and that they did not have records on oil, gas, and chemical spills. In addition, a request would need to be made for each address. Due to the number of properties along the Subject Right-of-Way and area within 500 feet, these records were not deemed reasonably ascertainable or practically reviewable due to their large numbers.

#### **4.4 Physical Settings Source**

##### *4.4.1 Topography*

The 2013 Hedwig Village, Texas United States Geological Survey 7.5-Minute topographic map was reviewed to determine the physical setting of the site as required by ASTM E1527-13 (refer to Appendix D). The topographic map shows that the land underlying the Project Alignment area is flat with a surface elevation ranging between 65 feet and 75 feet above Mean Sea Level (MSL). The surface gradient direction is generally to the south or southeast. Buffalo Bayou and Rummel Creek are the major bodies of water shown on the map. At its closest the bayou is approximately 1,300 feet from the Subject Right-of-Way. Besides the water bodies, roads are the only physical features shown on the topographic map. Except for the surface elevations, bayou, streets, and a few buildings, the topographic map contains minimal information on the topography, geology, hydrogeology, or other physical characteristics on or adjoining the Subject Right-of-Way.

##### *4.4.2 Soils*

As shown in the Natural Resources Conservation Service Web Custom Soil Resource Report for Harris County, Texas attached in Appendix D, the soil mapping units encountered in the Subject Right-of-Way and the surrounding area are the Addicks-Urban land complex (Ak), Gessner-Urban land complex (Gu), the Hatliff-Pluck-Klan complex (Hata), the Verland-Urban land complex (Mu), and Urban land (URLX).

Addicks-Urban Land Complex (Ak) soils occur in nearly level irregular-shaped areas. The parent material of these soils is loamy fluviomarine deposits. The surface of this soil-mapping unit is generally plane to slightly convex; and slopes range from 0 to 1 percent and average about 0.3 percent. This complex is composed of 20 to 85 percent Addicks loam, 10 to 60 percent urban land, and 5 to 20 percent other soils. Addicks soils are poorly drained, have slow surface runoff and internal drainage, moderate permeability, and high available water capacity.

Gessner-Urban Land Complex soils occur in broad nearly level areas and in depressions that vary from 15 to 180 acres in area with a few occurrences of several hundred acres. The parent material of these soils is loamy fluviomarine deposits. Gessner soils make up approximately 55 percent of this mapping unit, Urban soils compose approximately 35 percent, and other soils make up approximately 10 percent. Down-slope and across-slope shape of the unit is concave. Gessner soils are poorly drained, and are generally saturated in winter and early spring. Surface runoff is very slow, and internal drainage is slow. Water remains in surface depressions of this soil for long periods following rain. The soils have moderate permeability and high available water capacity.

Hatliff-Pluck-Klan Complex (Hata) is a nearly level soil on floodplains. The parent material is loamy alluvium. The surface slope ranges from 0 to 1 percent. The soils are frequently flooded. The Hatliff and similar soils make up about 38 percent of the unit; Pluck and similar soils make up approximately 35 percent of the unit; Klan and similar soils, 24 percent of the unit; and other soils, 3 percent of the unit. The Hatliff soils have a linear down-slope shape and a convex across-slope shape. The soils are well drained with negligible runoff. Water storage is moderate. Pluck soils have a concave down-slope and across-slope shape. The soils are poorly drained with high runoff. Available water storage is high. Klan soils have a linear down-slope shape and concave and linear across-slope shape. The soils are poorly drained with high runoff. Available water storage is moderate.

The Verland-Urban land complex (Mu; also known as Midland Urban land complex) is present in nearly level in broad irregular areas that vary from 30 to 600 acres. Slopes range from 0 to 1 percent and average 0.5 percent. Both down-slope and across-slope shapes are linear. Approximately 50 percent of this mapping unit is composed of Verland soils, 35 percent is urban land, and 15 percent or less is composed of other soils. Limitations for development on this mapping unit are severe due to poor drainage and shrinking and swelling in underlying layers. Verland series soils are characterized by very slow surface runoff, permeability, and internal drainage and high available water capacity.

Urban land (URLX) has a slope of 0 to 3 percent and has a linear down-slope and across-slope shape. Runoff is very high and available water capacity is very low.

#### 4.4.3 *Groundwater and Floodplains*

According to the 1994 Texas Water Development Board's Major Aquifers in Texas Map, the Gulf Coast Aquifer, which includes nine geologic formations, is the underlying aquifer in the area of the Subject Property. A map and description of the Gulf Coast Aquifer (modified from Baker 1979) is attached in Appendix D. The aquifer consists of complex interbedded clays, silts, sands and gravels which are hydraulically connected. The two major aquifers in the Houston area are the Chicot and the Evangeline aquifers. These aquifers are Pliocene and Pleistocene in age and

generally consist of sand layers interbedded with clays and gravels that occur near the surface and continue to a depth in excess of 1,200 feet. Recharge of these aquifers is from precipitation on outcrop areas that occur to the northwest.

To assess the flooding probability, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map No. 48201C0645L (revised June 18, 2007) for Harris County, Texas and Incorporated Areas was reviewed (refer to map and legend in Appendix D). As shown on the map, most of the eastern portion of the Subject Right-of-Way is located in Zone X Flood Areas. This zone includes areas of 0.2% annual chance of flooding (500-year floodplain); areas of 1% annual chance flood (100-year floodplain) with average depths less than one foot or with drainage areas less than 1 square mile; and areas protected by levees from the 1% annual flood.

#### 4.4.4 *Active Faults*

As shown on the map of Principal Surface Faults of the Houston Central Metropolitan Area (Terrain Solutions, Inc. after O'Neill and Van Sclen with additions by C. Norman, 2004) in Appendix A, the West Piney Point Fault crosses the western portion of the Subject Right-of-Way. On March 19, 2005, Robert Metzger, AEC Senior Geologist, visited the Subject Right-of-Way and surrounding area to look for evidence of faulting. He did not observe any evidence.

#### 4.5 **Historical Use Information**

ASTM E1527-13 states that "all obvious uses of the property shall be identified from the present, back to the property's first developed use, or back to 1940 whichever is earlier". The purpose of consulting historical sources is to "develop a history of the previous uses of the property and surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the property". The following standard historical sources (as identified in ASTM E1527-13) were reviewed: aerial photographs, historical topographic maps, fire insurance maps, and local city/county directories. References were reviewed once every 5 years or as available.

##### 4.5.1 *Aerial Photographs*

Historical aerial photographs of the Subject Right-of-Way and the surrounding area that were taken in 1944, 1953, 1966, 1978, 1989, 1996, 2004, and 2012 were reviewed (refer to copies of the aerial photographs in Appendix E). Two aerial photographs cover the Subject Right-of-Way for 1953 and 1989. The approximate location of the Subject Right-of-Way is identified on each aerial photograph.

In the 1944 aerial photographs, most of the area is wooded with some farm land. A few circular lakes can be observed. Two roads which became parts of present-day Memorial Drive and Beltway 8 are visible in the upper left-hand corner of the aerial. Buffalo Bayou and a few of its tributaries can be observed near the lower portion of the aerial photograph.

Some of the wooded areas are no longer present in the 1953 aerial photograph. The present-day Memorial Drive is visible on the aerial photograph. Some human activity can be seen along Buffalo Bayou. The remaining area is generally the same as in 1944.

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Much growth took place in the Memorial Drive area between 1953 and 1966. The area is now connected with roads including the road which now is occupied by Beltway 8. The area is mostly covered by residential areas with some commercial areas and multi-family dwellings. A cluster of commercial buildings can be seen north of the western end of the Subject Right-of-Way. A gasoline service station appears to be located on the northern side of Memorial Drive near the western end of the Subject Right-of-Way. Some wooded areas are still visible especially in the area south of the eastern end of the Subject Right-of-Way. The Lantern Lane Shopping Center at 12534 Memorial Drive near the end of the Subject Right-of-Way is first visible in the 1966 aerial photograph. A sewage or water treatment plant is visible along Buffalo Bayou.

Additional multi-family dwellings are now visible in the eastern portion of the Subject Right-of-Way in the 1978 aerial photograph. More commercial buildings are located north of the western end of the Subject Right-of-Way than in previous aerial photographs. Most of the wooded areas south of the Subject Right-of-Way have been removed. The remaining portion of the Subject Right-of-Way is similar to the 1966 aerial photograph.

Beltway 8 is now visible in the 1989 aerial photograph. The rest of the area remains largely unchanged.

The 1996 aerial photograph remains largely unchanged from the 1989 one.

The 2004 aerial photograph shows that the buildings in the area north of the western portion of the Subject Right-of-Way have been reconfigured. Little else has changed since the prior aerial photograph.

The 2012 aerial photograph shows little change from the 2004 aerial photograph.

In summary, aerial photographs since 1966 show that the Subject Right-of-Way area is predominantly residential with some commercial and wooded areas. A gasoline service station appears to be located in 1966 and subsequent aerial photographs. There is no evidence of RECs in connection with the Subject Right-of-Way which could be identified during the review of the aerial photographs.

#### *4.5.2 Historical Topographic Maps*

The Subject Right-of-Way is located on the 1915 Hillendahl, Texas; 1919 Addicks, Texas; 1928 North Houston, Texas; 1955 Addicks, Texas; 1970, 1982, 1995, and 2013 Hedwig Village, Texas topographic quadrangle maps. Each of these maps were reviewed for this ESA-I (refer to the topographic maps in Appendix E). The approximate location of the Project Alignment is identified on each map. The maps show that the land underlying the Project Alignment area is very flat. The topography of the area was discussed in Section 4.4.1.

A review of the 1915 topographic map shows the Subject Right-of-Way and surrounding land is mostly undeveloped and wooded. Houston and Katy Road (current Interstate 10) is located north of the Subject Right-of-Way. Buffalo Bayou and its tributaries including Rummel Creek, are visible in the lower portion of the map. Several unimproved roads are located northeast of the Subject Right-of-Way. The map uses a 1-foot contour interval.



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The 1919 and 1928 topographic maps do not show any significant changes. A 5-foot contour interval is used in these maps and in the remaining topographic maps.

The 1955 topographic map shows some roads and buildings in the Subject Right-of-Way and surrounding area including Memorial Drive. U.S. 90 is located at the previous location of Houston and Katy Road.

The 1970 topographic map shows significant residential and some commercial development in the Subject Right-of-Way and surrounding area. Many roads including West Belt Drive (current West Sam Houston Parkway or Beltway 8) are located in the area and most of the wooded areas are gone. A cluster of commercial buildings is now located on the northern side of Memorial Drive at the western end of the Subject Right-of-Way. A sewage disposal facility is now located near Buffalo Bayou near West Belt Drive. A commercial building is located at the northeastern corner of Tallowood Road and Memorial Drive.

In the 1982 topographic map, the commercial area north of the western end of the Subject Right-of-Way is larger. The wooded areas south of the eastern end of the Subject Right-of-Way have been removed and replaced with residential areas. The drainage pattern of one of the tributaries of Buffalo Bayou located just west of Tallowood Street has been modified.

Beltway 8 (West Sam Houston Parkway) is first visible in the 1995 topographic map. Town and Country Mall is also present north of the western area of the Subject Right-of-Way. The remaining portion of the topographic map is similar to the 1982 map.

The 2013 topographic map shows little change compared to the 1995 map. Interstate 10 is first identified on the 2013 topographic map.

Except for the man-made structures previously indicated and the general topographic information, the topographic maps contain minimal information on the topographic, geologic, or hydrologic conditions of the Subject Right-of-Way and the surrounding area. No RECs were observed on the topographic maps.

#### *4.5.3 Sanborn Fire Insurance Maps*

Mr. Robert Metzger reviewed the index to Sanborn Fire Insurance Maps at the Houston Public Library on March 13, 2015. No maps covering the Subject Right-of-Way or adjoining areas were available.

#### *4.5.4 Local Street Directories*

Houston City/Harris County directories located in the Houston Public Library from 1956 (first development) to 2015 were reviewed on March 12 and 18, 2015 to determine past land use and locations of possible RECs. Directories for every five years from 1956 to 1981 and from 1987 to 2012 were reviewed. The 2014 directory was also reviewed. Only Volume 1 and Volume 4 for 2015 were available and these were also reviewed. The following street addresses within approximately 500 feet of the Subject Right-of-Way plus the addresses for the IHW sites out to 1 mile were reviewed:

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- Entire Bendwood Drive
- 12519 to 12610 and 12699 to 12805 Boheme Drive
- 12702 to 12726 Broken Bough Drive
- 12802 to 12926 Butterfly Lane
- 614 to 631 Cherrybark Lane
- Entire Cobblestone Drive
- Entire Faust Lane
- 510 to 538 Hallie Drive
- 402 to 424 Hollow Drive
- Entire Huntington Drive
- 10310, 10420, and 10802 Katy Road/ Old Katy Road/ Katy Freeway
- 12727, 12859, and 12860 Kimberly
- 1 to 10 Legend Lane
- 12500 to 12926 Memorial Drive
- Entire Memorial Bend Drive
- Entire Memorial Park (Center)
- Entire Memorial Park Drive
- 402 to 450 Mignon Drive
- 12702 to 12726 Old Oaks Drive
- 12723 to 12730 Pebblebrook Drive
- Entire Rip Van Winkle Drive
- 401 to 425 Tallowood Drive
- 12707 to 12726 and 12903 to 12927 Taylorcrest Road
- 12802 to 12922 Tosca Lane
- Entire Town and Country Village Shopping Center
- 600 to 660 West Bough Lane
- 500 to 642 and 770 West Belt/West Sam Houston Parkway South

The potential environmental concerns found during the review are listed below.

<u>Address</u>	<u>Occupant</u>	<u>Directories</u>
12707 Boheme Drive	Sweetlake Chemical	2007
	Fusion Motor Inc.	2007
12702 Cobblestone Drive	Firethorn Oil Company	2007
10802 Katy Freeway	Hole Hog Pump and Petroleum Supply	1961, 1966
10802 Katy Freeway	Dixel Manufacturing and Hole Hog Pump Liners	1971, 1976
10802 Katy Freeway	Weatherford DMC	1981
12727 Kimberly	Esso Exploration	1976, 1981
12859 Kimberly	Texaco gas station	1971, 1976, 1981, 1987-8, 1992-3

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12859 Kimberly	Town and Country gas station	1997-8, 2002-3
12860 Kimberly	Mobil gas station	1971, 1976, 1981, 1987-8, 1992-3
12860 Kimberly	Shell gas station	1997-8
12526 Memorial Drive	Red Coachman Cleaners	1966, 1971
12534 Memorial Drive	Pro Cleaners, then MW Cleaners	2002-3, 2007, 2012, 2014
12633 Memorial Drive	Amco Auto Salvage and Car Center	2007
12645 Memorial Drive	Texaco gas station	1966, 1976
12645G Memorial Drive	Post Oak Cleaners	2012, 2014
12647 Memorial Drive	Gulf State Laundry	1992-3, 1997-8
12651 Memorial Drive	F. Joseph Service Station; Spic & Span Cleaners	1961
12651 Memorial Drive	Beeler ENCO gas station	1966
12651 Memorial Drive	NABB ENCO Service	1971
12651 Memorial Drive	Exxon gas station/Holiday Cleaners	1976
12651 Memorial Drive	God Bless You Cleaner	1987-8, 1992-3
12699 Memorial Drive	Caldwell Service Station	1961
12699 Memorial Drive	Conoco gas station	1971, 1976, 1992-3
12699 Memorial Drive	Post Oak Cleaners	2002-3, 2012
12754 Memorial Drive	Dapper Dan Cleaners	1976
12754 Memorial Drive	Pilgrims Laundry/Cleaners	1981, 1987-8
12754 Memorial Drive	A-1 Dry Cleaners	1992-3, 1997-8, 2002-3, 2007, 2012, 2014
12764 Memorial Drive	Phillips 66 gas station	1961, 1966, 1971
12802 Memorial Drive	Jims Mobil gas station	1976
12850 Memorial Drive	Pilgrims Launderers and Cleaners	1971, 1976, 1981

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12858 Memorial Drive #10	Pilgrims Laundry	1992-3
12858 Memorial Drive #46	Pilgrims Launderers	1976
12860 Memorial Drive	Gulf gas station and auto service	1971, 1976, 1981, 1987-8
12860 Memorial Drive	Town and Country Chevron	1997-8, 2002-3, 2014
12862 Memorial Drive	Gulf gasoline station	1961, 1966
10420 Old Katy Road	Plastic and Rubber Products	1981
10802 Old Katy Road	Weatherford Custom and International	1987-8
614 West Bough Lane	Memorial Martinizing	1966, 1971, 1976
614 West Bough Lane	Your Valet Cleaners and Laundry	1981, 1987-8
650 West Bough Lane	Pilgrims Cleaners	1992-3, 1997-8, 2002-3

A summary of potential environmental concerns found during the search of local city directories include:

- A chemical company and motor company operated at 12707 Boheme Drive for at least one year.
- An oil company operated at 12702 Cobblestone Drive for at least one year.
- A pump, manufacturing facility and petroleum supply company operated at 10802 Katy Freeway and 10802 Old Katy Freeway for at least 28 years (refer to Environmental Records, Section 4.1, Record #20).
- An oil exploration company operated at 12727 Kimberly for at least six years (refer to Environmental Records, Section 4.1, Record #17).
- Gasoline service stations have operated at 12859 Kimberly for at least 33 years (refer to Environmental Records, Section 4.1, Record #16).
- Gasoline service stations have operated at 12860 Kimberly for at least 28 years (refer to Environmental Records, Section 4.1, Record #18).
- A dry cleaners operated at 12526 Memorial Drive for at least six years.
- Dry cleaners operated at 12534 Memorial Drive for at least 13 years (refer to Environmental Records, Section 4.1, Record #8).
- An auto salvage and car care center operated at 12633 Memorial Drive for at least one year.
- A gasoline station operated at 12645 Memorial Drive for at least 11 years (refer to Environmental Records, Section 4.1, Record #2).
- A dry cleaners operated at 12645 Memorial Drive for at least three years (refer to Environmental Records, Section 4.1, Record #2).
- A laundry business operated at 12647 Memorial Drive for at least eight years (refer to Environmental Records, Section 4.1, Record #9).

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- A gasoline station operated at 12651 Memorial Drive for at least 16 years.
- A dry cleaners operated at least one year in the early 1960s and periodically from the 1970s to the 1990s at 12651 Memorial Drive.
- A gasoline station operated periodically for at least 33 years at 12699 Memorial Drive (refer to Environmental Records, Section 4.1, Record #5).
- A dry cleaners operated periodically for at least 11 years at 12699 Memorial Drive (refer to Environmental Records, Section 4.1, Record #5).
- A dry cleaners has operated at 12754 Memorial Drive for at least 39 years (refer to Environmental Records, Section 4.1, Record #3).
- A gasoline station has operated for at least 11 years at 12764 Memorial Drive.
- A gasoline station operated at 12802 Memorial Drive for at least one year.
- A dry cleaners operated at 12850 Memorial Drive for at least 11 years (refer to Environmental Records, Section 4.1, Record #1).
- A dry cleaners operated at 12858 Memorial Drive Suite #10 for at least one year and at #46 for at least one year.
- A gasoline station operated at 12860 Memorial Drive for most of the time during at least a 44 year period of time (refer to Environmental Records, Section 4.1, Record #6).
- A gasoline station operated at 12862 Memorial Drive for at least 6 years.
- A plastic and rubber manufacturer operated for at least 1 year at 10420 Old Katy Road (refer to Environmental Records, Section 4.1, Record #21).
- Dry cleaners operated at 614 West Bough Lane for at least 22 years (refer to Environmental Records, Section 4.1, Record #10).
- A dry cleaners operated at 650 West Bough Lane for at least 11 years.

*4.5.5 Harris County Appraisal District Records*

A review of the Harris County Appraisal District Records (HCAD) for the commercial properties adjacent to and within 500 feet of the Subject Right-of-Way were reviewed. The records are updated annually in January. The following HCAD files provided useful information to develop the past history of the properties adjacent and within 500 feet of the Subject Right-of-Way. A copy of HCAD records with useful information are included in Appendix F. The numbers at the top of the HCAD records correlate with the numbers in Site Reconnaissance, Section 5.2 and the numbers on Figures 4a and 4b in Appendix A.

According to HCAD record 040-160-000-0029, the Chevron Station located at 12860 Memorial Drive has been owned since December 2003 by Wheatley Investments, Ltd (refer to Section 5.2, Number 16). Between January 1988 and December 2003 the station was owned by Chevron USA, Inc. Gulf Oil Company owned the facility between January 1984 and January 1988. No ownership records are available prior to that date.

According to HCAD record 040-160-000-0011, 12699 Memorial Drive was owned by the Continental Oil Company (Conoco) from 1984 to 1986 (refer to Section 5.2, Numbers 46 and 47).



## 5.0 SITE RECONNAISSANCE OF SUBJECT RIGHT-OF-WAY WITH OBSERVATIONS OF THE ADJOINING PROPERTIES AND SURROUNDING AREA

### 5.1 Methodology and Limiting Conditions

Site reconnaissance of the Subject Right-of-Way, adjoining properties, and surrounding area within approximately 500 feet of the Subject Right-of-Way was conducted on March 17 through 19, 2014 and April 9, 2015. Mr. Robert J. Metzger conducted the reconnaissance. He viewed the Subject Right-of-Way, adjoining properties, and surrounding areas from a vehicle and on foot from the Subject Right-of-Way, nearby public roadways, or rights-of-way.

### 5.2 Observations

#### 5.2.1 Subject Right-of-Way

The Subject Right-of-Way is approximately 6,900 feet long. Most of the Subject Right-of-Way is located along Memorial Drive from the West Sam Houston Parkway North (Beltway 8) to approximately 100 feet east of its intersection with Tallowood Road. The Subject Right-of-Way, according to the information provided by LAN also consists the first 100 feet of each of the following roads: northbound Beltway 8 feeder road (north and south of Memorial Drive), Broken Bough Drive, West Bough Lane, Old Oaks Drive, Huntingwick Drive, Boheme Drive, Memorial Bend Drive, Hollow Drive, Somerset Place, Legend Lane, and Tallowood Road. A map provided by LAN and an aerial photograph showing the Subject Right-of-Way are included as Figure 2 in Appendix A).

The following is a description of the Subject-of-Way (the numbers correspond to the numbers on Figures 4a and 4b in Appendix A):

1. The northbound Beltway 8 feeder road consists of three lanes and a turn lane and is a one-way street (refer to Figure 4a and Photograph 1 in Appendix G). The road is constructed of concrete with curbs with storm drains and is lined with trees and landscaping. Overhead utilities cross the road.
2. Memorial Drive is a four lane road constructed of asphalt with turn lanes (refer to Figures 4a and 4b and Photograph 2 in Appendix G). The road is a mixture of curbed and uncurbed stretches. Ditches are present alongside the road in some areas. Harris County Flood Control District Channel W153, which is approximately 10 feet deep, is oriented perpendicular to the northern side of the road between Hollow Drive and Tallowood Road. The channel crosses beneath the road through a culvert with metal pipes and connects with the storm sewer system beneath Memorial Drive (refer to Photograph 3 in Appendix G). Storm sewer drains are located along portions of the road. Overhead utilities parallel and cross the road. Transformers are located on some power poles. The transformers are in fair to good condition and show no evidence of leakage. Two environmental monitor wells were observed on the western edge of the right-of-way; one was across from the Chase Bank at 12802 Memorial Drive and the other across from the Bank of Texas at 12764 Memorial Drive (refer to numbers 19 and 21 below and Photographs 4 and 5 in Appendix G). An additional monitor well was observed in the eastern edge of the Memorial Drive right-of-way just west of the A-1 Cleaners at 12754 Memorial Drive (refer to number 22 below). Two plugged monitor wells were also observed on the southern edge of the Memorial Drive right-of-way across from Tallowood Road (refer to number 31 below and Photograph 7 in Appendix G). A mixture of commercial and residential land use adjoins Memorial Drive.

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3. Broken Bough Drive is a two lane concrete road with sloped concrete curbs (refer to Figure 4a). No storm drains are present in the street right-of-way. Overhead utilities parallel and cross the road. Residential land use adjoins the street.
4. West Bough Lane consists of a two lane asphalt road (refer to Figure 4a and Photograph 8 in Appendix G). Some of the road has curbs with storm drains. Overhead utilities cross and parallel the road. Transformers are located on some utility poles. The transformers are in good condition and show no evidence of leakage. A monitor well was observed in the street right-of-way at the northern corner of West Bough Lane and Memorial Drive (refer to Photograph 9 in Appendix G). Land use adjacent to the road is commercial.
5. Old Oaks Drive consists of a two lane concrete road with curbs (refer to Figure 4a). Adjacent land use is residential.
6. Huntingwick Drive consists of a two lane concrete road with curbs (refer to Figure 4b). Adjacent land use is commercial.
7. Boheme Drive is a two lane concrete road with curbs (refer to Figure 4b). Overhead utilities parallel and cross the road. Adjacent land use is commercial and residential.
8. Rip Van Winkle Drive is a two lane concrete road with curbs (refer to Figure 4b). The street sign indicates this road as Rip Van Winkle Drive, however some maps show the portion of Rip Van Winkle which is in the Subject Right-of-Way as Memorial Bend Drive. Commercial land use adjoins the road.
9. Hollow Drive consists of a two lane asphalt road with ditches (refer to Figure 4b). Adjacent land use is residential (refer to Photograph 10 in Appendix G).
10. Somerset Place is a two lane road into an apartment/condominium complex at 12625 Memorial Drive (refer to Figure 4b). The road has storm drains and overhead utilities which cross the road and has a guard shack in the middle of the road.
11. Legend Lane is a two lane asphalt lane with concrete curbs (refer to Figure 4b). Overhead utilities cross the road. Plugged monitor wells were observed in the pavement of this street approximately 100 feet south of Memorial Drive (refer to Photograph 11 in Appendix G). Residential land use adjoins the road.
12. Tallowood Road is a two lane asphalt road with ditches (refer to Figure 4b). The road is partially curbed. Overhead utilities parallel and cross the road. Land use adjoining the road is a mixture of commercial and residential.

Except for the monitor wells observed, no evidence of any environmental concerns were observed during the site reconnaissance of the Subject Right-of-Way.

#### *5.2.2 Properties Which Adjoin the Subject Right of Way*

Properties adjoining the Subject Right of Way is a mixture of commercial, residential, and roads. The following nonresidential properties and conditions were observed adjacent to the Subject Right of Way during the site reconnaissance. The numbers correspond to the numbers on Figures 4a to 4b in Appendix A:

13. Main lanes of Beltway 8 which adjoin west of the Subject Right-of-Way (refer to Figure 4a). This road is a multilane concrete freeway with curbs and storm drains.
14. Bridge on Memorial Drive Bridge over Beltway 8 (refer to Figure 4a).
15. Beltway 8 feeder roads (refer to Figure 4a).
16. Chevron gasoline station with convenience store and car wash at 12860 Memorial Drive (refer to Figure 4a and Photograph 12 in Appendix G). This site is registered as LPST #091934 and

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LPST #116132 (refer to Sections 4.1, Record #6 and Section 4.2). Three plugged monitor wells and three plugged recovery wells were observed on site (refer to Photograph 13 in Appendix G).

17. Various retail shops (refer to Figure 4a).

18. Town and Village Shopping Center at 12850 Memorial Drive. The shopping center includes a Randalls grocery store, Walgreens, and various retail shops and businesses (refer to Figure 4a and Section 4.1, Record #1 and Section 4.2). The Dillard store identified in Section 4.1, Record #1 was not found during the site reconnaissance. This shopping center is the site of the Town and Country Village Shopping Center Dry Cleaners release (refer to Sections 4.1, Record #1 and Section 4.2). A Pilgrims Launderers and Cleaners was also once located in this shopping center. A total of 26 monitor wells and at least nine recovery wells were observed throughout the shopping center, but no dry cleaners was observed during the site reconnaissance. Five monitor wells are located in the grass area adjoining Memorial Drive (refer to Photograph 14 in Appendix G).

19. Chase Bank at 12802 Memorial Drive (refer to Figure 4a). This site was once occupied by a Mobil gasoline station (refer to Section 4.5.4, Local Street Directories), but no evidences of former leaks were observed during the reconnaissance.

20. West Bough Lane (refer to Figure 4a).

21. Bank of Texas at 12764 Memorial Drive (refer to Figure 4a). A Phillips 66 gasoline station was once located at this address (refer to Section 4.5.4, Local Street Directories). Five monitor wells were observed in the parking lot along Memorial Drive (refer to Photograph 15 in Appendix G). This site is not listed in any of the environmental records searched. The site is also located adjacent to A-1 Cleaners which is a leaking dry cleaner site.

22. A-1 Cleaners at 12754 Memorial Drive (refer to Figure 4a and Photograph 16 in Appendix G). This site is a leaking dry cleaner facility (refer to Figure 4a and Sections 4.1, Record #3 and Section 4.2). Pilgrim Town & Country Cleaner and Pilgrim's Cleaners were also once located here. Four monitor wells are located on site and a remediation system is located in the northwestern corner of the site (refer to Photograph 17 in Appendix G). One offsite monitor well is located in front of the strip shopping center at 12748 Memorial Drive and another is located at the western edge of Memorial Drive just west of the A-1 Cleaners property. A utility pole with transformer was located on the opposite side of the northern fence of this property. No evidence of leaks were observed from the transformer.

23. Strip shopping center at 12740 to 12748 Memorial Drive (refer to Figure 4a). Businesses located at the shopping center included More Hands maid service, a beauty salon, and Baskin Robbins ice cream parlor. A monitor well was observed in front of More Hands.

24. Old Oaks Drive (refer to Figure 4a).

25. Memorial Drive Townhouses (refer to Figure 4b). Some power poles have transformers on this property. One is rusting but no evidence of leaks from this or the other transformers was observed.

26. Huntingwick Drive (refer to Figure 4b).

27. Memorial Bend Drive (refer to Figure 4b).

28. Prosperity Bank at 12602 Memorial Drive (refer to Figure 4b).

29. Whitney Bank at 12600 Memorial Drive (refer to Figure 4b).

30. Hollow Drive (refer to Figure 4b).

31. Tallowood Road (refer to Figure 4b). Two plugged monitor wells were observed on the southern edge of the Memorial Drive right-of-way opposite the end of Tallowood Road (refer to Photograph 7 in Appendix G).

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32. Lantern Lane Shopping Center from 12502 to 12538 Memorial Drive (refer to Figure 4b). The shopping center includes CVS Pharmacy at 12502 Memorial Drive and MW Cleaners (former location of Pro Cleaners) at 12534 Memorial Drive which is the site of a dry cleaner leak (refer to Sections 4.1, Records #8 and #12; Section 4.2; and Photograph 18 in Appendix G). No evidence of monitor or recovery wells were observed at this site.
33. Memorial Drive (refer to Figure 4b).
34. Vacant lot (Memorial Green Property) at 12601 Memorial Drive (refer to Figure 4b and Photograph 19 in Appendix G). This is location of a VCP site (refer Sections 4.1, Record #11 and Section 4.2). No monitor wells or recovery system were observed on the site.
35. Legend Lane (refer to Figure 4b). Two plugged monitor well were observed in this section of Legend Lane.
36. Somerset Place apartments or condominiums at 12625 Memorial Drive (refer to Figure 4b).
37. Somerset Place (refer to Figure 4b).
38. The Pines Condominiums at 12633 Memorial Drive (refer to Figure 4b). An auto salvage and car center at 12633 Memorial Drive (refer to Section 4.5.4, Local Street Directories), but no evidence of the facility was observed.
39. Post Oak Cleaners at 12645G Memorial Drive (refer to Figure 4b). This site is a drop station (refer to Section 4.1, Record #2 and Section 4.2)
40. Two story strip shopping center at 12645 Memorial Drive (refer to Figure 4b). The center includes a spa; gym; restaurant; jewelers; massage center; a packing, mail, and copy center; fitness studio; and stylist (type not identified). A Texaco gasoline station was once located at this address (refer to Section 4.5.4, Local Street Directories). No evidence of the gasoline station or releases was observed during the site reconnaissance.
41. Weidner Hasou & Co. at 12649B, a home furnishing store (refer to Figure 4b). A power pole with transformer is located northeast of this facility. No evidences of leaks from the transformer were observed.
42. Building at 12649E through G includes a bank, dance studio, music shop, and title agency (refer to Figure 4b).
43. A beauty salon at 12651A (refer to Figure 4b).
44. Town and Country Tailors & Alterations at 12651B (refer to Figure 4b).
45. Robert's China Crystal and Gifts at 12651C-E (refer to Figure 4b).
46. Memorial Food Store at 12699A Memorial Drive (refer to Figure 4b and Photograph 20 in Appendix G). This site was part of the former Conoco gas station LPST site (refer to Sections 4.1, Record #5 and Section 4.2) and Caldwell Service Station (refer to Section 4.5.4, Local Street Directories). No evidence of the gasoline station or releases was observed. Post Oak Cleaners (refer to Section 4.1, Record #5 and Section 4.2) was once located either here or at adjacent 12699B-C Memorial Drive (see Number 47 below).
47. Tres Market Pantry at 12699B-C Memorial Drive (refer to Figure 4b and Photograph 20 in Appendix G). This site was part of the former Conoco gas station LPST site (refer to Sections 4.1, Record #5 and Section 4.2) and Caldwell Service Station (refer to Section 4.5.4, Local Street Directories). No evidence of the gasoline station or releases was observed. Post Oak Cleaners (refer to Section 4.1, Record #5 and Section 4.2) was once located either here or at adjacent 12699A Memorial Drive (see Number 46 above).
48. Boheme Drive (refer to Figure 4b).
49. Broken Bough Drive (refer to Figure 4a). A monitor well was observed on the pavement of this drive approximately 120 feet southwest of Memorial Drive (refer to Photograph 21).

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The following addresses or businesses were not found during the site reconnaissance of adjacent properties:

- Red Coachman Cleaners at 12526 Memorial Drive, which was listed in the 1966 and 1971 Houston City/Harris County Directories (refer to Section 4.5.4, Local Street Directories). The area where this address would have been is all residential with some apartment and condominium complexes.
- 12667 Memorial Drive: Alexan Memorial Bend Apartments an IOP site (refer to Section 4.1, Record #4). The area of this address would have been in the area of Numbers 39-42 and 82-83 in Figure 4b.
- Pilgrims Laundry at 12858 Memorial Drive, which was listed in the 1992-3 Houston City/Harris County Directory (refer to Section 4.5.4, Local Street Directories). This address was not found during the site reconnaissance, but would have been located adjacent to the east side of the Chevron station at 12860 Memorial Drive (refer to Number 16). No evidence of the laundry or releases from it were observed during the site reconnaissance.
- Gulf gasoline station at 12862 Memorial Drive, which was listed in the 1961 and 1966 Houston City/Harris County Directory (refer to Section 4.5.4, Local Street Directories). Neither the address nor the facility were found during the site reconnaissance. The address would have been located west of the Chevron Station at 12860 Memorial Drive, an area now occupied by the Beltway 8 feeder road.

*5.2.3 Properties within Approximately 500 Feet of the Subject Right-of-Way*

The following properties and conditions were observed within approximately 500 feet of the Project Alignment during the site reconnaissance (the numbers correspond to the numbers on Figures 4a and 4b in Appendix A).

50. Taylorcrest Road (refer to Figure 4a).
51. Cherry Bark Lane (refer to Figure 4a).
52. Continuation of Memorial Drive (refer to Figure 4a).
53. Southbound Beltway 8 feeder road (refer to Figure 4a). A power pole with transformer was observed. No evidences of leaks was observed.
54. Continuation of Beltway 8 main lanes (refer to Figure 4a).
55. Continuation of northbound Beltway 8 feeder road (refer to Figure 4a).
56. Building with vacant space and an art gallery (refer to Figure 4a).
57. Texas Children's Urgent Care (refer to Figure 4a).
58. Cell tower at 608 West Bough Lane (refer to Figure 4a and Photograph 22 in Appendix G). This site is an Innocent Owner/Operator site (refer to Sections 4, Record #7 and Section 4.2).
59. Trina Morgan at 608A West Bough Lane is a clothing shop (refer to Figure 4a).
60. Nail salon and spa at 608B West Bough Lane (refer to Figure 4a).
61. Florist at 612 West Bough Lane (refer to Figure 4a). A transformer on a power pole was observed in the residential area behind the eastern fence of this property. No evidence of leaks from the transformers was observed.
62. Strip shopping center at 650 West Bough Lane (refer to Figure 4a). The center contains various retail stores and businesses which provide various services. The following businesses are located within approximately 500 feet of the Subject Right-of-Way: restaurants, eye glasses center, haircutters, music store, café, shoe store, fitness center, and nail salon/ear piercing business. Twenty-seven monitor wells and some recovery wells were observed (refer to Photograph 23



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between the southern side of the shopping center (Suite 100) and the adjoining florist, the parking lot on the western side of the center, and in the alley on the eastern side of the shopping center. No remediation system was observed. Several power poles with transformers were observed in the residential area behind the eastern wall of this property. The transformers were in good condition and no evidence of leaks were observed.

63. Orangetheory, a fitness center, is located in Suite 100 of the shopping center at 650 West Bough Lane (refer to Figure 4a and Interviews in Section 5.0). According to an interview, this is the former location of Your Valet Cleaners at 614 West Bough Lane (refer to Interviews, Section 6.0)

64. Cocos is a café located in Suite 112 of the shopping center at 650 West Bough Lane (refer to Figure 4a, and Interviews in Section 6.0).

65. Sessions Music at Suite 116 in the shopping center at 650 West Bough Lane (refer to Figure 4a and Number 62 above) is the former location of Pilgrims Cleaner's dry cleaner drop off station (no dry cleaning done on site; refer to Figure 4a; Section 4.1, Record #13; and Section 4.2).

66. West Bough Lane (refer to Figure 4a). Power poles with transformers were observed. The transformers were in good condition and no evidence of leaks from the transformers was observed.

67. Taylorcrest Road (refer to Figure 4a).

68. Broken Bough Drive (refer to Figure 4a).

69. Cobblestone Drive (refer to Figure 4a).

70. Hallie Drive (refer to Figure 4a).

71. Old Oaks Drive (refer to Figure 4a).

72. Huntingwick Drive (refer to Figure 4b).

73. Bendwood Drive (refer to Figure 4b).

74. Rip Van Winkle Drive (refer to Figure 4b).

75. Hollow Drive (refer to Figure 4b).

76. Tallowood Road (refer to Figure 4b). A power pole with transformer was observed. The transformer was in good condition and no evidence of leaks was observed.

77. Old Oaks Drive (refer to Figure 4b).

78. Memorial Drive (refer to Figure 4b). A power pole with transformer was observed. The transformer was in good condition and no evidence of leaks was observed.

79. Legend Lane (refer to Figure 4b).

80. Somerset Place (refer to Figure 4b).

81. Faust Lane (refer to Figure 4b). A power pole with transformer was observed behind a residence at the dead end of Faust Lane. From the vantage point of the observation, the transformer was in good condition and no evidence of leaks was observed.

82. Memorial Town & Country Animal Clinic at 12661 Memorial Drive (refer to Figure 4b).

83. Gulf States Laundry Machinery Company at 12647 Memorial Drive (refer to Figure 4b and Photograph 24 in Appendix G). This facility is the former location of several dry cleaners (refer to Sections 4.1, Record #9 and Section 4.2). A fenced in area with loading dock was observed at the southern end of the facility (refer to Photograph 25 in Appendix G). The entire area was underlain by concrete pavement which appeared in good condition. A dumpster full of trash was observed on the south side of the area. Four 55-gallon drums, eight propane-type tanks on a rack, four gas tanks like those used in welding, were observed in the area. One of the drums was new and labeled Exxon Mobil DF2000 fluid. The remaining tanks and drums appeared in good condition from the point of observation (from the fence) and no evidence of any leaks was observed in the area from the fence. Various types of equipment and parts, wooden pallets, and scrap metal were observed in the fenced compound.

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84. Strip shopping center at 12649 to 12655 Memorial Drive (refer to Figure 4b). The center includes a Domino's pizza parlor, a hair salon, a realtor, and a shop which makes dress and clothing alterations. Various gasoline service stations and cleaners were located at 12651 Memorial Drive (refer to Section 4.5.4, Local Street Directories), but no evidence of the gasoline stations was observed. A plugged monitor well associated with a release from the Conoco LPST (refer to Sections 4.1, Record #5 and numbers 46 and 47 in this section) was observed in the parking lot north of this location (refer to Photograph 26 in Appendix G).
85. Izakaya Wa, a sushi, tapa, and wine bar and restaurant at 12665A Memorial Drive (refer to Figure 4b).
86. Compass drive-through bank (refer to Figure 4b).
87. Memorial Bend Place at 12707 Boheme Drive (refer to Figure 4b). This is a condominium complex. This was once the location of Sweetlake Chemical and Fusion Motor Inc. which was listed in the 2007 Houston City/Harris County Directory (refer to Section 4.5.4, Local Street Directories). No evidence of contamination at this location was visible from the vantage point of the site reconnaissance.
88. Boheme Drive (refer to Figure 4b).
89. Faust Lane (refer to Figure 4a).
90. Mignon Lane (refer to Figure 4a).
91. Broken Bough Drive (refer to Figure 4a).
92. Butterfly Lane (refer to Figure 4a). A monitor well was observed in the pavement of this street across from the residence at 12810 Butterfly Lane (refer to Photograph 27 in Appendix G).
93. Tosca Lane (refer to Figure 4a).
94. Beltway 8 north bound feeder road (refer to Figure 4a).
95. Main lanes of Beltway 8 (refer to Figure 4a).
96. Beltway 8 south bound feeder road (refer to Figure 4a).
97. Butterfly Lane (refer to Figure 4a).

The following addresses or businesses were not found during the site reconnaissance of the area within 500 feet of the Subject Right-of-Way:

- Firethorn Oil Company at 12702 Cobblestone which was listed in the 2007 Houston City/Harris County Directory (refer to Section 4.5.4, Local Street Directories). This address was found, but a house was located there. The surrounding area was all residential.
- Memorial Martinizing and Your Valet Cleaners and Laundry at 614 West Bough Lane (refer to Section 4.1, Record #9; Section 4.2; and Section 4.5.4, Local Street Directories). This address and these facilities were not found during the site reconnaissance, but based on currently addresses on West Bough Lane, these facilities and address likely would have been where the current strip shopping center is at 650 West Bough Lane. Interviews identified Suite 100 of the Shopping Center were Orangetheory is currently located as the location of the cleaners (refer to Interviews, Section 6.0)

#### 5.2.4 Properties Beyond 500 Feet of the Subject Right-of-Way

The following Industrial and Hazardous Waste and Industrial Hazardous Waste Corrective Action Sites (refer to Section 4.1, Records #16, #17, #18, #20, #21, and #22 and Section 4.2) are located beyond 500 feet from the Subject Right-of-Way but within the required 1.0 miles Environmental Records search radius.

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- Texaco at 12859 Kimberly Lane (refer to Section 4.1, Record #16 and Section 4.2). This gasoline service station has been replaced with a Wells Fargo Bank.
- CO Polydoros & Associates at 12727 Kimberly Lane (refer to Section 4.1, Record #17 and Section 4.2). The address is now occupied by a medical center.
- Mobil Service Station at 770 West Sam Houston Parkway North #100 (refer to Section 4.1, Record 18 and Section 4.2). The facility no longer exists and the address is occupied by a la Madeleine restaurant.
- Shell Oil at 12860 Kimberly Lane (refer to Section 4.1, Record #18 and Section 4.2). The facility and address were not found. The address would have been where the la Madeleine restaurant is now located across the street from the current Wells Fargo Bank at 12860 Kimberly Lane.
- Weatherford US Houston industrial and hazardous waste corrective action site at 10802 Katy Freeway (refer to Section 4.1, Record #20 and Section 4.2). The address and facility were not found during the site reconnaissance. An internet search of the address indicated it was approximately 0.9 miles to the north-northwest from the closest part of the Subject Right-of-Way.
- Fluorocarbon Plastic & Rubber Production industrial and hazardous waste corrective action site at 10420 Katy Freeway (refer to Section 4.1, Record #21 and Section 4.2). The address and facility were not found during the site reconnaissance. An internet search of the address indicated it was approximately 0.9 miles to the north-northwest from the closest part of the Subject Right-of-Way.
- Spring Branch Service Center at 10310 Katy Freeway (refer to Section 4.1, Record #22 and Section 4.2). The address and facility were not found during the site reconnaissance. An internet search of the address indicated it was approximately 1 mile to the north-northeast from the closest part of the Subject Right-of-Way.

#### 5.2.5 Site Reconnaissance Summary

During the site reconnaissance, monitor/recovery wells indicating a soil or groundwater release or plugged monitor wells/recovery wells indicating a previous release were observed at the Subject Right-of-Way or adjoining the Subject Right-of-Way at:

- Chevron gasoline station at 12860 Memorial Drive.
- Town and Village Shopping Center at 12850 Memorial Drive.
- Memorial Drive right of way near West Bough Lane.
- West Bough Lane right-of-way near Memorial Drive.
- Bank of Texas at 12764 Memorial Drive.
- A-1 Cleaners at 12754 Memorial Drive. A groundwater/soil remediation system was also observed on the site.
- More Hands at 12748 Memorial Drive.
- Lantern Lane right-of-way.

Monitor wells or plugged monitor wells which were observed at locations not adjoining the Subject Right-of-Way but within 500 feet of the Subject Right-of-Way include:

- Strip shopping center at 650 West Bough Lane.
- Butterfly Lane right-of-way near Broken Bough Drive.
- Broken Bough Drive right-of-way.

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- Plugged monitor wells in parking lot north of strip shopping center at 12649 to 12655 Memorial Drive.

Four 55-gallon drums, eight propane-type tanks on a rack, four gas tanks like those used in welding, were observed on concrete in the fenced in area of Gulf States Laundry Machinery Company at 12647 Memorial Drive which is not adjacent to Subject Right-of-Way, but within 500 feet. Various types of equipment and parts, wooden pallets, and scrap metal were observed in the fenced compound. No evidence of releases or spills were observed at this location.

No evidence of any of the following were observed on properties adjacent to or within 500 feet of the Subject Right-of-Way during the reconnaissance:

- Above-ground storage tanks (AST).
- Sumps, pits, ponds, pools, or standing water etc. containing liquids likely to be hazardous substances or petroleum products.
- Evidence of leaking electrical or hydraulic equipment known or likely to contain PCBs.
- Discarded, abandoned, or disposed equipment, solid wastes, etc. that could potentially contain or release hazardous substances or petroleum products.
- Odors indicative of hazardous substances or petroleum products.
- Drains and sumps containing petroleum products or hazardous substances or such materials draining into drains and sumps.
- Stained soil.
- Stressed vegetation.
- Dry wells, irrigation wells, injection wells, and abandoned wells.
- Waste water or septic systems.
- Suspect fill material or landfills.
- Medical waste, grease traps, or grease disposals.
- Hydraulic lifts that potentially released hydraulic fluids.
- Leaking tanks, drums, or hazardous substance containers.

## 6.0 INTERVIEWS

On March 5, 2015, Mr. Robert Metzger of AEC contacted Mr. Michael Marcon of In Control Technologies Inc. to discuss the dry cleaner release at MW Cleaners/Pro Cleaners VCP site at 12534 Memorial Drive in the Lantern Lane Shopping Center (refer to Figure 4a, Number 32; Section 4.1 Record #8; and Site Reconnaissance, Section 5.2, Number 32). He stated that the case had been closed in 2012 and that a Municipal Settings Designation (MSD) had been approved. The last groundwater monitoring report was prepared in October 2011 and the results were similar to the April 2011 report. He indicated that he would try to send a copy of it, but the report was not received by the completion time of this report. The applicable portions of the report are included in Appendix H. AEC reviewed the April 2011 report during the ESA-1 conducted in 2011 for the local drainage project at 12522 Old Oaks (AEC report E115-11, December 12, 2011). Review of that report indicated that in March 2011, groundwater samples were collected from 34 wells in two groundwater bearing units impacted by the release of chlorinated solvents from the VCP site. The depth to groundwater in the wells in the first (upper) groundwater bearing unit (GWBU) varies from approximately 16 to 19 feet below the ground surface (bgs) and in the second (lower) GWBU varies from approximately 23 to 28 feet bgs. The report indicated that groundwater flow direction

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in both groundwater bearing units is to the southwest. Concentration maps shows the contamination in the upper GWBU extends slightly northward of the shopping center beneath a residential area and westward and southwestward beneath Tallowood Road (refer to Figure 4b, Numbers 12, 31, and 76), a residential area west of Tallowood Road and north of Memorial Drive, and Memorial Drive. Contaminants in the second GWBU migrated southwestward beneath Tallowood Road, the residential area west of Tallowood Road and north of Memorial Drive, Memorial Drive from approximately 100 feet east of Tallowood Road to near the entrance of the Somerset Place Condominiums (refer to Figure 4b, Numbers 2 and 36), the Memorial Green property at 12601 Memorial Drive (refer to Figure 4b, Number 34), Legend Lane and its residential area (refer to Figure 4b, Numbers 11, 35, and 79), and a portion of the condominium complex at 12625 Memorial Drive (refer to maps in Appendix H).

AEC performed a Phase II ESA for the local drainage project at 12522 Old Oaks Road in early 2012 (AEC Phase II ESA report E102-12 dated February 27, 2012). Four soil borings were advanced along Tallowood Road from Memorial northward to Boheme Drive to 11 feet below the top of the pavement. No groundwater was encountered in the borings, but concentrations of 4-isopropyltoluene, methyl ethyl ketone, toluene, and tetrachloroethylene in some of the soil samples collected exceeded their respective laboratory sample detection limit. The compound 1,2-dibromoethane was also detected at a concentration exceeding the TCEQ Texas Risk Reduction Program (TRRP) Tier 1 Residential Soil <sup>GW</sup>Soil<sub>ing</sub> Protective Concentration Level (PCL) action level from a soil sample taken from 10 to 11 feet depth (refer to Table 2 from AEC ESA-II report in Interviews, Appendix H). A potentially petroleum contaminated area (PPCA) was identified extending from Memorial Drive northward along Tallowood Road.

On March 17, 2015, Mr. Metzger interviewed Ms. Potesta, owner of Orangetheory at 650 West Bough Lane, Suite 100 to determine the location of the Your Valet Cleaners at 614 West Bough Lane (refer to Figure 4a, Number 63 and Site Reconnaissance, Section 5.2 , Number 63). She did not know where the address or cleaners was.

Mr. Metzger interviewed on March 17, 2015 the counter clerk at the Colony Florist at 612 West Bough Lane to determine the location of the Your Valet Cleaners at 614 West Bough Lane (refer to Figure 4a, Number 61 and Site Reconnaissance, Section 5.2 , Number 61) She did not know where the address or cleaners was.

Mr. Metzger interviewed on March 17, 2015 the owner of CoCos café at 650 West Bough Lane, Suite 100 to determine the location of the Your Valet Cleaners at 614 West Bough Lane (refer to Figure 4a, Number 64 and Site Reconnaissance, Section 5.2 , Number 64) . She did not know where the address or cleaners was, but recommended that Mr. Metzger speak with Moody Ramin Realty since the company owns a lot of property in that area.

On March 18, 2015, Mr. Metzger spoke with the receptionist at Moody Ramin Realty about the former Your Valet Cleaners at 614 West Bough Lane. She indicated they did not have any information about a dry cleaners at that address.

On March 18, 2015 during the site reconnaissance, Mr. Metzger spoke with a person at the front counter at the Gulf States Laundry Machinery Company at 12647 Memorial Drive regarding



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environmental conditions at the site and about the previous dry cleaners located at that address (refer to Figure 4b, Number 83 and Site Reconnaissance, Section 5.2, Number 83). Mr. Metzger was instructed to speak to the owner who was not in at the time. Mr. Metzger contacted the owner on April 13, 2015. He was not in his office and a message was left for him to call Mr. Metzger. The owner returned the phone call on April 14, 2015. He stated that to the best of his knowledge no dry cleaners were located at that address prior to the current business. His business accepts dry cleaner parts and machines in boxes and then boxes them for redistribution to purchasers. Their company does not store any chemicals. The drums on the concrete in the fenced-in area are either empty or contain water. The gas cylinders in the same area are empty and are given to customers when they purchase machines. They do not have any USTs. He was unaware of any leaks in the area except at a nearby former gasoline station (Mr. Metzger believes this refers to the Conoco gasoline station LPST site).

On April 7, 2015, Mr. Metzger attempted to contact Ms. Susan Litherland of Weston Solutions, Inc. to inquire about the extent of the contaminant plume at the Town and Country Village Shopping Center (refer to Figure 4a, Number 18; Section 4.1, Record #1; and Site Reconnaissance, Section 5.2, Number 18). Ms Litherland no longer worked for Weston, but Mr. Alan Lea of the administrative staff said he would email the staff to see if anyone could provide information about the location and would have them contact Mr. Metzger. Mr. Metzger called Mr. Lea again on April 10, 2015 and transferred to Mr. Jeff Henke about the site. Mr. Henke stated that the plume from the shopping center traveled beneath Memorial Drive. There were at one time six monitor wells and one recovery well on the Memorial Drive right-of-way between West Bough Lane to the western-most entrance to the Town and Country Village Shopping Center. Mr. Henke sent a map showing the monitor wells along Memorial Drive (refer to Appendix H, Interviews). The wells have been removed as the site has received closure although wells still remain on the site of the Town and Country Village Shopping Center and the strip shopping center at 650 West Bough Lane (the field reconnaissance indicated that not all the monitor wells have been plugged yet). The source of the release was Your Valet Cleaners which was located at the south end of the strip shopping center at 650 West Bough Lane and the monitor wells at that location and at the Town and Country Village Shopping Center to the west are all part of the same project (refer to Figure 4a, Numbers 18, 62, and 63; and Site Reconnaissance, Section 5.2, Numbers 18, 62, and 63). The A-1 Cleaners release was found as a result of the work done on the Your Valet Project and assessment work of the two releases was at times combined together. Mr. Henke also indicated that a contaminant plume from a previous gasoline station is located at 12802 Memorial Drive which is now occupied by the Chase Bank.

Mr. Metzger telephoned Mr. Dan Moody of WB Holding Corporation on April 7, 2015 to obtain information about the release from the dry cleaners at the Town and Country Village Shopping Center (refer to Figure 4a, Number Section 4.1 Record #1 and Site Reconnaissance, Section 5.2, Number 18), and the release at A-1 Cleaners at 12754 Memorial Drive (refer to Figure 4a, Number 22; Section 4.1 Record #3 and Site Reconnaissance, Section 5.2, Number 22). Mr. Moody was not in the office, so a message was left to return Mr. Metzger's phone call. The phone call was not returned but information about the shopping center was obtained from other interviews.

Mr. Larry Nettles of Vinson & Elkins, LLP was contacted on April 7, 2015 to discuss the release from the dry cleaners at the Town and Country Village Shopping Center (refer to Figure 4a,

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Number 18; Section 4.1 Record #1; and Site Reconnaissance, Section 5.2, Number 18), the release at A-1 Cleaners at 12754 Memorial Drive (refer to Figure 4a, Number 22; refer to Section 4.1 Record #3; and Site Reconnaissance, Section 5.2, Number 22), and the Innocent Owner/Operator certification at Alexan Memorial Bend Apartments at 12667 Memorial Drive (refer to Section 4.1 Record #4). Mr. Nettles was listed as the contact for these sites on the GeoSearch environmental records. He stated that the release at Town and Country Village Shopping Center was from a historic dry cleaners in the shopping center. The case had been issued a certificate of completion. Groundwater gradient was to the south and depth of groundwater was approximately 25 feet. The monitor wells in the strip shopping center on the east side of West Bough Lane were also associated with this release (refer to Figure 4a, Number 62 and Site Reconnaissance, Section 5.2, Number 62). Mr. Nettles stated that the monitor wells have been or are being plugged.

Mr. Nettles also stated that the contamination at A-1 Cleaners had extended offsite. The monitor wells at the adjacent Bank of Texas (refer to Site Reconnaissance, Section 5.2, Number 21) and the adjacent strip shopping center (refer to Site Reconnaissance, Section 5.2, Number 23) are associated with this release. The groundwater depth is about 25 feet. Mr. Nettles indicated that he would send a map of the monitor well locations and groundwater information if requested by email (refer to Appendix H). He sent a map showing the monitor wells associated with the A-1 Cleaners release that were located in the right-of-way of West Bough Lane near Memorial Drive, in the eastern right-of-way adjacent to A-1 Cleaners at 12754 Memorial Drive, on the western right-of-way of Memorial Drive across from Chase Bank and Bank of Texas, the monitor well on Broken Bough Drive, and the monitor well on Butterfly Lane (refer to map in Appendix H and Site Reconnaissance, Section 5.2, Numbers 2, 4, 19, 21, 22, 49, and 89). The map showed the location of the former Your Valet Cleaners at 614 West Bough Lane to be at the southern end of the shopping center at 650 West Bough Lane where Orangetheory is located (refer to Figure 4a, Number 63; Site Reconnaissance, Section 5.2, Number 63). He also stated in the email that the contaminated groundwater zone is between 25 and 30 feet below ground surface.

Mr. Nettles was not very familiar with the Alexan Memorial Bend Apartments IOP case. He thought it was related to a release from a former dry cleaners where the Gulf States Laundry Machinery Company is located at 12647 Memorial Drive, however record searches did not support this information.

Mrs. Rina Chang was contacted on April 7, 2015 to discuss the Sprint cell tower IOP case (refer to Section 4.1 Environmental Record 7 and Site Reconnaissance, Section 5.2, Number 58). Her phone number was disconnected. Mr. Metzger then spoke with Mr. Andrew Mintz of Bracewell & Giuliani, another contact for the site. He did not have personal knowledge of the site or situation, so he indicated he would send Mr. Metzger another contact number. He sent the telephone number by email, and Mr. Metzger called the number (refer to Appendix H). The receptionist who answered the phone transferred the phone to Mr. Tracy Hester, but Mr. Hester did not answer. The receptionist indicated that she would email him Mr. Metzger's contact information so he could contact him. Mr. Metzger telephoned Mr. Hester on April 10, 2015 and left a message for him to call back. The call was not returned.

On April 7, 2015, Mr. Metzger attempted to telephone Mr. Joe Thai, contact for Your Valet Cleaners (refer to Section 4.1 Environmental Record 10). The phone number was disconnected.

Mr. Metzger contacted, on April 7, 2015, Mr. Scott Leafe, President of SKA Consulting LP, a contact for the Memorial Green VCP case at 12601 Memorial Drive (refer to Section 4.1 Environmental Record 11 and Site Reconnaissance, Section 5.2, Number 34). Mr. Leafe indicated that the northwestern corner of the property has been impacted by the dry cleaner release from MW Cleaners/Pro Cleaners across Memorial Drive at Lantern Lane Shopping Center and the northeastern portion of the property has been impacted by a leak from a Pilgrim's Dry Cleaners east of the shopping center.

Mr. Scott Burkey of Shell Oil Products/Motiva was contacted on April 7, 2015 to discuss the industrial and hazardous wastes generated at the Mobil Service Station and Texaco service station previously located at the intersection of Kimberly Lane and Beltway 8. He said the wastes generated were water from the tanks. It was taken off site to a water treatment facility.

Mr. Metzger attempted to contact, on April 7, 2015, Mr. Steve Aucoin, contact for CO Polydoros & Associates at 12727 Kimberly Drive to discuss the type of wastes the Industrial and Hazardous Waste registration was issued for. The phone had been disconnected.

## 7.0 EVALUATIONS

### 7.1 Findings and Opinions

The findings from this ESA-I which could be of environmental concern are listed below. An opinion is expressed after each finding as to whether the situation is a recognized environmental condition (REC) or a de minimis condition. As defined in ASTM E1527-13, the term recognized environmental conditions means "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment." ASTM E1527-13 defines de minimis conditions as "a condition that generally does not present a threat to human health or the environment and that generally would not be subject of an environmental enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis conditions are not recognized environmental conditions nor controlled environmental conditions."

- **Gulf gasoline station at 12862 Memorial Drive (refer to Local Street Directories, Section 4.5.4):** This gasoline station was listed in the 1961 and 1966 city directories. The address was not found during the site reconnaissance. No records of releases or spills at Phillips 66 gas station were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **Chevron LPST site/Wheatley Investments at 12860 Memorial Drive (refer to Section 4.1, Record # 6 and Figure 4a, Number 16 in Appendix A):** A gasoline station (Chevron or Gulf) has existed at this site for most of the time for at least the past 45 years. This facility was registered twice as a leaking petroleum storage tank (LPST) site. During the first time, hydrocarbons were reported in the storm drains adjacent to the site. Phase-separated hydrocarbons (PSH) was found floating on the water in one monitor well installed. Benzene, toluene, ethyl benzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) concentrations in soil and water at the site exceeded Texas Commission Environmental Quality (TCEQ) action levels as was methyl tertiary butyl

ether (MTBE) concentrations in groundwater. A remediation system was installed and operated between 1990 and 1995. The second LPST resulted when the first case was reopened. Approximately 0.8 feet of PSH was observed in a monitor well. Depth to groundwater ranged from 22 to 33 feet below top of the well casings and groundwater gradient was generally to the north and west. Remediation took place during 2005 and 2006. Three plugged monitor and three plugged recovery wells were observed during the site reconnaissance. Even though the groundwater gradient is away from Memorial Drive, the site is a REC with respect to the Subject Right-of-Way due to the time a gasoline station has been at this location, and the number of LPSTs at the site.

- **Pilgrims Launderers and Pilgrims Laundry at 12858 Memorial Drive (refer to Section 4.5.4):** The former facilities were listed in the 1976 city directory and the later in the 1992-3 directory. The facilities and address could not be found during the site reconnaissance. No records of releases or spills at this site were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **Walgreen 3328 at 12850 Memorial Drive (refer to Section 4.1, Record #1 and Figure 4a, Number 18 in Appendix A):** This location had an IHW registration as a small quantity generator of non-industrial and/or municipal wastes. The waste was managed offsite and no records of spills or releases were found, therefore the location is not an REC.
- **Town and Country Village Shopping Center Dry Cleaners at 12850 Memorial Drive; Strip Shopping Center at 650 West Bough Lane; Your Valet Cleaners at 614 West Bough Lane; A-1 Cleaners LPST and VCP site at 12754 Memorial Drive; Bank of Texas at 12764 Memorial Drive; More Hands Maid Service at 12748 Memorial Drive; West Bough Lane, Memorial Drive, Butterfly Lane, Broken Bough Drive rights-of-way; and residential areas northwest of Memorial Drive (refer to Section 4.1, Records #1 and #3, Figure 4a, Numbers 2, 3, 4, 18, 21, 22, 23, 49, 62, 63, and 92 in Appendix A):** A release occurred from the former Your Valet Cleaners at 614 West Bough Lane (refer to Section 5.2, Number 63). According to interviews, record searches, and site reconnaissance observations of existing and plugged monitor and recovery wells, the contaminant plume spread westward beneath West Bough Lane and the Town and Country Village Shopping Center to near the westernmost entrance of the shopping center, and beneath Memorial Drive. Soil and groundwater were contaminated with chlorinated hydrocarbons and VOCs. The Geosearch environmental record search also indicated that groundwater at 12850 Memorial Drive was contaminated with metals. According to the record searches, there were once 88 monitor wells in the area of the plume and 18 remediation injection wells along Memorial Drive. Injection was into the zone between 25 and 44 feet deep at 20 gallons per minute. During the reconnaissance, 26 monitor wells and at least 9 recovery wells were observed on site at the 12850 address and 27 monitor wells were observed in the shopping center at 650 West Bough Lane. Five monitor or recovery wells were observed in the grassy area adjoining Memorial Drive. According to a records search, an IOP certificate was issued on April 23, 2009. A VCP certificate of completion was issued on January 2015. The certificate has a restrictive covenant which prohibits the use and exposure to groundwater at the site.

During the assessment field work for the Your Valet Cleaners, a second dry cleaner contaminant plume was discovered associated with A-1 Cleaners (refer to Figure 4a, Number 22). According to the search of local telephone directories a dry cleaners has been

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located at the A-1 Cleaners address for at least 39 years. A release from the dry cleaners contaminated soil and groundwater with tetrachloroethylene, some of its degradation by products, and BTEX. Concentrations of many of these contaminants exceed TCEQ acceptable levels. Based on field observations of monitor wells and a recovery system, record searches, and interviews, this plume extended southeastward to near the More Hands facility (refer to Figure 4a, Number 23), northwestward beneath the Bank of Texas property (refer to Figure 4a, Number 21), beneath Memorial Drive (refer to Figure 4a, Number 2), West Bough Lane (refer to Figure 4a, Number 4), Broken Bough Drive (refer to Figure 4a, Numbers 3 and 49) and the residential area south of Memorial Drive to Butterfly Lane (refer to maps in Appendix H). Injection wells were installed for remediation of this contamination. As of March 2015, the groundwater/media was being monitored. Underground storage tanks were also removed from this site in December 1998 and a 1-inch diameter hole was observed in one of the tanks. Benzene concentrations in soil exceeded TCEQ LPST Action Levels. The case was closed in March 1999 with contamination in place down to about 15 feet below grade.

Based on information provided to AEC by LAN, the storm sewer boxes would be placed between 20 and 22.5 feet below the road surface. Therefore contamination could be encountered while excavating the soil for the storm water sewer boxes. These two dry cleaner contaminant plumes and the benzene contamination from the A-1 Cleaners site are RECs with respect to the Subject Right-of-Way because of the large expanse of the plumes, the contamination crosses and is located adjacent to the Subject Right-of-Way. These three plumes are so close together that it is difficult to determine the exact location of each, therefore the plumes from Your Valet Cleaners and A-1 Cleaners area and the benzene contamination at A-1 Cleaners are considered to be one REC.

- **Pilgrims Launderers and Cleaners at 12850 Memorial Drive (refer to Figure 4a, Number 18 in Appendix A):** This facility was listed in the 1971, 1976, and 1981 city directories. No records of releases or spills at this site were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **Randall's Food Store #1066 at 12850 Memorial Drive (refer to Section 4.1, Record #1 and Figure 4a, Number 18 in Appendix A):** This facility is registered as a RCRA waste generator. The environmental record search stated that no violations have been reported. No records of releases or spills were found. The site is nearly 500 feet from the Subject Right-of-Way. This site is not an REC with respect to the Subject Right-of-Way.
- **Oklahoma Installation Company (Dillards Department Store) at 12850 Memorial Drive (refer to Section 4.1, Record #1):** This facility was not found within 500 feet of the Subject Right-of-Way during the site reconnaissance. The environmental record search stated that no violations have been reported. The site is not a REC with respect to the Subject Right-of-Way.
- **Sprint PCS Tower IOP site at 608 West Bough Lane (refer to Section 4.1, Record #7 and Figure 4a, Number 58 in Appendix A):** The groundwater at this innocent owner/operator program (IOP) site is contaminated by tetrachloroethylene. The source of the contamination is unknown and additional information about the site could not be obtained from record searches and interviews, however the location of the tower is near the juncture of the contaminant plumes from A-1 Cleaners and the dry cleaners at the Town and Country Village Shopping Center Dry Cleaners to the north, northwest, and south.



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This location is not adjacent to the Subject Right-of-Way but within 500 feet. It is a REC with respect to the Subject Right-of-Way since contamination is located at that site.

- **Pilgrims Cleaners 128 at 650 West Bough Lane, Suite 116 (refer to Section 4.1, Record Number 13 and Figure 4a, Number 65 in Appendix A):** Record searches revealed this former dry cleaners had a drop station registration/certification (no dry cleaning done on site) and therefore is not a REC with respect to the Subject Right-of-Way.
- **Mobil gas station at 12802 Memorial Drive (refer to Section 4.5.4):** This gasoline station was listed in the 1976 city directory. The address is currently occupied by a Chase Bank. According to Mr. Jeff Henke of Weston Solutions, an old gasoline plume is located at this site. This site is a REC with respect to the Subject Right-of-Way due to the presence of the gasoline plume at the site.
- **Phillips 66 gas station at 12764 Memorial Drive (refer to Section 4.5.4):** This gasoline station was listed in the 1961, 1966, and 1971 city directories. Bank of Texas currently occupies the address. Though five monitor wells were located at this address, the monitor wells are for the dry cleaner release at adjacent A-1 Cleaners. No records of releases or spills at Phillips 66 gas station were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **Conoco 43059 at 12699 Memorial Drive LPST site (refer to Section 4.1, Record #5 and Figure 4b, Numbers 46 and 47 in Appendix A):** Groundwater was impacted at this LPST site. Phase-separated hydrocarbons (PSH) were found floating on the groundwater and were removed to the extent practical between December 1993 and September 1997. A remediation system operated at this site until 2006. A total of 30 monitor and recovery wells were once located at this site and in the right-of-way of Memorial Drive, Faust Street and offsite properties. According to the local street directory reviews, gasoline stations periodically operated at this location for at least 33 years. No evidence of the gasoline station were observed during the site reconnaissance, however one plugged monitor well was observed in the parking lot north of the shopping center at 12649 to 12655 Memorial Drive (refer to Site Reconnaissance, Section 5.2, Number 84). This contaminated area associated with the former Conoco gas station is a REC since it is adjacent to the Subject Right-of-Way and monitor wells were once located on the eastern portion of the Memorial Drive right-of-way.
- **Post Oak Cleaners at 12699 Memorial Drive (refer to Section 4.1, Record #5 and Figure 4b, Numbers 46 and 47 in Appendix A):** Record searches confirm this dry cleaners was a drop-off station, therefore this is not a REC with respect to the Subject Right-of-Way.
- **Sweetlake Chemical and Fusion Motor Company at 12707 Boheme Drive (refer to Section 4.5.4):** These businesses were listed in the 2007 City of Houston directory. A house was observed at this location during the site reconnaissance. No evidences of spills or releases were observed and no records of spills or releases at this location were found. This location is not a REC with respect to the Subject Right-of-Way.
- **Alexan Memorial Bend Apartments IOP site at 12667 Memorial Drive (refer to Section 4.1, Record #4 and bulleted items at end of Section 5.2.2):** Soil and groundwater were impacted by volatile organic compounds (VOCs) and TPH at this location. Neither these apartments, address, nor any additional information was found for this IOP case during the site reconnaissance and search of records. Mr. Larry Nettles of Vinson & Elkins, LLP indicated during an interview that he thought the IOP case was

related to a former release from a dry cleaners which was located at 12647 Memorial Drive where the Gulf States Laundry Machinery Company is now located. No information was found which confirmed this, however based on current addresses, this site could have been close to the 12647 Memorial Drive address. This site though it could not be exactly located is a REC with respect to the Subject Right-of-Way.

- **Pilgram Wyeliffe and Pilgrims Cleaners at 12647 Memorial Drive (refer to Section 4.1, Record #9 and Figure 4b, Number 83 in Appendix A):** These two dry cleaners were generators of small quantities of industrial and hazardous wastes. These facilities were not observed at this address during the site reconnaissance and no specific information about the waste was found during record searches. Review of the local city directories indicated a dry cleaners at this address for at least 8 years. Gulf States Laundry Machinery Company is now located at this address (refer to next bulleted item). Mr. Larry Nettles of Vinson & Elkins, LLP, during an interview, stated that he thought this was the location of a former dry cleaner leak (Alexan Memorial Bend Apartments IOP site), but the records and an interview with the owner of Gulf States Laundry Machinery Company at this address do not support this information. This location is not an REC with respect to the Subject Right-of-Way.
- **Gulf States Laundry Machinery Company at 12647 Memorial Drive (refer to Figure 4b, Number 83 in Appendix A):** This facility is at the former Pilgram Wyeliffe and Pilgrims Cleaners location at 12647. Four 55-gallon drums, including one labeled Exxon Mobil DF2000 fluid, eight propane-type tanks, four gas tanks like those used in welding were observed at the site. No evidence of leaks from these tanks and drums was observed and each of these tanks and drums along with various equipment, dry cleaner parts, wooden pallets, scrap metal, and a dumpster full of trash were located on concrete which appeared to be in good condition. No records of spills or leaks were found during the environmental record searches. During an interview, the owner stated that no chemicals were stored on site and that the drums were either empty or full of water. The tanks were empty and were given to customers with their purchase of machinery. The site is not a REC with respect to the Subject Right-of-Way because of lack of evidence of leaks, the location of the tanks and other materials located on concrete in good condition, and the fact that the site is not adjacent to the Subject Right-of-Way.
- **Post Oak Cleaners at 12645 Memorial Drive (refer to Section 4.1, Record #2 and Figure 4b, Number 39 in Appendix A):** A TCEQ record search indicated this facility is a drop-off dry cleaners (no dry cleaning performed on site). According to the search of local city directories, the dry cleaners has been at this location for at least 3 years. The search indicated a Texaco gasoline station was once located at this address for at least 11 years. No records of spills or releases were found and no evidence of spills, releases, or the former gasoline station was observed in the field. This site is not a REC with respect to the Subject Right-of-Way.
- **Firehorn Oil Company at 12702 Cobblestone Drive (refer to Section 4.5.4):** This business was listed in the 2007 City of Houston directory. A house was observed at this location during the site reconnaissance. No evidences of spills or releases were observed and no records of spills or releases at this location were found. This location is not a REC with respect to the Subject Right-of-Way.
- **Various gasoline service stations and cleaners at 12651 Memorial Drive (refer to Section 4.5.4):** Gasoline stations were listed for this address in the 1961, 1966, 1971, and

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1976 and a dry cleaners was listed in the 1987-8 and 1992-3 city directories. The address is currently occupied by a strip shopping center. No records of releases or spills at this site were found, therefore the site is not a REC with respect to the Subject Right-of-Way.

- **Amco Auto Salvage and Car Center at 12633 Memorial Drive (refer to Section 4.5.4):** This facility was listed in the 2007 City of Houston directory. The address is currently occupied by The Pines Condominiums. No records of releases or spills at this site were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **Red Coachman Cleaners at 12526 Memorial Drive (refer to Section 4.5.4):** This facility was listed in the 1966 and 1971 City of Houston directories. The address and business was not found during the site reconnaissance. No records of releases or spills at this site were found, therefore the site is not a REC with respect to the Subject Right-of-Way.
- **CVS Pharmacy #6752 at 12502 Memorial Drive (refer to Section 4.1, Record #12 and Figure 4b, Number 32 in Appendix A):** This pharmacy is a generator of RCRA wastes. This site is not a REC with respect to the Subject Right-of-Way since the GeoSearch record search indicated that no violations have been levied against this site
- **Thirty gallon diesel spill at 12516 Memorial Drive (refer to Section 5.3.3):** According to the Houston Fire Department Records, this small spill occurred in the Lantern Lane Shopping Center approximately 500 feet from the Subject Right-of-Way. No details surrounding the spill were given, but the spill would have been cleaned up by the fire department. This spill is not an REC with respect to the Subject Right-of-Way because of its distance from the Subject Right-of-Way and no further records were found indicating groundwater or soil was contaminated.
- **MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners VCP and IHWCA site at 12534 Memorial Drive, Memorial Green VCP site at 12601 Memorial Drive, Tallowood Road Right-of-Way, Memorial Drive Right-of-Way, Legend Lane Right-of-Way, residential area north of Lantern Lane Shopping Center, residential area between Tallowood Road and Somerset Place north of Memorial Drive, residential area adjoining Legend Lane, and condominium complex at 12625 Memorial Drive (refer to Section 4.1, Records #8 and #11, Figure 4b, Numbers 2, 11, 12, 31, 32, 34, 35, 76, and 79 in Appendix A):** The soil and groundwater at this site and offsite were contaminated with chlorinated solvents from a dry cleaner at the Lantern Lane Shopping Center (refer to Figure 4b, Number 32). Dry cleaners have been located at this address for at least 13 years. A March 2011 groundwater monitoring report prepared by InControl Technologies indicated that 34 wells had been installed in two groundwater bearing zones. Depth to groundwater in the wells completed in the upper zone vary from approximately 16 to 19 feet below ground surface and in the second unit the depth to groundwater in wells completed in that zone ranged from approximately 23 to 28 feet below ground surface. Groundwater gradient maps show the gradient is to the southwest. Concentration maps shows the contamination in the upper zone extends slightly northward of the shopping center beneath a residential area; westward and southwestward beneath Tallowood Road (refer to Figure 4b, Numbers 12, 31, and 76) and a residential area west of Tallowood Road and north of Memorial Drive; and southwestward beneath Memorial Drive. Contaminants in the second groundwater bearing zone migrated southwestward beneath Tallowood Road, the residential area west of Tallowood Road and north of Memorial Drive, Memorial Drive from approximately 100 feet east of Tallowood Road to near the

entrance of the Somerset Place Condominiums (refer to Figure 4b, Numbers 2 and 36), the Memorial Green property at 12601 Memorial Drive (refer to Figure 4b, Number 34), Legend Lane and its residential area (refer to Figure 4b, Numbers 11, 35, and 79), and a portion of the condominium complex at 12625 Memorial Drive (refer to maps in Appendix H). An MSD with restrictions on groundwater usage is being considered for this site and surrounding area. The Memorial Green property at 12601 Memorial Drive is also contaminated with a leak from a dry cleaners located east of the Lantern Lane Shopping Center. The entire area discussed above is a REC with respect to the Subject Right-of-Way since the plumes extended beneath the Subject Right-of-Way and adjacent properties.

- **Transformers mounted on utility poles throughout Subject Right-of-Way and surrounding properties:** No evidence of leaks or spills were observed from the transformers or on the ground around the transformers, therefore these are not RECs.
- **Mobil Service Station 12-BLY IHW and LPST site at 770 West Sam Houston Parkway North and Shell Oil at 12860 Kimberly Lane (refer to Section 4.1, Record #18 and Section 5.2.4):** This former gasoline station, now occupied by a la Madeleine restaurant, was a small quantity generator of non-industrial and/or municipal waste. According to an interview with Mr. Scott Burkey Shell Oil/Motiva, the contact for this site, the wastes generated were occasional water from the tanks which was transported offsite for treatment and disposal. This site was an LPST site but is farther than 500 feet from the Subject Right-of-Way. This site is not a REC due to its distance from the Subject Right-of-Way and because the wastes were only occasionally generated and treated offsite.
- **Texaco IHW and LPST site at 12859 Kimberly Lane (refer to Section 4.1, Record #16 and Section 5.2.4):** This former gasoline station, now occupied by a Wells Fargo bank, was a small quantity generator of non-industrial and/or municipal waste. A Shell gasoline station was also located here. According to the environmental record search and an interview with Mr. Scott Burkey Shell Oil/Motiva, the contact for this site, the wastes generated were occasional water from the tanks and contaminated soil generated during tank replacement. All the wastes were transported offsite for treatment and disposal. This site was an LPST site but is farther than 500 feet from the Subject Right-of-Way. This site is not a REC due to its distance from the Subject Right-of-Way and the wastes were only occasionally generated and treated offsite.
- **CO Polydoros & Associates IHW site at 12727 Kimberly Lane (refer to Section 4.1, Record #17 and Section 5.2.4):** This facility, now occupied by a medical center was a conditionally exempt small generator of non-industrial and/or municipal wastes. No records of spills or leaks were found during the environmental record searches. This site is over 500 feet from the Subject Right-of-Way. This is not a REC with respect to the subject right-of-way due to the distance and the small quantities of waste generated.
- **Weatherford US Houston IHWCA site at 10802 Katy Freeway (refer to Section 4.1, Record #20 and Section 5.2.4):** Soil and groundwater in two zones at this site were contaminated by chlorinated solvents and VOCs. The extent of a plume in the upper groundwater zone was estimated during the environmental work performed at the site to be approximately 100 feet offsite to the south. The plume in the lower groundwater zone was estimated to be approximately 350 feet offsite to the south. The location and facility could not be found in the field, but an internet search of the address indicated it was approximately 0.9 miles to the north-northwest from the closest part of the Subject Right-

of-Way. This site is not a REC with respect to the subject right-of-way due to the distance from the Subject Right-of-Way.

- **Flouorocarbon Plastic & Rubber Production IHWCA site at 10420 Katy Freeway (refer to Section 4.1, Record #21 and Section 5.2.4):** Soils were contaminated with methylene chloride, chlorinated hydrocarbons, acetone, 2-butanone, TPH, and the upper groundwater unit was contaminated with methylene chloride, oil and grease, trichloroethylene, and some other VOCs. According to reports in the TCEQ files, groundwater gradient is to the southeast, but no offsite migration has occurred. The location and facility could not be found in the field, but an internet search of the address indicated it was approximately 0.9 miles to the north-northeast from the closest part of the Subject Right-of-Way. This site is not a REC with respect to the subject right-of-way due to the distance from the Subject Right-of-Way and the lack of offsite migration.
- **Spring Branch Service Center IHWCA site at 10310 Katy Freeway (refer to Section 4.1, Record #22 and Section 5.2.4):** Soils at this site were contaminated with metals and TPH, but were excavated from the site. The site had industrial and hazardous waste registrations for many waste management units. Three different LPSTs were located at the site and the site was enrolled in the VCP program for soils contaminated by metals, semi-volatile organics, and TPH; and groundwater contaminated by metals, semi-volatile organics, TPH, and VOCs. The location and facility could not be found in the field, but an internet search of the address indicated it was approximately 1 mile to the north-northeast from the closest part of the Subject Right-of-Way. This site is not a REC with respect to the subject right-of-way due to the distance from the Subject Right-of-Way.

## 7.2 Conclusions and Recommendations

AEC has performed a Phase I Environmental Site Assessment (ESA-I) for the reconstruction of Memorial Drive between the West Sam Houston Parkway and approximately 100 feet east of Tallowood Drive in western Harris County in conformance with the scope and limitations of ASTM Practice E1527-13. Any exceptions to or deletions from this practice are described in Sections 2.6 and 7.3 of this report.

This ESA-I identified the following RECs in connection with the Subject Right-of-Way.

- REC 1: Chevron LPST site/Wheatley Investments at 12860 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 2: The contaminant plume associated with leaks from Your Valet Cleaners at 614 West Bough Lane and A-1 Cleaners LPST and VCP site at 12754 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 3: Sprint PCS Tower IOP site at 608 West Bough Lane (refer to Figure 5a in Appendix A).
- REC 4: Mobil gas station at 12802 Memorial Drive (refer to Figure 5a in Appendix A).
- REC 5: The contaminant plume associated with Conoco 43059 at 12699 Memorial Drive LPST site (refer to Figure 5b in Appendix A).
- REC 6: Alexan Memorial Bend Apartments IOP site at 12667 Memorial Drive (refer to Figure 5b in Appendix A).
- REC 7: The contaminant plume associated with the MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners VCP and IHWCA site at 12534 Memorial Drive and the Memorial Green VCP site at 12601 Memorial Drive (refer to Figure 5b in Appendix A).



**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

Research during the ESA-I revealed that the West Piney Point Fault crosses the western portion of the Subject Right-of-Way. Evidence of the fault was not found in during the site reconnaissance.

AEC recommends that a Phase II Environmental Site Assessment be conducted in the Subject Right-of-Way with soil borings drilled to 5 feet below the maximum depth of construction along the Memorial Drive Subject Right-of-Way. Some of the soil borings should be converted to temporary monitor wells. Soil samples and a groundwater sample should be collected and analyzed for the following:

- REC 1: benzene, toluene, ethylbenzene, and total xylenes (BTEX); methyl tertiary butyl ether (MTBE); and total petroleum hydrocarbons (TPH 1005).
- REC 2: volatile organic compounds, BTEX, MTBE, and TPH 1005, Resource Conservation and Recovery Act (RCRA) 8 metals.
- REC 3: VOCs, TPH 1005, and RCRA 8 metals
- REC 4: BTEX, MTBE, TPH 1005, and RCRA 8 metals.
- REC 5: BTEX, MTBE, and TPH 1005.
- REC 6: VOCs, and TPH 1005.
- REC 7: VOCs

Even though no evidence of faulting was observed during the site reconnaissance, AEC recommends that a qualified firm conduct a Phase I fault study for the Subject Right-of-Way since the West Piney Point Fault is a known mapped fault which is located near the western end of the Subject Right-of-Way.

### **7.3 Data Gaps, Data Failures, and Deletions**

Data gaps are defined by ASTM E 1527-13 as "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice...". There were no data gaps in this ESA-I.

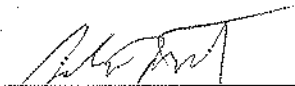
Data failure, a type of data gap, as defined in ASTM E1527-13 is a failure to "develop a history of the previous uses of the property and surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the property even after reviewing the standard historical sources... that are reasonably ascertainable and likely to be useful". There are no data failures in this ESA-I or deletions from the ASTM E1527-13 Standard Practice.

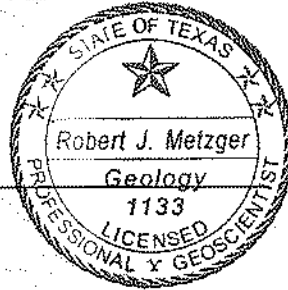
### **7.4 Qualifications of Environmental Professional**

Robert J. Metzger, Senior Geologist, conducted the ESA-I and prepared this report. He has 26 years of comprehensive environmental experience including performing and managing Phase I and Phase II Environmental Site Assessments for government and private clients. Robert J. Metzger's resume is included in Appendix I.

### 7.5 Signature of Environmental Professional

I declare to the best of my professional knowledge and belief I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312 and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property (Subject Right-of-Way). I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40CFR Part 312.

  
Robert J. Metzger, P.G., CAPM  
Senior Geologist  
Aviles Engineering Corporation



4/22/15  
Date

### 8.0 REFERENCES

The following references were used in preparation of this ESA-1 report:

1. ASTM International, 2013, ASTM E1527-13, *ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*, 47 pp.
2. Geo Search, Austin, Texas, Radius Report, Historical Aerial Photographs (Texas) and Historical Topographic Maps searches of March 5, 2015, [www.geo-search.com](http://www.geo-search.com).
3. Harris County Appraisal District Online Records and Maps, [www.hcad.org](http://www.hcad.org).
4. *Coles Directories* (city directories for Houston, Texas), every 5 years from 1956 to 1981 inclusive and 1987-2012 inclusive, 2014, and Volumes 1 and 4 (only ones available) of 2015.
5. Natural Resource Conservation Service, March 10, 2015, Web Soil Survey, National Cooperative Soil Survey, <http://wcbsoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
6. Terrain Solutions, Inc., Revised 2004, Principal Surface Faults of the Houston Central Metropolitan Area (After O'Neill & Van Siclen with additions by C. Norman), map.
7. Texas Commission on Environmental Quality, On-Line Central Registry Query, <http://www15.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch>, March 9, 2015
8. Texas Water Development Board, 1994, *Map of Major Aquifer in Texas*.
9. U.S. Department of Homeland Security, Federal Emergency Management Agency, *Flood Insurance Rate Map 48201C0645L*, Revised June 18, 2007, online map generator at <https://msc.fema.gov>.

### 9.0 NON-SCOPE SERVICES

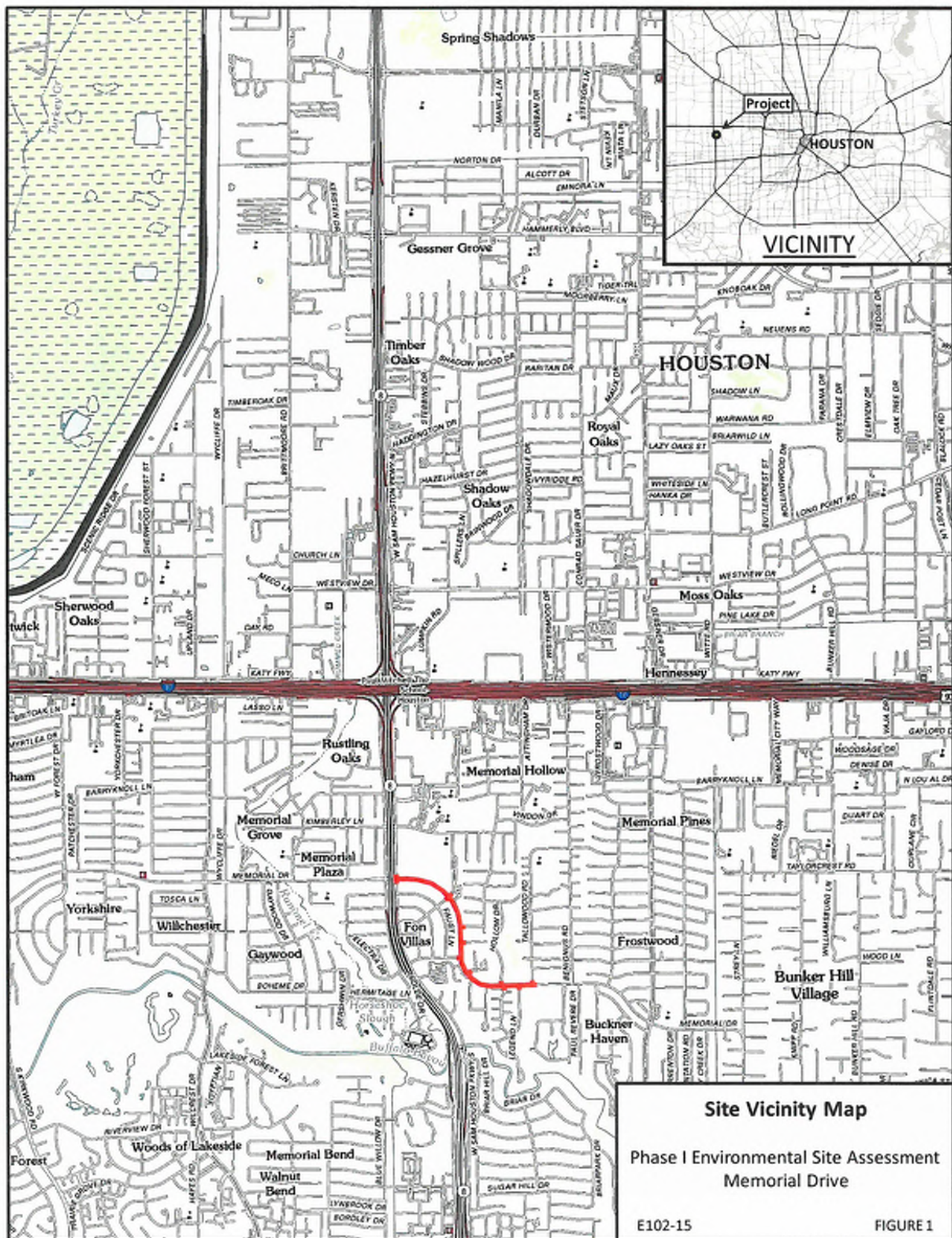
There were no additional services contracted between LAN, Inc. and AEC associated with the performance of this ESA-I.

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

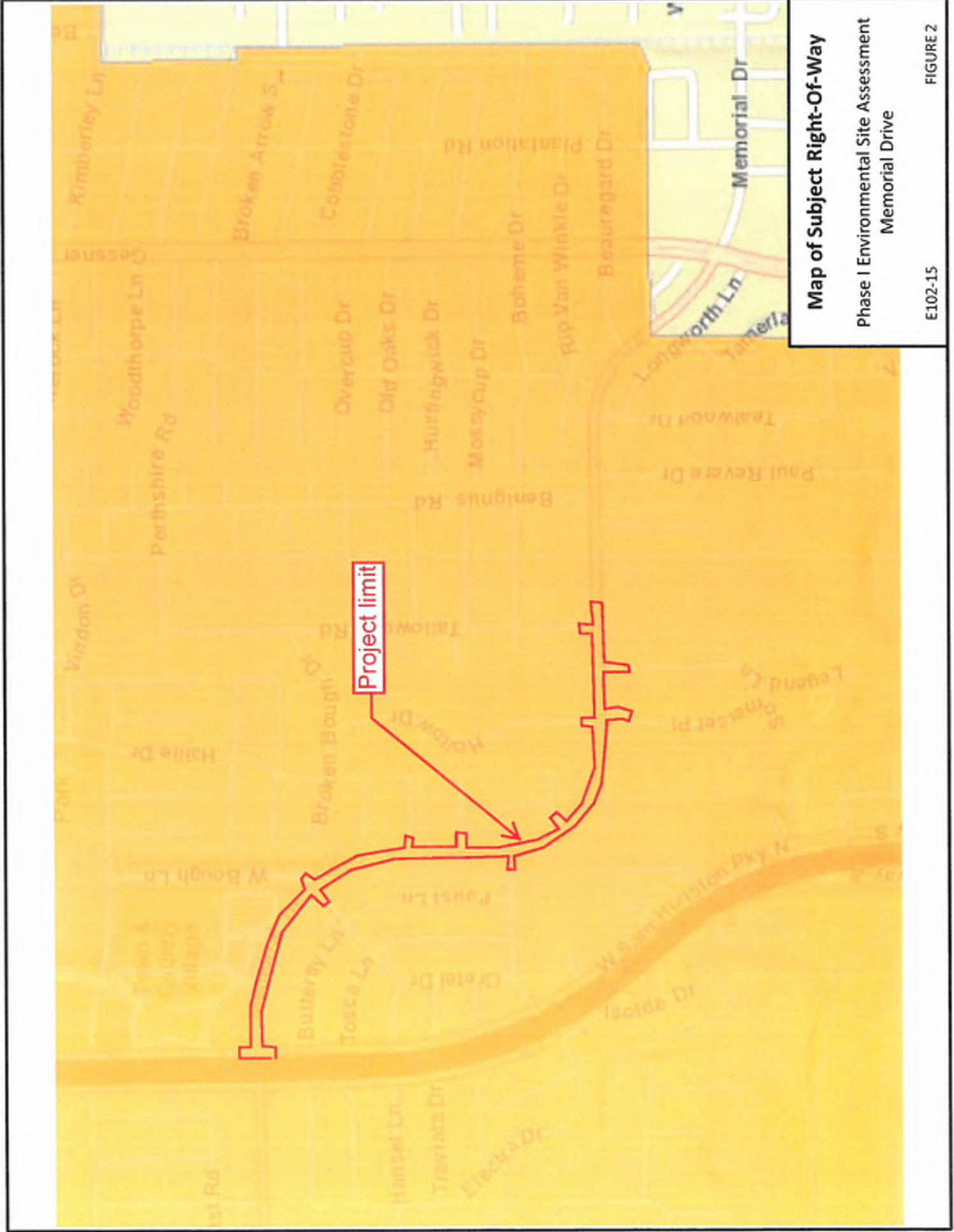
**APPENDIX A**

**SITE MAPS, FIGURES, AND GENERAL INFORMATION**









**Map of Subject Right-Of-Way**

Phase I Environmental Site Assessment  
Memorial Drive



Table 1

Streets	From	To	Quantity (LF)
Memorial	west line of north bound feeder of Sam Houston Pkwy	Tallowood Drive	5,900
Broken Bough	Memorial	100' to the south	100
W. Bough	Memorial	100' to the north	100
Old Oaks	Memorial	100' to the east	100
Huntingwick	Memorial	100' to the east	100
Boheme	Memorial	100' to the west	100
Memorial Bend	Memorial	100' to the east	100
Hollow Drive	Memorial	100' to the north	100
Somerset Place	Memorial	100' to the south	100
Legend	Memorial	100' to the south	100
Tallowood	Memorial	100' to the north	100
Total			6,900



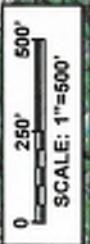


**Project Location on  
Aerial Photograph**  
Phase I Environmental Site Assessment  
Memorial Drive

— Subject Right-Of-Way

E102-15

FIGURE 3







Phase I Environmental Site Assessment  
 Memorial Drive  
 --- Subject Right-Of-Way  
 E102-15 FIGURE 4a















**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX B**

**ENVIRONMENTAL RECORDS DOCUMENTATION (GeoSearch Results)**

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## **Radius Report**

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[Satellite view](#)

*Target Property:*

**Memorial Drive Phase I Environmental Site Assessment**

**MEMORIAL DR**

**HOUSTON, Harris County, Texas 77024**

*Prepared For:*

**Aviles Engineering**

**Order #: 47227**

**Job #: 103133**

**Project #: E102-15**

**Date: 03/05/2015**

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<i>Zip Report</i> . . . . .	See Attachment

### **Disclaimer**

*This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquires Rule (40 CFR §312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal, state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR §312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.*

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## Target Property Summary

**Memorial Drive Phase I Environmental Site Assessment**

**MEMORIAL DR**

**HOUSTON, Harris County, Texas 77024**

USGS Quadrangle: **Hedwig Village, TX**

Target Property Geometry: **Corridor**

Target Property Longitude(s)/Latitude(s):

(-95.552515, 29.766221), (-95.554983, 29.766174), (-95.555766, 29.766146), (-95.556067, 29.766165),  
(-95.556313, 29.766221), (-95.556668, 29.766351), (-95.556968, 29.766491), (-95.557268, 29.766715),  
(-95.557526, 29.766975), (-95.557698, 29.767301), (-95.557869, 29.767748), (-95.557869, 29.768009),  
(-95.557923, 29.770049), (-95.557998, 29.770449), (-95.558180, 29.770896), (-95.558416, 29.771287),  
(-95.558695, 29.771660), (-95.558953, 29.771920), (-95.559285, 29.772163), (-95.559747, 29.772414),  
(-95.560380, 29.772647), (-95.560787, 29.772777), (-95.561356, 29.772805), (-95.562429, 29.772777)

County/Parish Covered:

**Harris (TX)**

Zipcode(s) Covered:

**Houston TX: 77024, 77042, 77043, 77077, 77079**

State(s) Covered:

**TX**

**\*Target property is located in Radon Zone 3.**

**Zone 3 areas have a predicted average indoor radon screening level less than 2 pCi/L  
(picocuries per liter).**

*This report may have unlocatable records. Please see the Unlocatables Report, attached to this file.*



## Database Findings Summary

### FEDERAL LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	<a href="#">AIRSAFS</a>	0	0	TP/AP
BIENNIAL REPORTING SYSTEM	<a href="#">BRS</a>	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	<a href="#">CDL</a>	0	0	TP/AP
EPA DOCKET DATA	<a href="#">DOCKETS</a>	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	<a href="#">EC</a>	0	0	TP/AP
EMERGENCY RESPONSE NOTIFICATION SYSTEM	<a href="#">ERNSTX</a>	0	0	TP/AP
FACILITY REGISTRY SYSTEM	<a href="#">FRSTX</a>	4	0	TP/AP
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	<a href="#">HMIRS06</a>	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	<a href="#">ICIS</a>	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	<a href="#">ICISNPDES</a>	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	<a href="#">LUCIS</a>	0	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	<a href="#">MLTS</a>	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	<a href="#">NPDES06</a>	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	<a href="#">PADS</a>	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	<a href="#">PCSR06</a>	0	0	TP/AP
RCRA SITES WITH CONTROLS	<a href="#">RCRASC</a>	0	0	TP/AP
CERCLIS LIENS	<a href="#">SELIENS</a>	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	<a href="#">SSTS</a>	0	0	TP/AP
TOXICS RELEASE INVENTORY	<a href="#">TRI</a>	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	<a href="#">TSCA</a>	0	0	TP/AP
NO LONGER REGULATED RCRA GENERATOR FACILITIES	<a href="#">NLRRCRAG</a>	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR FACILITIES	<a href="#">RCRAGR06</a>	3	0	0.1250
HISTORICAL GAS STATIONS	<a href="#">HISTPST</a>	0	0	0.2500
BROWNFIELDS MANAGEMENT SYSTEM	<a href="#">BF</a>	0	0	0.5000
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY INFORMATION SYSTEM	<a href="#">CERCLIS</a>	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	<a href="#">DNPL</a>	0	0	0.5000
NO FURTHER REMEDIAL ACTION PLANNED SITES	<a href="#">NFRAP</a>	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	<a href="#">NLRRCRAT</a>	0	0	0.5000
OPEN DUMP INVENTORY	<a href="#">ODI</a>	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - TREATMENT, STORAGE & DISPOSAL FACILITIES	<a href="#">RCRAT</a>	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	<a href="#">DOD</a>	0	0	1.0000
FORMERLY USED DEFENSE SITES	<a href="#">FUDS</a>	0	0	1.0000

## Database Findings Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	<a href="#">NLRRCRAC</a>	0	0	1.0000
NATIONAL PRIORITIES LIST	<a href="#">NPL</a>	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	<a href="#">PNPL</a>	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	<a href="#">RCRAC</a>	0	0	1.0000
RECORD OF DECISION SYSTEM	<a href="#">RODS</a>	0	0	1.0000
<b>SUB-TOTAL</b>		<b>7</b>	<b>0</b>	

## Database Findings Summary

### STATE (TX) LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
GROUNDWATER CONTAMINATION CASES	<a href="#">GWCC</a>	1	0	TP/AP
HISTORIC GROUNDWATER CONTAMINATION CASES	<a href="#">HISTGWCC</a>	0	0	TP/AP
TCEQ LIENS	<a href="#">LIENS</a>	0	0	TP/AP
MUNICIPAL SETTING DESIGNATIONS	<a href="#">MSD</a>	0	0	TP/AP
NOTICE OF VIOLATIONS	<a href="#">NOV</a>	0	0	TP/AP
STATE INSTITUTIONAL/ENGINEERING CONTROL SITES	<a href="#">SIECOI</a>	1	0	TP/AP
SPILLS LISTING	<a href="#">SPILLS</a>	0	0	TP/AP
TIER II CHEMICAL REPORTING PROGRAM FACILITIES	<a href="#">TIERII</a>	0	0	TP/AP
DRY CLEANER REGISTRATION DATABASE	<a href="#">DCR</a>	6	0	0.2500
INDUSTRIAL AND HAZARDOUS WASTE SITES	<a href="#">IHW</a>	11	0	0.2500
PERMITTED INDUSTRIAL HAZARDOUS WASTE SITES	<a href="#">PIHW</a>	0	0	0.2500
PETROLEUM STORAGE TANKS	<a href="#">PST</a>	6	0	0.2500
AFFECTED PROPERTY ASSESSMENT REPORTS	<a href="#">APAR</a>	1	0	0.5000
BROWNFIELDS SITE ASSESSMENTS	<a href="#">BSA</a>	0	0	0.5000
CLOSED & ABANDONED LANDFILL INVENTORY	<a href="#">CALE</a>	0	0	0.5000
DRY CLEANER REMEDIATION PROGRAM SITES	<a href="#">DCRPS</a>	1	0	0.5000
INNOCENT OWNER / OPERATOR DATABASE	<a href="#">IOP</a>	3	0	0.5000
LEAKING PETROLEUM STORAGE TANKS	<a href="#">LPST</a>	7	0	0.5000
MUNICIPAL SOLID WASTE LANDFILL SITES	<a href="#">MSWLF</a>	0	0	0.5000
RAILROAD COMMISSION VCP AND BROWNFIELD SITES	<a href="#">RRCVCP</a>	0	0	0.5000
RADIOACTIVE WASTE SITES	<a href="#">RWS</a>	0	0	0.5000
VOLUNTARY CLEANUP PROGRAM SITES	<a href="#">VCP</a>	4	0	0.5000
RECYCLING FACILITIES	<a href="#">WMRF</a>	0	0	0.5000
INDUSTRIAL AND HAZARDOUS WASTE CORRECTIVE ACTION SITES	<a href="#">IHWCA</a>	4	0	1.0000
STATE SUPERFUND SITES	<a href="#">SE</a>	0	0	1.0000
<b>SUB-TOTAL</b>		<b>45</b>	<b>0</b>	



## Database Findings Summary

### TRIBAL LISTING

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	<a href="#">USTR06</a>	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	<a href="#">LUSTR06</a>	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	<a href="#">ODINDIAN</a>	0	0	0.5000
INDIAN RESERVATIONS	<a href="#">INDIANRES</a>	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		52	0	

## Locatable Database Findings

### FEDERAL LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200		NS	NS	NS	NS	NS	0
BRS	0.0200		NS	NS	NS	NS	NS	0
CDL	0.0200		NS	NS	NS	NS	NS	0
DOCKETS	0.0200		NS	NS	NS	NS	NS	0
EC	0.0200		NS	NS	NS	NS	NS	0
ERNSTX	0.0200		NS	NS	NS	NS	NS	0
FRSTX	0.0200	4	NS	NS	NS	NS	NS	4
HMIRSR06	0.0200		NS	NS	NS	NS	NS	0
ICIS	0.0200		NS	NS	NS	NS	NS	0
ICISNPDES	0.0200		NS	NS	NS	NS	NS	0
LUCIS	0.0200		NS	NS	NS	NS	NS	0
MLTS	0.0200		NS	NS	NS	NS	NS	0
NPDESR06	0.0200		NS	NS	NS	NS	NS	0
PADS	0.0200		NS	NS	NS	NS	NS	0
PCSR06	0.0200		NS	NS	NS	NS	NS	0
RCRASC	0.0200		NS	NS	NS	NS	NS	0
SFLIENS	0.0200		NS	NS	NS	NS	NS	0
SSTS	0.0200		NS	NS	NS	NS	NS	0
TRI	0.0200		NS	NS	NS	NS	NS	0
TSCA	0.0200		NS	NS	NS	NS	NS	0
NLRRCRAG	0.1250		0	NS	NS	NS	NS	0
RCRAGR06	0.1250	2	1	NS	NS	NS	NS	3
HISTPST	0.2500		0	0	NS	NS	NS	0
BF	0.5000		0	0	0	NS	NS	0
CERCLIS	0.5000		0	0	0	NS	NS	0
DNPL	0.5000		0	0	0	NS	NS	0
NFRAP	0.5000		0	0	0	NS	NS	0
NLRRCRAT	0.5000		0	0	0	NS	NS	0
ODI	0.5000		0	0	0	NS	NS	0
RCRAT	0.5000		0	0	0	NS	NS	0
DOD	1.0000		0	0	0	0	NS	0
FUDS	1.0000		0	0	0	0	NS	0
NLRRCRAC	1.0000		0	0	0	0	NS	0
NPL	1.0000		0	0	0	0	NS	0
PNPL	1.0000		0	0	0	0	NS	0
RCRAC	1.0000		0	0	0	0	NS	0



## Locatable Database Findings

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
RODS	1.0000		0	0	0	0	NS	0
<b>SUB-TOTAL</b>		6	1	0	0	0	0	7

## Locatable Database Findings

### STATE (TX) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
GWCC	0.0200	1	NS	NS	NS	NS	NS	1
HISTGWCC	0.0200		NS	NS	NS	NS	NS	0
LJENS	0.0200		NS	NS	NS	NS	NS	0
MSD	0.0200		NS	NS	NS	NS	NS	0
NOV	0.0200		NS	NS	NS	NS	NS	0
SIEC01	0.0200	1	NS	NS	NS	NS	NS	1
SPILLS	0.0200		NS	NS	NS	NS	NS	0
TIERII	0.0200		NS	NS	NS	NS	NS	0
DCR	0.2500		4	2	NS	NS	NS	6
IHW	0.2500	1	5	5	NS	NS	NS	11
PIHW	0.2500		0	0	NS	NS	NS	0
PST	0.2500		3	3	NS	NS	NS	6
APAR	0.5000		1	0	0	NS	NS	1
BSA	0.5000		0	0	0	NS	NS	0
CALF	0.5000		0	0	0	NS	NS	0
DCRPS	0.5000		0	1	0	NS	NS	1
IOP	0.5000	1	2	0	0	NS	NS	3
LPST	0.5000		3	4	0	NS	NS	7
MSWLF	0.5000		0	0	0	NS	NS	0
RRCVCP	0.5000		0	0	0	NS	NS	0
RWS	0.5000		0	0	0	NS	NS	0
VCP	0.5000	1	3	0	0	NS	NS	4
WMRF	0.5000		0	0	0	NS	NS	0
IHWCA	1.0000		1	0	0	3	NS	4
SF	1.0000		0	0	0	0	NS	0
<b>SUB-TOTAL</b>		<b>5</b>	<b>22</b>	<b>15</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>45</b>

## Locatable Database Findings

### TRIBAL LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR06	0.2500		0	0	NS	NS	NS	0
LUSTR06	0.5000		0	0	0	NS	NS	0
ODINDIAN	0.5000		0	0	0	NS	NS	0
INDIANRES	1.0000		0	0	0	0	NS	0

SUB-TOTAL			0	0	0	0	0	0
-----------	--	--	---	---	---	---	---	---

TOTAL		11	23	15	0	3	0	52
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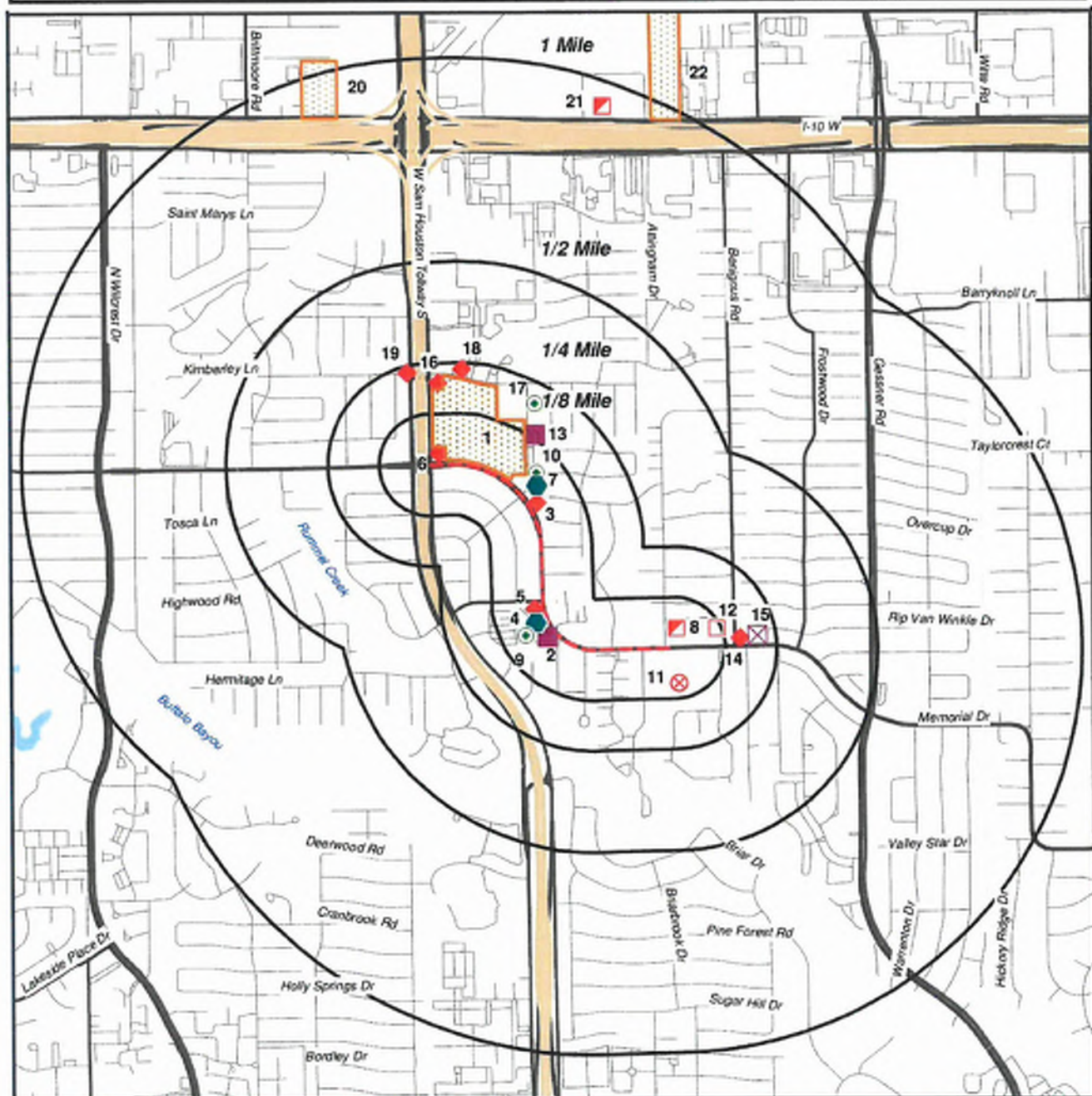
**NOTES:**

NS = NOT SEARCHED

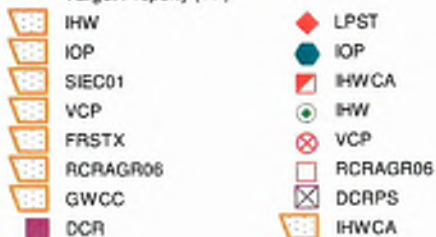
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY



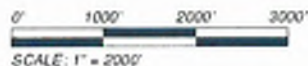
# Radius Map 1



Target Property (TP)



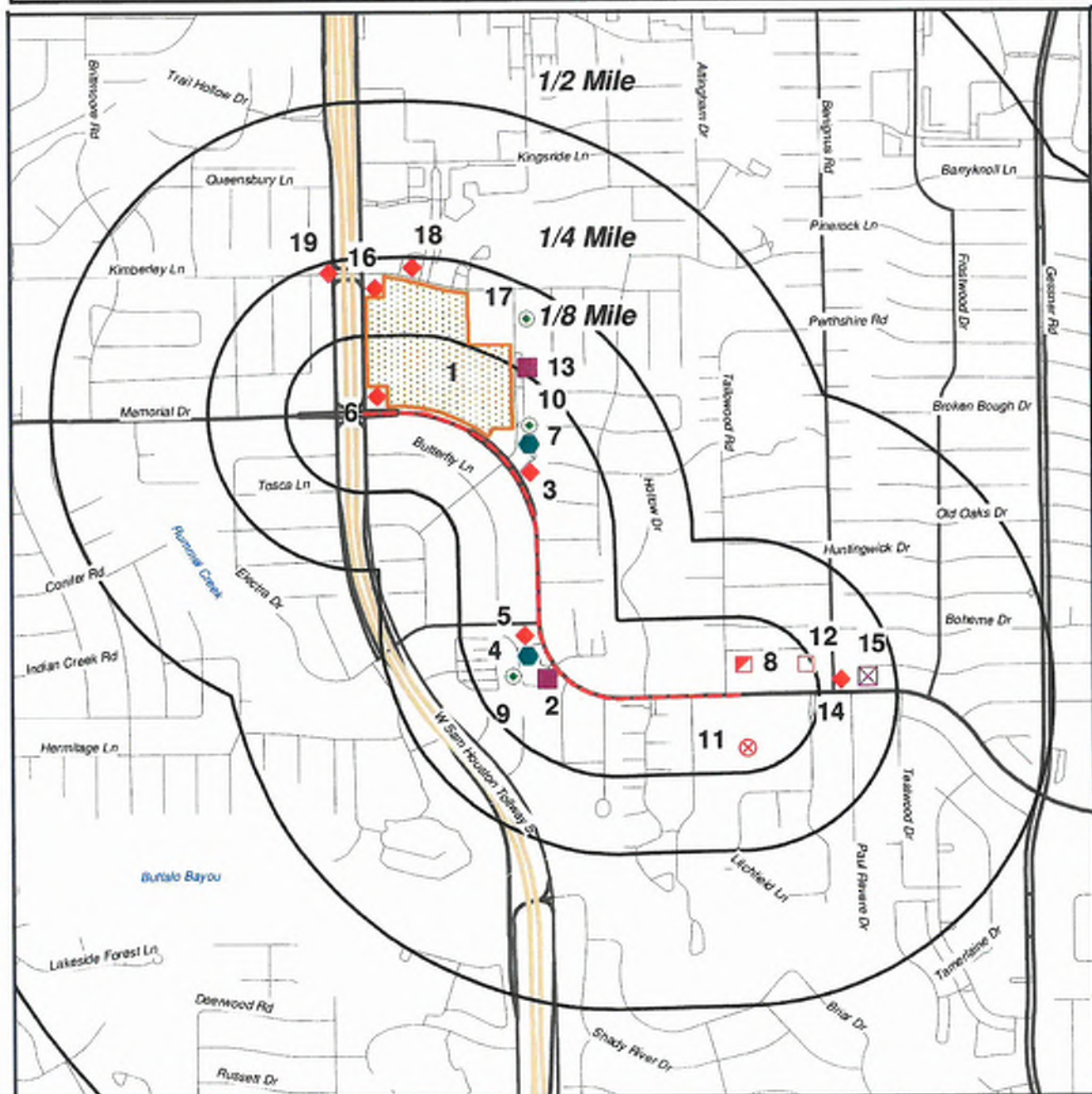
**Memorial Drive Phase I  
Environmental Site Assessment  
MEMORIAL DR  
HOUSTON, Texas  
77024**



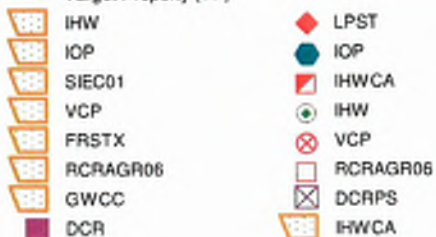
[Click here to access Satellite view](#)



## Radius Map 2



Target Property (TP)



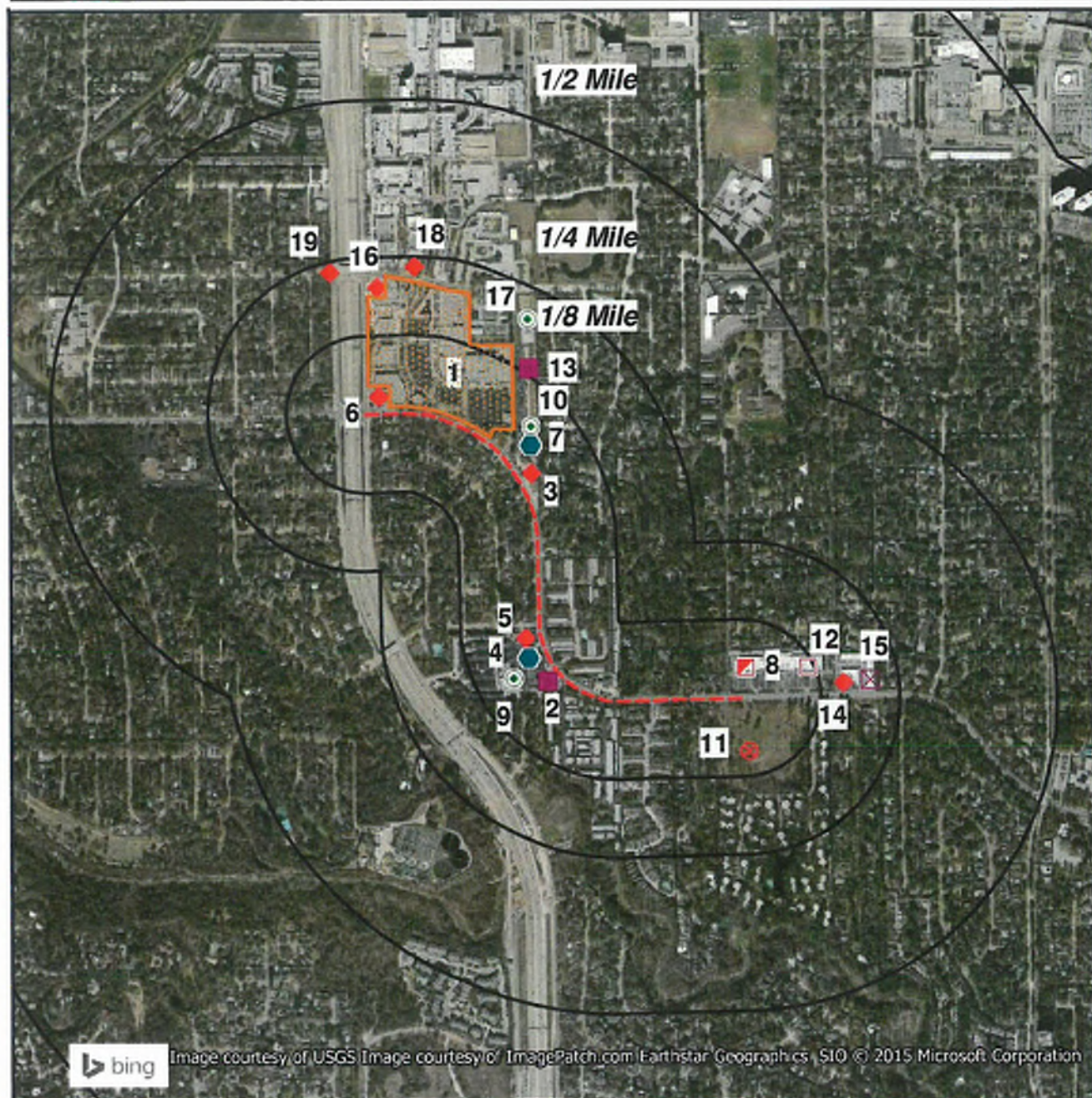
**Memorial Drive Phase I  
Environmental Site Assessment  
MEMORIAL DR  
HOUSTON, Texas  
77024**



[Click here to access Satellite view](#)



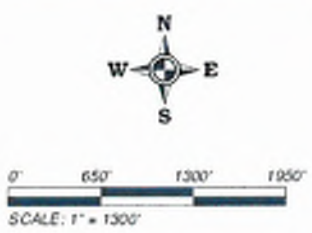
# Ortho Map



bing Image courtesy of USGS Image courtesy of ImagePatch.com Earthstar Geographics, SIO © 2015 Microsoft Corporation

- Target Property (TP)
- IHW
- IOP
- SIEC01
- VCP
- FRSTX
- RCRAGR06
- GWCC
- DCR
- LPST
- IOP
- IHWCA
- IHW
- VCP
- RCRAGR06
- DCRPS
- IHWCA

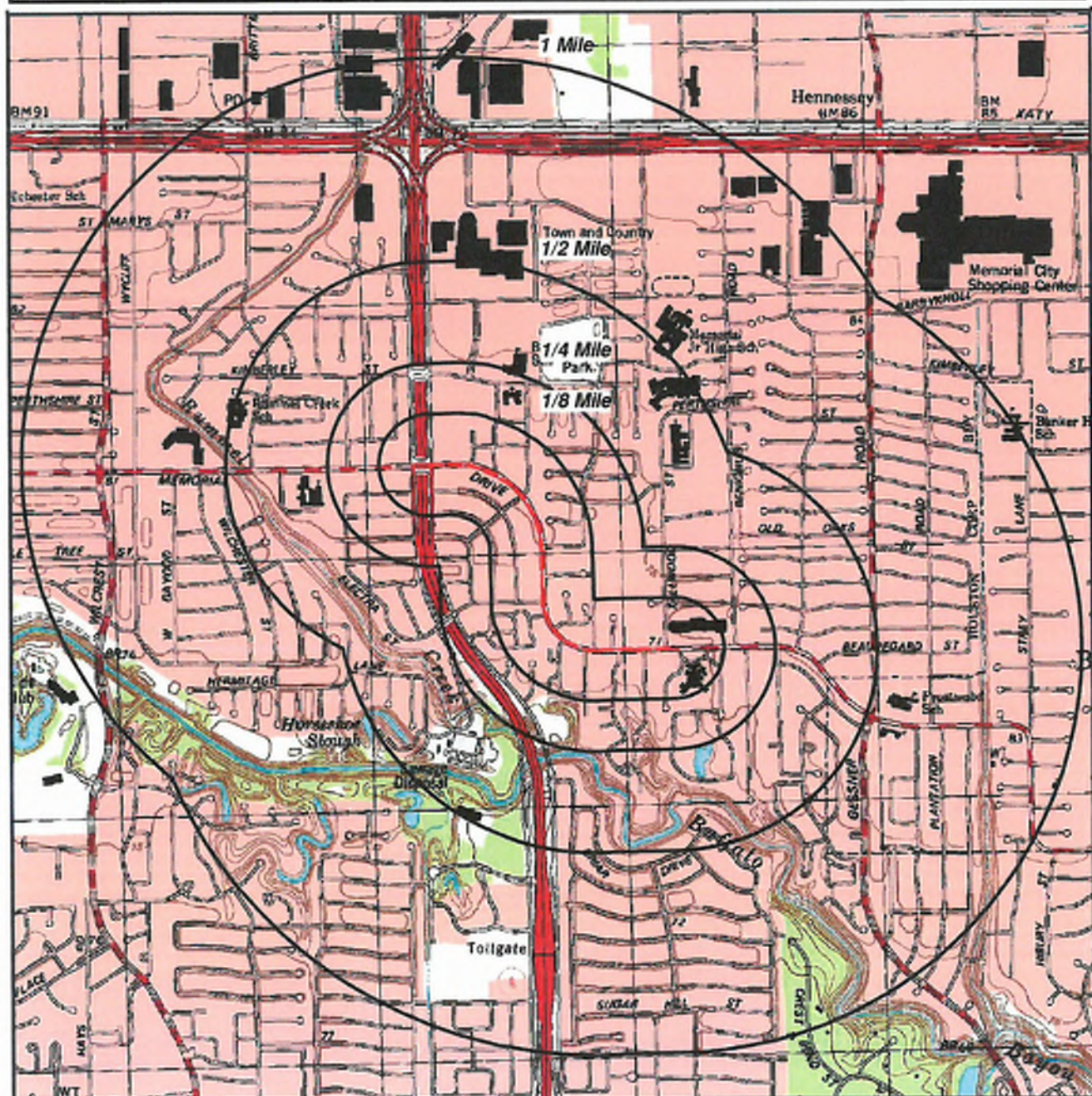
**Quadrangle(s): Hedwig Village  
Memorial Drive Phase I  
Environmental Site Assessment  
MEMORIAL DR  
HOUSTON, Texas  
77024**



[Click here to access Satellite view](#)



## Topographic Map



— Target Property (TP)

**Quadrangle(s): Hedwig Village**  
**Source: USGS, 1982**  
**Memorial Drive Phase I**  
**Environmental Site Assessment**  
**MEMORIAL DR**  
**HOUSTON, Texas**  
**77024**



0' 1000' 2000' 3000'  
SCALE: 1" = 2000'

[Click here to access Satellite view](#)



## Report Summary of Locatable Sites

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address	City, Zip Code	PAGE #
1	IHW	84841	0.01 N	WALGREEN 3328	12850 MEMORIAL DR	HOUSTON, 77024	<a href="#">17</a>
1	IOP	0817	0.01 N	TOWN & COUNTRY VILLAGE SHOPPING CENTER	12850 MEMORIAL DR.	HOUSTON, 77024	<a href="#">18</a>
1	SIEC01	0152	0.01 N	TOWN AND COUNTRY VILLAGE SHOPPING CENTER	12850 MEMORIAL DRIVE	HOUSTON	<a href="#">19</a>
1	VCP	0152	0.01 N	TOWN AND COUNTRY VILLAGE SHOPPING CENTER	12850 MEMORIAL DRIVE	HOUSTON	<a href="#">20</a>
1	FRSTX	110035195286	0.01 N	TOWN & COUNTRY VILLAGE	12850 MEMORIAL DR	HOUSTON, 77024	<a href="#">21</a>
1	FRSTX	110005175452	0.01 N	WALGREENS 3328	12850 MEMORIAL	HOUSTON, 77024	<a href="#">22</a>
1	FRSTX	110046450354	0.01 N	RANDALL'S STORE #1066	12850 MEMORIAL DR., STE 1000	HOUSTON, 77024	<a href="#">23</a>
1	FRSTX	110008166885	0.01 N	OKLAHOMA INSTALLATIN CO	570 TOWN & COUNTRY VILLAGE	HOUSTON, 77024	<a href="#">24</a>
1	RCRAGR06	TXR000081221	0.01 N	RANDALL'S STORE #1066	12850 MEMORIAL DR., STE 1000	HOUSTON, 77024	<a href="#">25</a>
1	RCRAGR06	TXD988078226	0.01 N	OKLAHOMA INSTALLATIN CO	570 TOWN & COUNTRY VILLAGE	HOUSTON, 77024	<a href="#">27</a>
1	GWCC	152	0.01 N	TOWN AND COUNTRY VILLAGE SHOPPING CENTER	12850 MEMORIAL DRIVE, HOUSTON, TX	HOUSTON	<a href="#">29</a>
2	DCR	RN104946496	0.03 W	POST OAK CLEANERS	12645 MEMORIAL DR STE G	HOUSTON, 77024	<a href="#">30</a>
3	IHW	51071	0.03 N	PILGRIM CLEANERS	12754 MEMORIAL DR	HOUSTON, 77024	<a href="#">32</a>
3	IHW	70234	0.03 N	PILGRIM TOWN & COUNTRY CLEANER	12754 MEMORIAL DR	HOUSTON, 77024	<a href="#">34</a>
3	LPST	0061076	0.03 N	A 1 CLEANERS	12754 MEMORIAL DR	HOUSTON, 77024	<a href="#">35</a>
3	PST	61076	0.03 N	A-1 CLEANERS	12754 MEMORIAL DR	HOUSTON, 77024	<a href="#">39</a>
3	VCP	1621	0.03 N	A-1 CLEANERS	12754 MEMORIAL DRIVE	HOUSTON, 77024	<a href="#">44</a>
3	DCR	RN100659127	0.03 N	A-1 CLEANERS	12754 MEMORIAL DR	HOUSTON, 77024	<a href="#">45</a>
4	IOP	0219	0.03 W	ALEXAN MEMORIAL BEND APARTMENTS	12667 MEMORIAL DRIVE	HOUSTON, 77024	<a href="#">47</a>
5	LPST	0014936	0.03 W	CONOCO 43059	12699 MEMORIAL DR	HOUSTON, 77024	<a href="#">48</a>
5	PST	14936	0.03 W	CONOCO 43059	12699 MEMORIAL DR	HOUSTON, 77024	<a href="#">54</a>
5	DCR	RN103960738	0.03 W	POST OAK CLEANERS	12699 MEMORIAL DR	HOUSTON, 77024	<a href="#">60</a>
6	PST	29268	0.03 NW	WHEATLEY INVESTMENTS	12860 MEMORIAL DR	HOUSTON, 77024	<a href="#">61</a>
6	LPST	0029268	0.03 NW	CHEVRON 60108123	12860 MEMORIAL DR	HOUSTON, 77024	<a href="#">73</a>
7	IOP	0249	0.05 NE	SPRINT PCS TOWER SITE (H054XC695)LEONARD	608 WEST BOUGH LANE	HOUSTON, 77024	<a href="#">83</a>

## Report Summary of Locatable Sites

8	DCR	RN103953188	0.06 NE	MW CLEANERS 10244	12534 MEMORIAL DR	HOUSTON, 77024	<a href="#">84</a>
8	IHWCA	T1936	0.06 NE	MW CLEANERS 10244	12534 MEMORIAL DR	HOUSTON, 77024	<a href="#">86</a>
8	VCP	1714	0.06 NE	LANTERN LANE SHOPPING CENTER - PRO CLEAN	12534 MEMORIAL DRIVE	HOUSTON, 77024	<a href="#">87</a>
8	APAR	1714	0.06 NE	LANTERN LANE SHOPPING CENTER PRO CLEANER	12534 MEMORIAL DR	HOUSTON, 77024	<a href="#">88</a>
9	IHW	70233	0.07 W	PILGRAM WYCLIFFE	12647 MEMORIAL DR	HOUSTON, 77024	<a href="#">89</a>
9	IHW	70231	0.07 W	PILGRIM CLEANERS	12647 MEMORIAL DR	HOUSTON, 77024	<a href="#">90</a>
10	IHW	90546	0.07 NE	YOUR VALET CLEANERS	614 W BOUGH LN	HOUSTON, 77024	<a href="#">91</a>
11	VCP	2700	0.09 SE	MEMORIAL GREEN	12601 MEMORIAL DR	HOUSTON, 77024	<a href="#">92</a>
12	RCRAGR06	TXR000081215	0.12 NE	CVS PHARMACY #6752	12502 MEMORIAL DR	HOUSTON, 77024	<a href="#">93</a>
13	DCR	RN103957502	0.14 NE	PILGRIM CLEANERS 128	650 W BOUGH LN STE 116	HOUSTON, 77024	<a href="#">95</a>
14	PST	33022	0.17 E	TPG 573 07	12490 MEMORIAL DR	HOUSTON, 77024	<a href="#">96</a>
14	LPST	0033022	0.17 E	SHELL	12490 MEMORIAL DR	HOUSTON, 77024	<a href="#">106</a>
15	DCRPS	DC0076	0.21 E	PILGRIM CLEANERS	12442 MEMORIAL DRIVE	HOUSTON	<a href="#">113</a>
15	IHW	51067	0.21 E	PILGRIM CLEANERS BOLTIN E	12442 MEMORIAL DR	HOUSTON, 77024	<a href="#">114</a>
15	IHW	70235	0.21 E	PILGRIM MEMORIAL CLEANERS	12442 MEMORIAL DR	HOUSTON, 77024	<a href="#">115</a>
15	DCR	RN100659812	0.21 E	PILGRIM CLEANERS 111	12442 MEMORIAL DR	HOUSTON, 77024	<a href="#">116</a>
16	LPST	0023106	0.21 N	TEXACO	12859 KIMBERLY LN	HOUSTON, 77024	<a href="#">118</a>
16	PST	23106	0.21 N	SHELL	12859 KIMBERLEY LN	HOUSTON, 77024	<a href="#">126</a>
16	IHW	84066	0.21 N	TEXACO SERVICE STATION 42 049 0390	12859 KIMBERLEY LN	HOUSTON, 77024	<a href="#">136</a>
17	IHW	90100	0.21 N	C O POLYDOROS & ASSOCIATES	12727 KIMBERLEY LN	HOUSTON, 77024	<a href="#">137</a>
18	LPST	0022134	0.24 N	MOBIL SERVICE STATION 12-BLY	770 WEST SAM HOUSTON PKWY NORTH #10	HOUSTON, 77024	<a href="#">138</a>
18	PST	22134	0.24 N	SHELL OIL	12860 KIMBERLEY LN	HOUSTON, 77024	<a href="#">149</a>
18	IHW	80248	0.24 N	MOBIL OIL 00BLY	12860 KIMBERLY & W BELT	HOUSTON, 77024	<a href="#">161</a>
19	LPST	GS091439	0.24 N	LEAK @ INTERSECTION	KIMBERLY LN @ WEST BELT	HOUSTON, 77000	<a href="#">162</a>
20	IHWCA	31159	0.9 N	WEATHERFORD US HOUSTON	10802 KATY FWY	HOUSTON, 77043	<a href="#">164</a>

## Report Summary of Locatable Sites

21	IHWCA	31402	0.95 N	FLUOROCARBON PLASTIC & RUBBER PRODUCTION	10420 KATY FWY	HOUSTON, 77043	<a href="#">165</a>
22	IHWCA	34348	0.97 N	SPRING BRANCH SERVICE CENTER	10310 KATY FWY	HOUSTON, 77043	<a href="#">166</a>



## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### FACILITY INFORMATION

REGISTRATION#: 84841 EPA ID: TXR000018523

TNRCC ID #: 104760

NAME: WALGREEN 3328

ADDRESS: 12850 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: ANNA OHERNIN

PHONE: 713-7227242

BUSINESS DESCRIPTION: DRUGSTORE (PHOTO LAB) FACILITY INACTIVATED AT THE REQUEST OF QUALEX ON-SITE  
PITCURES. SEE LTR. DATED 1/23/02. LOG#1223. 5/15/02 BB

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 04/16/2003

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 155594

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

GENERATOR'S DESCRIPTION OF WASTE: USED PPHOTO CHEMISTRY USED IN PHOTO PROCESSING. (USED FIXER)

[Back to Report Summary](#)

## Innocent Owner / Operator Database (IOP)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### FACILITY INFORMATION

ID#: 0817  
DATE IOP RECIEVED: 02/24/12  
CERTIFICATE ISSUED: 09/12/12  
NAME: TOWN & COUNTRY VILLAGE SHOPPING CENTER  
ADDRESS: 12850 MEMORIAL DR.  
HOUSTON, TX 77024

CONTAMINANTS: VOCS, CHLORINATED SOLVENTS  
MEDIA AFFECTED: GROUNDWATER  
PHASE: COMPLETED  
PROPERTY USE: COMMERCIAL INDUSTRIAL  
ACRES: 27.789

### OTHER CONTACTS (CONSULTANT/ATTORNEY)

ORGANIZATION: VINSON & ELKINS, LLP  
LARRY NETTLES ATTORNEY  
1001 FANNIN ST. STE. 2500  
HOUSTON TX 77002  
PHONE: 713-756-4586 FAX: 713-758-2346

### APPLICANT INFORMATION

ORGANIZATION: WB HOLDING CORP.  
LARRY NETTLES, PRESIDENT  
ADDRESS: 12850 MEMORIAL DR.  
HOUSTON, TX, 77024  
INTEREST IN SITE: OWNER  
PHONE: 713-773-5540 FAX: 713-773-5556

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[Back to Report Summary](#)

## State Institutional/Engineering Control Sites (SIEC01)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### SITE INFORMATION

ID#: 0152  
NAME: TOWN AND COUNTRY VILLAGE SHOPPING CENTER  
ADDRESS: 12850 MEMORIAL DRIVE  
HOUSTON TX  
ACRES: 27.789  
FACILITY TYPE: DRY CLEANERS  
APPLICATION DATE: 12/21/95  
DATE OF AGREEMENT: 04/22/96  
CERTIFICATE OF COMPLETION DATE: 07/15/97  
TYPE OF CERTIFICATE ISSUED: CONDITIONAL  
TYPE LEAD: OWNER  
PHASE: CONDITIONAL  
CONTAMINANT/S: CHLORINATED SOLVENTS  
MEDIA AFFECTED: SOILS/GROUNDWATER  
REMEDY: PUMP/TREAT, VAPOR EXTRACTION  
CONTROL: NON-RESIDENTIAL, NO GW USE, O&M REMEDIATION SYSTEMS  
TNRCC SOLID WASTE REGISTRATION #: 52142  
LPST #: NOT REPORTED  
EPA CERCLIS #: 987989621  
EPA RCRIS #: NOT REPORTED  
PROGRAM: VOLUNTARY CLEANUP PROGRAM

### APPLICANT INFORMATION

ORGANIZATION: WB HOLDING CORPORATION  
DAN M. MOODY, JR. (PRESIDENT)  
3003 WEST ALABAMA  
HOUSTON TX 77098  
PHONE: 713-773-5502  
FAX: NOT REPORTED

### CONSULTANT/ATTORNEY INFORMATION

ORGANIZATION: WESTON SOLUTIONS, INC.  
SUSAN LITHERLAND (PROJECT OFFICER)  
2705 BEE CAVES ROAD, SUITE 330  
AUSTIN TX 78746-5640  
PHONE: 512-651-7100  
FAX: 512-651-7101

[Back to Report Summary](#)

## Voluntary Cleanup Program Sites (VCP)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### SITE INFORMATION

ID#: 0152  
NAME: TOWN AND COUNTRY VILLAGE SHOPPING CENTER  
ADDRESS: 12850 MEMORIAL DRIVE  
HOUSTON TX  
ACRES: 27.789  
FACILITY TYPE: DRY CLEANERS  
APPLICATION DATE: 12/21/95  
DATE OF AGREEMENT: 04/22/96  
CERTIFICATE OF COMPLETION DATE: 07/15/97  
TYPE OF CERTIFICATE ISSUED: CONDITIONAL  
TYPE LEAD: OWNER  
PHASE: CONDITIONAL  
MEDIA AFFECTED: SOILS/GROUNDWATER  
TNRCC SOLID WASTE REGISTRATION #: 52142  
REMEDY: PUMP/TREAT, VAPOR EXTRACTION  
INSTITUTIONAL CONTROL: NON-RESIDENTIAL, NO GW USE,  
O&M REMEDIATION SYSTEMS  
LPST #: NOT REPORTED  
EPA CERCLIS #: 987989621  
EPA RCRIS #: NOT REPORTED  
CONTAMINANT/S: CHLORINATED SOLVENTS

### APPLICANT INFORMATION

ORGANIZATION: WB HOLDING CORPORATION  
DAN M., MOODY, JR., PRESIDENT  
3003 WEST ALABAMA  
HOUSTON, TX, 77098  
PHONE: 713-773-5502  
FAX: NOT REPORTED

### CONSULTANT/ATTORNEY INFORMATION

ORGANIZATION: WESTON SOLUTIONS, INC.  
SUSAN, LITHERLAND, PROJECT OFFICER  
2705 BEE CAVES ROAD, SUITE 330  
AUSTIN, TX, 78746-5640  
PHONE: 512-651-7100  
FAX: 512-651-7101

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## Facility Registry System (FRSTX)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### FACILITY INFORMATION

REGISTRY ID: 110035195286

NAME: TOWN & COUNTRY VILLAGE

LOCATION ADDRESS: 12850 MEMORIAL DR  
HOUSTON, TX 77024-4972

COUNTY: HARRIS

EPA REGION: 06

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

### ALTERNATIVE NAME/S:

TOWN & COUNTRY VILLAGE

### PROGRAM/S LISTED FOR THIS FACILITY

TX-TCEQ ACR - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - AGENCY CENTRAL REGISTRY

### STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

### NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

NO NAICS DATA REPORTED

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## Facility Registry System (FRSTX)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### **FACILITY INFORMATION**

REGISTRY ID: 110005175452

NAME: WALGREENS 3328

LOCATION ADDRESS: 12850 MEMORIAL  
HOUSTON, TX 77024-4972

COUNTY: HARRIS

EPA REGION: 06

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

### ALTERNATIVE NAME/S:

WALGREENS 3328

### PROGRAM/S LISTED FOR THIS FACILITY

RCRAINFO - RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM

### STANDARD INDUSTRIAL CLASSIFICATION(S) (SIC)

NO SIC DATA REPORTED

### NORTH AMERICAN INDUSTRY CLASSIFICATION(S) (NAICS)

NO NAICS DATA REPORTED

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## Facility Registry System (FRSTX)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### **FACILITY INFORMATION**

REGISTRY ID: 110046450354

NAME: RANDALL'S STORE #1066

LOCATION ADDRESS: 12850 MEMORIAL DR., STE 1000  
HOUSTON, TX 77024-4972

COUNTY: HARRIS

EPA REGION: 06

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

### ALTERNATIVE NAME/S:

RANDALL'S STORE #1066

### PROGRAM/S LISTED FOR THIS FACILITY

RCRAINFO - RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM

### STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

### NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

44511 - SUPERMARKETS AND OTHER GROCERY (EXCEPT CONVENIENCE) STORES

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## Facility Registry System (FRSTX)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### **FACILITY INFORMATION**

REGISTRY ID: 110008166885

NAME: OKLAHOMA INSTALLATIN CO

LOCATION ADDRESS: 570 TOWN & COUNTRY VILLAGE  
HOUSTON, TX 77024

COUNTY: HARRIS

EPA REGION: 06

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

### ALTERNATIVE NAME/S:

OKLAHOMA INSTALLATIN CO

### PROGRAM/S LISTED FOR THIS FACILITY

RCRAINFO - RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM

### STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

### NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

NO NAICS DATA REPORTED

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**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

MAP ID# 1

Distance from Property: 0.01 mi. N

**FACILITY INFORMATION**

EPA ID#: TXR000081221

NAME: RANDALL'S STORE #1066

ADDRESS: 12850 MEMORIAL DR., STE 1000  
HOUSTON, TX 77024-4972

CONTACT NAME: KEITH B POWERS

CONTACT ADDRESS: 12850 MEMORIAL DR., STE 1000  
HOUSTON TX 770244972

CONTACT PHONE: 925-226-5655

NON-NOTIFIER: NOT A NON-NOTIFIER

DATE RECEIVED BY AGENCY: 08/29/2012

OWNER TYPE: PRIVATE

OWNER NAME: TOWN & COUNTRY PARTNERSHIP

OPERATOR TYPE: PRIVATE

OPERATOR NAME: RANDALL'S

**CERTIFICATION**

CERTIFICATION NAME:

CERTIFICATION TITLE:

CERTIFICATION SIGNED DATE:

KEITH POWERS

ENVR COMPLIANCE MGR

07/26/2012

**INDUSTRY CLASSIFICATION (NAICS)**

44511 - SUPERMARKETS AND OTHER GROCERY (EXCEPT CONVENIENCE) STORES

**SITE HISTORY (INCLUDES GENERATORS AND NON-GENERATORS)**

DATE RECEIVED BY AGENCY: 08/29/2012

NAME: RANDALL'S STORE #1066

GENERATOR CLASSIFICATION: LARGE QUANTITY GENERATOR

**CURRENT ACTIVITY INFORMATION**

GENERATOR STATUS: **CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR** LAST UPDATED DATE: 08/29/2012

SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**

TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)(v) UNIVERSE: **NO**

TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**

NON TDSFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **NO**

CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**

IMPORTER: **NO**

UNDERGROUND INJECTION: **NO**

MIXED WASTE GENERATOR: **NO**

UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**

TRANSFER FACILITY: **NO**

TRANSPORTER: **NO**

USED OIL FUEL BURNER: **NO**

ONSITE BURNER EXEMPTION: **NO**

USED OIL PROCESSOR: **NO**

FURNACE EXEMPTION: **NO**

USED OIL FUEL MARKETER TO BURNER: **NO**

USED OIL REFINER: **NO**

SPECIFICATION USED OIL MARKETER: **NO**

USED OIL TRANSFER FACILITY: **NO**

USED OIL TRANSPORTER: **NO**

**COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION**

**EVALUATIONS - NO EVALUATIONS REPORTED -**

**VIOLATIONS - NO VIOLATIONS REPORTED -**

**ENFORCEMENTS - NO ENFORCEMENTS REPORTED -**

**HAZARDOUS WASTE**

P075 NICOTINE, & SALTS

**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

P075 PYRIDINE, 3-(1-METHYL-2-PYRROLIDINYL)-, (S)-, & SALTS

UNIVERSAL WASTE - NO UNIVERSAL WASTE REPORTED -

CORRECTIVE ACTION AREA - NO CORECTIVE ACTION AREA INFORMATION REPORTED -

CORRECTIVE ACTION EVENT - NO CORECTIVE ACTION EVENT REPORTED -

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**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

MAP ID# 1

Distance from Property: 0.01 mi. N

**FACILITY INFORMATION**

EPA ID#: TXD988078226

NAME: OKLAHOMA INSTALLATIN CO

ADDRESS: 570 TOWN & COUNTRY VILLAGE  
HOUSTON, TX 77024

CONTACT NAME: BRYON DEJARNETTE

CONTACT ADDRESS: PO BOX 740  
OWASSO OK 74055

CONTACT PHONE: 918-272-1899

NON-NOTIFIER: NOT A NON-NOTIFIER

DATE RECEIVED BY AGENCY: 09/21/1992

CERTIFICATION - NO CERTIFICATION REPORTED -

INDUSTRY CLASSIFICATION (NAICS) - NO NAICS INFORMATION REPORTED -

SITE HISTORY (INCLUDES GENERATORS AND NON-GENERATORS)

DATE RECEIVED BY AGENCY: 09/21/1992

NAME: OKLAHOMA INSTALLATIN CO

GENERATOR CLASSIFICATION: LARGE QUANTITY GENERATOR

OWNER TYPE: PRIVATE

OWNER NAME: DILLARDS DEPT STORE

OPERATOR TYPE: NOT REPORTED

OPERATOR NAME: NOT REPORTED

**CURRENT ACTIVITY INFORMATION**

GENERATOR STATUS: **CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR** LAST UPDATED DATE: 09/02/2000

SUBJECT TO CORRECTIVE ACTION UNIVERSE: NO

TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: NO

TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: NO

NON TDSFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: NO

CORRECTIVE ACTION WORKLOAD UNIVERSE: NO

IMPORTER: NO

UNDERGROUND INJECTION: NO

MIXED WASTE GENERATOR: NO

UNIVERSAL WASTE DESTINATION FACILITY: NO

RECYCLER: NO

TRANSFER FACILITY: NO

TRANSPORTER: NO

USED OIL FUEL BURNER: NO

ONSITE BURNER EXEMPTION: NO

USED OIL PROCESSOR: NO

FURNACE EXEMPTION: NO

USED OIL FUEL MARKETER TO BURNER: NO

USED OIL REFINER: NO

SPECIFICATION USED OIL MARKETER: NO

USED OIL TRANSFER FACILITY: NO

USED OIL TRANSPORTER: NO

**COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION**

EVALUATIONS - NO EVALUATIONS REPORTED -

VIOLATIONS - NO VIOLATIONS REPORTED -

ENFORCEMENTS - NO ENFORCEMENTS REPORTED -

**HAZARDOUS WASTE**

D001 IGNITABLE WASTE

**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

- F003 THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
- F005 THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

UNIVERSAL WASTE - NO UNIVERSAL WASTE REPORTED -

CORRECTIVE ACTION AREA - NO CORRECTIVE ACTION AREA INFORMATION REPORTED -

CORRECTIVE ACTION EVENT - NO CORRECTIVE ACTION EVENT REPORTED -

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## Groundwater Contamination Cases (GWCC)

[MAP ID# 1](#)

Distance from Property: 0.01 mi. N

### **FACILITY INFORMATION**

FILE NUMBER: 152

FILE NAME: TOWN AND COUNTRY VILLAGE SHOPPING CENTER

LOCATION: 12850 MEMORIAL DRIVE, HOUSTON, TX

COUNTY: HARRIS

AGENCY: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

DIVISION: REMEDIATION DIVISION/VOLUNTARY CLEANUP (TCEQ)

DATE OF CONTAMINATION

CONFIRMATION BY AGENCY: 12/21/1995

CONTAMINANT(S): METALS

ENFORCEMENT STATUS: NOT REPORTED

ACTIVITY STATUS: NOT REPORTED

NEW CASE?: NO

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## Dry Cleaner Registration Database (DCR)

[MAP ID# 2](#)

Distance from Property: 0.03 mi. W

### FACILITY INFORMATION

REGISTRATION #: RN104946496

CUSTOMER #: NOT REPORTED

NAME: POST OAK CLEANERS

ADDRESS: 12645 MEMORIAL DR STE G  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: 713-2660900

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2014

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2013

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2012

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2011

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2010

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2009

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2008

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2007

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2006

SOLVENT: NOT REPORTED



***Dry Cleaner Registration Database (DCR)***

QUANTITY: NOT REPORTED

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## Industrial and Hazardous Waste Sites (IHW)

MAP ID# 3

Distance from Property: 0.03 mi. N

### FACILITY INFORMATION

REGISTRATION#: 51071 EPA ID: TXD982561581

TNRCC ID #: 18806

NAME: PILGRIM CLEANERS

ADDRESS: 12754 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: MARGERY FIRESTONE

PHONE: 713-4641239

BUSINESS DESCRIPTION: NOT REPORTED

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 04/22/2003

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 43769

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

WASTE ID: 43770

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

WASTE ID: 138542

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

## ***Industrial and Hazardous Waste Sites (IHW)***

GENERATOR'S DESCRIPTION OF WASTE: PERC SLUDGE

WASTE ID: 138543

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

GENERATOR'S DESCRIPTION OF WASTE: PERC FILTERS

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 3](#)

Distance from Property: 0.03 mi. N

### FACILITY INFORMATION

REGISTRATION#: 70234 EPA ID: TXD982561581

TNRCC ID #: 25065

NAME: PILGRIM TOWN & COUNTRY CLEANER

ADDRESS: 12754 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: NOT REPORTED

PHONE: NOT REPORTED

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THIS FACILITY WAS REGISTERED PRIOR TO 1994 AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

NO RECORDS

---

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 3

Distance from Property: 0.03 mi. N

### FACILITY INFORMATION

Geosearch ID: 0061076  
FACILITY ID: 0061076  
NAME: A 1 CLEANERS  
ADDRESS: 12754 MEMORIAL DR  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 113777  
NAME: A 1 CLEANERS  
FACILITY LOCATION: 12754 MEMORIAL DR  
PRIORITY CODE: (4.0) ASSESSMENT INCOMPLETE, NO APPARENT RECEPTORS IMPACTED  
STATUS CODE: (6A) FINAL CONCURRENCE ISSUED, CASE CLOSED  
REPORTED DATE: 12/4/1998  
ENTERED DATE: 2/3/1999

### PRP INFORMATION

NAME: EPSTEIN ALTA ESTATE  
ADDRESS: 1800 BEING STE 495  
HOUSTON TX 77057  
CONTACT: JOHN HUTCHINSON  
PHONE: 713/974-1777

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 08/31/1987	REGISTRATION DATE: 10/22/1991
TANK CAPACITY (GAL): NOT REPORTED	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 12/01/1998
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: YES	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: YES	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 150193  
TANK ID: 1  
COMPARTMENT LETTER: A

## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **0**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **1**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **08/31/1987**

REGISTRATION DATE: **10/22/1991**

TANK CAPACITY (GAL): **NOT REPORTED**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **12/01/1998**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **YES**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **YES**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **150193**

TANK ID: **1**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **NOT REPORTED**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

## Leaking Petroleum Storage Tanks (LPST)

### NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 08/31/1987

REGISTRATION DATE: 10/22/1991

TANK CAPACITY (GAL): NOT REPORTED

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 12/01/1998

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

NOT REPORTED

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 150192

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 0

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

#### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 08/31/1987

REGISTRATION DATE: 10/22/1991

TANK CAPACITY (GAL): NOT REPORTED

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 12/01/1998

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED



## Leaking Petroleum Storage Tanks (LPST)

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

NOT REPORTED

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 150192

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): NOT REPORTED

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### ABOVEGROUND STORAGE TANK INFORMATION

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Petroleum Storage Tanks (PST)

MAP ID# 3

Distance from Property: 0.03 mi. N

### FACILITY INFORMATION

ID#: 61076  
NAME: A-1 CLEANERS  
ADDRESS: 12754 MEMORIAL DR  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: FLEET REFUELING  
BEGIN DATE: 10/28/1991  
STATUS: INACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: NO  
NUMBER OF ACTIVE UNDERGROUND TANKS: 0  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 10/22/1991  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 10/14/1991  
SIGNATURE NAME & TITLE: ALTA J EPSTEIN, OWNER  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN601253842  
NAME: ESTATE OF ALTA J EPSTEIN  
CONTACT ADDRESS: OWNER ADDRESS NOT REPORTED  
CITY NOT REPORTED

TYPE: ORGANIZATION  
BEGIN DATE: 10/22/1991  
CONTACT ROLE: NOT REPORTED  
CONTACT NAME: NOT REPORTED  
CONTACT TITLE: NOT REPORTED  
ORGANIZATION: NOT REPORTED  
PHONE: NOT REPORTED  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

NO OPERATOR INFORMATION REPORTED

### SELF-CERTIFICATION

-NO SELF-CERTIFICATION INFORMATION REPORTED-

### CONSTRUCTION NOTIFICATION

NO CONSTRUCTION NOTIFICATION DATA REPORTED FOR THIS FACILITY

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 08/31/1987	REGISTRATION DATE: 10/22/1991
TANK CAPACITY (GAL): NOT REPORTED	EMPTY TANK: NOT EMPTY

### CONTACT INFORMATION

NAME: NOT REPORTED  
TITLE: NOT REPORTED  
ORGANIZATION: NOT REPORTED  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: NOT REPORTED

## Petroleum Storage Tanks (PST)

STATUS: **REMOVED FROM GROUND** STATUS BEGIN DATE: **12/01/1998**  
INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**  
TANK DESIGN SINGLE WALL: **YES** TANK DESIGN DOUBLE WALL: **NO**  
PIPE DESIGN SINGLE WALL: **YES** PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **150193**

TANK ID: **1**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **0**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **1**

INSTALLATION DATE: **08/31/1987**

TANK CAPACITY (GAL): **NOT REPORTED**

STATUS: **REMOVED FROM GROUND**

INTERNAL PROTECTION DATE: **NOT REPORTED**

TANK DESIGN SINGLE WALL: **YES**

PIPE DESIGN SINGLE WALL: **YES**

NUMBER OF COMPARTMENTS: **1**

REGISTRATION DATE: **10/22/1991**

EMPTY TANK: **NOT EMPTY**

STATUS BEGIN DATE: **12/01/1998**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

## Petroleum Storage Tanks (PST)

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **150193**

TANK ID: **1**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **NOT REPORTED**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **08/31/1987**

REGISTRATION DATE: **10/22/1991**

TANK CAPACITY (GAL): **NOT REPORTED**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **12/01/1998**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

TANK DETAILS

MATERIAL:

**NOT REPORTED**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **150192**

TANK ID: **2**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**



## Petroleum Storage Tanks (PST)

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **0**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2**

INSTALLATION DATE: **08/31/1987**

TANK CAPACITY (GAL): **NOT REPORTED**

STATUS: **REMOVED FROM GROUND**

INTERNAL PROTECTION DATE: **NOT REPORTED**

TANK DESIGN SINGLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

NUMBER OF COMPARTMENTS: **1**

REGISTRATION DATE: **10/22/1991**

EMPTY TANK: **NOT EMPTY**

STATUS BEGIN DATE: **12/01/1998**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**NOT REPORTED**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **150192**

TANK ID: **2**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **NOT REPORTED**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**



## ***Petroleum Storage Tanks (PST)***

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### **ABOVEGROUND STORAGE TANK INFORMATION**

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Voluntary Cleanup Program Sites (VCP)

[MAP ID# 3](#)

Distance from Property: 0.03 mi. N

### SITE INFORMATION

ID#: 1621  
NAME: A-1 CLEANERS  
ADDRESS: 12754 MEMORIAL DRIVE  
HOUSTON TX 77024-4861  
ACRES: 0.45  
FACILITY TYPE: DRY CLEANERS  
APPLICATION DATE: 08/08/03  
DATE OF AGREEMENT: 09/03/03  
CERTIFICATE OF COMPLETION DATE: NOT REPORTED  
TYPE OF CERTIFICATE ISSUED: NOT REPORTED  
TYPE LEAD: OWNER  
PHASE: INVESTIGATION  
MEDIA AFFECTED: SOILS/GROUNDWATER  
TNRCC SOLID WASTE REGISTRATION #: NOT REPORTED  
REMEDY: NOT REPORTED  
INSTITUTIONAL CONTROL: NOT REPORTED  
LPST #: 113777  
EPA CERCLIS #: NOT REPORTED  
EPA RCRIS #: NOT REPORTED  
CONTAMINANT/S: VOCS

### APPLICANT INFORMATION

ORGANIZATION: WB HOLDING CORPORATION  
DAN, MOODY III  
3003 WEST ALABAMA  
HOUSTON, TX, 77098  
PHONE: 713-773-5540  
FAX: 713-773-5556

### CONSULTANT/ATTORNEY INFORMATION

ORGANIZATION: VINSON & ELKINS, LLP  
LARRY W., NETTLES, ATTORNEY  
2300 FIRST CITY TOWER, 1001 FANNIN STREET  
HOUSTON, TX, 77002  
PHONE: 713-758-4586  
FAX: 713-615-5538

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## Dry Cleaner Registration Database (DCR)

MAP ID# 3

Distance from Property: 0.03 mi. N

### FACILITY INFORMATION

REGISTRATION #: RN100659127

CUSTOMER #: NOT REPORTED

NAME: A-1 CLEANERS

ADDRESS: 12754 MEMORIAL DR  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: 713-4676684

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2014

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2013

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2012

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2011

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2010

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2009

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2008

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2007

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2006

SOLVENT: NOT REPORTED

## Dry Cleaner Registration Database (DCR)

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2005

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2004

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

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## Innocent Owner / Operator Database (IOP)

[MAP ID# 4](#)

Distance from Property: 0.03 mi. W

### FACILITY INFORMATION

ID#: 0219  
DATE IOP RECIEVED: 02/07/01  
CERTIFICATE ISSUED: 06/08/01  
NAME: ALEXAN MEMORIAL BEND APARTMENTS  
ADDRESS: 12667 MEMORIAL DRIVE  
HOUSTON, TX 77024  
CONTAMINANTS: VOCS, TPH  
MEDIA AFFECTED: SOILS/GROUNDWATER  
PHASE: COMPLETED  
PROPERTY USE: APARTMENT COMPLEX  
ACRES: 5.6277

### OTHER CONTACTS (CONSULTANT/ATTORNEY)

ORGANIZATION: VINSON & ELKINS, LLP  
LARRY NETTLES PARTNER  
2300 FANNIN  
HOUSTON TX 77002  
PHONE: 713-758-4586 FAX: 713-615-5538

### APPLICANT INFORMATION

ORGANIZATION: TCR MEMORIAL BEND HOLDINGS,  
LARRY NETTLES, VICE PRESIDE  
ADDRESS: 10333 RICHMOND AVENUE, SUITE 400  
HOUSTON, TX, 77042  
INTEREST IN SITE: OWNER  
PHONE: 713-781-5775 FAX: 713-781-8988

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 5

Distance from Property: 0.03 mi. W

### FACILITY INFORMATION

Geosearch ID: 0014936  
FACILITY ID: 0014936  
NAME: CONOCO 43059  
ADDRESS: 12699 MEMORIAL DR  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 104023  
NAME: CONOCO 43059  
FACILITY LOCATION: 12699 MEMORIAL DR  
PRIORITY CODE: (4.1) GROUNDWATER IMPACTED, NO APPARENT THREATS OR IMPACTS TO RECEPTORS  
STATUS CODE: (6A) FINAL CONCURRENCE ISSUED, CASE CLOSED  
REPORTED DATE: 5/5/1992  
ENTERED DATE: 8/31/1992

### PRP INFORMATION

NAME: CONOCO INC  
ADDRESS: PO BOX 4784  
HOUSTON TX 77210  
CONTACT: PAUL TAYLOR  
PHONE: 832/379-6423

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1982	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 10000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 01/23/1992
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16238  
TANK ID: 1  
COMPARTMENT LETTER: A

## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: KEROSENE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 10000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1982	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 10000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 01/23/1992
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16237

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: KEROSENE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:



## Leaking Petroleum Storage Tanks (LPST)

### NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1959

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 10/29/1987

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16236

TANK ID: 3

COMPARTMENT LETTER: A

SUBSTANCES: KEROSENE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

#### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 10/01/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/23/1992

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED



## Leaking Petroleum Storage Tanks (LPST)

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16239

TANK ID: 3A

COMPARTMENT LETTER: A

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **10000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1959

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: 10/29/1987

INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

## Leaking Petroleum Storage Tanks (LPST)

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **16240**  
TANK ID: **4**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **DIESEL**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **6000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>5</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>08/31/1987</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>550</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>10/24/1990</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **16241**  
TANK ID: **5**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **USED OIL**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **550**

## Leaking Petroleum Storage Tanks (LPST)

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### ABOVEGROUND STORAGE TANK INFORMATION

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Petroleum Storage Tanks (PST)

MAP ID# 5

Distance from Property: 0.03 mi. W

### FACILITY INFORMATION

ID#: 14936  
NAME: CONOCO 43059  
ADDRESS: 12699 MEMORIAL DR  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: RETAIL  
BEGIN DATE: 09/01/1988  
STATUS: INACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: NO  
NUMBER OF ACTIVE UNDERGROUND TANKS: 0  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 05/08/1986  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 04/16/1986  
SIGNATURE NAME & TITLE: M R BEEVERS, DIR SFTY  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN601674351  
NAME: CONOCOPHILLIPS COMPANY  
CONTACT ADDRESS: OWNER ADDRESS NOT REPORTED  
CITY NOT REPORTED

TYPE: CORPORATION/COMPANY  
BEGIN DATE: 09/01/1988  
CONTACT ROLE: NOT REPORTED  
CONTACT NAME: NOT REPORTED  
CONTACT TITLE: NOT REPORTED  
ORGANIZATION: NOT REPORTED  
PHONE: NOT REPORTED  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

NO OPERATOR INFORMATION REPORTED

### SELF-CERTIFICATION

-NO SELF-CERTIFICATION INFORMATION REPORTED-

### CONSTRUCTION NOTIFICATION

NO CONSTRUCTION NOTIFICATION DATA REPORTED FOR THIS FACILITY

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1982	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 10000	EMPTY TANK: NOT EMPTY

### CONTACT INFORMATION

NAME: NOT REPORTED  
TITLE: NOT REPORTED  
ORGANIZATION: CONOCO 43059  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: 713-528-3032



## Petroleum Storage Tanks (PST)

STATUS: REMOVED FROM GROUND                      STATUS BEGIN DATE: 01/23/1992  
INTERNAL PROTECTION DATE: NOT REPORTED        REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN SINGLE WALL: NO                      TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO                      PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16238

TANK ID: 1

COMPARTMENT LETTER: A

SUBSTANCES: KEROSENE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1982

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/23/1992

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

## Petroleum Storage Tanks (PST)

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **16237**

TANK ID: **2**

COMPARTMENT LETTER: **A**

SUBSTANCES: **KEROSENE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **10000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **3**

INSTALLATION DATE: **01/01/1959**

TANK CAPACITY (GAL): **6000**

STATUS: **REMOVED FROM GROUND**

INTERNAL PROTECTION DATE: **NOT REPORTED**

TANK DESIGN SINGLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

NUMBER OF COMPARTMENTS: **1**

REGISTRATION DATE: **05/08/1986**

EMPTY TANK: **NOT EMPTY**

STATUS BEGIN DATE: **10/29/1987**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **16236**

TANK ID: **3**

COMPARTMENT LETTER: **A**

SUBSTANCES: **KEROSENE**

## Petroleum Storage Tanks (PST)

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 10/01/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/23/1992

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16239

TANK ID: 3A

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED



## Petroleum Storage Tanks (PST)

CORROSION PROTECTION: **NOT REPORTED**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **4**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1959**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **6000**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **10/29/1987**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **16240**

TANK ID: **4**

COMPARTMENT LETTER: **A**

SUBSTANCES: **DIESEL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **6000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **5**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **08/31/1987**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **550**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **10/24/1990**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**



## Petroleum Storage Tanks (PST)

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 16241

TANK ID: 5

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### ABOVEGROUND STORAGE TANK INFORMATION

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Dry Cleaner Registration Database (DCR)

[MAP ID# 5](#)

Distance from Property: 0.03 mi. W

### **FACILITY INFORMATION**

REGISTRATION #: RN103960738

CUSTOMER #: NOT REPORTED

NAME: POST OAK CLEANERS

ADDRESS: 12699 MEMORIAL DR  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: NOT REPORTED

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2005

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2004

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

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## Petroleum Storage Tanks (PST)

[MAP ID# 6](#)

Distance from Property: 0.03 mi. NW

### FACILITY INFORMATION

ID#: 29268  
NAME: WHEATLEY INVESTMENTS  
ADDRESS: 12860 MEMORIAL DR  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: RETAIL  
BEGIN DATE: 10/29/1986  
STATUS: ACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: YES  
NUMBER OF ACTIVE UNDERGROUND TANKS: 3  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 05/30/2014  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 05/27/2014  
SIGNATURE NAME & TITLE: MARK WHEATLEY, NOT REPORTED  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN602597478  
NAME: WHEATLEY INVESTMENTS LTD  
CONTACT ADDRESS: 12860 MEMORIAL DR  
HOUSTON TX 77024  
TYPE: ORGANIZATION  
BEGIN DATE: 12/18/2003  
CONTACT ROLE: OWNCON  
CONTACT NAME: MARK WHEATLEY  
CONTACT TITLE: PARTNER  
ORGANIZATION: WHEATLEY INVESTMENTS LTD  
PHONE: 713-468-6264  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

OPERATOR NUMBER: CN602597478  
NAME: WHEATLEY INVESTMENTS LTD  
CONTACT ADDRESS: 12860 MEMORIAL DR  
HOUSTON TX 77024  
TYPE: ORGANIZATION  
BEGIN DATE: 12/18/2003  
CONTACT ROLE: OPRCON  
CONTACT NAME: MARK WHEATLEY  
CONTACT TITLE: PARTNER

### CONTACT INFORMATION

NAME: MARK WHEATLEY  
TITLE: PARTNER  
ORGANIZATION: WHEATLEY INVESTMENTS  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: 713-468-6264

## Petroleum Storage Tanks (PST)

ORGANIZATION: WHEATLEY INVESTMENTS LTD

PHONE: (713) 4686264

FAX: NOT REPORTED

EMAIL: NOT REPORTED

### **SELF-CERTIFICATION**

SELF-CERTIFICATION ID: 237426

SIGNATURE DATE: 05/27/2014

SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 219594

SIGNATURE DATE: 05/05/2013

SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73766

SIGNATURE DATE: 04/26/2012

SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73765

SIGNATURE DATE: 05/10/2011

SIGNATURE NAME & TITLE: MARK WHEATLEY, VP

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73764

SIGNATURE DATE: 04/28/2010

SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73763

SIGNATURE DATE: 05/26/2009

SIGNATURE NAME & TITLE: MARK WHEATLEY, VP

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73762

SIGNATURE DATE: 05/20/2008

SIGNATURE NAME & TITLE: MARK WHEATLEY, NOT REPORTED

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73761

SIGNATURE DATE: 06/10/2007

SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 73760

SIGNATURE DATE: 05/25/2006



## Petroleum Storage Tanks (PST)

SIGNATURE NAME & TITLE: MARK WHEATLEY, VP  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73759  
SIGNATURE DATE: 05/19/2005  
SIGNATURE NAME & TITLE: MARK WHEATLEY, PARTNER  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73758  
SIGNATURE DATE: 12/18/2003  
SIGNATURE NAME & TITLE: CLARENCE R WHEATLEY, CHAIRMAN  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73757  
SIGNATURE DATE: 12/17/2003  
SIGNATURE NAME & TITLE: CLARENCE R WHEATLEY, CHAIRMAN  
FILING STATUS: INITIAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73756  
SIGNATURE DATE: 04/01/2003  
SIGNATURE NAME & TITLE: HAROLD CROUTHER, RESH SPECIALIST  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73755  
SIGNATURE DATE: 02/12/2002  
SIGNATURE NAME & TITLE: RICHARD S MARTIN, RESH SPECIALIST  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 73754  
SIGNATURE DATE: 01/16/2001  
SIGNATURE NAME & TITLE: RICHARD MARTIN, RESH SPECIALIST  
FILING STATUS: INITIAL  
REGISTRATION FLAG: YES

### CONSTRUCTION NOTIFICATION

NO CONSTRUCTION NOTIFICATION DATA REPORTED FOR THIS FACILITY

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 11/01/1995	REGISTRATION DATE: 01/29/1996
TANK CAPACITY (GAL): 12000	EMPTY TANK: NOT EMPTY
STATUS: IN USE	STATUS BEGIN DATE: 11/01/1995
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: YES
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:

## Petroleum Storage Tanks (PST)

### FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

#### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73552

TANK ID: 1

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

#### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

#### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1AA

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 03/01/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 10/01/1995

INTERNAL PROTECTION DATE: NOT REPORTED REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

#### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

#### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73549

## Petroleum Storage Tanks (PST)

TANK ID: **1AA**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **10000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>1AB</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1966</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>550</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>03/31/1987</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73545**  
TANK ID: **1AB**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **USED OIL**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **550**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**  
PIPING SYSTEMS  
MATERIAL: **NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**



## Petroleum Storage Tanks (PST)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 11/01/1995

REGISTRATION DATE: 01/29/1996

TANK CAPACITY (GAL): 12000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 11/01/1995

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: YES

TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 73553

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2AB

NUMBER OF COMPARTMENTS: 1



## Petroleum Storage Tanks (PST)

INSTALLATION DATE: 01/01/1977      REGISTRATION DATE: 05/08/1986  
TANK CAPACITY (GAL): 10000      EMPTY TANK: NOT EMPTY  
STATUS: REMOVED FROM GROUND      STATUS BEGIN DATE: 03/31/1987  
INTERNAL PROTECTION DATE: NOT REPORTED      REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN SINGLE WALL: NO      TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO      PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
NOT REPORTED  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73544  
TANK ID: 2AB  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 10000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2AA      NUMBER OF COMPARTMENTS: 1  
INSTALLATION DATE: 03/01/1987      REGISTRATION DATE: 05/08/1986  
TANK CAPACITY (GAL): 10000      EMPTY TANK: NOT EMPTY  
STATUS: REMOVED FROM GROUND      STATUS BEGIN DATE: 10/01/1995  
INTERNAL PROTECTION DATE: NOT REPORTED      REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN SINGLE WALL: NO      TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO      PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
FRP

## Petroleum Storage Tanks (PST)

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 73548

TANK ID: 2AA

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AA

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 03/01/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 10/01/1995

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 73551

TANK ID: 3AA

## Petroleum Storage Tanks (PST)

COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 10000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP  
CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 11/01/1995	REGISTRATION DATE: 01/29/1996
TANK CAPACITY (GAL): 12000	EMPTY TANK: NOT EMPTY
STATUS: IN USE	STATUS BEGIN DATE: 11/01/1995
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: YES
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73554  
TANK ID: 3  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 12000  
COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET  
SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

### PIPING SYSTEMS

MATERIAL: FRP



## Petroleum Storage Tanks (PST)

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AB

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1966

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 12000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 03/31/1987

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 73546

TANK ID: 3AB

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 03/01/1987

REGISTRATION DATE: 05/08/1986



## Petroleum Storage Tanks (PST)

TANK CAPACITY (GAL): 1000  
STATUS: **REMOVED FROM GROUND**  
INTERNAL PROTECTION DATE: **NOT REPORTED**  
TANK DESIGN SINGLE WALL: **NO**  
PIPE DESIGN SINGLE WALL: **NO**

EMPTY TANK: **NOT EMPTY**  
STATUS BEGIN DATE: 10/01/1995  
REGULATORY STATUS: **FULLY REGULATED**  
TANK DESIGN DOUBLE WALL: **NO**  
PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73550

TANK ID: **4A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **USED OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **1000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **4**  
INSTALLATION DATE: **01/01/1966**  
TANK CAPACITY (GAL): **12000**  
STATUS: **REMOVED FROM GROUND**  
INTERNAL PROTECTION DATE: **NOT REPORTED**  
TANK DESIGN SINGLE WALL: **NO**  
PIPE DESIGN SINGLE WALL: **NO**

NUMBER OF COMPARTMENTS: **1**  
REGISTRATION DATE: **05/08/1986**  
EMPTY TANK: **NOT EMPTY**  
STATUS BEGIN DATE: **03/31/1987**  
REGULATORY STATUS: **FULLY REGULATED**  
TANK DESIGN DOUBLE WALL: **NO**  
PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

## Petroleum Storage Tanks (PST)

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 73547

TANK ID: 4

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

ABOVEGROUND STORAGE TANK INFORMATION

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 6

Distance from Property: 0.03 mi. NW

### FACILITY INFORMATION

Geosearch ID: 0029268  
FACILITY ID: 0029268  
NAME: CHEVRON 60108123  
ADDRESS: 12860 MEMORIAL DR  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 116132  
NAME: CHEVRON 60108123  
FACILITY LOCATION: 12860 MEMORIAL DR  
PRIORITY CODE: (4.0) ASSESSMENT INCOMPLETE, NO APPARENT RECEPTORS IMPACTED  
STATUS CODE: (6P) FINAL CONCURRENCE PENDING DOCUMENTATION OF WELL PLUGGING  
REPORTED DATE: 11/23/2003  
ENTERED DATE: 9/24/2004

### PRP INFORMATION

NAME: CHEVRON PRODUCTS CO  
ADDRESS: 5959 CORPORATE DR  
HOUSTON TX 77036  
CONTACT: ADRIANNE ROBINSON  
PHONE: 713/219-5266

LPST ID#: 091934  
NAME: CHEVRON 60108123  
FACILITY LOCATION: 12860 MEMORIAL DR @ W BELT  
PRIORITY CODE: (4.1) GROUNDWATER IMPACTED, NO APPARENT THREATS OR IMPACTS TO RECEPTORS  
STATUS CODE: (6P) FINAL CONCURRENCE PENDING DOCUMENTATION OF WELL PLUGGING  
REPORTED DATE: 6/10/1988  
ENTERED DATE: 6/10/1988

### PRP INFORMATION

NAME: CHEVRON PRODUCTS CO  
ADDRESS: 4800 FOURNACE PL  
BELLAIRE TX 77401  
CONTACT: RAVELLE JONES  
PHONE: 713/219-5224

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 11/01/1995	REGISTRATION DATE: 01/29/1996
TANK CAPACITY (GAL): 12000	EMPTY TANK: NOT EMPTY
STATUS: IN USE	STATUS BEGIN DATE: 11/01/1995
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: YES
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: YES



## Leaking Petroleum Storage Tanks (LPST)

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73552**

TANK ID: **1**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **12000**

COMPARTMENT RELEASE DETECTION: **GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED.**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **1AA**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **03/01/1987**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **10000**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **10/01/1995**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG



## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73549**

TANK ID: **1AA**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **10000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **1AB**

INSTALLATION DATE: **01/01/1966**

TANK CAPACITY (GAL): **550**

STATUS: **REMOVED FROM GROUND**

INTERNAL PROTECTION DATE: **NOT REPORTED**

TANK DESIGN SINGLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

NUMBER OF COMPARTMENTS: **1**

REGISTRATION DATE: **05/08/1986**

EMPTY TANK: **NOT EMPTY**

STATUS BEGIN DATE: **03/31/1987**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73545**

TANK ID: **1AB**

COMPARTMENT LETTER: **A**

SUBSTANCES: **USED OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **550**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

## Leaking Petroleum Storage Tanks (LPST)

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 11/01/1995

REGISTRATION DATE: 01/29/1996

TANK CAPACITY (GAL): 12000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 11/01/1995

INTERNAL PROTECTION DATE: NOT REPORTED REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73553

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

## Leaking Petroleum Storage Tanks (LPST)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>2AB</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1977</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>10000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>03/31/1987</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**FRP**  
CORROSION PROTECTION:  
**NOT REPORTED**

EXTERNAL CONTAINMENT:  
**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73544**  
TANK ID: **2AB**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **10000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>2AA</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>03/01/1987</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>10000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>10/01/1995</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>



## Leaking Petroleum Storage Tanks (LPST)

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73548

TANK ID: 2AA

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AA

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 03/01/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 10/01/1995

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE



## Leaking Petroleum Storage Tanks (LPST)

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73551  
TANK ID: 3AA  
COMPARTMENT LETTER: A  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **10000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>3</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>11/01/1995</b>	REGISTRATION DATE: <b>01/29/1996</b>
TANK CAPACITY (GAL): <b>12000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>IN USE</b>	STATUS BEGIN DATE: <b>11/01/1995</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>YES</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>YES</b>

### TANK DETAILS

MATERIAL:  
**FRP**  
CORROSION PROTECTION:  
**FRP TANK OR PIPING (NONCORRODIBLE)**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73554  
TANK ID: 3  
COMPARTMENT LETTER: A  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **12000**  
COMPARTMENT RELEASE DETECTION: **GROUNDWATER MONITORING,AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL,INTERSTITIAL MONITORING WITHIN SECONDARY WALL/JACKET**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT**

## Leaking Petroleum Storage Tanks (LPST)

SPILL CONTAINER/BUCKET/SUMP, DELIVERY SHUT-OFF VALVE, FLOW RESTRICTOR VALUE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AB

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1966

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 12000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 03/31/1987

INTERNAL PROTECTION DATE: NOT REPORTED REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 73546

TANK ID: 3AB

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>4A</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>03/01/1987</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>1000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>10/01/1995</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73550**

TANK ID: **4A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **USED OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **1000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>4</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1966</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>12000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>03/31/1987</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:



## Leaking Petroleum Storage Tanks (LPST)

### STEEL

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

#### COMPARTMENT DETAILS

UST COMPARTMENT ID: **73547**

TANK ID: **4**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **12000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

#### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

#### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

#### ABOVEGROUND STORAGE TANK INFORMATION

**NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY**

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## Innocent Owner / Operator Database (IOP)

[MAP ID# 7](#)

Distance from Property: 0.05 mi. NE

### FACILITY INFORMATION

ID#: 0249  
DATE IOP RECIEVED: 07/17/01  
CERTIFICATE ISSUED: 10/19/01  
NAME: SPRINT PCS TOWER SITE (HO54XC695/LEONARD)  
ADDRESS: 608 WEST BOUGH LANE  
HOUSTON, TX 77024

CONTAMINANTS: VOCS  
MEDIA AFFECTED: GROUNDWATER  
PHASE: COMPLETED  
PROPERTY USE: GRASS MEDIAN/PARKING LOT  
ACRES: 400 SQFT

### OTHER CONTACTS (CONSULTANT/ATTORNEY)

ORGANIZATION: BRACEWELL & PATTERSON, LLP  
RINA CHANG ATTORNEY  
711 LOUISIANA, SUITE 2900  
HOUSTON TX 77002  
PHONE: 713-221-1580 FAX: 713-221-1212

### APPLICANT INFORMATION

ORGANIZATION: SPRINT COM, INC.  
RINA CHANG, LEASE MANAGEMEN  
ADDRESS: 1341 WEST MOCKINGBIRD LANE, SUITE 600E  
DALLAS, TX, 75247-4938  
INTEREST IN SITE: OPERATOR  
PHONE: 214-525-4049 FAX: 214-525-4066

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## Dry Cleaner Registration Database (DCR)

[MAP ID# 8](#)

Distance from Property: 0.06 mi. NE

### FACILITY INFORMATION

REGISTRATION #: RN103953188

CUSTOMER #: NOT REPORTED

NAME: MW CLEANERS 10244

ADDRESS: 12534 MEMORIAL DR  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: 281-3209807

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2014

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2013

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2012

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2011

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2010

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2009

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2007

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2006

SOLVENT: PETROLEUM

QUANTITY: 200 GALLONS

FISCAL YEAR: FY2005

SOLVENT: NOT REPORTED

## Dry Cleaner Registration Database (DCR)

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2004

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

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## Industrial and Hazardous Waste Corrective Action Sites (IHWCA)

[MAP ID# 8](#)

Distance from Property: 0.06 mi. NE

PROGRAM ID: T1936  
RN NUMBER: RN103953188  
NAME: MW CLEANERS 10244  
ADDRESS: 12534 MEMORIAL DR  
HOUSTON, TX 77024  
STATUS: INACTIVE  
STATUS DATE: 6/21/11  
LOCATION DESCRIPTION:  
NOT REPORTED

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## Voluntary Cleanup Program Sites (VCP)

[MAP ID# 8](#)

Distance from Property: 0.06 mi. NE

### SITE INFORMATION

ID#: 1714  
NAME: LANTERN LANE SHOPPING CENTER - PRO  
CLEANERS  
ADDRESS: 12534 MEMORIAL DRIVE  
HOUSTON TX 77024-6000  
ACRES: 6.75  
FACILITY TYPE: DRY CLEANERS  
APPLICATION DATE: 07/01/04  
DATE OF AGREEMENT: 07/19/04  
CERTIFICATE OF COMPLETION DATE: 10/11/12  
TYPE OF CERTIFICATE ISSUED: FINAL  
TYPE LEAD: OPERATOR  
PHASE: COMP/AFFIDAFIT  
MEDIA AFFECTED: SOILS/GROUNDWATER  
TNRCC SOLID WASTE REGISTRATION #: NOT REPORTED  
REMEDY: NOT REPORTED  
INSTITUTIONAL CONTROL: MSD  
LPST #: NOT REPORTED  
EPA CERCLIS #: NOT REPORTED  
EPA RCRIS #: NOT REPORTED  
CONTAMINANT/S: CHLORINATED SOLVENTS

### APPLICANT INFORMATION

ORGANIZATION: DIFFERENTIAL DEVELOPMENT - 1994, LTD.  
BART, RAINEY, VICE PRESIDENT  
2001 KIRBY DRIVE, SUITE 1200  
HOUSTON, TX, 77010  
PHONE: 713-630-9628  
FAX: 713-528-8166

### CONSULTANT/ATTORNEY INFORMATION

ORGANIZATION: SKA CONSULTING, LP  
MIKE, SCHULTZ, PE, OPERATIONS MANAGE  
10260 WESTHEIMER, SUITE 605  
HOUSTON, TX, 77042  
PHONE: 713-266-6056  
FAX: 713-266-0996

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## Affected Property Assessment Reports (APAR)

[MAP ID# 8](#)

Distance from Property: 0.06 mi. NE

### FACILITY INFORMATION

PROGRAM ID: 1714  
REFERENCE NUMBER: RN103953188  
FACILITY NAME: LANTERN LANE SHOPPING CENTER PRO CLEANERS  
ADDRESS: 12534 MEMORIAL DR  
HOUSTON, TX 77024  
COUNTY: HARRIS  
LOCATION DESCRIPTION: (NO\_MEMO\_FILE\_OPEN)  
TYPE OF FACILITY: DRY CLEANER  
FACILITY STATUS: INVESTIGATION  
PROGRAM: VOLUNTARY CLEANUP  
PROGRAM STATUS: ACTIVE

### CONTACTS

RAINEY, BART

### REMEDIATIONS

NO REMEDIATION REPORTED

### CATEGORY OF CONTAMINATION

DATE	CONTAMINATIONS:
02/01/06	NOT REPORTED
06/17/08	NOT REPORTED
07/02/13	NOT REPORTED

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 9](#)

Distance from Property: 0.07 mi. W

### FACILITY INFORMATION

REGISTRATION#: 70233      EPA ID: TXD982552382

TNRCC ID #: 25064

NAME: PILGRAM WYCLIFFE

ADDRESS: 12647 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: MELVIN WEISER

PHONE: NOT REPORTED

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THIS FACILITY WAS REGISTERED PRIOR TO 1994 AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 02/26/2004

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

NO RECORDS

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## Industrial and Hazardous Waste Sites (IHW)

MAP ID# 9

Distance from Property: 0.07 mi. W

### FACILITY INFORMATION

REGISTRATION#: 70231 EPA ID: TXD982552382

TNRCC ID #: 25062

NAME: PILGRIM CLEANERS

ADDRESS: 12647 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: NANCY BALLARD

PHONE: 713-6660351

BUSINESS DESCRIPTION: NOT REPORTED

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 04/22/2003

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 50417

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

WASTE ID: 50418

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 10](#)

Distance from Property: 0.07 mi. NE

### FACILITY INFORMATION

REGISTRATION#: 90546 EPA ID: TXD987989621

TNRCC ID #: 33547

NAME: YOUR VALET CLEANERS

ADDRESS: 614 W BOUGH LN

HOUSTON, TX 77024

CONTACT: JOE THAI

PHONE: 713-4687617

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THERE WERE ONLY 6-DIGIT WASTE CODES ON THE NOR AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 63685

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

WASTE ID: 63686

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

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## Voluntary Cleanup Program Sites (VCP)

[MAP ID# 11](#)

Distance from Property: 0.09 mi. SE

### SITE INFORMATION

ID#: 2700  
NAME: MEMORIAL GREEN  
ADDRESS: 12601 MEMORIAL DR  
HOUSTON TX 77024  
ACRES: 13.46  
FACILITY TYPE: VACANT PROPERTY  
APPLICATION DATE: 10/22/14  
DATE OF AGREEMENT: NOT REPORTED  
CERTIFICATE OF COMPLETION DATE: NOT REPORTED  
TYPE OF CERTIFICATE ISSUED: NOT REPORTED  
TYPE LEAD: OWNER  
PHASE: INVESTIGATION  
MEDIA AFFECTED: GROUNDWATER  
TNRCC SOLID WASTE REGISTRATION #: NOT REPORTED  
REMEDY: NOT REPORTED  
INSTITUTIONAL CONTROL: NOT REPORTED  
LPST #: NOT REPORTED  
EPA CERCLIS #: NOT REPORTED  
EPA RCRIS #: NOT REPORTED  
CONTAMINANT/S: VOCS

### APPLICANT INFORMATION

ORGANIZATION: LITCHFIELD MEMORIAL PARTNERS LP  
BO, SANFORD, EVP  
800 TOWN & COUNTRY BLVD STE 200  
HOUSTON, TX, 77024

PHONE: 713-629-5200

FAX: NOT REPORTED

### CONSULTANT/ATTORNEY INFORMATION

ORGANIZATION: SKA CONSULTING LP  
SCOTT, LEAFE, PRESIDENT  
1515 WITTE RD STE 150  
HOUSTON, TX, 77080

PHONE: 713-266-6056

FAX: 713-266-0996

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**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

**MAP ID# 12**

Distance from Property: 0.12 mi. NE

**FACILITY INFORMATION**

EPA ID#: TXR000081215

NAME: CVS PHARMACY #6752

ADDRESS: 12502 MEMORIAL DR  
HOUSTON, TX 77024-6000

CONTACT NAME: WENDY L BRANT

CONTACT ADDRESS: 1 CVS DR  
WOONSOCKET RI 028956145

CONTACT PHONE: 401-765-1500

NON-NOTIFIER: NOT A NON-NOTIFIER

DATE RECEIVED BY AGENCY: 08/13/2012

OWNER TYPE: PRIVATE

OWNER NAME: AMREIT LANTERN LANE,LPA

OPERATOR TYPE: PRIVATE

OPERATOR NAME: CVS PHARMACY INC

**CERTIFICATION**

CERTIFICATION NAME: CERTIFICATION TITLE:

CHARLES SAVAGE CVS AGENT

CERTIFICATION SIGNED DATE:

07/23/2012

**INDUSTRY CLASSIFICATION (NAICS)**

44611 - PHARMACIES AND DRUG STORES

**SITE HISTORY (INCLUDES GENERATORS AND NON-GENERATORS)**

DATE RECEIVED BY AGENCY: 08/13/2012

NAME: CVS PHARMACY #6752

GENERATOR CLASSIFICATION: LARGE QUANTITY GENERATOR

**CURRENT ACTIVITY INFORMATION**

GENERATOR STATUS: **CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR** LAST UPDATED DATE: 08/13/2012

SUBJECT TO CORRECTIVE ACTION UNIVERSE: **NO**

TDSFs POTENTIALLY SUBJECT TO CORRECTIVE ACTION UNDER 3004 (u)/(v) UNIVERSE: **NO**

TDSFs ONLY SUBJECT TO CORRECTIVE ACTION UNDER DISCRETIONARY AUTHORITIES UNIVERSE: **NO**

NON TDSFs WHERE RCRA CORRECTIVE ACTION HAS BEEN IMPOSED UNIVERSE: **NO**

CORRECTIVE ACTION WORKLOAD UNIVERSE: **NO**

IMPORTER: **NO**

UNDERGROUND INJECTION: **NO**

MIXED WASTE GENERATOR: **NO**

UNIVERSAL WASTE DESTINATION FACILITY: **NO**

RECYCLER: **NO**

TRANSFER FACILITY: **NO**

TRANSPORTER: **NO**

USED OIL FUEL BURNER: **NO**

ONSITE BURNER EXEMPTION: **NO**

USED OIL PROCESSOR: **NO**

FURNACE EXEMPTION: **NO**

USED OIL FUEL MARKETER TO BURNER: **NO**

USED OIL REFINER: **NO**

SPECIFICATION USED OIL MARKETER: **NO**

USED OIL TRANSFER FACILITY: **NO**

USED OIL TRANSPORTER: **NO**

**COMPLIANCE, MONITORING AND ENFORCEMENT INFORMATION**

**EVALUATIONS - NO EVALUATIONS REPORTED -**

**VIOLATIONS - NO VIOLATIONS REPORTED -**

**ENFORCEMENTS - NO ENFORCEMENTS REPORTED -**

**HAZARDOUS WASTE**

**D001 IGNITABLE WASTE**



**Resource Conservation & Recovery Act - Generator Facilities  
(RCRAGR06)**

D002	CORROSIVE WASTE
P001	2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%
P001	WARFARIN, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%
P042	1,2-BENZENEDIOL, 4-[1-HYDROXY-2-(METHYLAMINO)ETHYL]-, (R)-
P042	EPINEPHRINE
P075	NICOTINE, & SALTS
P075	PYRIDINE, 3-(1-METHYL-2-PYRROLIDINYL)-,(S)-, & SALTS
P081	1,2,3-PROPANETRIOL, TRINITRATE (R)
P081	NITROGLYCERINE (R)

UNIVERSAL WASTE - NO UNIVERSAL WASTE REPORTED -

CORRECTIVE ACTION AREA - NO CORRECTIVE ACTION AREA INFORMATION REPORTED -

CORRECTIVE ACTION EVENT - NO CORRECTIVE ACTION EVENT REPORTED -

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## Dry Cleaner Registration Database (DCR)

[MAP ID# 13](#)

Distance from Property: 0.14 mi. NE

### **FACILITY INFORMATION**

REGISTRATION #: RN103957502

CUSTOMER #: NOT REPORTED

NAME: PILGRIM CLEANERS 128

ADDRESS: 650 W BOUGH LN STE 116  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: NOT REPORTED

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2006

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2005

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2004

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

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## Petroleum Storage Tanks (PST)

[MAP ID# 14](#)

Distance from Property: 0.17 mi. E

### FACILITY INFORMATION

ID#: 33022  
NAME: TPG 573 07  
ADDRESS: 12490 MEMORIAL DR  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: RETAIL  
BEGIN DATE: 11/26/1986  
STATUS: ACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: YES  
NUMBER OF ACTIVE UNDERGROUND TANKS: 4  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 05/05/1986  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 05/05/1986  
SIGNATURE NAME & TITLE: B R BATY, DIST MGR  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN603438003  
NAME: TEXAS PETROLEUM GROUP LLC  
CONTACT ADDRESS: 11111 WILCREST GREEN DR STE 100  
HOUSTON TX 77042

TYPE: CORPORATION/COMPANY  
BEGIN DATE: 10/31/2008  
CONTACT ROLE: OWNCON  
CONTACT NAME: J BRANDON DUJKA  
CONTACT TITLE: NOT REPORTED  
ORGANIZATION: TEXAS PETROLEUM GROUP LLC  
PHONE: NOT REPORTED  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

OPERATOR NUMBER: CN603438003  
NAME: TEXAS PETROLEUM GROUP LLC  
CONTACT ADDRESS: 1111 WILCREST GREEN  
HOUSTON TX 77042

TYPE: CORPORATION/COMPANY  
BEGIN DATE: 10/31/2008  
CONTACT ROLE: OPRCON  
CONTACT NAME: JOHN SALERNO  
CONTACT TITLE: MANAGER

### CONTACT INFORMATION

NAME: S J GRISELL  
TITLE: ENV COORDINATOR  
ORGANIZATION: TPG 573 07  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: 713-789-2018

## Petroleum Storage Tanks (PST)

ORGANIZATION: TEXAS PETROLEUM GROUP LLC  
PHONE: (713) 7890310  
FAX: (713) 7892907  
EMAIL: JS@LANDMARKINDUSTRIES.COM

### SELF-CERTIFICATION

SELF-CERTIFICATION ID: 232510  
SIGNATURE DATE: 02/24/2014  
SIGNATURE NAME & TITLE: JOHN B DUJKA, ENV COORD  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24400  
SIGNATURE DATE: 03/14/2013  
SIGNATURE NAME & TITLE: J BRANDON DUJKA, ENV COORD  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24399  
SIGNATURE DATE: 02/21/2012  
SIGNATURE NAME & TITLE: JOHN B DUJKA, ENV COORD  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24398  
SIGNATURE DATE: 02/03/2011  
SIGNATURE NAME & TITLE: JOHN B DUJKA, ENV COORD  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24397  
SIGNATURE DATE: 02/23/2010  
SIGNATURE NAME & TITLE: STEPHEN J GISELL, ENV COORDINATOR  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24396  
SIGNATURE DATE: 03/19/2009  
SIGNATURE NAME & TITLE: STEPHEN J GISELL, ENVIRONMENTAL COORD  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24395  
SIGNATURE DATE: 11/07/2008  
SIGNATURE NAME & TITLE: STEPHEN J GISELL, ENV COORDINATOR  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24394  
SIGNATURE DATE: 03/24/2008  
SIGNATURE NAME & TITLE: TARONZA GRAVES, AUTHORIZED AGENT  
FILING STATUS: RENEWAL  
REGISTRATION FLAG: YES  
SELF-CERTIFICATION ID: 24393  
SIGNATURE DATE: 04/04/2007



## Petroleum Storage Tanks (PST)

SIGNATURE NAME & TITLE: S DEMARCUS CHAVOUS, PERMITTING MGR

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24392

SIGNATURE DATE: 02/20/2006

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24391

SIGNATURE DATE: 02/17/2005

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COORD

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24390

SIGNATURE DATE: 01/15/2004

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COOR

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24389

SIGNATURE DATE: 02/20/2003

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COORD

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24388

SIGNATURE DATE: 02/16/2002

SIGNATURE NAME & TITLE: DAVID J MULKEY, NOT REPORTED

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 24387

SIGNATURE DATE: 10/20/2000

SIGNATURE NAME & TITLE: DAVID MULKEY, SH&E

FILING STATUS: INITIAL

REGISTRATION FLAG: YES

### CONSTRUCTION NOTIFICATION

NOTIFICATION CONSTRUCTION ID: 2245

APPLICATION RECEIVED DATE: 02/28/2005

SCHEDULE CONSTRUCTION DATE: 03/22/2005

GENERAL DESCRIPTION OF PROPOSED CONSTRUCTION:

NOT REPORTED

### UNDERGROUND STORAGE TANK

TANK ID: 1

INSTALLATION DATE: 01/01/1979

TANK CAPACITY (GAL): 10000

STATUS: IN USE

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: YES

PIPE DESIGN SINGLE WALL: YES

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/05/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 01/01/1979

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO



## Petroleum Storage Tanks (PST)

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21268

TANK ID: 1

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1979

REGISTRATION DATE: 05/05/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 01/01/1979

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

## Petroleum Storage Tanks (PST)

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21270

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 12/31/1970

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 12/31/1970

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21275

TANK ID: 3

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

## Petroleum Storage Tanks (PST)

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED.

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1976

REGISTRATION DATE: 05/05/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 01/01/1976

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21269

TANK ID: 4

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED.

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT



## Petroleum Storage Tanks (PST)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>5</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1979</b>	REGISTRATION DATE: <b>05/05/1986</b>
TANK CAPACITY (GAL): <b>1000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>PERM FILLED IN PLACE</b>	STATUS BEGIN DATE: <b>06/13/2005</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>YES</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>YES</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **21271**

TANK ID: **5**

COMPARTMENT LETTER: **A**

SUBSTANCES: **USED OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **NOT REPORTED**

COMPARTMENT RELEASE DETECTION: **WEEKLY MANUAL TANK GAUGING (TANKS <= 1000 GAL)**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **N/A - ALL DELIVERIES TO TANK <= 25 GAL**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>6</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1979</b>	REGISTRATION DATE: <b>05/05/1986</b>
TANK CAPACITY (GAL): <b>44</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>IN USE</b>	STATUS BEGIN DATE: <b>01/01/1979</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>EXEMPT</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>



## Petroleum Storage Tanks (PST)

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21273

TANK ID: 6

COMPARTMENT LETTER: A

SUBSTANCES: **HYDRAULIC LIFT OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): 44

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: 7

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1979

REGISTRATION DATE: 05/05/1986

TANK CAPACITY (GAL): 44

EMPTY TANK: **NOT EMPTY**

STATUS: **IN USE**

STATUS BEGIN DATE: 01/01/1979

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **EXEMPT**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

## Petroleum Storage Tanks (PST)

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21272  
TANK ID: 7  
COMPARTMENT LETTER: A  
SUBSTANCES: HYDRAULIC LIFT OIL  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 44  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 8	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1984	REGISTRATION DATE: 05/05/1986
TANK CAPACITY (GAL): 44	EMPTY TANK: NOT EMPTY
STATUS: IN USE	STATUS BEGIN DATE: 01/01/1984
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: EXEMPT
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
STEEL  
CORROSION PROTECTION:  
NOT REPORTED  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21274  
TANK ID: 8  
COMPARTMENT LETTER: A  
SUBSTANCES: HYDRAULIC LIFT OIL  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 44  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

## Petroleum Storage Tanks (PST)

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### ABOVEGROUND STORAGE TANK INFORMATION

**NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY**

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 14

Distance from Property: 0.17 mi. E

### FACILITY INFORMATION

Geosearch ID: 0033022  
FACILITY ID: 0033022  
NAME: SHELL  
ADDRESS: 12490 MEMORIAL DR  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 117467  
NAME: SHELL  
FACILITY LOCATION: 12490 MEMORIAL DR  
PRIORITY CODE: (3.1) GROUNDWATER IMPACT, PUBLIC/DOMESTIC WATER SUPPLY WELL W/IN 0.25 -0.5 MILES  
STATUS CODE: (6A) FINAL CONCURRENCE ISSUED, CASE CLOSED  
REPORTED DATE: 7/27/2007  
ENTERED DATE: 10/26/2007

### PRP INFORMATION

NAME: SHELL OIL PRODUCTS/MOTIVA  
ADDRESS: 7750 N MACARTHUR PMB319 STE 120  
IRVING TX 75063  
CONTACT: SCOTT E BURKEY  
PHONE: 214/483-5460

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1979	REGISTRATION DATE: 05/05/1986
TANK CAPACITY (GAL): 10000	EMPTY TANK: NOT EMPTY
STATUS: IN USE	STATUS BEGIN DATE: 01/01/1979
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: YES	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: YES	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21268  
TANK ID: 1  
COMPARTMENT LETTER: A



## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **10000**

COMPARTMENT RELEASE DETECTION: **AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT**

**SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1979**

REGISTRATION DATE: **05/05/1986**

TANK CAPACITY (GAL): **10000**

EMPTY TANK: **NOT EMPTY**

STATUS: **IN USE**

STATUS BEGIN DATE: **01/01/1979**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **YES**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **YES**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **21270**

TANK ID: **2**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **10000**

COMPARTMENT RELEASE DETECTION: **AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT**

**SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

## Leaking Petroleum Storage Tanks (LPST)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE), ISOLATED IN OPEN AREA/2ND CONTAINMENT

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 12/31/1970

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 12/31/1970

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 21275

TANK ID: 3

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP, FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP, DELIVERY SHUT-OFF VALVE

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE), ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE), ISOLATED IN OPEN AREA/2ND CONTAINMENT

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1976

REGISTRATION DATE: 05/05/1986



## Leaking Petroleum Storage Tanks (LPST)

TANK CAPACITY (GAL): 6000  
STATUS: IN USE  
INTERNAL PROTECTION DATE: NOT REPORTED  
TANK DESIGN SINGLE WALL: YES  
PIPE DESIGN SINGLE WALL: YES

EMPTY TANK: NOT EMPTY  
STATUS BEGIN DATE: 01/01/1976  
REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 21269

TANK ID: 4

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED.

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 5

INSTALLATION DATE: 01/01/1979

TANK CAPACITY (GAL): 1000

STATUS: PERM FILLED IN PLACE

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: YES

PIPE DESIGN SINGLE WALL: YES

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/05/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 06/13/2005

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 21271

TANK ID: 5

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): NOT REPORTED

COMPARTMENT RELEASE DETECTION: WEEKLY MANUAL TANK GAUGING (TANKS <= 1000 GAL)

SPILL CONTAINMENT AND OVERFILL PREVENTION: N/A - ALL DELIVERIES TO TANK <= 25 GAL

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 6

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1979

REGISTRATION DATE: 05/05/1986

TANK CAPACITY (GAL): 44

EMPTY TANK: NOT EMPTY

STATUS: IN USE

STATUS BEGIN DATE: 01/01/1979

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: EXEMPT

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 21273

TANK ID: 6



## Leaking Petroleum Storage Tanks (LPST)

COMPARTMENT LETTER: **A**  
SUBSTANCES: **HYDRAULIC LIFT OIL**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **44**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>7</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1979</b>	REGISTRATION DATE: <b>05/05/1986</b>
TANK CAPACITY (GAL): <b>44</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>IN USE</b>	STATUS BEGIN DATE: <b>01/01/1979</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>EXEMPT</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **21272**  
TANK ID: **7**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **HYDRAULIC LIFT OIL**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **44**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

## Leaking Petroleum Storage Tanks (LPST)

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **8**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1984**

REGISTRATION DATE: **05/05/1986**

TANK CAPACITY (GAL): **44**

EMPTY TANK: **NOT EMPTY**

STATUS: **IN USE**

STATUS BEGIN DATE: **01/01/1984**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **EXEMPT**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **21274**

TANK ID: **8**

COMPARTMENT LETTER: **A**

SUBSTANCES: **HYDRAULIC LIFT OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **44**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### ABOVEGROUND STORAGE TANK INFORMATION

**NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY**

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## Dry Cleaner Remediation Program Sites (DCRPS)

[MAP ID# 15](#)

Distance from Property: 0.21 mi. E

DCRP ID: DC0078

RN NUMBER: 100659812

NAME: PILGRIM CLEANERS

ADDRESS: 12442 MEMORIAL DRIVE  
HOUSTON, TX

COORECTIVE ACTION STATUS: REMEDIATION

PRIORITY STATUS: ACTIVE

RANKING SCORE: 385

TCEQ PROJECT MANAGER: STACEY DUNAHOO

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## Industrial and Hazardous Waste Sites (IHW)

MAP ID# 15

Distance from Property: 0.21 mi. E

### FACILITY INFORMATION

REGISTRATION#: 51067 EPA ID: NOT REPORTED

TNRCC ID #: 18602

NAME: PILGRIM CLEANERS BOLTIN E

ADDRESS: 12442 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: ANITA BARKER

PHONE: 713-4642729

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THIS FACILITY WAS REGISTERED PRIOR TO 1994 AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

NO RECORDS

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## Industrial and Hazardous Waste Sites (IHW)

MAP ID# 15

Distance from Property: 0.21 mi. E

### FACILITY INFORMATION

REGISTRATION#: 70235 EPA ID: NOT REPORTED

TNRCC ID #: 25066

NAME: PILGRIM MEMORIAL CLEANERS

ADDRESS: 12442 MEMORIAL DR  
HOUSTON, TX 77024

CONTACT: MELVIN WEISER

PHONE: 713-4646710

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THERE WERE ONLY 6-DIGIT WASTE CODES ON THE NOR AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 50420

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

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## Dry Cleaner Registration Database (DCR)

MAP ID# 15

Distance from Property: 0.21 mi. E

### FACILITY INFORMATION

REGISTRATION #: RN100659812

CUSTOMER #: NOT REPORTED

NAME: PILGRIM CLEANERS 111

ADDRESS: 12442 MEMORIAL DR  
HOUSTON, TX 77024

ACCOUNT NUMBER: NOT REPORTED

PRINCIPAL NAME: NOT REPORTED

PHONE NUMBER: 713-5013976

SITE TYPE: DROP STATION REGISTRATION

FISCAL YEAR: FY2014

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2013

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2012

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2011

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2010

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2009

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2009

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2008

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2007

SOLVENT: NOT REPORTED

## Dry Cleaner Registration Database (DCR)

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2006

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2005

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

FISCAL YEAR: FY2004

SOLVENT: NOT REPORTED

QUANTITY: NOT REPORTED

---

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 16

Distance from Property: 0.21 mi. N

### FACILITY INFORMATION

Geosearch ID: 0023106  
FACILITY ID: 0023106  
NAME: **TEXACO**  
ADDRESS: 12859 KIMBERLY LN  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 091860  
NAME: **TEXACO**  
FACILITY LOCATION: 12859 KIMBERLY LN  
PRIORITY CODE: (4.1) GROUNDWATER IMPACTED, NO APPARENT THREATS OR IMPACTS TO RECEPTORS  
STATUS CODE: (6A) FINAL CONCURRENCE ISSUED, CASE CLOSED  
REPORTED DATE: 5/6/1988  
ENTERED DATE: 5/6/1988

### PRP INFORMATION

NAME: SHELL OIL PRODUCTS/MOTIVA  
ADDRESS: 7750 N MACARTHUR BLVD 120 PMB 31  
IRVING TX 75063  
CONTACT: **SCOTT BURKEY**  
PHONE: 214/483-5460

### UNDERGROUND STORAGE TANK

TANK ID: <b>1B</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1967</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>6000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>12/30/1990</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121320  
TANK ID: **1B**  
COMPARTMENT LETTER: **A**



## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **6000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>1A</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>12/01/1990</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>9684</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>07/18/2006</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>YES</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>YES</b>

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121328**

TANK ID: **1A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **9684**

COMPARTMENT RELEASE DETECTION: **AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT**

**SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

EXTERNAL CONTAINMENT: **NOT REPORTED**

## Leaking Petroleum Storage Tanks (LPST)

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE), ISOLATED IN OPEN AREA/2ND CONTAINMENT

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2B**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1987**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **6000**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **12/30/1990**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121322**

TANK ID: **2B**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **6000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2A**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **12/01/1990**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **9684**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **07/18/2006**

## Leaking Petroleum Storage Tanks (LPST)

INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**  
TANK DESIGN SINGLE WALL: **NO** TANK DESIGN DOUBLE WALL: **YES**  
PIPE DESIGN SINGLE WALL: **NO** PIPE DESIGN DOUBLE WALL: **YES**

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121327**

TANK ID: **2A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **9684**

COMPARTMENT RELEASE DETECTION: **AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **3A**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **12/01/1990**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **9684**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **07/18/2006**

INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **YES**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **YES**

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**



## Leaking Petroleum Storage Tanks (LPST)

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **121326**

TANK ID: **3A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **9684**

COMPARTMENT RELEASE DETECTION: **AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE**

PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **3B**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1967**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **6000**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **12/30/1990**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **121324**

TANK ID: **3B**

COMPARTMENT LETTER: **A**



## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **6000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**  
CONNECTORS & VALVES:  
**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>4B</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1967</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>6000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>12/30/1990</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121323**  
TANK ID: **4B**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **6000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **STEEL**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**  
CONNECTORS & VALVES:

## Leaking Petroleum Storage Tanks (LPST)

### NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 12/01/1990

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 550

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 11/23/2004

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121325

TANK ID: 4A

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: WEEKLY MANUAL TANK GAUGING (TANKS <= 1000 GAL)

SPILL CONTAINMENT AND OVERFILL PREVENTION: N/A - ALL DELIVERIES TO TANK <= 25 GAL

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

#### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 5

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1967

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 550

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 12/30/1990

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

## Leaking Petroleum Storage Tanks (LPST)

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121321

TANK ID: 5

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: VAPOR MONITORING

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,ALARM (SET@<=90%)

W3A OR 3B

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### ABOVEGROUND STORAGE TANK INFORMATION

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Petroleum Storage Tanks (PST)

[MAP ID# 16](#)

Distance from Property: 0.21 mi. N

### FACILITY INFORMATION

ID#: 23106  
NAME: SHELL  
ADDRESS: 12859 KIMBERLEY LN  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: RETAIL  
BEGIN DATE: 09/24/1986  
STATUS: INACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: YES  
NUMBER OF ACTIVE UNDERGROUND TANKS: 0  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 05/08/1986  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 04/16/1986  
SIGNATURE NAME & TITLE: R L EBERT, DIV. MGR.  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN600124051  
NAME: MOTIVA ENTERPRISES LLC  
CONTACT ADDRESS: 13258 FM 1960 RD W  
HOUSTON TX 77065  
TYPE: CORPORATION/COMPANY  
BEGIN DATE: 01/20/1999  
CONTACT ROLE: OWNCON  
CONTACT NAME: NOT REPORTED  
CONTACT TITLE: NOT REPORTED  
ORGANIZATION: MOTIVA ENTERPRISES LLC  
PHONE: NOT REPORTED  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

OPERATOR NUMBER: CN600124051  
NAME: MOTIVA ENTERPRISES LLC  
CONTACT ADDRESS: PO BOX 22087  
GREENSBORO NC 27420  
TYPE: CORPORATION/COMPANY  
BEGIN DATE: 01/20/1999  
CONTACT ROLE: OPRCON  
CONTACT NAME: NOT REPORTED  
CONTACT TITLE: NOT REPORTED

### CONTACT INFORMATION

NAME: DAVID MULKEY  
TITLE: NOT REPORTED  
ORGANIZATION: SHELL  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: 281-376-2537



## Petroleum Storage Tanks (PST)

ORGANIZATION: MOTIVA ENTERPRISES LLC

PHONE: (800) 2538054

FAX: NOT REPORTED

EMAIL: NOT REPORTED

### SELF-CERTIFICATION

SELF-CERTIFICATION ID: 124941

SIGNATURE DATE: 02/20/2006

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COOR

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 124940

SIGNATURE DATE: 02/17/2005

SIGNATURE NAME & TITLE: DAVID J MULKEY, HSE COMP COORD

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 124939

SIGNATURE DATE: 01/15/2004

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COORD

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 124938

SIGNATURE DATE: 02/20/2003

SIGNATURE NAME & TITLE: DAVID MULKEY, HSE COMP COORD

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 124937

SIGNATURE DATE: 02/16/2002

SIGNATURE NAME & TITLE: DAVID J MULKEY, SH&E C C

FILING STATUS: RENEWAL

REGISTRATION FLAG: YES

SELF-CERTIFICATION ID: 124936

SIGNATURE DATE: 12/01/2000

SIGNATURE NAME & TITLE: GEORGE CARTWRIGHT, SH&E

FILING STATUS: INITIAL

REGISTRATION FLAG: YES

### CONSTRUCTION NOTIFICATION

NOTIFICATION CONSTRUCTION ID: 13674

APPLICATION RECEIVED DATE: 10/22/2004

SCHEDULE CONSTRUCTION DATE: 11/18/2004

GENERAL DESCRIPTION OF PROPOSED CONSTRUCTION:

NOT REPORTED

NOTIFICATION CONSTRUCTION ID: 13673

APPLICATION RECEIVED DATE: 07/06/2006

SCHEDULE CONSTRUCTION DATE: 07/17/2006

GENERAL DESCRIPTION OF PROPOSED CONSTRUCTION:

NOT REPORTED

### UNDERGROUND STORAGE TANK

## Petroleum Storage Tanks (PST)

TANK ID: 1B  
INSTALLATION DATE: 01/01/1967  
TANK CAPACITY (GAL): 6000  
STATUS: REMOVED FROM GROUND  
INTERNAL PROTECTION DATE: NOT REPORTED  
TANK DESIGN SINGLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1  
REGISTRATION DATE: 05/08/1986  
EMPTY TANK: NOT EMPTY  
STATUS BEGIN DATE: 12/30/1990  
REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121320

TANK ID: 1B

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1A  
INSTALLATION DATE: 12/01/1990  
TANK CAPACITY (GAL): 9684  
STATUS: REMOVED FROM GROUND  
INTERNAL PROTECTION DATE: NOT REPORTED  
TANK DESIGN SINGLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1  
REGISTRATION DATE: 05/08/1986  
EMPTY TANK: NOT EMPTY  
STATUS BEGIN DATE: 07/18/2006  
REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN DOUBLE WALL: YES  
PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:

## Petroleum Storage Tanks (PST)

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 121328

TANK ID: 1A

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 9684

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2B

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1967

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 6000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 12/30/1990

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS



## Petroleum Storage Tanks (PST)

UST COMPARTMENT ID: 121322  
TANK ID: 2B  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 6000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2A	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 12/01/1990	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 9684	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 07/18/2006
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: YES
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121327  
TANK ID: 2A  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 9684  
COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL  
SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

### PIPING SYSTEMS



## Petroleum Storage Tanks (PST)

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED.

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 12/01/1990

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 9684

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 07/18/2006

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: YES

TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 121326

TANK ID: 3A

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 9684

COMPARTMENT RELEASE DETECTION: AUTOMATIC TANK GAUGE TEST & INVENTORY CONTROL

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE,FLOW RESTRICTOR VALVE

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

EXTERNAL CONTAINMENT: NOT REPORTED.

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE),ISOLATED IN OPEN AREA/2ND CONTAINMENT

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

## Petroleum Storage Tanks (PST)

TANK ID: 3B  
INSTALLATION DATE: 01/01/1967  
TANK CAPACITY (GAL): 6000  
STATUS: REMOVED FROM GROUND  
INTERNAL PROTECTION DATE: NOT REPORTED  
TANK DESIGN SINGLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1  
REGISTRATION DATE: 05/08/1986  
EMPTY TANK: NOT EMPTY  
STATUS BEGIN DATE: 12/30/1990  
REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121324

TANK ID: 3B

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 6000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: STEEL

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4B  
INSTALLATION DATE: 01/01/1967  
TANK CAPACITY (GAL): 6000  
STATUS: REMOVED FROM GROUND  
INTERNAL PROTECTION DATE: NOT REPORTED  
TANK DESIGN SINGLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1  
REGISTRATION DATE: 05/08/1986  
EMPTY TANK: NOT EMPTY  
STATUS BEGIN DATE: 12/30/1990  
REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

## Petroleum Storage Tanks (PST)

### STEEL

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

#### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121323**

TANK ID: **4B**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **6000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

#### PIPING SYSTEMS

MATERIAL: **STEEL**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

#### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **4A**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **12/01/1990**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **550**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **11/23/2004**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **YES**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

#### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

#### COMPARTMENT DETAILS

UST COMPARTMENT ID: **121325**



## Petroleum Storage Tanks (PST)

TANK ID: 4A

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: WEEKLY MANUAL TANK GAUGING (TANKS <= 1000 GAL)

SPILL CONTAINMENT AND OVERFILL PREVENTION: N/A - ALL DELIVERIES TO TANK <= 25 GAL

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 5

INSTALLATION DATE: 01/01/1967

TANK CAPACITY (GAL): 550

STATUS: REMOVED FROM GROUND

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/08/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 12/30/1990

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: YES

PIPE DESIGN DOUBLE WALL: YES

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 121321

TANK ID: 5

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: VAPOR MONITORING

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP\_ALARM (SET@<=90%)

W3A OR 3B

### PIPING SYSTEMS

MATERIAL: FRP



## ***Petroleum Storage Tanks (PST)***

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED.

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### **ABOVEGROUND STORAGE TANK INFORMATION**

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 16](#)

Distance from Property: 0.21 mi. N

### FACILITY INFORMATION

REGISTRATION#: 84066 EPA ID: TX0000994699

TNRCC ID #: 101894

NAME: TEXACO SERVICE STATION 42 049 0390

ADDRESS: 12859 KIMBERLEY LN  
HOUSTON, TX 77024

CONTACT: DARVIN E MAYO

PHONE: 404-4535400

BUSINESS DESCRIPTION: RETAIL GASOLINE SALES

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 01/10/2012

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 134277

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: YES

GENERATOR'S DESCRIPTION OF WASTE: PERIODIC OR OCCASIONAL GENERATOR OF TANK WATER BOTTOMS FROM  
CONDENSATION AND CON

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 17](#)

Distance from Property: 0.21 mi. N

### FACILITY INFORMATION

REGISTRATION#: 90100 EPA ID: NOT REPORTED

TNRCC ID #: 33313

NAME: C O POLYDOROS & ASSOCIATES

ADDRESS: 12727 KIMBERLEY LN  
HOUSTON, TX 77024

CONTACT: STEVE AUCOIN

PHONE: 713-6273270

BUSINESS DESCRIPTION: NOT REPORTED

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

NO RECORDS

### OWNER INFORMATION

NAME: ESSO EXPLORATION INC

ADDRESS: PO BOX 27845

HOUSTON, TX 77227

PHONE: 1-713-6273270

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 18

Distance from Property: 0.24 mi. N

### FACILITY INFORMATION

Geosearch ID: 0022134  
FACILITY ID: 0022134  
NAME: MOBIL SERVICE STATION 12-BLY  
ADDRESS: 770 WEST SAM HOUSTON PKWY NORTH #100  
HOUSTON, TX 77024

### FACILITY DETAILS

LPST ID#: 091859  
NAME: MOBIL SERVICE STATION 12-BLY  
FACILITY LOCATION: 770 WEST SAM HOUSTON PKWY NORTH #100  
PRIORITY CODE: (4.1) GROUNDWATER IMPACTED, NO APPARENT THREATS OR IMPACTS TO RECEPTORS  
STATUS CODE: (3) MONITORING  
REPORTED DATE: 5/4/1988  
ENTERED DATE: 5/4/1988

### PRP INFORMATION

NAME: MOTIVA ENTERPRISES LLC  
ADDRESS: 7750 N MACARTHUR PMB319 STE 120  
IRVING TX 75063  
CONTACT: SCOTT BURKEY  
PHONE: 214/483-5460

### UNDERGROUND STORAGE TANK

TANK ID: 1	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1970	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 5000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 11/14/1988
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
**STEEL**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20721  
TANK ID: 1  
COMPARTMENT LETTER: A



## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **5000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>1AA</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>05/01/1989</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>12000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>01/07/1998</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>YES</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>YES</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**FRP**  
CORROSION PROTECTION:  
**FRP TANK OR PIPING (NONCORRODIBLE)**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **20726**  
TANK ID: **1AA**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **GASOLINE**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **12000**  
COMPARTMENT RELEASE DETECTION: **GROUNDWATER MONITORING**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT**  
**SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

## Leaking Petroleum Storage Tanks (LPST)

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 08/31/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): NOT REPORTED

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 08/31/1987

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**NOT REPORTED**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20723

TANK ID: 1A

COMPARTMENT LETTER: A

SUBSTANCES: UNKNOWN

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 0

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 08/31/1987

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): NOT REPORTED

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 08/31/1987

## Leaking Petroleum Storage Tanks (LPST)

INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**  
TANK DESIGN SINGLE WALL: **NO** TANK DESIGN DOUBLE WALL: **NO**  
PIPE DESIGN SINGLE WALL: **NO** PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**NOT REPORTED**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **20723**

TANK ID: **1A**

COMPARTMENT LETTER: **A**

SUBSTANCES: **UNKNOWN**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **NOT REPORTED**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **2**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **01/01/1970**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **8000**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **11/14/1988**

INTERNAL PROTECTION DATE: **NOT REPORTED** REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:



## Leaking Petroleum Storage Tanks (LPST)

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 20720  
TANK ID: 2  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 8000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

PIPING SYSTEMS

MATERIAL: FRP  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2A	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1988	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 12000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 01/01/1988
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 20725  
TANK ID: 2A  
COMPARTMENT LETTER: A  
SUBSTANCES: EMPTY  
OTHER SUBSTANCES: NOT REPORTED



## Leaking Petroleum Storage Tanks (LPST)

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2AA

INSTALLATION DATE: 05/01/1989

TANK CAPACITY (GAL): 10000

STATUS: REMOVED FROM GROUND

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: YES

PIPE DESIGN SINGLE WALL: YES

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/08/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 01/07/1998

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20728

TANK ID: 2AA

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1970

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 8000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 11/14/1988

INTERNAL PROTECTION DATE: NOT REPORTED REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

COMPARTMENT DETAILS

UST COMPARTMENT ID: 20719

TANK ID: 3

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 8000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1988

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/01/1988

INTERNAL PROTECTION DATE: NOT REPORTED REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

## Leaking Petroleum Storage Tanks (LPST)

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20722

TANK ID: 3A

COMPARTMENT LETTER: A

SUBSTANCES: EMPTY

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AA

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 05/01/1989

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/07/1998

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG



## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20729

TANK ID: 3AA

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1970

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 550

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 11/14/1988

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20718

TANK ID: 4

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550



## Leaking Petroleum Storage Tanks (LPST)

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>4A</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>01/01/1988</b>	REGISTRATION DATE: <b>05/08/1988</b>
TANK CAPACITY (GAL): <b>10000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>01/01/1988</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>NO</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>NO</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:  
**FRP**  
CORROSION PROTECTION:  
**FRP TANK OR PIPING (NONCORRODIBLE)**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**  
TANK COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: **YES**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **20724**  
TANK ID: **4A**  
COMPARTMENT LETTER: **A**  
SUBSTANCES: **EMPTY**  
OTHER SUBSTANCES: **NOT REPORTED**  
CAPACITY (GAL): **10000**  
COMPARTMENT RELEASE DETECTION: **NOT REPORTED**  
SPILL CONTAINMENT AND OVERFILL PREVENTION: **NOT REPORTED**

### PIPING SYSTEMS

MATERIAL: **FRP**  
CORROSION PROTECTION: **NOT REPORTED**  
EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**  
CORROSION PROTECTION: **NOT REPORTED**

### PIPE COMPLIANCE FLAG

## Leaking Petroleum Storage Tanks (LPST)

CORROSION PROTECTION COMPLIANCE FLAG: **NO**  
CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: <b>4AA</b>	NUMBER OF COMPARTMENTS: <b>1</b>
INSTALLATION DATE: <b>05/01/1989</b>	REGISTRATION DATE: <b>05/08/1986</b>
TANK CAPACITY (GAL): <b>1000</b>	EMPTY TANK: <b>NOT EMPTY</b>
STATUS: <b>REMOVED FROM GROUND</b>	STATUS BEGIN DATE: <b>01/07/1998</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>FULLY REGULATED</b>
TANK DESIGN SINGLE WALL: <b>YES</b>	TANK DESIGN DOUBLE WALL: <b>NO</b>
PIPE DESIGN SINGLE WALL: <b>YES</b>	PIPE DESIGN DOUBLE WALL: <b>NO</b>

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **20727**

TANK ID: **4AA**

COMPARTMENT LETTER: **A**

SUBSTANCES: **USED OIL**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **1000**

COMPARTMENT RELEASE DETECTION: **NOT REPORTED**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP**

### PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED**

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

### ABOVEGROUND STORAGE TANK INFORMATION

**NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY**

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## Petroleum Storage Tanks (PST)

MAP ID# 18

Distance from Property: 0.24 mi. N

### FACILITY INFORMATION

ID#: 22134  
NAME: SHELL OIL  
ADDRESS: 12860 KIMBERLEY LN  
HOUSTON, TX 77024  
COUNTY: HARRIS  
REGION: 12  
TYPE: RETAIL  
BEGIN DATE: 09/01/1989  
STATUS: INACTIVE  
EXEMPT STATUS: NO  
RECORDS OFF-SITE: YES  
NUMBER OF ACTIVE UNDERGROUND TANKS: 0  
NUMBER OF ACTIVE ABOVEGROUND TANKS: 0

### APPLICATION INFORMATION:

RECEIVED DATE ON EARLIEST REGISTRATION FORM: 05/08/1986  
SIGNATURE DATE ON EARLIEST REGISTRATION FORM: 04/24/1986  
SIGNATURE NAME & TITLE: JOE DAVIS, MGR  
ENFORCEMENT ACTION DATE: NOT REPORTED

### OWNER

OWNER NUMBER: CN600124051  
NAME: MOTIVA ENTERPRISES LLC  
CONTACT ADDRESS: OWNER ADDRESS NOT REPORTED  
CITY NOT REPORTED

TYPE: CORPORATION/COMPANY  
BEGIN DATE: 10/01/1998  
CONTACT ROLE: NOT REPORTED  
CONTACT NAME: NOT REPORTED  
CONTACT TITLE: NOT REPORTED  
ORGANIZATION: NOT REPORTED  
PHONE: NOT REPORTED  
FAX: NOT REPORTED  
EMAIL: NOT REPORTED

### OPERATOR

NO OPERATOR INFORMATION REPORTED

### SELF-CERTIFICATION

-NO SELF-CERTIFICATION INFORMATION REPORTED-

### CONSTRUCTION NOTIFICATION

NO CONSTRUCTION NOTIFICATION DATA REPORTED FOR THIS FACILITY

### UNDERGROUND STORAGE TANK

TANK ID: 1  
INSTALLATION DATE: 01/01/1970  
TANK CAPACITY (GAL): 5000  
NUMBER OF COMPARTMENTS: 1  
REGISTRATION DATE: 05/08/1986  
EMPTY TANK: NOT EMPTY

### CONTACT INFORMATION

NAME: NOT REPORTED  
TITLE: NOT REPORTED  
ORGANIZATION: SHELL OIL  
MAIL ADDRESS: MAILING ADDRESS NOT REPORTED  
CITY NOT REPORTED  
PHONE: 713-467-0872



## Petroleum Storage Tanks (PST)

STATUS: REMOVED FROM GROUND                      STATUS BEGIN DATE: 11/14/1988  
INTERNAL PROTECTION DATE: NOT REPORTED      REGULATORY STATUS: FULLY REGULATED  
TANK DESIGN SINGLE WALL: NO                      TANK DESIGN DOUBLE WALL: NO  
PIPE DESIGN SINGLE WALL: NO                      PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20721

TANK ID: 1

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 5000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1AA

INSTALLATION DATE: 05/01/1989

TANK CAPACITY (GAL): 12000

STATUS: REMOVED FROM GROUND

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: YES

PIPE DESIGN SINGLE WALL: YES

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/08/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 01/07/1998

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)



## Petroleum Storage Tanks (PST)

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **20726**

TANK ID: **1AA**

COMPARTMENT LETTER: **A**

SUBSTANCES: **GASOLINE**

OTHER SUBSTANCES: **NOT REPORTED**

CAPACITY (GAL): **12000**

COMPARTMENT RELEASE DETECTION: **GROUNDWATER MONITORING**

SPILL CONTAINMENT AND OVERFILL PREVENTION: **TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE**

PIPING SYSTEMS

MATERIAL: **FRP**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT: **NOT REPORTED**

CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: **FRP TANK OR PIPING (NONCORRODIBLE)**

PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **YES**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

TANK ID: **1A**

NUMBER OF COMPARTMENTS: **1**

INSTALLATION DATE: **08/31/1987**

REGISTRATION DATE: **05/08/1986**

TANK CAPACITY (GAL): **NOT REPORTED**

EMPTY TANK: **NOT EMPTY**

STATUS: **REMOVED FROM GROUND**

STATUS BEGIN DATE: **08/31/1987**

INTERNAL PROTECTION DATE: **NOT REPORTED**

REGULATORY STATUS: **FULLY REGULATED**

TANK DESIGN SINGLE WALL: **NO**

TANK DESIGN DOUBLE WALL: **NO**

PIPE DESIGN SINGLE WALL: **NO**

PIPE DESIGN DOUBLE WALL: **NO**

TANK DETAILS

MATERIAL:

**NOT REPORTED**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NO**

CORROSION PROTECTION VARIANCE: **NO VARIANCE**

COMPARTMENT DETAILS

UST COMPARTMENT ID: **20723**

TANK ID: **1A**

COMPARTMENT LETTER: **A**

## Petroleum Storage Tanks (PST)

SUBSTANCES: UNKNOWN

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 0

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 1A

INSTALLATION DATE: 08/31/1987

TANK CAPACITY (GAL): NOT REPORTED

STATUS: REMOVED FROM GROUND

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/08/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 08/31/1987

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

NOT REPORTED

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20723

TANK ID: 1A

COMPARTMENT LETTER: A

SUBSTANCES: UNKNOWN

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): NOT REPORTED

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

## Petroleum Storage Tanks (PST)

### NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1970

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 8000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 11/14/1988

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

STEEL

CORROSION PROTECTION:

NOT REPORTED

EXTERNAL CONTAINMENT:

NOT REPORTED

#### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20720

TANK ID: 2

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 8000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

#### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

#### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1988

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 12000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/01/1988

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED



## Petroleum Storage Tanks (PST)

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20725

TANK ID: 2A

COMPARTMENT LETTER: A

SUBSTANCES: EMPTY

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 12000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 2AA

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 05/01/1989

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/07/1998

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: YES

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: YES

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED



## Petroleum Storage Tanks (PST)

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20728  
TANK ID: 2AA  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 10000  
COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING  
SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT  
SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP  
CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1970	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 8000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 11/14/1988
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: NO	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
STEEL  
CORROSION PROTECTION:  
NOT REPORTED

EXTERNAL CONTAINMENT:  
NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20719  
TANK ID: 3  
COMPARTMENT LETTER: A  
SUBSTANCES: GASOLINE  
OTHER SUBSTANCES: NOT REPORTED

## Petroleum Storage Tanks (PST)

CAPACITY (GAL): 8000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3A

INSTALLATION DATE: 01/01/1988

TANK CAPACITY (GAL): 10000

STATUS: REMOVED FROM GROUND

INTERNAL PROTECTION DATE: NOT REPORTED

TANK DESIGN SINGLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

NUMBER OF COMPARTMENTS: 1

REGISTRATION DATE: 05/08/1986

EMPTY TANK: NOT EMPTY

STATUS BEGIN DATE: 01/01/1988

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20722

TANK ID: 3A

COMPARTMENT LETTER: A

SUBSTANCES: EMPTY

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED

## Petroleum Storage Tanks (PST)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 3AA	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 05/01/1989	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 10000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 01/07/1998
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: YES	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: YES	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

FRP

CORROSION PROTECTION:

FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT:

NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20729

TANK ID: 3AA

COMPARTMENT LETTER: A

SUBSTANCES: GASOLINE

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 10000

COMPARTMENT RELEASE DETECTION: GROUNDWATER MONITORING

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP,FACTORY - BUILT

SPILL CONTAINER/BUCKET/SUMP,DELIVERY SHUT-OFF VALVE

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 01/01/1970	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 550	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 11/14/1988
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: NO	TANK DESIGN DOUBLE WALL: NO



## Petroleum Storage Tanks (PST)

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**STEEL**

CORROSION PROTECTION:

**NOT REPORTED**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20718

TANK ID: 4

COMPARTMENT LETTER: A

SUBSTANCES: USED OIL

OTHER SUBSTANCES: NOT REPORTED

CAPACITY (GAL): 550

COMPARTMENT RELEASE DETECTION: NOT REPORTED

SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP

CORROSION PROTECTION: NOT REPORTED

EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

**NOT REPORTED**

CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO

CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4A

NUMBER OF COMPARTMENTS: 1

INSTALLATION DATE: 01/01/1988

REGISTRATION DATE: 05/08/1986

TANK CAPACITY (GAL): 10000

EMPTY TANK: NOT EMPTY

STATUS: REMOVED FROM GROUND

STATUS BEGIN DATE: 01/01/1988

INTERNAL PROTECTION DATE: NOT REPORTED

REGULATORY STATUS: FULLY REGULATED

TANK DESIGN SINGLE WALL: NO

TANK DESIGN DOUBLE WALL: NO

PIPE DESIGN SINGLE WALL: NO

PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:

**FRP**

CORROSION PROTECTION:

**FRP TANK OR PIPING (NONCORRODIBLE)**

EXTERNAL CONTAINMENT:

**NOT REPORTED**

### TANK COMPLIANCE FLAG



## Petroleum Storage Tanks (PST)

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20724  
TANK ID: 4A  
COMPARTMENT LETTER: A  
SUBSTANCES: EMPTY  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 10000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: FRP  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED

### CONNECTORS & VALVES:

NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED

### PIPE COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: NO  
CORROSION PROTECTION VARIANCE: NO VARIANCE

TANK ID: 4AA	NUMBER OF COMPARTMENTS: 1
INSTALLATION DATE: 05/01/1989	REGISTRATION DATE: 05/08/1986
TANK CAPACITY (GAL): 1000	EMPTY TANK: NOT EMPTY
STATUS: REMOVED FROM GROUND	STATUS BEGIN DATE: 01/07/1998
INTERNAL PROTECTION DATE: NOT REPORTED	REGULATORY STATUS: FULLY REGULATED
TANK DESIGN SINGLE WALL: YES	TANK DESIGN DOUBLE WALL: NO
PIPE DESIGN SINGLE WALL: YES	PIPE DESIGN DOUBLE WALL: NO

### TANK DETAILS

MATERIAL:  
FRP  
CORROSION PROTECTION:  
FRP TANK OR PIPING (NONCORRODIBLE)  
EXTERNAL CONTAINMENT:  
NOT REPORTED

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: YES  
CORROSION PROTECTION VARIANCE: NO VARIANCE

### COMPARTMENT DETAILS

UST COMPARTMENT ID: 20727  
TANK ID: 4AA  
COMPARTMENT LETTER: A  
SUBSTANCES: USED OIL  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): 1000  
COMPARTMENT RELEASE DETECTION: NOT REPORTED

## ***Petroleum Storage Tanks (PST)***

SPILL CONTAINMENT AND OVERFILL PREVENTION: TIGHT-FILL FITTING CONTAINER/BUCKET/SUMP

### **PIPING SYSTEMS**

MATERIAL: FRP

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

EXTERNAL CONTAINMENT: NOT REPORTED.

### **CONNECTORS & VALVES:**

NOT REPORTED

CORROSION PROTECTION: FRP TANK OR PIPING (NONCORRODIBLE)

### **PIPE COMPLIANCE FLAG**

CORROSION PROTECTION COMPLIANCE FLAG: YES

CORROSION PROTECTION VARIANCE: NO VARIANCE

### **ABOVEGROUND STORAGE TANK INFORMATION**

NO ABOVEGROUND STORAGE TANK DATA REPORTED FOR THIS FACILITY

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## Industrial and Hazardous Waste Sites (IHW)

[MAP ID# 18](#)

Distance from Property: 0.24 mi. N

### FACILITY INFORMATION

REGISTRATION#: 80248      EPA ID: TXD988038857

TNRCC ID #: 34958

NAME: MOBIL OIL 00BLY

ADDRESS: 12860 KIMBERLY & W BELT  
HOUSTON, TX 77024

CONTACT: ROBIN A BUNN

PHONE: 703-8493330

BUSINESS DESCRIPTION: THIS REGISTRATION WAS INACTIVATED BECAUSE THERE WERE ONLY 6-DIGIT WASTE CODES ON THE NOR AND NO WASTE ACTIVITY WAS REPORTED IN 1994, 1995 AND 1996.

INDUSTRIAL WASTE PERMIT #: NOT REPORTED

MUNICIPAL WASTE PERMIT #: NOT REPORTED

SIC CODE: NOT REPORTED

WASTE GENERATOR: YES

WASTE RECEIVER: NO

WASTE TRANSPORTER: NO

TRANSFER FACILITY: NO

MAQUILADORA (MEXICAN FACILITY): NO

STATUS: INACTIVE

AMOUNT OF WASTE GENERATED: SMALL QUANTITY GENERATOR

GENERATOR TYPE: NON-INDUSTRIAL AND/OR MUNICIPAL

THIS FACILITY IS A NOTIFIER

THIS FACILITY IS NOT A STEERS REPORTER - (STATE OF TEXAS ENVIRONMENTAL ELECTRONIC REPORTING SYSTEM)

THIS FACILITY IS NOT REQUIRED TO SUBMIT AN ANNUAL WASTE SUMMARY REPORT

THIS FACILITY IS NOT INVOLVED IN RECYCLING ACTIVITIES

LAST UPDATE TO TRACS (TCEQ REGULATORY ACTIVITIES AND COMPLIANCE SYSTEM): 06/04/2010

### ACTIVITIES

ACTIVITY TYPE: UNKNOWN

ACTIVITY DESCRIPTION: NOT REPORTED

### WASTE

WASTE ID: 68614

WASTE CODE STATUS: INACTIVE

WASTE IS RADIOACTIVE: NO

WASTE IS TREATED OFF SITE: NO

GENERATOR'S DESCRIPTION OF WASTE: NOT REPORTED

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## Leaking Petroleum Storage Tanks (LPST)

MAP ID# 19

Distance from Property: 0.24 mi. N

### FACILITY INFORMATION

Geosearch ID: **GS091439**  
FACILITY ID: **NOT REPORTED**  
NAME: **LEAK @ INTERSECTION**  
ADDRESS: **KIMBERLY LN @ WEST BELT**  
**HOUSTON, TX 77000**

### FACILITY DETAILS

LPST ID#: **091439**  
NAME: **LEAK @ INTERSECTION**  
FACILITY LOCATION: **KIMBERLY LN @ WEST BELT**  
PRIORITY CODE: **(1D) GROUP 1 GROUNDWATER, PLUME HAS/LIKELY TO MIGRATE OFF-SITE**  
STATUS CODE: **(6P) FINAL CONCURRENCE PENDING DOCUMENTATION OF WELL PLUGGING**  
REPORTED DATE: **8/12/1987**  
ENTERED DATE: **8/12/1987**

### PRP INFORMATION

NAME: **ENVIRONMENTAL IMPACT**  
ADDRESS: **NOT REPORTED**  
**NOT REPORTED NOT REPORTED NOT REPORTED**  
CONTACT: **NOT REPORTED**  
PHONE: **/-**

### UNDERGROUND STORAGE TANK

TANK ID: <b>NOT REPORTED</b>	NUMBER OF COMPARTMENTS: <b>NOT REPORTED</b>
INSTALLATION DATE: <b>NOT REPORTED</b>	REGISTRATION DATE: <b>NOT REPORTED</b>
TANK CAPACITY (GAL): <b>NOT REPORTED</b>	EMPTY TANK: <b>NOT REPORTED</b>
STATUS: <b>NOT REPORTED</b>	STATUS BEGIN DATE: <b>NOT REPORTED</b>
INTERNAL PROTECTION DATE: <b>NOT REPORTED</b>	REGULATORY STATUS: <b>NOT REPORTED</b>
TANK DESIGN SINGLE WALL: <b>NOT REPORTED</b>	TANK DESIGN DOUBLE WALL: <b>NOT REPORTED</b>
PIPE DESIGN SINGLE WALL: <b>NOT REPORTED</b>	PIPE DESIGN DOUBLE WALL: <b>NOT REPORTED</b>

### TANK DETAILS

MATERIAL:  
**NOT REPORTED**  
CORROSION PROTECTION:  
**NOT REPORTED**  
EXTERNAL CONTAINMENT:  
**NOT REPORTED**

### TANK COMPLIANCE FLAG

CORROSION PROTECTION COMPLIANCE FLAG: **NOT REPORTED**  
CORROSION PROTECTION VARIANCE: **NOT REPORTED**

### COMPARTMENT DETAILS

UST COMPARTMENT ID: **NOT REPORTED**  
TANK ID: **NOT REPORTED**  
COMPARTMENT LETTER: **NOT REPORTED**



## Leaking Petroleum Storage Tanks (LPST)

SUBSTANCES: NOT REPORTED  
OTHER SUBSTANCES: NOT REPORTED  
CAPACITY (GAL): NOT REPORTED  
COMPARTMENT RELEASE DETECTION: NOT REPORTED  
SPILL CONTAINMENT AND OVERFILL PREVENTION: NOT REPORTED

### PIPING SYSTEMS

MATERIAL: NOT REPORTED  
CORROSION PROTECTION: NOT REPORTED  
EXTERNAL CONTAINMENT: NOT REPORTED  
CONNECTORS & VALVES:

NOT REPORTED

CORROSION PROTECTION: NOT REPORTED  
PIPE COMPLIANCE FLAG  
CORROSION PROTECTION COMPLIANCE FLAG: NOT REPORTED  
CORROSION PROTECTION VARIANCE: NOT REPORTED

### ABOVEGROUND STORAGE TANK INFORMATION

AST ID #: NOT REPORTED      MULTIPLE COMPARTMENT FLAG: NOT REPORTED  
TANK ID: NOT REPORTED      REGISTRATION DATE: NOT REPORTED  
INSTALLATION DATE: NOT REPORTED      STATUS BEGIN DATE: NOT REPORTED  
TANK CAPACITY (GAL): NOT REPORTED      REGULATORY STATUS: NOT REPORTED  
STATUS: NOT REPORTED      SUBSTANCES: NOT REPORTED

### MATERIAL OF CONSTRUCTION

STEEL: NOT REPORTED      CORRUGATED METAL: NOT REPORTED  
FIBERGLASS: NOT REPORTED      CONCRETE: NOT REPORTED  
ALUMINIUM: NOT REPORTED

### CONTAINMENT

EARTHEN DIKE: NOT REPORTED      CONCRETE: NOT REPORTED  
CONTAINMENT LINER: NOT REPORTED      NONE: NOT REPORTED  
STAGE I VAPOR RECOVERY: NOT REPORTED  
STAGE I INSTALLATION DATE: NOT REPORTED

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## Industrial and Hazardous Waste Corrective Action Sites (IHWCA)

[MAP ID# 20](#)

Distance from Property: 0.90 mi. N

PROGRAM ID: 31159  
RN NUMBER: RN100675230  
NAME: WEATHERFORD US HOUSTON  
ADDRESS: 10802 KATY FWY  
HOUSTON, TX 77043  
STATUS: ACTIVE  
STATUS DATE: 7/14/09  
LOCATION DESCRIPTION:  
NOT REPORTED

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## Industrial and Hazardous Waste Corrective Action Sites (IHWCA)

[MAP ID# 21](#)

Distance from Property: 0.95 mi. N

PROGRAM ID: 31402

RN NUMBER: RN100663798

NAME: FLUOROCARBON PLASTIC & RUBBER PRODUCTION

ADDRESS: 10420 KATY FWY  
HOUSTON, TX 77043

STATUS: INACTIVE

STATUS DATE: 12/8/98

LOCATION DESCRIPTION:

10420 OLD KATY RD, HOUSTON, TX

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## Industrial and Hazardous Waste Corrective Action Sites (IHWCA)

[MAP ID# 22](#)

Distance from Property: 0.97 mi. N

PROGRAM ID: 34348

RN NUMBER: RN100666924

NAME: SPRING BRANCH SERVICE CENTER

ADDRESS: 10310 KATY FWY  
HOUSTON, TX 77043

STATUS: INACTIVE

STATUS DATE: 7/18/11

LOCATION DESCRIPTION:

10310 OLD KATY RD HOUSTON TX

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## ***Unlocatable Summary***

*This list contains sites that could not be mapped due to limited or incomplete address information.*

*No Records Found*

## Environmental Records Definitions - FEDERAL

**AIRSAFS** Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.

**BRS** Biennial Reporting System

VERSION DATE: 12/31/11

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

**CDL** Clandestine Drug Laboratory Locations

VERSION DATE: 04/14/14

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

**DOCKETS** EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

**EC** Federal Engineering Institutional Control Sites

VERSION DATE: 05/21/14

This database includes site locations where Engineering and/or Institutional Controls have been identified as part

## Environmental Records Definitions - FEDERAL

of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

**ERNSTX** Emergency Response Notification System

VERSION DATE: 11/09/14

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

**FRSTX** Facility Registry System

VERSION DATE: 09/30/14

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

**HMIRSR06** Hazardous Materials Incident Reporting System

VERSION DATE: 10/28/14

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

**ICIS** Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 10/20/14

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.



## Environmental Records Definitions - FEDERAL

**ICISNPDES** Integrated Compliance Information System National Pollutant Discharge Elimination System  
VERSION DATE: 08/01/12

In 2006, the Integrated Compliance Information System (ICIS) - National Pollutant Discharge Elimination System (NPDES) became the NPDES national system of record for select states, tribes and territories. ICIS-NPDES is an information management system maintained by the United States Environmental Protection Agency's Office of Compliance to track permit compliance and enforcement status of facilities regulated by the NPDES under the Clean Water Act. ICIS-NPDES is designed to support the NPDES program at the state, regional, and national levels.

**LUCIS** Land Use Control Information System  
VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

**MLTS** Material Licensing Tracking System  
VERSION DATE: 04/14/14

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements.

**NPDES06** National Pollutant Discharge Elimination System  
VERSION DATE: 04/01/07

Information in this database is extracted from the Water Permit Compliance System (PCS) database which is used by United States Environmental Protection Agency to track surface water permits issued under the Clean Water Act. This database includes permitted facilities located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. The NPDES database was collected from December 2002 until April 2007. Refer to the PCS and/or ICIS-NPDES database as source of current data.

**PADS** PCB Activity Database System  
VERSION DATE: 07/01/14

The PCB Activity Database System (PADS) is used by the United States Environmental Protection Agency to monitor the activities of polychlorinated biphenyls (PCB) handlers.

**PCSR06** Permit Compliance System  
VERSION DATE: 08/01/12



## Environmental Records Definitions - FEDERAL

The Permit Compliance System is used in tracking enforcement status and permit compliance of facilities controlled by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act and is maintained by the United States Environmental Protection Agency's Office of Compliance. PCS is designed to support the NPDES program at the state, regional, and national levels. This database includes permitted facilities located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. PCS has been modernized, and no longer exists. National Pollutant Discharge Elimination System (ICIS-NPDES) data can now be found in Integrated Compliance Information System (ICIS).

**RCRASC** RCRA Sites with Controls

VERSION DATE: 05/23/14

This list of Resource Conservation and Recovery Act sites with institutional controls in place is provided by the U.S. Environmental Protection Agency.

**SFLIENS** CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete.

**SSTS** Section Seven Tracking System

VERSION DATE: 12/31/09

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. ("Production" includes formulation, packaging, repackaging, and relabeling.)

**TRI** Toxics Release Inventory

VERSION DATE: 12/31/13

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

## Environmental Records Definitions - FEDERAL

**TSCA** Toxic Substance Control Act Inventory

VERSION DATE: 12/31/06

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured, imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site.

**NLRRCRAG** No Longer Regulated RCRA Generator Facilities

VERSION DATE: 10/09/14

This database includes RCRA Generator facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly generated hazardous waste.

Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.

Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.

Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

**RCRAGR06** Resource Conservation & Recovery Act - Generator Facilities

VERSION DATE: 10/09/14

This database includes sites listed as generators of hazardous waste (large, small, and exempt) in the RCRAInfo



## Environmental Records Definitions - FEDERAL

system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). This database includes sites located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

**Large Quantity Generators:** Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.

**Small Quantity Generators:** Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.

**Conditionally Exempt Small Quantity Generators:** Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

**HISTPST** Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

**BF** Brownfields Management System

VERSION DATE: 10/01/14

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment.

## Environmental Records Definitions - FEDERAL

**CERCLIS** Comprehensive Environmental Response, Compensation & Liability Information System

VERSION DATE: 10/25/13

CERCLIS is the repository for site and non-site specific Superfund information in support of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This United States Environmental Protection Agency database contains an extract of sites that have been investigated or are in the process of being investigated for potential environmental risk.

**DNPL** Delisted National Priorities List

VERSION DATE: 10/25/13

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

**NFRAP** No Further Remedial Action Planned Sites

VERSION DATE: 10/25/13

This database includes sites which have been determined by the United States Environmental Protection Agency, following preliminary assessment, to no longer pose a significant risk or require further activity under CERCLA. After initial investigation, no contamination was found, contamination was quickly removed or contamination was not serious enough to require Federal Superfund action or NPL consideration.

**NLRRCRAT** No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 10/09/14

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

**ODI** Open Dump Inventory

VERSION DATE: 06/01/85

The open dump inventory was published by the United States Environmental Protection Agency. An "open dump" is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

**RCRAT** Resource Conservation & Recovery Act - Treatment, Storage & Disposal Facilities

VERSION DATE: 10/09/14



## Environmental Records Definitions - FEDERAL

This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

**DOD** Department of Defense Sites

VERSION DATE: 12/01/05

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

**FUDS** Formerly Used Defense Sites

VERSION DATE: 06/01/14

The 2012 Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not all properties currently have polygon data available. **DISCLAIMER:** This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

**NLRRCRAC** No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 10/09/14

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

**NPL** National Priorities List

VERSION DATE: 10/25/13

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

## ***Environmental Records Definitions - FEDERAL***

**PNPL** Proposed National Priorities List

VERSION DATE: 10/25/13

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

**RCRAC** Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 10/09/14

This database includes all hazardous waste sites with ongoing corrective action activity and where corrective action is statutorily required to be address but have not had corrective action imposed in the RCRAInfo system. The Corrective Action Program requires owners or operators of RCRA facilities (or treatment, storage, and disposal facilities) to investigate and cleanup contamination in order to protect human health and the environment. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

**RODS** Record of Decision System

VERSION DATE: 07/01/13

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.



## Environmental Records Definitions - STATE (TX)

**GWCC** Groundwater Contamination Cases

VERSION DATE: 12/31/13

This report contains a listing of groundwater contamination cases which were documented for the 2013 calendar year. Texas Water Code, Section 26.406 requires the annual report to describe the current status of groundwater monitoring activities conducted or required by each agency at regulated facilities or associated with regulated activities. The agencies reporting these contamination cases include the Texas Commission on Environmental Quality, Railroad Commission of Texas, Texas Alliance of Groundwater Districts, and Department of State Health Services.

**HISTGWCC** Historic Groundwater Contamination Cases

VERSION DATE: 12/31/12

This historic report contains all agency groundwater contamination cases documented from 1994 to 2012. The agencies that reported these contamination cases included the Texas Commission on Environmental Quality, Railroad Commission of Texas, Texas Alliance of Groundwater Districts, and Department of State Health Services.

**LIENS** TCEQ Liens

VERSION DATE: 02/09/15

Liens filed upon State and/or Federal Superfund Sites by the Texas Commission on Environmental Quality.

**MSD** Municipal Setting Designations

VERSION DATE: 10/31/14

The Texas Commission on Environmental Quality defines an MSD as an official state designation given to property within a municipality or its extraterritorial jurisdiction that certifies that designated groundwater at the property is not used as potable water, and is prohibited from future use as potable water because that groundwater is contaminated in excess of the applicable potable-water protective concentration level. The prohibition must be in the form of a city ordinance, or a restrictive covenant that is enforceable by the city and filed in the property records. The MSD property can be a single property, multi-property, or a portion of property.

**NOV** Notice of Violations

VERSION DATE: 01/22/15

This database containing Notice of Violations (NOV) is maintained by the Texas Commission on Environmental Quality. An NOV is a written notification that documents and communicates violations observed during an inspection to the business or individual inspected.

## Environmental Records Definitions - STATE (TX)

**SIEC01** State Institutional/Engineering Control Sites

VERSION DATE: 02/09/15

The Texas Risk Reduction Program (TRRP) requires the placement of institutional controls (e.g., deed notices or restrictive covenants) on affected property in different circumstances as part of completing a response action. In its simplest form, an institutional control (IC) is a legal document that is recorded in the county deed records. In certain circumstances, local zoning or ordinances can serve as an IC. This listing may also include locations where Engineering Controls are in effect, such as a cap, barrier, or other engineering device to prevent access, exposure, or continued migration of contamination. The sites included on this list are regulated by various programs of the Texas Commission on Environmental Quality (TCEQ).

**SPILLS** Spills Listing

VERSION DATE: 01/22/15

This Texas Commission on Environmental Quality database includes releases of hazardous or potentially hazardous materials into the environment.

**TIERII** Tier II Chemical Reporting Program Facilities

VERSION DATE: 12/31/12

The Texas Tier II Chemical Reporting Program in the Department of State Health Services (DSHS) is the state repository for EPCRA-required Emergency Planning Letters (EPLs), which are one-time notifications to the state from facilities that have certain extremely hazardous chemicals in specified amounts. The Program is also the state repository for EPCRA/state-required hazardous chemical inventory reports called Texas Tier Two Reports. This data contains those facility reports for the 2005 through the 2012 calendar years.

**DCR** Dry Cleaner Registration Database

VERSION DATE: 01/01/15

The database includes dry cleaning drop stations and facilities registered with the Texas Commission on Environmental Quality.

**IHW** Industrial and Hazardous Waste Sites

VERSION DATE: 01/01/15

Owner and facility information is included in this database of permitted and non-permitted industrial and hazardous waste sites. Industrial waste is waste that results from or is incidental to operations of industry, manufacturing, mining, or agriculture. Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in federal waste regulations. The IHW database is maintained by the Texas Commission on Environmental Quality.



## Environmental Records Definitions - STATE (TX)

**PIHW** Permitted Industrial Hazardous Waste Sites

VERSION DATE: 01/01/15

Owner and facility information is included in this database of all permitted industrial and hazardous waste sites. Industrial waste is waste that results from or is incidental to operations of industry, manufacturing, mining, or agriculture. Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in federal waste regulations. Permitted IHW facilities are regulated under 30 Texas Administrative Code Chapter 335 in addition to federal regulations. The IHW database is maintained by the Texas Commission on Environmental Quality.

**PST** Petroleum Storage Tanks

VERSION DATE: 01/29/15

The Petroleum Storage Tank database is administered by the Texas Commission on Environmental Quality (TCEQ). Both Underground storage tanks (USTs) and Aboveground storage tanks (ASTs) are included in this report. Petroleum Storage Tank registration has been a requirement with the TCEQ since 1986.

**APAR** Affected Property Assessment Reports

VERSION DATE: 12/22/14

As regulated by the Texas Commission on Environmental Quality, an Affected Property Assessment Report is required when a person is addressing a release of chemical of concern (COC) under 30 TAC Chapter 350, the Texas Risk Reduction Program (TRRP). The purpose of the APAR is to document all relevant affected property information to identify all release sources and COCs, determine the extent of all COCs, identify all transport/exposure pathways, and to determine if any response actions are necessary. The Texas Administrative Code Title 30 §350.4(a)(1) defines affected property as the entire area (i.e. on-site and off-site; including all environmental media) which contains releases of chemicals of concern at concentrations equal to or greater than the assessment level applicable for residential land use and groundwater classification.

**BSA** Brownfields Site Assessments

VERSION DATE: 02/09/15

The Brownfields Site Assessments database is maintained by the Texas Commission on Environmental Quality (TCEQ). The TCEQ, in close partnership with the U.S. Environmental Protection Agency (EPA) and other federal, state, and local redevelopment agencies, and stakeholders, is facilitating cleanup, transferability, and revitalization of brownfields through the development of regulatory, tax, and technical assistance tools.

**CALF** Closed & Abandoned Landfill Inventory

VERSION DATE: 11/01/05

The Texas Commission on Environmental Quality, under a contract with Texas State University, and in cooperation with the 24 regional Council of Governments (COGs) in the State, has located over 4,000 closed

## Environmental Records Definitions - STATE (TX)

and abandoned municipal solid waste landfills throughout Texas. This listing contains "unauthorized sites". Unauthorized sites have no permit and are considered abandoned. The information available for each site varies in detail and this historical information is not updated. Please refer to the specific regional COG for the most current information.

### **DCRPS** Dry Cleaner Remediation Program Sites

VERSION DATE: 09/01/14

This list of DCRP sites is provided by the Texas Commission on Environmental Quality (TCEQ). According to the TCEQ, the Dry Cleaner Remediation Program (DCRP) establishes a prioritization list of dry cleaner sites and administers the Dry Cleaning Remediation fund to assist with remediation of contamination caused by dry cleaning solvents.

### **IOP** Innocent Owner / Operator Database

VERSION DATE: 02/09/15

Texas Innocent Owner / Operator (IOP), created by House Bill 2776 of the 75th Legislature, provides a certificate to an innocent owner or operator if their property is contaminated as a result of a release or migration of contaminants from a source or sources not located on the property, and they did not cause or contribute to the source or sources of contamination. The IOP database is maintained by the Texas Commission on Environmental Quality.

### **LPST** Leaking Petroleum Storage Tanks

VERSION DATE: 02/01/15

The Leaking Petroleum Storage Tank listing is derived from the Petroleum Storage Tank (PST) database and is maintained by the Texas Commission on Environmental Quality. This listing includes aboveground and underground storage tank facilities with reported leaks.

### **MSWLF** Municipal Solid Waste Landfill Sites

VERSION DATE: 02/08/15

The municipal solid waste landfill database is provided by the Texas Commission on Environmental Quality. This database includes active landfills and inactive landfills, where solid waste is treated or stored.

### **RRCVCP** Railroad Commission VCP and Brownfield Sites

VERSION DATE: 01/27/15

According to the Railroad Commission of Texas, their Voluntary Cleanup Program (RRC-VCP) provides an incentive to remediate Oil & Gas related pollution by participants as long as they did not cause or contribute to the contamination. Applicants to the program receive a release of liability to the state in exchange for a successful cleanup.



## Environmental Records Definitions - STATE (TX)

**RWS** Radioactive Waste Sites

VERSION DATE: 07/11/06

This Texas Commission on Environmental Quality database contains all sites in the State of Texas that have been designated as Radioactive Waste sites.

**VCP** Voluntary Cleanup Program Sites

VERSION DATE: 02/09/15

The Texas Voluntary Cleanup Program (VCP) provides administrative, technical, and legal incentives to encourage the cleanup of contaminated sites in Texas. Since all non-responsible parties, including future lenders and landowners, receive protection from liability to the state of Texas for cleanup of sites under the VCP, most of the constraints for completing real estate transactions at those sites are eliminated. As a result, many unused or underused properties may be restored to economically productive or community beneficial uses. The VCP database is maintained by the Texas Commission on Environmental Quality.

**WMRF** Recycling Facilities

VERSION DATE: 11/01/12

This listing of recycling facilities is provided by the Texas Commission on Environmental Quality's Recycle Texas Online service. The company information provided in this database is self-reported. Since recyclers post their own information, a facility or company appearing on the list does not imply that it is in compliance with TCEQ regulations or other applicable laws. This database is no longer maintained and includes the last compilation of the program participants before the Recycle Texas Online program was closed.

**IHWCA** Industrial and Hazardous Waste Corrective Action Sites

VERSION DATE: 11/18/14

This database is provided by the Texas Commission on Environmental Quality (TCEQ). According to the TCEQ, the mission of the industrial and hazardous waste corrective action program is to oversee the cleanup of sites contaminated from industrial and municipal hazardous and industrial nonhazardous wastes. The goals of this program are to: Ensure that sites are assessed and remediated to levels that protect human health and the environment; Verify that waste management units or facilities are taken out of service and closed properly; and to Facilitate revitalization of contaminated properties.

**SF** State Superfund Sites

VERSION DATE: 12/11/14

The state Superfund program mission is to remediate abandoned or inactive sites within the state that pose an unacceptable risk to public health and safety or the environment, but which do not qualify for action under the federal Superfund program (NPL - National Priority Listing). As required by the Texas Solid Waste Disposal Act, Texas Health and Safety Code, Chapter 361, the Texas Commission on Environmental Quality identifies and

## ***Environmental Records Definitions - STATE (TX)***

evaluates these facilities for inclusion on the state Superfund registry. This registry includes any recent developments and the anticipated action for these sites.



## ***Environmental Records Definitions - TRIBAL***

**USTR06**                      Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/30/13

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

**LUSTR06**                      Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 10/30/13

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

**ODINDIAN**                      Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

**INDIANRES**                      Indian Reservations

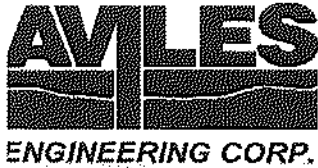
VERSION DATE: 01/01/00

The Department of Interior and Bureau of Indian Affairs maintains this database that includes American Indian Reservations, off-reservation trust lands, public domain allotments, Alaska Native Regional Corporations and Recognized State Reservations.

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX C**

**REGULATORY AGENCY RECORD SEARCH DOCUMENTATION**



5790 Windfern, Houston, Texas 77041

TELEPHONE NO.: 713-895-7645

FAX NO.: 713-895-7943

## Fax Cover Page

TO: Todd Thompson	FROM: Bob Metzger
FAX: 713-767-3646	OATE: March 10, 2015
PHONE: 713-422-8941	PAGES (Including this Cover Sheet): 1
RE: file review requests	

Urgent       For Review       Please Comment       Please Reply

I need to review the following files:

LPSTs: Facility Numbers 0014936, and 0029268, and 0061076.

IOPs: 0219, 0249, and 0817

VCPs: 0152, 1621, 1711, and 2700

Please let me know as soon as possible when I can come in to review the files.

### CONFIDENTIALITY NOTICE

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## Robert Metzger

---

**From:** Robert Metzger <rmetzger@avilesengineering.com>  
**Sent:** Monday, March 9, 2015 6:08 PM  
**To:** 'Leah Piette'  
**Subject:** TCEQ file review

**Importance:** High

Leah,

I need to review the following LPST, IOP, and VCP files:

**LPSTs:**

- Facility 0061076
- Facility 0014936
- Facility 0029268

**IOPS:**

- 0817
- 0219
- 0249

**VCPs:**

- 0152
- 1621
- 1711
- 2700

Please let me know as soon as possible when I can come in to review the files.

Thanks,

Robert J. Metzger, P.G., CAPM  
Aviles Engineering Corporation  
5790 Windfern  
Houston, TX 77041  
Office: 713-895-7645  
Fax: 713-895-7943

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN101459972

**Name:** WALGREENS 3328

**Primary Business:** No primary business description on file.

**Street Address:** 12850 MEMORIAL DR, HOUSTON TX 77024 4972

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12850 Memorial, Houston, TX

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN601476641	WALGREEN CO	OWNER OPERATOR	<a href="#">↔</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-2 of 2 Records

Program ▲	ID Type	ID Number	ID Status
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXR000018523	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	84841	INACTIVE

[Questions or Comments >>](#)

[Query Home](#)  
 [Customer Search](#)  
 [RE Search](#)  
 [ID Search](#)  
 [Search Results](#)  
 [Solid Waste Registration Detail](#)  
 [TCEQ Home](#)

## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 84841

For: **WALGREENS 3328 (RN101459972)**

12850 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WALGREEN CO (CN601476641)**

**OWNER OPERATOR** Since 01/23/2002

Mailing Address: PO BOX 4685 HOUSTON, TX 77210-4685

#### Facility Information

**Registration Number:** 84841

**Status:** Inactive

**Site Name:** WALGREEN 3328

**Company Name:** WALGREEN CO

**Site Street Address:** 12850 MEMORIAL DR, HOUSTON, TX, 77024

**Site Location:** 12850 Memorial, Houston, TX

**County:** HARRIS

**EPA Number:** TXR000018523

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:** 446110 Pharmacies and Drug Stores

[View Annual Waste Summary not available](#)

<a href="#">View Waste Receipt Report</a> <input type="button" value="Year"/> <input type="button" value="Month"/> <b>Waste Receipt Report not available</b>
<a href="#">View Waste Management Units</a> <a href="#">View Waste</a>

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 84841**

For: **WALGREENS 3328 (RN101459972)**

12850 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WALGREEN CO (CN601476641)**

**OWNER OPERATOR** Since 01/23/2002

Mailing Address: PO BOX 4685 HOUSTON, TX 77210-4685

### **WASTE** Facility Information

#### IHW Waste Detail

Waste Code: 0629119H	Company Code:			Description: Used pphoto chemistry used in photo processing. (used fixer)				
Origin	Recycle	Managed	New Chemical	Waste Stream Status	Source	Management	SIC	NAICS
Generated on-site from a product process or service activity		Off-Site Only	No	Inactive	Other one-time or intermittent processes			446110

#### IHW Waste Management Units

Sequence Number:	Unit Type:	Status:	Description:
No Waste Management Units Information exists for this Waste Stream			

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 84841**

For: **WALGREENS 3328 (RN101459972)**

12850 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**  
Registration

Status:

Held by: **WALGREEN CO (CN601476641)**

**OWNER OPERATOR** Since 01/23/2002

Mailing Address: PO BOX 4685 HOUSTON, TX 77210-4685

### Facility Information

#### IHW Waste

Texas Waste Code	Waste Description
0629119H	Used photo chemistry used in photo processing. (used fixer)

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN102643988

**Name:** TOWN & COUNTRY VILLAGE

**Primary Business:** No primary business description on file.

**Street Address:** 12850 MEMORIAL DR, HOUSTON TX 77024 4972

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12850 MEMORIAL DRIVE

### Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

#### 1-2 of 2 Records

CN Number	Customer Name	Customer Role	Details
CN601346844	WB HOLDING CORP	OWNER OPERATOR	<a href="#">↗</a>
CN601346844	WB HOLDING CORP	VOLUNTEER CLEANUP APPLICANT	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
6512	SIC	Operators of Nonresidential Buildings

### Permits, Registrations, or Other Authorizations

There are a total of **3** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-3 of 3 Records

Program <a href="#">▲</a>	ID Type	ID Number	ID Status
INNOCENT OWNER/OPERATOR PROGRAM	ID NUMBER	817	INACTIVE
UNDERGROUND INJECTION CONTROL	PERMIT	5X2600312	ACTIVE
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	152	ACTIVE

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

**SITE SEARCH:**

please enter search phrase

**SUBJECT INDEX**

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[Search TCEQ Data](#)

[Agency Organization Map](#)

Customer	Site Associated with This Customer			TCEQ Region	Related Numbers	Rating	Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)		
	Name	City or Nearest City	County				Classification	Date Rated	Date Posted
WB HOLDING CORP	TOWN & COUNTRY VILLAGE	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>• 152</li> <li>• 152</li> <li>• SX2600312</li> <li>• 817</li> <li>• 152</li> <li>• 152</li> <li>• 817</li> <li>• 152</li> <li>• SX2600312</li> <li>• 817</li> <li>• 817</li> <li>• 152</li> <li>• SX2600312</li> <li>• 817</li> <li>• SX2600312</li> <li>• SX2600312</li> <li>• SX2600312</li> <li>• 817</li> <li>• 817</li> <li>• 152</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014

**What's a "site"?**

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry



- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

**What's a "customer"?**

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleaners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleaners

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## Central Registry

### Detail of: Innocent Owner/Operator Program ID Number 817

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)** Since 01/31/2005 [View Compliance History](#)

Mailing Address: 12850 MEMORIAL DR HOUSTON, TX 77024-4972

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18762581	11/18/2014	OUTGOING	PCA CLOSE IOM			11/18/2014	11/18/2014	
16111663	09/12/2012	OUTGOING	IOC			09/12/2012		USPS
15987961	07/24/2012	INCOMING	SURVEY/PLAT	SIGNED AFFIDAVIT	09/07/2012	09/12/2012	07/24/2012	
15970628	07/12/2012	INCOMING	SIGNED AFFIDAVIT	SIGNED AFFIDAVIT	08/26/2012	09/12/2012	07/09/2012	
15854782	05/09/2012	INCOMING	PROOF OF NOTICE	PROOF OF NOTICE ADJACENT LANDOWNER	06/23/2012	06/22/2012	05/08/2012	
15545650	03/26/2012	INCOMING	TECHNICAL CORRESPONDENCE	ADJACENT LANDOWNER	05/10/2012	05/08/2012	03/22/2012	
15877878	03/23/2012	OUTGOING	APPLICATION ACCEPTANCE			03/23/2012	03/23/2012	
15530162	02/24/2012	INCOMING	IOP APPLICATION	IOP APPLICATION	04/09/2012	03/23/2012	02/24/2012	
15530165	02/24/2012	INCOMING	SIR	SIR	05/24/2012	05/08/2012	02/24/2012	

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## Central Registry

### Detail of: Innocent Owner/Operator Program ID Number 817

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)** Since 01/31/2005 [View Compliance History](#)

Mailing Address: 12850 MEMORIAL DR HOUSTON, TX 77024-4972

Legal	Description	Start Date	End Date	Type	Status	Status Date
817	INNOCENT OWNER PROGRAM	02/24/2012	09/12/2012	CLEANUP	INACTIVE	09/12/2012

Tracking No.	Type	Value	Start Date	End Date
9312467	ADMINISTRATIVE STATUS	INACTIVE	09/12/2012	
15530787	PROJECT MANAGER	CWHITNEY	03/22/2012	09/12/2012
15530152	PROJECT MANAGER	RMUSICK	02/24/2012	03/22/2012
15530148	CASHIER RECEIVED DATE	2/24/2012	02/24/2012	
15530151	PCA NUMBER	32817	02/24/2012	11/18/2014
15530153	PROJECT NUMBER	328170	02/24/2012	
15530149	FILE LOCATION	212/D2	02/24/2012	
15530150	FILE MEDIA	PAPER	02/24/2012	
16122553	IOP EMPLOYEE TIME	2 HRS	08/31/2012	
16084844	IOP EMPLOYEE TIME	1 HRS	07/31/2012	
15942834	IOP EMPLOYEE TIME	7 HRS	05/31/2012	



15836446	<a href="#">IOP EMPLOYEE TIME</a>	1 HRS	03/31/2012
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Physical	Description	Start Date	Type	Status	Status Date
TOWN & COUNTRY VILLAGE SHOPPING CENTER	COMMERCIAL INDUSTRIAL	02/24/2012	IOP APPLICANT	COMPLETED	09/12/2012

Tracking No.	Type	Value	Start Date	End Date
9313384	PROJECT PHASE	COMPLETED	09/12/2012	09/12/2012
15530158	SITE SIZE	27.789 ACRES	02/24/2012	
15530160	CURRENT FACILITY TYPE	RETAIL STORE/SHOPPING CENTER	02/24/2012	

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 152

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)**

Mailing Address: 2705 BEE CAVES RD AUSTIN, TX 78746-5684

## Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18955806	01/22/2015	OUTGOING	APPROVAL			01/22/2015	01/22/2015	USPS
18915941	01/08/2015	INCOMING	TECHNICAL CORRESPONDENCE	CERT OF COMPLETION & RESTRICTIVE COVENANT	03/09/2015	01/22/2015	01/05/2015	USPS
18811464	12/04/2014	OUTGOING	CDC			12/04/2014	12/04/2014	USPS
18772691	12/01/2014	INCOMING	SIGNED AFFIDAVIT			12/04/2014	11/25/2014	USPS
18678852	11/07/2014	OUTGOING	AFFIDAVIT		01/30/2015	11/07/2014	11/07/2014	USPS
18678853	11/07/2014	PENDING	P SIGNED AFFIDAVIT		12/07/2014			
17693230	11/22/2013	INCOMING	PRACR	AND FINAL CLOSURE RPT	01/21/2014	11/07/2014	11/22/2013	HAND DELIV
17464772	09/06/2013	OUTGOING	COMMENTS/NOO			09/06/2013	09/06/2013	ELECTRONIC SUBMITTAL
17290603	07/02/2013	INCOMING	PRACR	MAY 2013 ANNL EVENT	08/31/2013	09/06/2013	07/02/2013	HAND DELIV
17204510	06/25/2013	OUTGOING	APPROVAL			06/25/2013	06/25/2013	ELECTRONIC SUBMITTAL
17180700	05/07/2013	OUTGOING	APPROVAL			05/07/2013	05/07/2013	ELECTRONIC SUBMITTAL
17121586	04/26/2013	INCOMING	PRACR	PRAC GW MON FEB 2013 ANNL EVENT	06/25/2013	06/25/2013	04/24/2013	HAND DELIV
16930022	03/01/2013	INCOMING	PRACR			05/07/2013	03/01/2013	HAND DELIV
16478783	10/17/2012	OUTGOING	APPROVAL			10/17/2012	10/17/2012	EMAIL
16104925	09/10/2012	INCOMING	TECHNICAL RPT	PROPOSED PRAC GW MON PLAN	11/09/2012	10/17/2012	09/06/2012	
15921887	06/05/2012	OUTGOING	APPROVAL			06/05/2012	06/05/2012	
15734506	04/10/2012	INCOMING	GW/MEDIA MONITORING RPT	GWNR	06/09/2012	06/05/2012	04/10/2012	
14686258	04/26/2011	OUTGOING	APPROVAL			04/26/2011	04/26/2011	
14620037	03/04/2011	INCOMING	GW/MEDIA MONITORING RPT	GWNR	05/03/2011	04/26/2011	03/03/2011	
13131474	07/13/2010	INCOMING	STATUS UPDATE	MSR	09/11/2010	08/11/2010	07/12/2010	
13052374	04/23/2010	INCOMING	STATUS UPDATE	QTRLY STATUS RPT - 1ST QTR 2010	06/22/2010	04/29/2010	04/22/2010	

	04/23/2010	OUTGOING	APPROVAL		06/14/2010	04/23/2010	04/23/2010	EMAIL
13055832	04/15/2010	INCOMING	GW/MEDIA MONITORING PLAN		06/09/2009	04/14/2009	04/13/2010	
13043258	05/04/2009	INCOMING	RACK A	2008 ANN MON RPT	07/03/2009	06/09/2009	04/30/2009	
12682311	03/13/2009	INCOMING	TECHNICAL RPT	UIC PERMITS TEAM	05/12/2009	04/14/2009	03/12/2009	
12632830	10/24/2008	INCOMING	STATUS UPDATE	FINAL 2008 ANN MDN RPT FOR REMED SYS	12/23/2008	11/13/2008	10/21/2008	
12515024	10/23/2008	INCOMING	STATUS UPDATE	MSR	12/22/2008	10/23/2008	10/23/2008	
12512984	05/09/2008	INCOMING	STATUS UPDATE		07/08/2008	05/12/2008	05/06/2008	
12250060	04/23/2008	INCOMING	GW/MEDIA MONITORING RPT		06/22/2008	05/23/2008	04/22/2008	
12235486	04/23/2008	INCOMING	STATUS UPDATE		06/22/2008	05/12/2008	04/18/2008	
12235504	09/27/2007	INCOMING	STATUS UPDATE		11/26/2007	10/15/2007	09/21/2007	
12137704	03/16/2007	INCOMING	GW/MEDIA MONITORING RPT	2006 ANNUAL REPORT	05/15/2007	04/26/2007	03/14/2007	
12038604	03/14/2007	INCOMING	STATUS UPDATE	FEBRUARY	05/13/2007	03/14/2007	03/14/2007	
12038031	12/20/2006	INCOMING	STATUS UPDATE		02/18/2007	12/21/2006	12/14/2006	
12033576	10/09/2006	INCOMING	STATUS UPDATE		11/23/2006	10/31/2006	10/09/2006	
12017046	08/17/2006	INCOMING	STATUS UPDATE		10/01/2006	09/06/2006	08/15/2006	
12013299	06/23/2006	INCOMING	STATUS UPDATE	ANNUAL	08/07/2006	07/31/2006	06/08/2006	
12004491	05/09/2006	INCOMING	GW/MEDIA MONITORING RPT		06/19/2006	06/12/2006	05/09/2006	
11342312	04/20/2006	INCOMING	STATUS UPDATE		06/04/2006	05/09/2006	04/20/2006	
11327543	12/05/2005	INCOMING	STATUS UPDATE		01/19/2006	01/05/2006	12/05/2005	
11217086	03/18/2005	INCOMING	GW/MEDIA MONITORING RPT		05/02/2005	04/11/2005	03/18/2005	
10923071	01/31/2005	INCOMING	UIC AUTHORIZATION		03/17/2005	02/25/2005	01/27/2005	
10883331	11/17/2004	INCOMING	GW/MEDIA MONITORING RPT		01/01/2005	12/16/2004	11/16/2004	
10805346	05/18/2004	INCOMING	GW/MEDIA MONITORING RPT	ANNUAL 2003	07/02/2004	06/24/2004	05/17/2004	
10610899	03/31/2004	INCOMING	AGENCY MEMO/FILE		05/15/2004	03/31/2004	03/30/2004	INTRA-AGENCY
10555110	03/29/2004	OUTGOING	APPROVAL			03/29/2004	03/29/2004	PHONE
10552984	01/30/2004	INCOMING	UIC AUTHORIZATION		03/15/2004	03/29/2004	01/30/2004	
10496117	01/09/2004	INCOMING	GW/MEDIA MONITORING RPT	2003 SEMI ANNUAL	02/23/2004	02/06/2004	01/09/2004	HAND DELIV
10462163	11/25/2003	OUTGOING	COMMENTS/NOD			11/25/2003		LETTER
10409173	10/27/2003	INCOMING	GW/MEDIA MONITORING RPT	2002 ANNUAL	12/11/2003	11/25/2003	10/23/2003	
10386177	06/11/2003	OUTGOING	PM ASSIGNED			06/11/2003	06/11/2003	LETTER
10271055	03/28/2003	INCOMING	RESPONSE ACTION STATUS	32R QTR 2002	05/12/2003	06/11/2003	03/27/2003	HAND DELIV
10247729	10/21/2002	INCOMING	RESPONSE ACTION STATUS	2ND QTR 2002	12/05/2002	12/18/2002	10/18/2002	OVERNIGHT
10189935	08/07/2002	INCOMING	RESPONSE ACTION STATUS	1ST QTR 2002	09/23/2002	09/24/2002	08/06/2002	HAND DELIV
10145636	04/11/2002	INCOMING	RESPONSE ACTION STATUS	2001 ANNUAL	05/26/2002	06/11/2002	03/29/2002	HAND DELIV
10092737	11/19/2001	INCOMING	RESPONSE ACTION STATUS	DISCHARGE SUMMARY		02/06/2002	11/15/2001	USPS
10044507	08/28/2001	INCOMING	RESPONSE ACTION STATUS	DISCHARGE SUMMARY REPORT	11/26/2001	02/06/2002	08/27/2001	

10032204	08/03/2001	INCOMING	RESPONSE ACTION STATUS	ANNUAL REPORT	11/01/2001	02/06/2002	07/31/2001
10026091	06/07/2001	INCOMING	RESPONSE ACTION STATUS	DISCHARGE SUMMARY	08/06/2001	01/30/2002	06/05/2001
10009531	01/11/2001	INCOMING	INVESTIGATION RPT REV	OFF-SITE	02/25/2001	01/16/2002	01/09/2001
10003169	10/05/2000	INCOMING	RESPONSE ACTION STATUS	2ND QTR 2000 - DISCHARGE SUMMARY	11/19/2000	11/30/2000	10/02/2000
1000258	04/17/2000	INCOMING	GW/MEDIA MONITORING RPT			07/15/1997	USPS
1000257	04/03/2000	INCOMING	GW/MEDIA MONITORING RPT			07/15/1997	USPS
1000256	03/30/2000	INCOMING	GW/MEDIA MONITORING RPT			07/15/1997	USPS
1000255	07/19/1999	INCOMING	TECHNICAL CORRESPONDENCE	DISCHARGE SUMMARY		07/15/1997	
1000254	06/14/1999	INCOMING	GW/MEDIA MONITORING RPT			07/15/1997	USPS
1000253	04/16/1999	INCOMING	GW/MEDIA MONITORING RPT			07/15/1997	USPS
1000252	09/11/1998	OUTGOING	COMMENTS/NOD	TOWN AND COUNTRY VILLAGE		07/15/1997	USPS
1000251	08/20/1998	OUTGOING	COMMENTS/NOD	TOWN COUNTRY VILLAGE		07/15/1997	USPS
1725027	07/15/1997	OUTGOING	CCOC			07/15/1997	
1000250	04/22/1996	OUTGOING	AGREEMENT			07/15/1997	USPS

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 152

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)**

Mailing Address: 2705 BEE CAVES RD AUSTIN, TX 78746-5684

Legal	Description	Start Date	End Date	Type	Status	Status Date
152	VOLUNTARY CLEANUP	04/22/1996		CLEANUP	ACTIVE	04/22/2006

Tracking No.	Type	Value	Start Date	End Date
18769669	PROJECT MANAGER	EMCCONNE	12/01/2014	
17778389	PROJECT MANAGER	RSCHARLA	01/06/2014	12/01/2014
17531742	PROJECT MANAGER	RGOLDSMI	10/10/2013	01/06/2014
10268492	PROJECT MANAGER	CWHITNEY	06/03/2003	10/10/2013
1006090	PROJECT MANAGER	MFREW	09/21/2000	06/03/2003
9286529	ADMINISTRATIVE STATUS	ACTIVE	04/22/2006	
1004930	PCA NUMBER	38060	09/21/2000	
1007248	PROJECT NUMBER	310600	09/21/2000	
1009828	APPLICATION RECEIVED DATE	12/21/1995	12/21/1995	
9284558	APPLICANT INTEREST IN SITE	OWNER	09/21/2000	
1010987	REGION NOTIFIED	04/22/1996	09/21/2000	
1003576	FILE LOCATION	CFR-INEW	09/21/2000	
1012970	FILE MEDIA	PAPER	09/21/2000	
9310487	OTHER PROGRAM	EPA	09/21/2000	
17491429	VCP EMPLOYEE TIME	2.5 HRS	08/31/2013	
17285350	VCP EMPLOYEE TIME	2 HRS	05/31/2013	
17201794	VCP EMPLOYEE TIME	2 HRS	04/30/2013	
16551302	VCP EMPLOYEE TIME	2.5 HRS	10/31/2012	
15942620	VCP EMPLOYEE TIME	5 HRS	05/31/2012	
15895605	VCP EMPLOYEE TIME	1 HRS	04/30/2012	
14786128	VCP EMPLOYEE TIME	.5 HRS	05/31/2011	

14715723	VCP EMPLOYEE TIME	6 HRS	04/30/2011
13085502	VCP EMPLOYEE TIME	3.5 HRS	04/30/2010

Physical	Description	Start Date	Type	Status	Status Date
TOWN AND COUNTRY VILLAGE SHOPP	VCP SITE	04/22/1996	AFFECTED PROPERTY	AFFIDAVIT	11/07/2014
Tracking No.	Type	Value	Start Date	Status	End Date
18894377	PROJECT PHASE	AFFIDAVIT	11/07/2014		
9289064	PROJECT PHASE	REMEDATION	01/19/2001		11/07/2014
18658774	APPLICABLE PROGRAM RULES	TRRP	11/03/2014		
1010485	CURRENT FACILITY TYPE	RETAIL STORE/SHOPPING CENTER	09/21/2000		
18658767	FORMER TYPE OF FACILITY	DRY CLEANER	11/03/2014		
1000040	SITE SIZE	27.789 ACRES	09/21/2000		
18658770	CURRENT OFFSITE LAND USE	MIXED USE	11/03/2014		
18658769	CURRENT ONSITE LAND USE	COMMERCIAL/INDUSTRIAL	11/03/2014		
18658768	SOURCE OF RELEASE	FORMER DRY CLEANER (YOUR VALET CLEANERS)	11/03/2014		
9291712	SOILS CHEMICAL OF CONCERN CLASSIFICATION	CHLORINATED SOLVENTS	09/21/2000		
9304612	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	DICHLOROETHYLENE, CIS-1,2-	09/21/2000		
9304613	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	TETRACHLOROETHYLENE	09/21/2000		
9304614	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	TRICHLOROETHYLENE	09/21/2000		
18658819	GW BEARING UNIT	GW BEARING UNIT 2	11/03/2014		
9291713	GW BEARING UNIT	GW BEARING UNIT 1	09/21/2000		
18658780	GROUNDWATER CLOSURE	GROUNDWATER	11/03/2014		
9304615	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	DICHLOROETHYLENE, CIS-1,2-	09/21/2000		
9304616	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	TETRACHLOROETHYLENE	09/21/2000		
9304617	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	TRICHLOROETHYLENE	09/21/2000		
18658869	NEAREST SURFACE WATER BODY NAME	BUFFALO BAYOU	11/03/2014		
18658771	SOLID WASTE UNITS CLOSED	NO	11/03/2014		

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## Central Registry

### Detail of: Underground Injection Control Permit 5X2600312

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

Held by: **WB HOLDING CORP (CN601346844)**

**OWNER OPERATOR** Since 01/31/2005 [View Compliance History](#)

Mailing Address: 3003 W ALABAMA ST HOUSTON, TX 77098-2001

**WB HOLDING CORP (CN601346844)**

**VOLUNTEER CLEANUP APPLICANT**

Mailing Address: 3003 W ALABAMA ST HOUSTON, TX 77098-2001

## Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
17645214	11/22/2013	INCOMING	CLASS V WELL REPORT	CC ON REQUEST TO VCP FOR COMPLETION	11/22/2013	11/22/2013	11/22/2013	HAND DELIV
16930473	03/01/2013	INCOMING	ANNUAL/BIENNIAL SITE ACTV RPT	NOVEMBER 2012 - ANNUAL MONITORING EVENT			03/01/2013	HAND DELIV
15823104	04/10/2012	INCOMING	CLASS V WELL REPORT	2011 ANNUAL MONITORING REPORT	04/10/2012	04/10/2012	04/03/2012	USPS
13049437	04/14/2010	INCOMING	CLASS V WELL REPORT	2009 ANNUAL MONITORING REPORT	04/14/2010	04/14/2010	04/13/2010	HAND DELIV
13005078	03/03/2010	INCOMING	CLASS V WELL AUTHORIZATION	AMENDMENT APPROVAL		03/03/2010	03/03/2010	LETTER
13004783	02/16/2010	INCOMING	CLASS V REVISION	CLASS V AMENDMENT #4		02/16/2010	02/09/2010	HAND DELIV
12677373	05/01/2009	INCOMING	CLASS V WELL REPORT			05/01/2009	04/30/2009	





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## Central Registry

### Detail of: **Underground Injection Control Permit 5X2600312**

For: **TOWN & COUNTRY VILLAGE (RN102643988)**

12850 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

Held by: **WB HOLDING CORP (CN601346844)**

**OWNER OPERATOR** Since 01/31/2005 [View Compliance History](#)

Mailing Address: 3003 W ALABAMA ST HOUSTON, TX 77098-2001

**WB HOLDING CORP (CN601346844)**

**VOLUNTEER CLEANUP APPLICANT**

Mailing Address: 3003 W ALABAMA ST HOUSTON, TX 77098-2001

Legal	Description	Start Date	End Date	Type	Status	Status Date
5X2600312	UIC PERMITS	01/28/2005		PERMIT	ACTIVE	02/04/2005

Tracking No.	Type	Value	Start Date	End Date
13004777	APPLICATION RECEIVED	CLASS V REVISION	02/16/2010	03/03/2010
12690425	APPLICATION RECEIVED	CLASS V REVISION	05/01/2009	06/02/2009
12004260	APPLICATION RECEIVED	CLASS V REVISION	06/16/2006	07/31/2006
10882690	APPLICATION RECEIVED	CLASS V REVISION	01/28/2005	02/04/2005

Physical	Description	Start Date	Type	Status	Status Date
TOWN COUNTRY VILLAGE		01/28/2005	CLASS V	ACTIVE	02/04/2005

Tracking No.	Type	Value	Start Date	End Date
9279468	NUMBER OF PERMITTED WELLS	60	01/28/2005	
9278927	WELL TYPE	AQUIFER REMEDIATION	01/28/2005	
9280006	WELL LATITUDE	29.77222	01/28/2005	
9280535	WELL LONGITUDE	-95.55889	01/28/2005	
9283727	COMMENTS	AMENDMENT TO ADD INJECTION WELLS. 8/13/12 REQUEST TO CHANGE REPORTING REQUIREMENTS	01/28/2005	
9281216	INJECTION ZONE FORMATION	ALLUVIUM	01/28/2005	

9281733	INJECTION ZONE TOP DEPTH	25		01/28/2005
9282176	INJECTION ZONE BOTTOM DEPTH	44		01/28/2005
9282692	INJECTION RATE REPORTED	20 GPM		01/28/2005
9283207	INJECTION FLUID	NA		01/28/2005

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152 12

Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Zak Covar, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

November 7, 2014

Mr. Jeffery Henke  
Weston Solutions, Inc.  
2705 Bee Caves Road, Suite 100  
Austin, Texas 78746

Re: Town & Country Village Shopping Center, 12850 Memorial Drive, Houston, Harris County, TX; Voluntary Cleanup Program (VCP) No. 152; Customer No. CN601346844; Regulated Entity No. RN100659127

Dear Mr. Henke:

The Texas Commission on Environmental Quality (TCEQ) has reviewed Exhibit "C-1", restrictive covenant for the off-site property, and executed the exhibit on October, 31, 2014. Based on this review, the TCEQ has determined that the site has attained Texas Risk Reduction Program (TRRP) Remedy Standard B commercial/industrial standards, in accordance with 30 Texas Administrative Code (TAC) §350.33. Therefore, the TCEQ is prepared to issue a Certificate of Completion (COC) for the site pursuant to 30 TAC §333.10.

Enclosed for your signature is an exhibit entitled *Affidavit of Completion of Response Actions* (Exhibit "B"), which will become an attachment to the COC. Exhibit "B" is a statement of your diligence in performing the necessary corrective action at the site. Additionally, an exhibit entitled *Restrictive Covenant* (Exhibit "C") for the on-site property is included for your signature. Exhibit "C" lists restrictions that must be observed and to which the current landowner must consent.

In addition to the supplied exhibits, a legal description of the site should be submitted. The legal description may include either a lot and block description and corresponding map of the site, or a metes and bounds and corresponding survey of the site. This information will become Exhibit "A", an attachment to the COC.

If you are relying upon a restrictive covenant, it will be necessary to submit other maps labeled "C-1", "C-2", "C-3", etc. that identify the physical location(s) of the site to which the restrictions in Exhibit "C" pertain. If restricting an area less than the site described in Exhibit "A", the area must be described by a metes and bounds description, survey map and prepared and sealed by a State of Texas Registered Land Surveyor. If restricting the whole site, Exhibit "A" and its legal description and map may be used.

If the certificate will be filed on property that you do not own or control, you must provide the VCP with documentation that the current landowner consents to the placement of the VCP certificate on the property deed along with the attached exhibits unless this was previously performed. Similarly, if not already performed, you must provide the TCEQ with a copy of the written request for permission to file the VCP certificate. The copy of the written request must

RECEIVED

NOV 13 2014

REGION 12



Mr. Jeff Henke  
Page 2  
November 7, 2014  
VCP No. 152

contain a draft certificate (complete with exhibits), the address and phone number of the TCEQ's Public Interest Counsel and a clear explanation as to the content and purpose of the institutional control.

We appreciate the opportunity for the Texas VCP to help you receive the COC. The TCEQ requests that you complete the Texas Brownfields Survey and return it in the enclosed envelope. We would appreciate feedback regarding the VCP which would help us serve you and others better in the future. Additionally, we would like to track both the short and long term success of sites remediated through the VCP. We may contact you in the future to request additional information regarding measurable economic and community successes (e.g. increased number of jobs, increased property value) realized since the issuance of the VCP COC.

Please return the original executed exhibits, legal description and survey map of the site (as well as any other necessary survey maps) with the enclosed envelope. The Texas Brownfields Survey should also be included. The requested information should be sent to my attention at the TCEQ, Voluntary Cleanup Program, mail code MC-221, at the letterhead address no later than 30 days from the date of this letter. If an adequate response cannot be prepared within this time frame, please contact me to discuss an alternative schedule.

When we have received the requested information, we will prepare the COC with attached exhibits and mail it to you. At that time, you will file the COC in the Harris County deed records and return proof of the filing to me. You may contact me with any questions or comments at (512) 239-2215.

Sincerely,



Richard Scharlach, Team Leader  
VCP-CA Section  
Remediation Division  
Texas Commission on Environmental Quality

RS/EM/jdm

cc: Mr. Dan Moody, WB Holding Corporation, [Dan.Moody3@moodyrambin.com](mailto:Dan.Moody3@moodyrambin.com)  
Mr. Kris Heckmann, Granite Public Affairs, [kris@granitepublicaffairs.com](mailto:kris@granitepublicaffairs.com)  
Mr. Larry Nettles, Vinson & Elkins, [lnettles@velaw.com](mailto:lnettles@velaw.com)  
Ms. Nicolle Bealle, Waste Section Manager, TCEQ Region 12 Office, Houston

Enclosures: Exhibits "B" and "C" for execution, Brownfields Survey

RECEIVED  
NOV 10 2014

**EXHIBIT "B"**  
**Affidavit of Completion of Response Actions**  
**VCP No. 152**

BEFORE ME, the undersigned authority, on this day personally appeared \_\_\_\_\_, as an authorized representative of WB Holding Corporation, known to me to be the person whose name is subscribed below who being by me first duly sworn, upon their oath, stated as follows:

I am over the age of 18 and legally competent to make this affidavit. I have personal knowledge of the facts stated herein.

WB Holding Corporation (Applicant) has completed response actions pursuant to Chapter 361, Subchapter S, Texas Health and Safety Code, at the tract of land described in Exhibit "A" to this certificate that pertains to Town & Country Village Shopping Center (Site), Voluntary Cleanup Program (VCP) No. 152 located at 12850 Memorial Drive, Houston, Harris County, Texas. The Site was owned by \_\_\_\_\_ at the time the application to participate in the VCP was filed.

The Applicant has submitted and received approval from the Texas Commission on Environmental Quality (TCEQ) Remediation Division on all plans and reports required by the Voluntary Cleanup Agreement. The plans and reports were prepared using a prudent degree of inquiry of the Site consistent with accepted industry standards to identify all hazardous substances, waste and contaminated media of regulatory concern. The response actions for the Site have achieved standards acceptable for commercial/industrial land use as determined by the TCEQ.

The response actions substantially eliminated present or future risk to public health and safety and to the environment from releases and threatened releases of hazardous substances and/or contaminants at or from the Site. The Applicant has not acquired this certificate of completion by fraud, misrepresentation or knowing failure to disclose material information. Further information concerning the response action at this Site may be found in the final report at the central office of the TCEQ under VCP No. 152.

The preceding is true and correct to the best of my knowledge and belief.

Applicant

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Title)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

SUBSCRIBED AND SWORN before me on this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, to which witness my hand and seal of office.

\_\_\_\_\_  
Notary Public in and for the State of \_\_\_\_\_

**EXHIBIT "C"**  
**Restrictive Covenant**  
**VCP No. 152**

\_\_\_\_\_ (Owner) is the owner of the tract of land described in Exhibit "A", attached hereto and incorporated herein, that pertains to Town & Country Village Shopping Center (Site), VCP No. 152 located at 12850 Memorial Drive in Houston, Harris County, Texas. In consideration of the Response Actions by WB Holding Corporation (VCP Applicant) and issuance of this Final Certificate of Completion, the Owner has agreed to place the restrictions listed below on the Site at the areas described in the Exhibit "C-1" and in favor of the Texas Commission on Environmental Quality (TCEQ) and the State of Texas. This Restrictive Covenant is filed to provide information concerning certain environmental conditions and use limitations.

This Restrictive Covenant is required for the following reasons:

The area described in Exhibit "C-1", attached hereto and incorporated herein, overlies groundwater which contains concentrations of chemicals exceeding TCEQ-approved protective concentrations, plus any additional area allowed by the TCEQ. The area in Exhibit "C-1", attached hereto and incorporated herein, is being managed such that human exposure is prevented and other groundwater resources are protected.

Now, therefore, in consideration of these premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the following Restrictive Covenant in favor of the TCEQ and the State of Texas is placed on the Site, at the areas described in the attached exhibits, to-wit:

1. The following restrictions shall be a covenant running with the land.
2. Use of and exposure to the groundwater at the Site for any purpose is prohibited until such time when all of the chemicals of concern in groundwater within the area specified in Exhibit "C-1" no longer exceed levels which are protective of the public health.
3. Removal or modification of this restrictive covenant is prohibited without prior written approval of the TCEQ.

For additional information, contact:

In person:  
TCEQ Central Records  
12100 Park 35 Circle, Building E  
Austin, Texas 78753

Mail:  
TCEQ - MC 199  
P.O. Box 13087  
Austin, Texas 78711-3087

This Restrictive Covenant may be rendered of no further force or effect only by a release executed by the TCEQ or its successor agencies and filed in the same Real Property Records as those in which this Restrictive Covenant is filed.

**Property Owner**

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Mailing Address)

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

SUBSCRIBED AND SWORN before me on this \_\_\_\_\_ the day of \_\_\_\_\_ 20\_\_\_\_,  
to which witness my hand and seal of office.

Notary Public in and for the State of \_\_\_\_\_

**VCP Applicant**

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Title)



STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

SUBSCRIBED AND SWORN before me on this \_\_\_\_\_ the day of \_\_\_\_\_ 20\_\_\_\_,  
to which witness my hand and seal of office.

\_\_\_\_\_  
Notary Public in and for the State of \_\_\_\_\_

Accepted as Third Party Beneficiary this day of 20

**Texas Commission on Environmental Quality**

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Title)

STATE OF TEXAS

TRAVIS COUNTY

SUBSCRIBED AND SWORN before me on this \_\_\_\_\_ the day of \_\_\_\_\_ 20\_\_\_\_,  
to which witness my hand and seal of office.

Notary Public in and for the State of \_\_\_\_\_

# Texas Brownfields Survey

Town & Country Village Shopping Center, 12850 Memorial Drive, Houston, Harris County, Texas; Voluntary Cleanup program (VCP) No. 152

Contact Person: \_\_\_\_\_

Telephone Number and email: \_\_\_\_\_

If you do not or will no longer own the property, please provide an alternate contact name, phone number, and email for future questions:

\_\_\_\_\_

1. Is development or redevelopment planned for the property? Yes      No
  
2. Is additional development or redevelopment planned for the area surrounding the property? Yes      No
  
3. Would the sale of this property or redevelopment have occurred without the VCP? Yes      No
  
4. If redevelopment is planned, what is the approximate schedule for redevelopment?  
N/A      0-1 year      1-3 years      3-5 years      5-10 years      10 + years
  
5. What is the anticipated increase in jobs due to receiving the certificate and/or redevelopment?  
0-5 jobs    5-10 jobs    10-50 jobs    50-100 jobs    100-500 jobs    500 + jobs
  
6. What is the anticipated increase in appraised property value due to receiving the certificate and/or redevelopment? Approximate increase \$ \_\_\_\_\_ OR  
0-20%      20-50%      50-100%      100-200%      200-500%      500 + %
  
7. Please describe any areas within the VCP administrative or technical review process where you believe improvements should be made (attach additional pages as necessary): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

IOP 817 12

Bryan W. Shaw, Ph.D., *Chairman*  
Carlos Rubinstein, *Commissioner*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

September 12, 2012

**RECEIVED**  
**SEP 24 2012**  
**REGION 12**

Mr. Jeffrey Henke  
Weston Solutions, Inc.  
2705 Bee Cave Road, Suite 100  
Austin, Texas 78746

Re: Town & Country Village Shopping Center, 12850 Memorial Drive, Houston,  
Harris County, Texas; IOP No. 817; Customer No. CN601346844; Regulated  
Entity No. RN100659127

Dear Mr. Henke:

The Texas Commission on Environmental Quality (TCEQ) received an IOP Application on February 24, 2012, for the above referenced property (Site) and has determined that WB Holding Corp has successfully completed IOP requirements and is an Innocent Owner/Operator as defined by §361.751(2) of the Solid Waste Disposal Act (SWDA), Texas Health and Safety Code (THSC). Therefore, the enclosed Certificate for the Site is issued pursuant to §361.753 of the SWDA, THSC.

Please contact Ms. Christine Whitney of my staff with any questions or comments at (512) 239-0843.

Sincerely,

Beth Seaton, Director  
Remediation Division

BS/CMW/mdh

Enclosure

cc: Mr. Dan Moody, WB Holding Corporation, [Dan.Moody3@moodyrambin.com](mailto:Dan.Moody3@moodyrambin.com)  
Mr. Larry Nettles, Vinson & Elkins, 1001 Fannin Street, Suite 2500, Houston, Texas 77002  
Ms. Nicole Bealle, Waste Section Manager, TCEQ Region 12 Office, Houston



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



INNOCENT OWNER/OPERATOR PROGRAM CERTIFICATE

As provided for in §361.753, Subchapter V, Solid Waste Disposal Act (SWDA), Texas Health and Safety Code:

I, Beth Seaton, Director of the Remediation Division, Office of Waste, Texas Commission on Environmental Quality (TCEQ or Commission), certify under §361.753, SWDA, Texas Health and Safety Code, that necessary investigations have been completed as described in the approved Site Investigation Report(s) dated February 2012 (Site Report) for the tract(s) of land described in Exhibit "A" (Site), and that WB Holding Corp is an Innocent Owner as defined by §361.751(2) for the Site, based on the affidavit for IOP No. 817 in Exhibit "B". A copy of the Site Report(s) may be found in the TCEQ Central Records Office under IOP No. 817.

WB Holding Corp is not liable under the Texas Health and Safety Code or the Texas Water Code for investigation, monitoring, remediation or corrective or other response actions regarding the conditions attributable to the release or migration of the contaminant(s) in groundwater from a source or sources not located on or at the site, including benzene, toluene, ethyl benzene, xylenes (BTEX) and methyl tert-butyl ether (MTBE) or related degradation products described in the Site Report(s), or otherwise liable regarding those conditions. WB Holding Corp shall grant reasonable access to the property for purposes of investigation and remediation to persons designated by the Executive Director of the TCEQ.

EXECUTED this the 12<sup>th</sup> day of September, 2012

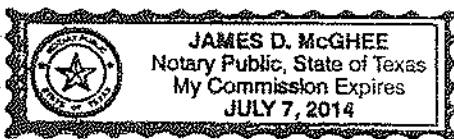
*Beth Seaton*

Beth Seaton, Director  
Remediation Division

STATE OF TEXAS  
TRAVIS COUNTY

BEFORE ME, on this the 12<sup>th</sup> day of SEPTEMBER, personally appeared Beth Seaton, Division Director of the Remediation Division of the Texas Commission on Environmental Quality, known to me to be the person and agent of said Commission whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 12<sup>th</sup> day of SEPTEMBER, 2012



Notary without Bond

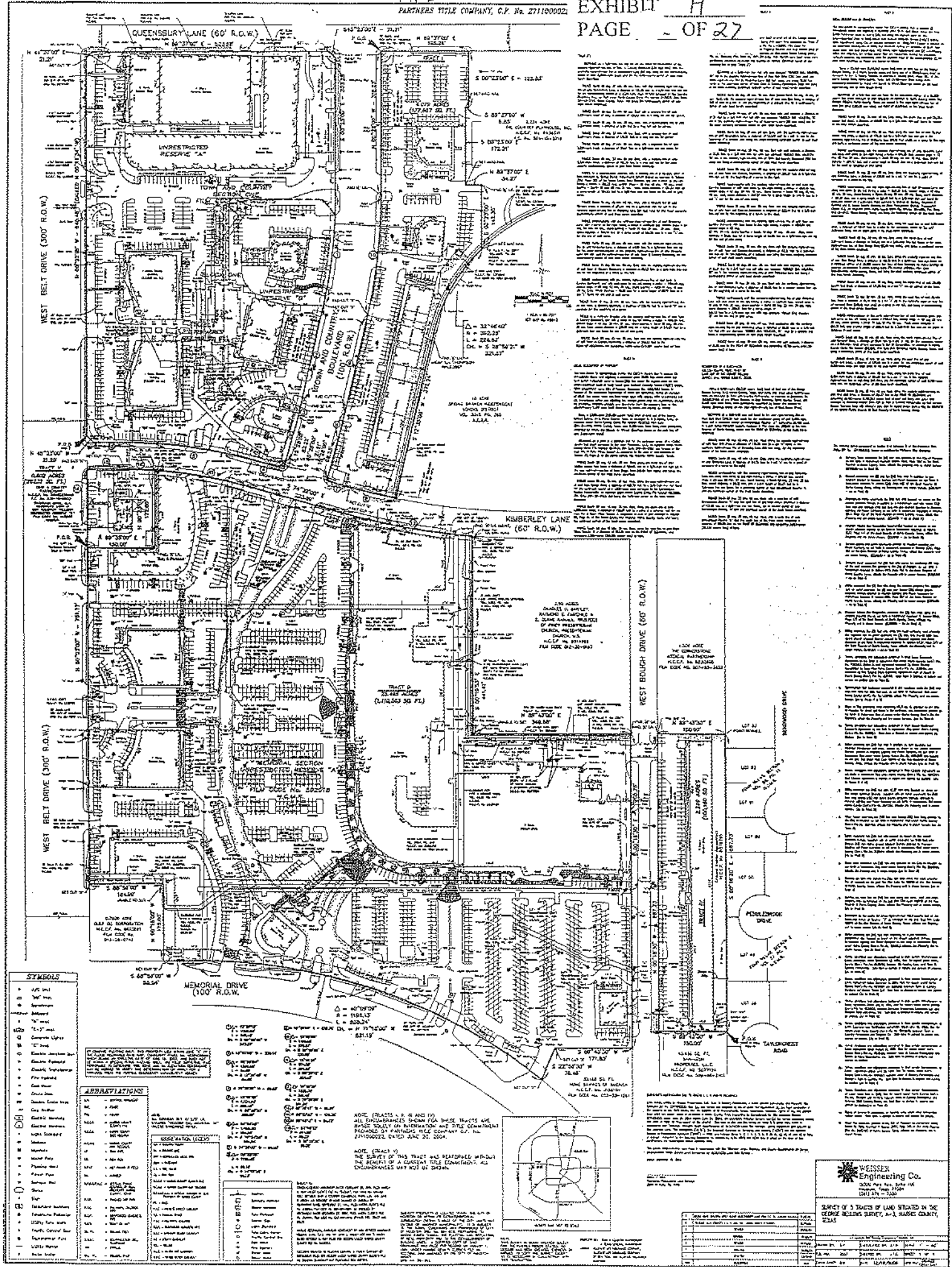
*James D. McGhee*  
Notary Public in and for the State of Texas

EXHIBIT "A"  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
INNOCENT OWNER/OPERATOR PROGRAM  
LEGAL DESCRIPTION OF PROPERTY

The property belonging to WB Holding Corp. is a 27.789 acre tract (Tract III and Tract IV), more or less, located at 12850 Memorial Drive, Houston. Tract III is recorded in the George Bellows Survey, A-3, Harris County Texas, recorded in Volume 5647, Page 593, of the Deed of Records Harris County, Texas. Tract IV is part of the George Bellows Survey, A-3, Harris County Texas, recorded in under Harris County Clerks File Number R578753, Film Code 505-36-2449, Harris County Texas. The IOP site is the portion of the map located south of Kimberly Lane and both tracts are more particularly described as follows:

**EXHIBIT "A"**  
**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**  
**INNOCENT OWNER/OPERATOR PROGRAM**  
**LEGAL DESCRIPTION OF PROPERTY**

The property belonging to WB Holding Corp. is a 27.789 acre tract (Tract III and Tract IV), more or less, located at 12850 Memorial Drive, Houston. Tract III is recorded in the George Bellows Survey, A-3, Harris County Texas, recorded in Volume 5647, Page 593, of the Deed of Records Harris County, Texas. Tract IV is part of the George Bellows Survey, A-3, Harris County Texas, recorded in under Harris County Clerks File Number R578753, Film Code 505-36-2449, Harris County Texas. The IOP site is the portion of the map located south of Kimberly Lane and both tracts are more particularly described as follows:



- SYMBOLS**
- ▲ 1/4" Easement
  - 1/2" Easement
  - 3/4" Easement
  - △ 1" Easement
  - △ 2" Easement
  - △ 3" Easement
  - △ 4" Easement
  - △ 6" Easement
  - △ 8" Easement
  - △ 10" Easement
  - △ 12" Easement
  - △ 15" Easement
  - △ 18" Easement
  - △ 24" Easement
  - △ 30" Easement
  - △ 36" Easement
  - △ 42" Easement
  - △ 48" Easement
  - △ 60" Easement
  - △ 72" Easement
  - △ 84" Easement
  - △ 96" Easement
  - △ 108" Easement
  - △ 120" Easement
  - △ 144" Easement
  - △ 168" Easement
  - △ 192" Easement
  - △ 216" Easement
  - △ 240" Easement
  - △ 264" Easement
  - △ 288" Easement
  - △ 312" Easement
  - △ 336" Easement
  - △ 360" Easement
  - △ 384" Easement
  - △ 408" Easement
  - △ 432" Easement
  - △ 456" Easement
  - △ 480" Easement
  - △ 504" Easement
  - △ 528" Easement
  - △ 552" Easement
  - △ 576" Easement
  - △ 600" Easement
  - △ 624" Easement
  - △ 648" Easement
  - △ 672" Easement
  - △ 696" Easement
  - △ 720" Easement
  - △ 744" Easement
  - △ 768" Easement
  - △ 792" Easement
  - △ 816" Easement
  - △ 840" Easement
  - △ 864" Easement
  - △ 888" Easement
  - △ 912" Easement
  - △ 936" Easement
  - △ 960" Easement
  - △ 984" Easement
  - △ 1008" Easement
  - △ 1032" Easement
  - △ 1056" Easement
  - △ 1080" Easement
  - △ 1104" Easement
  - △ 1128" Easement
  - △ 1152" Easement
  - △ 1176" Easement
  - △ 1200" Easement
  - △ 1224" Easement
  - △ 1248" Easement
  - △ 1272" Easement
  - △ 1296" Easement
  - △ 1320" Easement
  - △ 1344" Easement
  - △ 1368" Easement
  - △ 1392" Easement
  - △ 1416" Easement
  - △ 1440" Easement
  - △ 1464" Easement
  - △ 1488" Easement
  - △ 1512" Easement
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**WEISSER Engineering Co.**  
 5207 N. 11th St.  
 Denver, CO 80231  
 (303) 751-2200

Survey of 3 Acres of Land Situated in the  
 George Williams Survey, A-1, Adams County,  
 Texas

DATE: 01/15/2024  
 BY: [Signature]  
 CHECKED: [Signature]  
 APPROVED: [Signature]



**EXHIBIT "B"**  
**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**  
**INNOCENT OWNER/OPERATOR PROGRAM**  
**AFFIDAVIT BY INNOCENT OWNER/OPERATOR**

Before me, the undersigned authority, personally appeared Mr. Dan Moody III, who, being by me duly sworn, deposed as follows:

My name is Dan Moody III, and I am a representative of WB Holding Corp. I am of sound mind, capable of making this affidavit, and personally acquainted with the facts herein stated:

WB Holding Corp is the owner of the Site located at 12850 Memorial Drive, Houston, Harris County, Texas. The physical boundaries of the site are set out in the attached Exhibit "A", legal description of property (Site).

WB Holding Corp has owned the Site from September 14, 1995 to the present.

WB Holding Corp or its representatives have completed investigations pursuant to Section 361.753(a) of the Texas Solid Waste Disposal Act, at the Site described in Exhibit "A" to this certificate. The plans and reports submitted by WB Holding Corp in its Innocent Owner/Operator Application contain information collected and analyzed using a prudent degree of inquiry consistent with accepted industry standards. The plans and reports are true, correct and complete to the best of my knowledge.

The Site has become contaminated as a result of a release or migration of contaminants in groundwater from a source or sources not located on or at the Site. These contaminants are described in the Site Investigation Report for the Site dated February 2012 located in the TCEQ Central Records under IOP No. 817.

Neither I, WB Holding Corp, its agents, nor other persons, properties or operations for which it has legal responsibility, have caused or contributed to the source or source(s) of contamination at the Site.

Site Innocent Owner or Operator

By: \_\_\_\_\_

Signature

Dan M. Moody III  
Name (Printed or Typed)

President  
Title

SWORN TO AND SUBSCRIBED before me on the 9 day of June, 2012

(Notary) \_\_\_\_\_



Bryan W. Shaw, Ph.D., *Chairman*  
Buddy Garcia, *Commissioner*  
Carlos Rubinstein, *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



12

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

April 23, 2009

Mr. Jeffrey Henke  
Weston Solutions, Inc.  
2705 Bee Cave Road, Suite 100  
Austin, Texas 78746

Re: Final 2008 Annual Monitoring Report For the Remediation System for Town & Country Village Shopping Center, 12850 Memorial Drive, Houston, Harris County, Texas; Voluntary Cleanup Program (VCP) No. 152; Customer No. CN601346844; Regulated Entity No. RN100659127

Dear Mr. Henke:

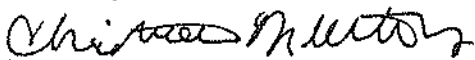
The VCP of the Texas Commission on Environmental Quality (TCEQ) has reviewed the above referenced report for groundwater monitoring and the remediation system. The report documents the operation and performance of the groundwater remediation system at the site for the 88 monitoring and recovery wells onsite as well as the installation of 18 additional injection wells along Memorial Drive. The TCEQ notes that the water treatment system appears to be effectively removing contaminants from the discharged water and the air effluent appears to be within allowable discharge limits.

It is stated that Weston and WB Holding believe the second sand unit is technically impracticable to remediate to the appropriate PCLs. The TCEQ does not concur that a demonstration has been made that it is technically impracticable to remediate the second sand unit. The TCEQ notes that the relevant cleanup target goals have not been met, and that the second sand unit should continue to be monitored.

After careful review, the TCEQ has determined that the report contains the necessary information for an annual groundwater monitoring report. Currently, the TCEQ has no objections to your plans to continue the operation of the remediation system and monitoring program as proposed for 2010.

The 2010 Annual Groundwater Monitoring Report should be received no later than April 30, 2011. Please continue to reference VCP No. 152 on the front of any future letters or reports. Future submittals should be mailed to my attention at the TCEQ, Remediation Division, mail code MC 221, at the letterhead address. You may contact me at (512) 239-0843.

Sincerely,

  
Christine M. Whitney, Project Manager  
VCP-CAS Section  
Remediation Division

**RECEIVED**  
**APR 29 2010**  
**REGION 12**

CMW/jdm

cc: Mr. Dan Moody, WB Holding Corporation, 3003 West Alabama, Houston, Texas 77098  
Ms. Nicole Bealle, Waste Program Manager, TCEQ Region 12, Houston

## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN104946496

**Name:** POST OAK CLEANERS

**Primary Business:** No primary business description on file.

**Street Address:** 12645 MEMORIAL DR STE G, HOUSTON TX 77024 4979

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** No near zip code on file.

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CH602898082	J AND H LEE CORPORATION	OWNER OPERATOR	<a href="#">↔</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-2 of 2 Records

Program <a href="#">▲</a>	ID Type	ID Number	ID Status
DRY CLEANERS REGISTRATION	INTERNAL	104946496	CANCELLED
DRY CLEANERS REGISTRATION	REGISTRATION	DCR14406	ACTIVE

Questions or Comments &gt;&gt;

[Query Home](#)  
 [Customer Search](#)  
 [RE Search](#)  
 [ID Search](#)  
 [Search Results](#)  
 [Registration Detail](#)  
 [TCEQ Home](#)

## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR14406

For: **POST OAK CLEANERS (RN104946496)**

12645 MEMORIAL DR STE G, HOUSTON

Registration **ACTIVE**

Status:

Held by: **J AND H LEE CORPORATION (CN602898082)**

**OWNER OPERATOR** Since 09/01/2005

Mailing Address: 2515 S GESSNER RD HOUSTON, TX 77063-2007

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18903686	01/06/2015	OUTGOING	DROP STATION CERT	2015 Q - 2				
18568801	10/03/2014	OUTGOING	DROP STATION CERT	2015 Q - 1				
18472710	06/19/2014	OUTGOING	COMPT FILE CREATION					
18464849	07/31/2014	INCOMING	DROP STATION REGISTRATION				07/25/2014	
18365097	07/18/2014	OUTGOING	DROP STATION CERT	2014 Q - 4				
18238286	06/24/2014	OUTGOING	RENEWAL REG LETTER	FY2015				LETTER
18055047	04/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 3				
17784566	01/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 2				
17784688	01/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 1				
17622985	11/20/2013	OUTGOING	COMPT FILE CREATION					
17613751	11/18/2013	OUTGOING	COMPT FILE CREATION					
17612035	11/14/2013	INCOMING	DROP STATION REGISTRATION				11/07/2013	
17312068	07/15/2013	OUTGOING	DROP STATION CERT	2013 Q - 4				
17269564	06/21/2013	OUTGOING	RENEWAL REG LETTER	FY2014				LETTER
17040314	04/04/2013	OUTGOING	DROP STATION CERT	2013 Q - 3				
16861285	02/13/2013	OUTGOING	DROP STATION CERT	2013 Q - 2				
16861315	02/13/2013	OUTGOING	DROP STATION CERT	2013 Q - 1				
16643444	01/02/2013	OUTGOING	COMPT FILE CREATION					
16626776	12/21/2012	INCOMING	DROP STATION REGISTRATION				12/17/2012	
15953592	07/09/2012	OUTGOING	DROP STATION CERT	2012 Q - 4				
15913334	06/13/2012	OUTGOING	RENEWAL REG LETTER	FY2013				LETTER
15904467	06/08/2012	OUTGOING	DROP STATION CERT	2012 Q - 3				
15485014	02/27/2012	OUTGOING	DROP STATION CERT	2012 Q - 1				
15485018	02/27/2012	OUTGOING	DROP STATION CERT	2012 Q - 2				
15098312	12/12/2011	OUTGOING	COMPT FILE CREATION					
15098384	12/12/2011	OUTGOING	COMPT FILE CREATION					



15095489	12/07/2011	OUTGOING	COMPT FILE CREATION				
15095543	12/07/2011	OUTGOING	COMPT FILE CREATION				
15086447	12/05/2011	INCOMING	DROP STATION REGISTRATION			11/28/2011	
15086474	12/05/2011	INCOMING	DROP STATION REGISTRATION			11/28/2011	
15086487	12/05/2011	INCOMING	DROP STATION REGISTRATION			11/28/2011	
15086498	12/05/2011	INCOMING	DROP STATION REGISTRATION			11/28/2011	
15086510	12/05/2011	INCOMING	DROP STATION REGISTRATION			11/28/2011	
3512909	02/15/2007	OUTGOING	DROP STATION CERT	2007 Q - 3			
3533445	10/17/2006	OUTGOING	DROP STATION CERT	2007 Q - 1			
3019550	09/19/2006	INCOMING	DROP STATION REGISTRATION				
3516036	07/11/2006	OUTGOING	DROP STATION CERT	2006 Q - 4			
3526296	05/23/2006	OUTGOING	DROP STATION CERT	2006 Q - 1			
3528383	05/23/2006	OUTGOING	DROP STATION CERT	2006 Q - 3			
3019549	05/12/2006	INCOMING	DROP STATION REGISTRATION				

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR14406

For: **POST OAK CLEANERS (RN104946496)**

12645 MEMORIAL DR STE G, HOUSTON

Registration **ACTIVE**

Status:

Held by: **J AND H LEE CORPORATION (CN602898082)**

**OWNER OPERATOR** Since 09/01/2005

Mailing Address: 2515 S GESSNER RD HOUSTON, TX 77063-2007

Legal	Description	Start Date	End Date	Type	Status	Status Date
DCR14406	FY2015	08/14/2014		DROP STATION REGISTRATION	ACTIVE	08/22/2014
DCR14406	FY2014	11/15/2013		DROP STATION REGISTRATION	ACTIVE	11/22/2013
DCR14406	FY2013	12/27/2012		DROP STATION REGISTRATION	ACTIVE	01/03/2013
DCR14406	FY2008	12/06/2011		DROP STATION REGISTRATION	ACTIVE	12/06/2011
DCR14406	FY2009	12/06/2011		DROP STATION REGISTRATION	ACTIVE	12/06/2011
DCR14406	FY2010	12/06/2011		DROP STATION REGISTRATION	ACTIVE	12/06/2011
DCR14406	FY2011	12/06/2011		DROP STATION REGISTRATION	ACTIVE	12/12/2011
DCR14406	FY2012	12/06/2011		DROP STATION REGISTRATION	ACTIVE	12/12/2011
DCR14406	FY2007	09/01/2006		DROP STATION REGISTRATION	ACTIVE	09/19/2006
DCR14406	FY2006	09/01/2005		DROP STATION REGISTRATION	ACTIVE	05/12/2006

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## Central Registry

Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 113777**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **EPSTEIN ALTA ESTATE (CN604460873)** [View Compliance History](#)

Mailing Address: Not on file

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
6247696	03/26/1999	OUTGOING	FINAL			03/26/1999	03/26/1999	
6247697	03/26/1999	OUTGOING	FINAL			03/26/1999	03/26/1999	
6247698	03/26/1999	OUTGOING	FINAL			03/26/1999	03/26/1999	
6131337	02/03/1999	INCOMING	REL DET			03/26/1999	12/16/1998	
6131338	02/03/1999	INCOMING	SCR			03/26/1999	12/16/1998	
6131339	02/03/1999	INCOMING	TANK CLR			03/26/1999	12/30/1998	

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## Central Registry

### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 113777

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **EPSTEIN ALTA ESTATE (CN604460873)** [View Compliance History](#)

Mailing Address: Not on file

Legal	Description	Start Date	End Date	Type	Status	Status Date
113777	LEAKING PETROLEUM STORAGE TANK	02/03/1999	03/26/1999	CLEANUP	INACTIVE	03/26/1999

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## Central Registry

### Detail of: Petroleum Storage Tank Registration 61076

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Registration **INACTIVE**

Status:

Held by: **ESTATE OF ALTA J EPSTEIN (CN601253842)**

**OWNER** Since 10/22/1991 [View Compliance History](#)

Mailing Address: 1177 WEST LOOP S STE 1560 HOUSTON, TX 77027-9019

### Financial Assurance

None

### Self-Certification Status by Compartment

None

### Registered Tanks and Their Associated Systems

Table 1. Underground Storage Tank Summary

Tank	Capacity (Gallon)	Date Installed	Status	Substance Stored	Related Information
1		08/31/1987	Removed from Ground (12/01/1998)	A: Gasoline	Tank Details Compartment Piping Vapor Recovery

Table 2. Tank Details

Tank	Design & Materials	Corrosion Protection	Release Detection	Spill Containment and Overfill Prevention	Installation Contractor	Installer	Test Result	Related Information
1	1: Single Wall ( Steel )						Tank Tested	Tank Summary Compartment Piping Vapor Recovery

Table 3. Compartment Details

Tank Compartment	Capacity (gallons)	Principal Substance	Other Substance	Release Detection	Spill Containment and Overfill Prevention	Related Information
1 A	0	Gasoline				Tank Summary Tank Details Piping Vapor Recovery

Table 4. Piping Systems

Tank	Type of Piping	Piping Material	Design and External Containment	Connectors and valves	Corrosion Protection	Release Detection	Related Inform
1		Steel	Single Wall				Tank Summary Tank Details Compartment Vapor Recovery

Table 5. Vapor Recovery Systems

Tank	Type of Stage 1	Date Installed	Type of Stage 2	Date Installed	Related Information
1	Not Reported				Tank Summary Tank Details Compartment Piping

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 1621

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)** Since 08/08/2003

Mailing Address: 2300 FIRST CITY TOWER, 1001 FA HOUSTON, TX 77002-6760

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
19041112	03/04/2015	INCOMING	GW/MEDIA MONITORING RPT	GW MON RPT	05/03/2015		02/26/2015	USPS
18584455	10/09/2014	INCOMING	RESPONSE TO COMMENTS	JULY 25, 2014 LTR	12/08/2014	11/03/2014	10/07/2014	USPS
18486370	08/22/2014	OUTGOING	RESEND RETURNED MAIL			08/22/2014	08/22/2014	USPS
18478879	08/11/2014	INCOMING	RETURNED MAIL	INSUFFICIENT ADDRESS	10/10/2014	08/22/2014	07/25/2014	USPS
18427070	07/25/2014	OUTGOING	COMMENTS/NOD			07/25/2014	07/25/2014	USPS
18427071	07/25/2014	PENDING	P GW/MEDIA MONITORING RPT		08/01/2014	10/09/2014		
17980832	03/03/2014	INCOMING	GW/MEDIA MONITORING RPT	2013 ANNL GW MON RPT	08/04/2014	07/25/2014	02/27/2014	
17290977	07/01/2013	INCOMING	RETURNED MAIL		08/30/2013	08/26/2013	06/17/2013	
17258506	06/17/2013	OUTGOING	APPROVAL			06/17/2013	06/17/2013	
17112572	04/23/2013	INCOMING	GW/MEDIA MONITORING RPT	2012 ANNL GW MON RPT	06/22/2013	06/17/2013	04/12/2013	



16115474	09/21/2012	INCOMING	RETURNED MAIL	NOT DELIVERABLE AS ADDRESSED	11/20/2012	09/28/2012	09/04/2012
16114483	09/04/2012	OUTGOING	APPROVAL			09/04/2012	USPS
16032769	07/30/2012	INCOMING	GW/MEDIA MONITORING RPT	2011 ANNUAL GWMR	09/28/2012	09/04/2012	07/27/2012 OVERNIGHT
14713233	05/11/2011	OUTGOING	APPROVAL			05/11/2011	05/11/2011
14646973	03/29/2011	INCOMING	GW/MEDIA MONITORING RPT	2010 ANN GW MON RPT	05/28/2011	05/11/2011	03/25/2011
13109630	06/22/2010	OUTGOING	COMMENTS/NOD			06/22/2010	
13095691	06/14/2010	INCOMING	RESPONSE TO COMMENTS	LTR DTD 4/28/2010	08/13/2010	06/22/2010	06/11/2010
13061517	04/28/2010	OUTGOING	COMMENTS/NOD			04/28/2010	04/28/2010
13020717	03/19/2010	INCOMING	GW/MEDIA MONITORING RPT	ANN 2009 GW MON RPT	05/18/2010	04/28/2010	03/18/2010
12675481	04/30/2009	INCOMING	TECHNICAL RPT	2008 ANN GW MON RPT	06/29/2009	06/22/2009	04/25/2009
12233819	04/22/2008	INCOMING	GW/MEDIA MONITORING RPT		06/21/2008	05/12/2008	04/18/2008
12129637	07/31/2007	INCOMING	RESPONSE TO COMMENTS		09/29/2007	09/10/2007	07/20/2007
12114434	05/03/2007	INCOMING	STATUS UPDATE		07/02/2007	05/09/2007	05/03/2007
12040879	04/02/2007	INCOMING	GW/MEDIA MONITORING RPT		06/01/2007	05/21/2007	03/30/2007
12013128	09/01/2006	INCOMING	GW/MEDIA MONITORING RPT		10/16/2006	10/06/2006	08/30/2006
10926904	03/28/2005	INCOMING	GW/MEDIA MONITORING RPT	ANNUAL	05/12/2005	05/05/2005	03/24/2005
10906356	02/28/2005	INCOMING	UIC AUTHORIZATION		04/14/2005	03/15/2005	02/25/2005
10896255	02/14/2005	INCOMING	UIC AUTHORIZATION		03/31/2005	02/25/2005	02/11/2005
10865463	12/20/2004	INCOMING	STATUS UPDATE		02/03/2005	01/06/2005	12/20/2004
10828098	11/29/2004	INCOMING	STATUS UPDATE		01/13/2005	12/10/2004	11/19/2004
10828462	11/29/2004	INCOMING	RESPONSE TO COMMENTS		01/13/2005	01/06/2005	11/19/2004
10743590	09/01/2004	INCOMING	STATUS UPDATE		10/16/2004	09/03/2004	09/01/2004
10698335	07/28/2004	INCOMING	GW/MEDIA MONITORING RPT	2003 ANNUAL	09/11/2004	09/09/2004	07/26/2004
10688368	07/20/2004	INCOMING	STATUS UPDATE		09/03/2004	08/06/2004	07/20/2004
10622531	05/25/2004	INCOMING	STATUS UPDATE		07/09/2004	05/28/2004	05/25/2004
10553303	03/15/2004	INCOMING	STATUS UPDATE		04/29/2004	03/22/2004	03/12/2004





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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 1621

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **WB HOLDING CORP (CN601346844)** Since 08/08/2003

Mailing Address: 2300 FIRST CITY TOWER, 1001 FA HOUSTON, TX 77002-6760

Legal	Description	Start Date	End Date	Type	Status	Status Date
1621	VOLUNTARY CLEANUP	08/08/2003		CLEANUP	ACTIVE	08/15/2003

Tracking No.	Type	Value	Start Date	End Date
18347407	PROJECT MANAGER	AGOETSCH	07/02/2014	
17778390	PROJECT MANAGER	RSCHARLA	01/06/2014	07/02/2014
10326269	PROJECT MANAGER	CWHITNEY	09/18/2003	01/06/2014
10308581	PROJECT MANAGER	DCHRISTI	08/15/2003	09/18/2003
9287985	ADMINISTRATIVE STATUS	ACTIVE	08/15/2003	
10308580	PCA NUMBER	33821	08/15/2003	
10308582	PROJECT NUMBER	338210	08/15/2003	
10308576	CASHIER RECEIVED DATE	08/01/2003	08/15/2003	
10308584	APPLICATION RECEIVED DATE	08/08/2003	08/15/2003	
9285906	APPLICANT INTEREST IN SITE	OWNER	08/15/2003	
10308583	REGION NOTIFIED	08/08/2003	08/15/2003	
10308577	FILE LOCATION	D/211	08/15/2003	
10308578	FILE MEDIA	PAPER	08/15/2003	
18564143	VCP EMPLOYEE TIME	2 HRS	08/31/2014	
18496577	VCP EMPLOYEE TIME	16 HRS	07/31/2014	
17372739	VCP EMPLOYEE TIME	3.5 HRS	06/30/2013	
16122389	VCP EMPLOYEE TIME	4 HRS	08/31/2012	
13156542	VCP EMPLOYEE TIME	2 HRS	06/30/2010	
13085618	VCP EMPLOYEE TIME	2 HRS	04/30/2010	

Physical	Description	Start Date	Type	Status	Status Date
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DRY CLEANERS | 08/08/2003 | AFFECTED PROPERTY | REMEDIATION | 10/24/2008

Tracking No.	Type	Value	Start Date	End Date
9290510	PROJECT PHASE	REMIEDIATION	10/24/2008	
10308588	APPLICABLE PROGRAM RULES	RRR	08/15/2003	
10308597	CURRENT FACILITY TYPE	DRY CLEANER	08/15/2003	
10308593	SITE SIZE	0.45 ACRES	08/15/2003	
9296259	SOILS CHEMICAL OF CONCERN CLASSIFICATION	VOCS	08/15/2003	
9308461	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	TETRACHLOROETHYLENE	08/15/2003	
9308462	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	BENZENE	08/15/2003	
9308463	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	TOLUENE	08/15/2003	
9308464	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	ETHYL BENZENE	08/15/2003	
9308465	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	XYLENES	08/15/2003	
9296260	GW BEARING UNIT	DEFAULT GW BEARING UNIT 1	08/15/2003	
9308466	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	TETRACHLOROETHYLENE	08/15/2003	
9308467	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	BENZENE	08/15/2003	
9308468	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	TOLUENE	08/15/2003	
9308469	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	ETHYL BENZENE	08/15/2003	
9308470	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	XYLENES	08/15/2003	

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## Central Registry

### Detail of: **Underground Injection Control Permit 5X2600297**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
14798338	04/13/2011	OUTGOING	ISSUED	CLASS V APPROVAL			04/13/2011	CERTIFIED
14646350	03/28/2011	INCOMING	CLASS V REVISION	REQUEST TO MODIFY CLASS V WELL PERMIT	03/28/2011	03/28/2011	03/25/2011	OVERNIGHT
12713506	06/16/2009	INCOMING	CLASS V REVISION	CLASS V REQUEST FOR AMENDMENT 2	06/16/2009	06/16/2009	06/15/2009	USPS
10895504	02/11/2005	INCOMING	CLASS V REVISION			02/25/2005	02/11/2005	

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### Detail of: Underground Injection Control Permit 5X2600297

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

Legal	Description	Start Date	End Date	Type	Status	Status Date
5X2600297	UIC PERMITS	02/11/2005		PERMIT	ACTIVE	02/25/2005

Tracking No.	Type	Value	Start Date	End Date
14646346	<a href="#">APPLICATION RECEIVED</a>	CLASS V REVISION	03/28/2011	04/13/2011
12713503	<a href="#">APPLICATION RECEIVED</a>	CLASS V REVISION	06/16/2009	06/16/2009
10895498	<a href="#">APPLICATION RECEIVED</a>	CLASS V REVISION	02/11/2005	02/25/2005

Physical	Description	Start Date	Type	Status	Status Date
A-1 CLEANERS		02/25/2005	CLASS V	ACTIVE	02/25/2005

Tracking No.	Type	Value	Start Date	End Date
9279476	NUMBER OF PERMITTED WELLS	7	02/11/2005	
9278936	WELL TYPE	AQUIFER REMEDIATION	02/11/2005	
9280014	WELL LATITUDE	29.77139	02/11/2005	
9280543	WELL LONGITUDE	-95.55806	02/11/2005	
9283734	COMMENTS	ADDITION OF 5 INJECTION WELLS	02/11/2005	

9281224	INJECTION ZONE FORMATION	CHICOT	02/11/2005
9281738	INJECTION ZONE TOP DEPTH	5	02/11/2005
9282184	INJECTION ZONE BOTTOM DEPTH	200	02/11/2005
9282699	INJECTION RATE REPORTED	< 10 PSI	02/11/2005
9283215	INJECTION FLUID	NA	02/11/2005

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### Detail of: **Underground Injection Control Permit 5X2600297**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

#### APPLICATION RECEIVED - CLASS V REVISION - 03/28/2011 - 04/13/2011 - Tracking No. 14646346

Tracking No.	Type	Value	Start Date	End Date
14798337	ACTION	ISSUED	04/13/2011	
14646348	PROCESS SCHEDULE	UIC	03/28/2011	
14646349	SUBJECT	INCLUDE INSTALLATION OF 5 WELLS	03/28/2011	

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## Central Registry

### Detail of: **Underground Injection Control Permit 5X2600297**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

### APPLICATION RECEIVED - CLASS V REVISION - 06/16/2009 - 06/16/2009 - Tracking No. 12713503

Tracking No.	Type	Value	Start Date	End Date
12725170	ACTION	ISSUED	06/16/2009	
12713504	PROCESS SCHEDULE	UTC	06/16/2009	

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## Central Registry

### Detail of: **Underground Injection Control Permit 5X2600297**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Permit Status: **ACTIVE**

### APPLICATION RECEIVED - CLASS V REVISION - 02/11/2005 - 02/25/2005 - Tracking No. 10895498

Tracking No.	Type	Value	Start Date	End Date
10904675	ACTION	ISSUED	02/25/2005	
10895500	PROCESS SCHEDULE	UIC	02/11/2005	

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100659127

**Name:** A-1 CLEANERS [View Prior Names](#)

**Primary Business:** FLEET REFUELING

**Street Address:** 12754 MEMORIAL DR, HOUSTON TX 77024 4861

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12754 Memorial Dr, Houston, TX

### Affiliated Customers - Current

Your Search Returned **6** Current Affiliation Records ([View Affiliation History](#))

#### 1-6 of 6 Records

CN Number	Customer Name	Customer Role	Details
CH601253842	ESTATE OF ALTA J EPSTEIN	OWNER	<a href="#">↗</a>
CH601346844	WB HOLDING CORP	VOLUNTEER CLEANUP APPLICANT	<a href="#">↗</a>
CH601346844	WB HOLDING CORP	OWNER OPERATOR	<a href="#">↗</a>
CH602455339	LEE, DEAN	OWNER	<a href="#">↗</a>
CH602502486	PILGRIM CLEANERS INC	OWNER OPERATOR	<a href="#">↗</a>
CH604460873	EPSTEIN ALTA ESTATE	OWNER	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
812320	NAICS	Drycleaning and Laundry Services (except Coin-Operated)
7216	SIC	Drycleaning Plants
9999	SIC	Nonclassifiable Establishments

### Permits, Registrations, or Other Authorizations

There are a total of **10** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-10 of 10 Records

Program ▲	ID Type	ID Number	ID Status
DRY CLEANERS REGISTRATION	INTERNAL	100659127	CANCELLED

DRY CLEANERS REGISTRATION	REGISTRATION	DCR10391	ACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD982561581	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	51071	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	70234	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	113777	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	61076	INACTIVE
PETROLEUM STORAGE TANK STAGE II			
UNDERGROUND INJECTION CONTROL	PERMIT	5X2600297	ACTIVE
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	1621	ACTIVE

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The list below is not sorted.

Site Associated with This Customer				Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)					
Customer	Name	City or Nearest City	County	TCEQ Region	Related Numbers	Rating	Classification	Date Rated	Date Posted
PILGRIM TOWN & COUNTRY CLEANER	A-1 CLEANERS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD982561581</li> <li>▪ 61076</li> <li>▪ 113777</li> <li>▪ TXD982561581</li> </ul>	0		09/01/2008	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 61076</li> <li>▪ 1621</li> <li>▪ 100659127</li> <li>▪ 61076</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
LEE, DEAN	A-1 CLEANERS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 1621</li> <li>▪ 51071</li> <li>▪ 61076</li> <li>▪ 1621</li> <li>▪ 100659127</li> <li>▪ 5X2600297</li> <li>▪ TXD982561581</li> <li>▪ TXD982561581</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014



WB HOLOING CORP	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	DCR10391	0		09/01/2011	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 113777</li> </ul>	0		09/01/2011	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 5X2600297</li> <li>▪ 70234</li> <li>▪ OCR10391</li> <li>▪ 113777</li> </ul>	0		09/01/2008	
PILGRIM CLEANERS INC	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXO982561581</li> <li>▪ 51071</li> <li>▪ 51071</li> <li>▪ TXO982561581</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
WB HOLOING CORP	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 100659127</li> <li>▪ 113777</li> <li>▪ 5X2600297</li> <li>▪ 70234</li> <li>▪ 1621</li> <li>▪ TXD982561581</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
EPSTEIN ALTA ESTATE	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 5X2600297</li> </ul>	0	UNCLASSIFIED	09/01/2014	11/15/2014
PILGRIM TOWN & COUNTRY CLEANER	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 100659127</li> <li>▪ 5X2600297</li> </ul>	0		09/01/2008	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXO982561581</li> <li>▪ 70234</li> <li>▪ 5X2600297</li> <li>▪ 113777</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
LEE, DEAN		HARRIS			0	UNCLASSIFIED	09/01/2008	11/15/2014



ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 61076</li> <li>▪ 70234</li> <li>▪ DCR10391</li> <li>▪ 113777</li> <li>▪ 1621</li> <li>▪ 100659127</li> <li>▪ TXD982561581</li> <li>▪ 5X2600297</li> <li>▪ 70234</li> <li>▪ 1621</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
LEE, DEAN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD982561581</li> <li>▪ DCR10391</li> <li>▪ TXD982561581</li> <li>▪ 51071</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
WB HOLDING CORP	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 5X2600297</li> </ul>	0		09/01/2011	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD982561581</li> <li>▪ 51071</li> <li>▪ 61076</li> </ul>	0		09/01/2011	
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 1621</li> <li>▪ 70234</li> <li>▪ 1621</li> <li>▪ 113777</li> <li>▪ 51071</li> <li>▪ 1621</li> </ul>	0		09/01/2008	
PILGRIM CLEANERS INC	A-1 CLEANERS	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 51071</li> </ul>	0	UNCLASSIFIED	09/01/2014	11/15/2014
	A-1 CLEANERS	HARRIS		<ul style="list-style-type: none"> <li>▪ TXD982561581</li> </ul>	0	UNCLASSIFIED	09/01/2010	11/15/2014

WB HOLDING CORP				REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 1621</li> <li>▪ TXD982561581</li> <li>▪ 51071</li> </ul>				
PILGRIM TOWN & COUNTRY CLEANER	A-1 CLEANERS	HARRIS		REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 51071</li> <li>▪ 70234</li> <li>▪ 1621</li> </ul>	0	09/01/2011		
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS		REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 51071</li> <li>▪ 61076</li> <li>▪ 1621</li> <li>▪ TXD982561581</li> <li>▪ DCR10391</li> <li>▪ 51071</li> <li>▪ 61076</li> <li>▪ DCR10391</li> <li>▪ 113777</li> </ul>	0	09/01/2009	UNCLASSIFIED	11/15/2014
LEE, DEAN	A-1 CLEANERS	HARRIS		REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 70234</li> <li>▪ 113777</li> <li>▪ 1621</li> <li>▪ 100659127</li> <li>▪ 70234</li> <li>▪ 5X2600297</li> <li>▪ 113777</li> </ul>	0	09/01/2008	UNCLASSIFIED	11/15/2014
ESTATE OF ALTA J EPSTEIN	A-1 CLEANERS	HARRIS		REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 70234</li> <li>▪ DCR10391</li> <li>▪ 51071</li> </ul>	0	09/01/2009		

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**What's a "site"?**

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

**What's a "customer"?**

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleanners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleanners

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR10391

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **LEE, DEAN (CN602455339)**

**OWNER** [View Compliance History](#)

Mailing Address: 12754 MEMORIAL DR HOUSTON, TX 77024-4861

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18903844	01/06/2015	OUTGOING	DROP STATION CERT	2015 Q - 2				
18569015	10/03/2014	OUTGOING	DROP STATION CERT	2015 Q - 1				
18445697	07/31/2014	INCOMING	DROP STATION REGISTRATION				07/25/2014	
18385071	07/18/2014	OUTGOING	DROP STATION CERT	2014 Q - 4				
18239000	06/24/2014	OUTGOING	RENEWAL REG LETTER	FY2015				LETTER
18054973	04/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 3				
17784616	01/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 1				
17784698	01/08/2014	OUTGOING	DROP STATION CERT	2014 Q - 2				
17622969	11/20/2013	OUTGOING	COMPT FILE CREATION					
17613777	11/18/2013	OUTGOING	COMPT FILE CREATION					
17611568	11/14/2013	INCOMING	DROP STATION REGISTRATION				11/07/2013	
17311872	07/15/2013	OUTGOING	DROP STATION CERT	2013 Q - 4				
17208048	06/21/2013	OUTGOING	RENEWAL REG LETTER	FY2014				LETTER
17040310	04/04/2013	OUTGOING	DROP STATION CERT	2013 Q - 3				
16861287	02/13/2013	OUTGOING	DROP STATION CERT	2013 Q - 1				
16861309	02/13/2013	OUTGOING	DROP STATION CERT	2013 Q - 2				
16643496	01/02/2013	OUTGOING	COMPT FILE CREATION					
16612892	12/19/2012	INCOMING	DROP STATION REGISTRATION				12/15/2012	
15953546	07/09/2012	OUTGOING	DROP STATION CERT	2012 Q - 4				
15915334	06/13/2012	OUTGOING	RENEWAL REG LETTER	FY2013				LETTER
15894513	06/01/2012	OUTGOING	DROP STATION CERT	2012 Q - 3				
15200582	02/01/2012	OUTGOING	DROP STATION CERT	2012 Q - 2				
15200584	02/01/2012	OUTGOING	DROP STATION CERT	2012 Q - 1				
15085365	12/05/2011	OUTGOING	COMPT FILE CREATION					
15081963	11/30/2011	INCOMING	DROP STATION REGISTRATION				11/22/2011	
14786977	07/05/2011	OUTGOING	DROP STATION CERT	2011 Q - 4				

14754837	06/23/2011	OUTGOING	RENEWAL REG LETTER	FY2012	LETTER
14655246	04/05/2011	OUTGOING	DROP STATION CERT	2011 Q - 3	
14661802	03/23/2011	OUTGOING	DROP STATION CERT	2011 Q - 2	
14661810	03/23/2011	OUTGOING	DROP STATION CERT	2011 Q - 1	
14582341	01/10/2011	OUTGOING	COMPT FILE CREATION		12/27/2010
14557644	01/04/2011	INCOMING	DROP STATION REGISTRATION		
13047115	04/20/2010	OUTGOING	DROP STATION CERT	2010 Q - 3	
12945291	01/05/2010	OUTGOING	DROP STATION CERT	2010 Q - 2	
12865517	10/16/2009	OUTGOING	DROP STATION CERT	2010 Q - 1	
12836923	09/16/2009	OUTGOING	COMPT FILE CREATION		
12832268	09/14/2009	OUTGOING	COMPT FILE CREATION		
12630470	09/09/2009	INCOMING	DROP STATION REGISTRATION		09/05/2009
12741297	07/06/2009	OUTGOING	DROP STATION CERT	2009 Q - 4	
12730441	06/24/2009	OUTGOING	RENEWAL REG LETTER	FY2010	
12656287	04/15/2009	OUTGOING	DROP STATION CERT	2009 Q - 3	
12659439	04/15/2009	OUTGOING	DROP STATION CERT	2009 Q - 2	
12659861	04/15/2009	OUTGOING	DROP STATION CERT	2009 Q - 1	
3001542	10/28/2008	INCOMING	DROP STATION REGISTRATION		
3512602	08/11/2008	OUTGOING	DROP STATION CERT	2008 Q - 4	
3518987	04/07/2008	OUTGOING	DROP STATION CERT	2008 Q - 3	
3518656	01/02/2008	OUTGOING	DROP STATION CERT	2008 Q - 2	
3532544	12/07/2007	OUTGOING	DROP STATION CERT	2008 Q - 1	
3001541	08/29/2007	INCOMING	DROP STATION REGISTRATION		
3522942	01/03/2007	OUTGOING	DROP STATION CERT	2007 Q - 2	
3532815	10/31/2006	OUTGOING	DROP STATION CERT	2007 Q - 1	
3001540	09/26/2006	INCOMING	DROP STATION REGISTRATION		
3532058	04/10/2006	OUTGOING	DROP STATION CERT	2006 Q - 3	
3001539	09/16/2005	INCOMING	DROP STATION REGISTRATION		
3001538	09/21/2004	INCOMING	DROP STATION REGISTRATION		
3001537	10/17/2003	INCOMING	DROP STATION REGISTRATION		



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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR10391

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **LEE, DEAN (CN602455339)**

**OWNER** [View Compliance History](#)

Mailing Address: 12754 MEMORIAL DR HOUSTON, TX 77024-4861

Legal	Description	Start Date	End Date	Type	Status	Status Date
DCR10391	FY2015	08/08/2014		DROP STATION REGISTRATION	ACTIVE	08/08/2014
DCR10391	FY2014	11/15/2013		DROP STATION REGISTRATION	ACTIVE	11/22/2013
DCR10391	FY2013	12/20/2012		DROP STATION REGISTRATION	ACTIVE	01/03/2013
DCR10391	FY2012	12/01/2011		DROP STATION REGISTRATION	ACTIVE	12/06/2011
DCR10391	FY2011	01/06/2011		DROP STATION REGISTRATION	ACTIVE	01/10/2011
DCR10391	FY2010	09/10/2009		DROP STATION REGISTRATION	ACTIVE	09/17/2009
DCR10391	FY2009	09/01/2008		DROP STATION REGISTRATION	ACTIVE	10/28/2008
DCR10391	FY2008	09/01/2007		DROP STATION REGISTRATION	ACTIVE	08/29/2007
DCR10391	FY2007	09/01/2006		DROP STATION REGISTRATION	ACTIVE	09/26/2006
DCR10391	FY2006	09/01/2005		DROP STATION REGISTRATION	ACTIVE	09/16/2005
DCR10391	FY2005	09/01/2004		DROP STATION REGISTRATION	ACTIVE	09/21/2004
DCR10391	FY2004	09/01/2003		DROP STATION REGISTRATION	ACTIVE	10/17/2003



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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 51071**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: 12442 MEMORIAL DR HOUSTON, TX 77024-6167

### Related Information:

#### [Solid Waste Registration Information](#)

There is no information related to this Solid Waste Registration in the following categories:

- [Commissioners' Actions](#)
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- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
- [Proposed Enforcement Orders](#)
- [Complaints](#)
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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 51071

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: 12442 MEMORIAL DR HOUSTON, TX 77024-6167

#### Facility Information

**Registration Number:** 51071

**Status:** Inactive

**Site Name:** PILGRIM CLEANERS

**Company Name:** PILGRIM CLEANERS INC

**Site Street Address:** 12754 MEMORIAL DR, HOUSTON, TX, 77024

**Site Location:** 12754 Memorial Dr, Houston, TX

**County:** HARRIS

**EPA Number:** TXD982561581

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:** 812320 Drycleaning and Laundry Services (except Coin-Op)

[View Annual Waste Summary](#) not available

<a href="#">View Waste Receipt Report</a> <input type="button" value="Year"/> <input type="button" value="Month"/> <b>Waste Receipt Report not available</b>
<a href="#">View Waste Management Units</a> <a href="#">View Waste</a>

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 51071**

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: 12442 MEMORIAL DR HOUSTON, TX 77024-6167

### Facility Information

#### IHW Waste

Texas Waste Code	Waste Description
0506609H	PERC SLUDGE
0906310H	PERC FILTERS

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 51071

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: 12442 MEMORIAL DR HOUSTON, TX 77024-6167

### [BACK TO](#) Facility Information

#### IHW Waste Detail

Waste Code: 0506609H	Company Code: 6073524065			Description: PERC SLUDGE				
Origin	Recycle	Managed	New Chemical	Waste Stream Status	Source	Management	SIC	NAICS
Generated on-site from a product process or service activity		Off-Site Only	No	Inactive	Solvent or product distillation recovery (sludge, waste)			812320

#### IHW Waste Management Units

Sequence Number:	Unit Type:	Status:	Description:
No	Waste Management Units	Information exists for this Waste Stream	

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 51071

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: 12442 MEMORIAL DR HOUSTON, TX 77024-6167

### [BACK TO](#) Facility Information

#### IHW Waste Detail

Waste Code: 0906310H	Company Code: 6073524065			Description: PERC FILTERS				
Origin	Recycle	Managed	New Chemical	Waste Stream Status	Source	Management	SIC	NAICS
Generated on-site from a product process or service activity		Off-Site Only	No	Inactive	Product and by-product processing			812320

#### IHW Waste Management Units

Sequence Number:	Unit Type:	Status:	Description:
No Waste Management Units Information exists for this Waste Stream			



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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 70234

For: **A-1 CLEANERS (RN100659127)**

12754 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 01/27/2001 [View Compliance History](#)

Mailing Address: Not on file

#### Facility Information

**Registration Number:** 70234

**Status:** Inactive

**Site Name:** PILGRIM TOWN & COUNTRY CLEANER

**Company Name:** PILGRIM CLEANERS INC

**Site Street Address:** 12754 MEMORIAL DR, HOUSTON, TX, 77024

**Site Location:** 12754 Memorial Dr, Houston, TX

**County:** HARRIS

**EPA Number:** TXD982561581

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:**

[View Annual Waste Summary](#) not available

[View Waste Receipt Report](#)   **Waste Receipt Report not available**

[View Waste Management Units](#) [View Waste Types](#)

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**UNDERGROUND STORAGE TANK SYSTEM  
PERMANENT REMOVAL FROM SERVICE**

Estate of Alta Epstein  
12754 Memorial Drive  
Houston, Texas  
Facility ID No. 0061076  
LPST ID No. 113777

HBC Report No. 21-3440-97  
December 30, 1998

INFORMATION COPY

Prepared for:

Estate of Alta Epstein  
c/o Mr. Alan Shelby  
1800 Bering, Suite 495  
Houston, TX 77057

Prepared by

**HBC Engineering, Inc.**  
2313 W. Sam Houston Parkway North, Suite 107  
Houston, Texas 77043

Charles F. Smith  
Project Manager

Thomas R. Martens, CAPM 01105  
Senior Technical Review

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- E TNRCC UST Registration Form
- F Laboratory Analytical Results



## **UNDERGROUND STORAGE TANK SYSTEM PERMANENT REMOVAL FROM SERVICE**

**Estate of Alta Epstein  
12754 Memorial, Houston, Texas  
Facility ID No. 0061076  
LPST ID No. 113777**

### **1.0 INTRODUCTION**

HBC Engineering, Inc. (HBC) has conducted a Permanent Removal From Service of the underground storage tank (UST) system at the A-1 Cleaners facility located at 12754 Memorial Drive in Houston, Texas. The facility had two (2) 6,000-gallon USTs assumed to have formerly stored gasoline and diesel fuel.

Figure 1, Appendix A, presents the location of the site on the Hedwig Village, Texas USGS topographic quadrangle map. The location of the tankhold and tank system in relation to the structures at the site is presented on the Site Plan (Figure 2, Appendix A).

The Texas Natural Resource Conservation Commission (TNRCC) Central Office in Austin, Texas and the Region 12 office in Houston, Texas were notified of the removal activities through the filing of a 30-day UST Construction Notification Form (Appendix B). The Region 12 TNRCC office was verbally notified by USA Environmental Systems, Inc. 24 hours prior to the scheduled time of the proposed activities.

### **2.0 UST SYSTEM REMOVAL**

Under the supervision of Mr. Charles Smith of HBC, on December 1, 1998, the soil excavation and tank removal activities were conducted by USA Environmental Systems, Inc. of Houston, Texas, a licensed contractor in the State of Texas. One 6,000 gallon UST assumed to contain gasoline (UST-1) and one 6,000 gallon UST assumed to contain diesel fuel (UST-2) were observed to be present at the site located near the northwest corner of the property. One former dispenser island was located to the south directly adjacent to the tanks along with two fill tubes (Photo 1). No representatives of the TNRCC were present at the site during the removal activities. Photographs of the tank removal activities are included in Appendix C.

Prior to the removal of the two 6,000 gallon USTs, the residual contents of the tanks were removed and the tanks were rinsed with using a high pressure washer and a Biosolve® solution by Freemyer Company, Inc. Approximately 55 gallons of product and rinsate were removed from the tanks and recycled at Re-Claim Environmental's facility in Houston, Texas. A copy of the waste manifest for the product/rinsate disposal is included in Appendix D.

The dispenser island footing adjacent to the tank hold was left in place because it is a support structure for the A-1 Cleaners canopy. Two USTs were uncovered near the northwest corner of the property (Photo 2). The USTs were covered by approximately 4 inches of asphalt. The soils encountered during excavation activities in the tankhold consisted of yellowish red silty sand (coarse-grained soils) from approximately 0.5 feet below grade surface (bgs) to approximately 12 feet bgs. The native soils encountered during excavation activities beyond the tankhold boundaries generally consisted of dark brown to gray and yellowish red silty clay (fine-grained soils).

An explosimeter was utilized to confirm that the combustible vapor concentrations in the USTs were below 10% of the lower explosive limit (LEL)(Photo 3). Prior to removal of the USTs, a City of Houston Fire Marshal arrived on site, confirmed the LEL readings and gave approval to remove and transport the USTs (Photo 4).

Upon removal, the USTs were visually inspected. The USTs were observed to have an external dielectric coating. No holes were observed in the UST-1; however, one hole approximately 1-inch in diameter was observed in the bottom end of UST-2 (Photo 6). The product and vent piping were disconnected, removed and disposed at Huff Industries in Houston, Texas. The product and vent piping were constructed of galvanized steel.

The USTs were removed from the tankhold, properly labeled, loaded on a truck, and transported to Huff Industries in Houston, Texas for scrap metal recycling. A copy of the Certificate of Destruction is included in Appendix D. The revised UST registration form is presented in Appendix E.

The dimensions of the tankhold excavation for the two 6,000 gallon USTs were approximately 24' x 24' x 12.' deep. The excavated material from the tankhold was stockpiled on site. After removal of the USTs, based on the field evidence the previously excavated material was placed back into the tankhold.

### **3.0 SAMPLING PROGRAM**

Prior to returning the backfill material to the tankhold, discrete soil samples were collected from the floor and walls of the tankhold. Two soil samples (T-1B and T-2B) were collected from the floor of the tankhold beneath each tank. Soil samples were collected from the north (NSW-1), south (SSW-1), east (ESW-1) and west (WSW-1) sidewalls of the tankhold and three composite soil samples (SPC-1, SPC-2 and SPC-3) were collected from the excavated/stockpiled backfill material. Based on the field evidence, additional soil samples (verification samples) were collected from the bottom of the tankhold (T-1B-15' and T-2B-15') at the site on December 1, 1998. The samples were collected from a depth of 15 feet bgs near the location of original soil samples T-1B and T-2B to evaluate whether native soils beyond the limits of excavation were impacted by hydrocarbons. The Soil Sample Location Map (Figure 3 - Appendix A) presents the locations of each soil sample collected from the native soils at the site.

Soil samples were collected in laboratory supplied precleaned glassware, sealed with custody tape and placed in a cooler filled with ice and secured with custody seals. The sample cooler and completed chain-of-custody forms were relinquished and delivered to Xenco Laboratories in Houston, Texas. The samples were submitted on a 48 hour rush turn-around-time.

#### ***4.0 LABORATORY ANALYTICAL PROGRAM AND RESULTS***

The soil samples collected from the tankhold excavation native soils and the stockpiles were analyzed for the following parameters:

- Total Petroleum Hydrocarbons (TPH) using Texas Method 1005;
- Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX) using EPA Method SW-846 #8020; and
- Total Lead using EPA Method 6010 (selected samples).

The executed chain-of-custody and laboratory results are provided in Appendix F.

Laboratory results, sampling dates, sample location designations and sample depths are summarized in the following table:

**EXCAVATION SOIL SAMPLE LABORATORY ANALYTICAL RESULTS**

Sample ID	Date	Sample Depth (feet)	Benzene 8020 (mg/kg)	Toluene 8020 (mg/kg)	Ethylbenzene 8020 (mg/kg)	Total Xylenes 8020 (mg/kg)	TPH (G) 1005 (mg/kg)	TPH (D) 1005 (mg/kg)	Total Lead 6010 (mg/kg)
T-1B	12/1/98	13	1.05	1.09	2.77	4.46	<50.0	<50.0	5.3
T-2B	12/1/98	13	0.78	1.02	1.13	2.90	<50.0	<50.0	NA
T-1B	12/1/98	15	<0.050	<0.050	0.230	0.557	NA	NA	NA
T-2B	12/1/98	15	<0.050	<0.050	<0.050	<0.150	NA	NA	NA
NSW-1	12/1/98	8	<0.050	<0.050	<0.050	<0.150	<50.0	<50.0	NA
ESW-2	12/1/98	8	<0.050	<0.050	<0.050	<0.150	<50.0	<50.0	NA
SSW-1	12/1/98	8	<0.050	<0.050	<0.050	<0.150	<50.0	<50.0	NA
WSW-1	12/1/98	8	<0.050	<0.050	<0.050	<0.150	<50.0	<50.0	NA

TPH(G) = Total Petroleum Hydrocarbons (gasoline range C6-C10)

TPH(D) = Total Petroleum Hydrocarbons (diesel range >C10-C28)

mg/kg = milligrams per kilogram

< = Not detected above listed laboratory equipment detection limits

NA = Not analyzed for this constituent

**STOCKPILED SOIL SAMPLE LABORATORY ANALYTICAL RESULTS**

Sample ID	Date	Benzene 8020 (mg/kg)	Toluene 8020 (mg/kg)	Ethylbenzene 8020 (mg/kg)	Total Xylenes 8020 (mg/kg)	TPH (G) 1005 (mg/kg)	TPH (D) 1005 (mg/kg)	Total Lead 6010 (mg/kg)
SPC-1	12/1/98	NA	NA	NA	NA	<50.0	<50.0	NA
SPC-2	12/1/98	NA	NA	NA	NA	<50.0	<50.0	NA
SPC-3	12/1/98	NA	NA	NA	NA	<50.0	<50.0	NA

TPH(G) = Total Petroleum Hydrocarbons (gasoline range C6-C10)

TPH(D) = Total Petroleum Hydrocarbons (diesel range >C10-C28)

mg/kg = milligrams per kilogram

< = Not detected above listed laboratory equipment detection limits

NA = Not analyzed for this constituent



## 5.0 DATA EVALUATION

Per the TNRCC's Release Determination guidance dated August 1, 1996 (TNRCC-0621), the Leaking Petroleum Storage Tank (LPST) Action Levels for gasoline releases in fine-grained soils (classified as clays and silts) like the native soils encountered at the site are 0.5 milligram per kilogram (mg/kg) benzene, 70 mg/kg ethylbenzene, 100 mg/kg toluene, and 560 mg/kg total xylenes, 100 mg/kg TPH(G) and 500 mg/kg TPH(D). The results of the laboratory analyses indicated that the BTEX and TPH concentrations exhibited by the discrete soil samples collected from the north, east, south and west walls of the tankhold (NSW-1, ESW-1, SSW-1, and WSW-1) were below the appropriate LPST Action Levels defined by the TNRCC and/or below the laboratory detection limits. The toluene, ethylbenzene, xylene and TPH concentrations exhibited by the discrete soil samples collected from the bottom of the tankhold (T-1B and T-2B) were below the appropriate LPST Action Levels defined by the TNRCC.

The results of the analyses indicated that benzene concentrations exhibited by the discrete soil samples T-1B (1.05 mg/kg) and T-2B (0.78 mg/kg) collected from the bottom of the tankhold exceeded the TNRCC LPST Action Levels for this compound in fine-grained soil.

The results of the analyses indicated that total lead was detected in soil samples T-1B (5.3 mg/kg).

The results of the additional sampling and analysis indicated that BTEX concentrations exhibited by the discrete (confirmation) soil samples (T-1B-15' and T-2B-15') collected from the bottom of the tankhold at a depth of 15 feet were below the appropriate LPST Action Levels defined by the TNRCC and/or below the laboratory detection limits.

## 6.0 DISPOSITION OF EXCAVATED SOILS

The laboratory analysis results indicated that the TPH concentrations exhibited by the composite soil samples collected from the stockpile (SPC-1, SPC-2 and SPC-3) were below the laboratory detection limits.

Per the TNRCC's Guidance for the Proper Handling of Backfill Materials Generated from Petroleum Storage System Removals or Repairs interoffice memorandum dated March 2, 1993, Standard 4 (sites where no corrective action is required) applies to the site. Under Standard 4, backfill materials are to be returned to the tankhold without treatment (if no free product is detected in the soils, and if the site is not in the Edwards Aquifer recharge area, and the tankhold will be covered with an impervious surface and groundwater is not present in the tankhold or is not reasonably threatened by the backfill contaminants). The laboratory analysis results indicated that the stockpile sample SPC-1, SPC-2 and SPC-3 did not exhibit concentrations of TPH(G) and/or TPH(D) above the detection limits the TNRCC Standard 4 levels for TPH (1,000 mg/kg). Based on the field evidence the tankhold was backfilled with the previously excavated materials and imported fill on December 1, 1998 by USA Environmental Services.

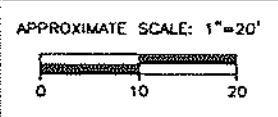
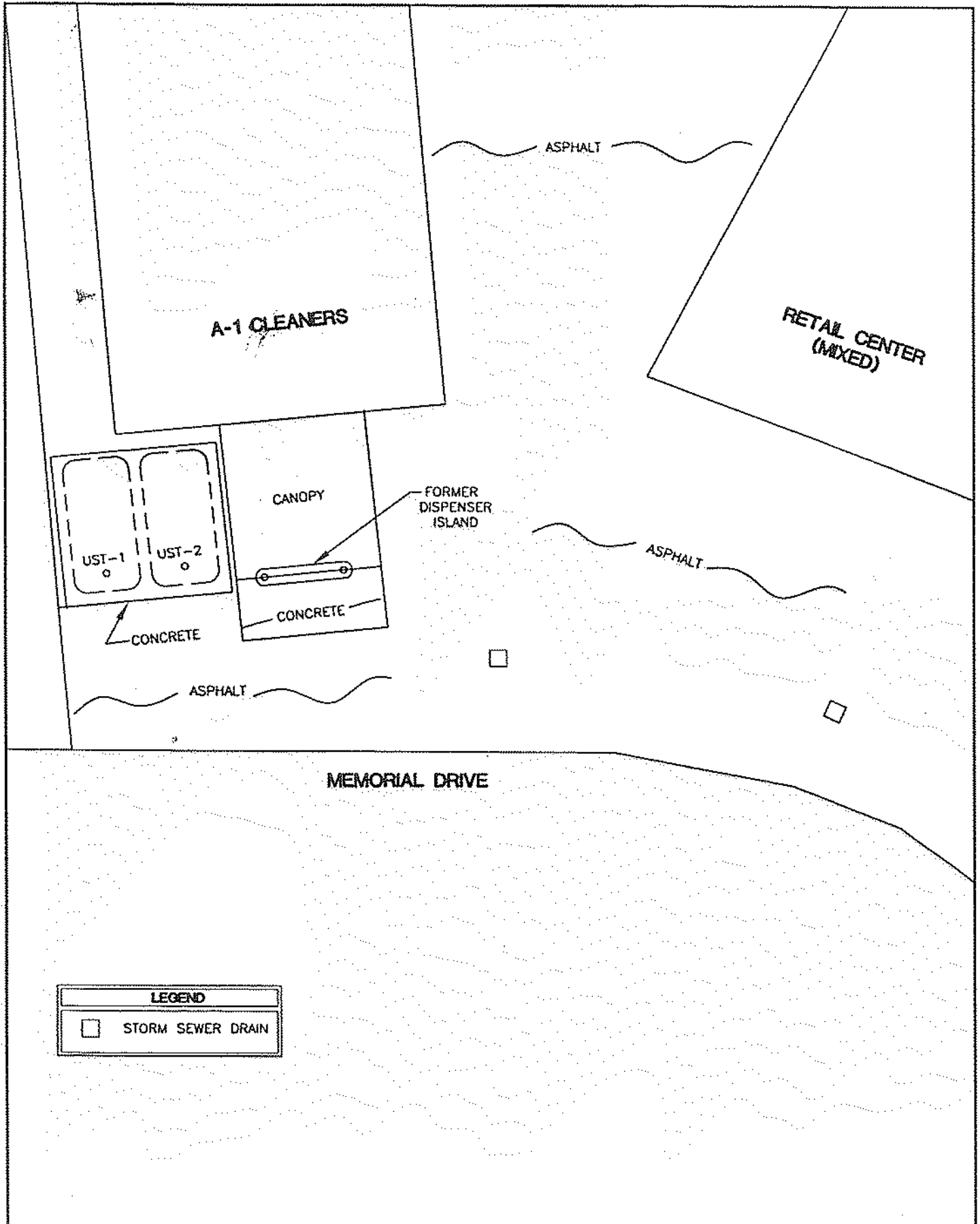
## 7.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this investigation are presented as follows:

- The site was assumed to have two 6,000 gallons USTs. Two USTs were located, and removed from the site on December 1, 1998 in general accordance with API Recommended Practice 1604. The tanks had a capacity of approximately 6,000 gallons each and were composed of steel. The USTs were assumed to have been used to store leaded gasoline and diesel fuel.
- Native soil samples were collected from the floor and walls of the tankhold. The results of the soil sample analysis indicated that the TPH and BTEX concentrations in the discrete soil samples collected from the north, east, south and west walls of the tankhold (NSW-1, ESW-1, SSW-1, and WSW-1) were below TNRCC LPST Action Levels and/or the laboratory method detection limits.
- The results of the analyses indicated that the benzene (1.05 mg/kg) and (0.78 mg/kg) concentrations exhibited by the discrete soil samples collected at a depth of 13 feet bgs from the bottom of the tankhold (T-1B-13' and T-2B-13') respectively exceeded the TNRCC LPST Action Levels for these compounds in fine-grained soils but the results of the additional (verification) soil samples collected at a depth of 15 feet on December 1, 1998 from the bottom of the tankhold (T-1B-15' and T-2B-15') were below TNRCC LPST Action Levels. Mr. Ken Ausbie of the TNRCC reviewed the analytical data, assigned LPST ID number 113777 to the site and gave verbal authorization for closure of the UST system at the site.
- Based on the field evidence the tankhold was backfilled with the previously excavated materials and imported fill on December 1, 1998 by USA Environmental Services.
- Based on the results of the laboratory analysis and field evidence, site will be considered an LPST site. At the client's request, HBC has communicated the results of laboratory analyses to the TNRCC and will submit with this report a Release Determination Report and a Request for Closure for this site. An LPST ID number has been assigned by the TNRCC. Based on communications with the TNRCC, further investigation will not likely be required by the TNRCC to evaluate the extent of impacted soil and/or groundwater at the site.
- The TNRCC has a reimbursement program in place at this time but the deadline for qualifying for the program is December 22, 1998. Any releases reported after December 22, 1998 will not be eligible for reimbursement. Associated with the reimbursement is a one time deductible of \$2,000.00 to \$4,000.00 which is not refundable. Reimbursement for each phase of work submitted to the TNRCC takes approximately two to four months. The reimbursable amounts are determined by the

TNRCC PST reimbursable cost guidelines. Please note that the deductible amount will increase over time if certain TNRCC deadlines for submittal of corrective action documents are not met.

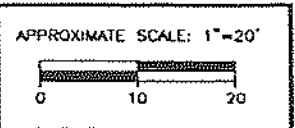
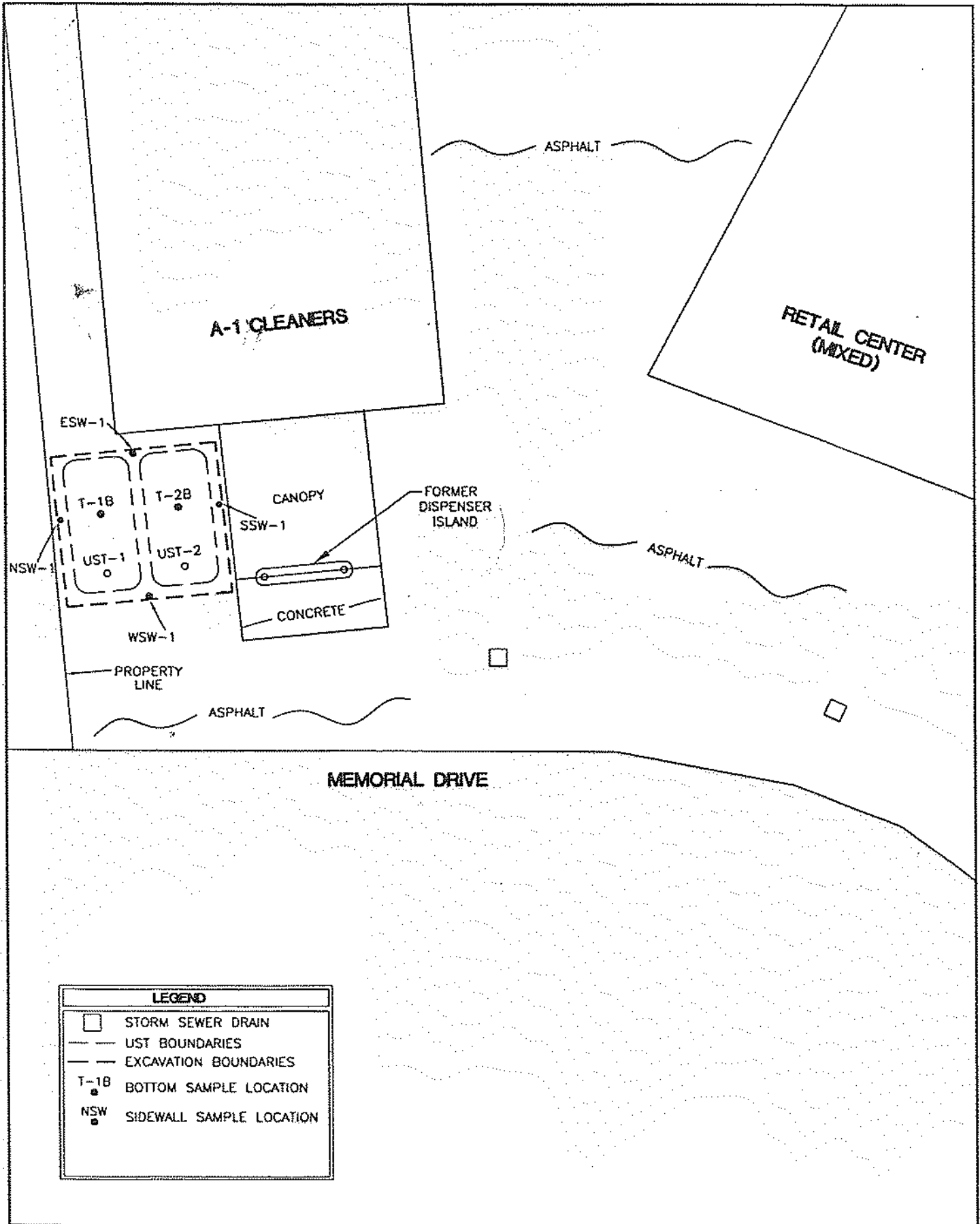
- HBC recommends no further action be conducted at the site at this time .



A-1 CLEANERS  
 12754 MEMORIAL DRIVE  
 HOUSTON, TEXAS

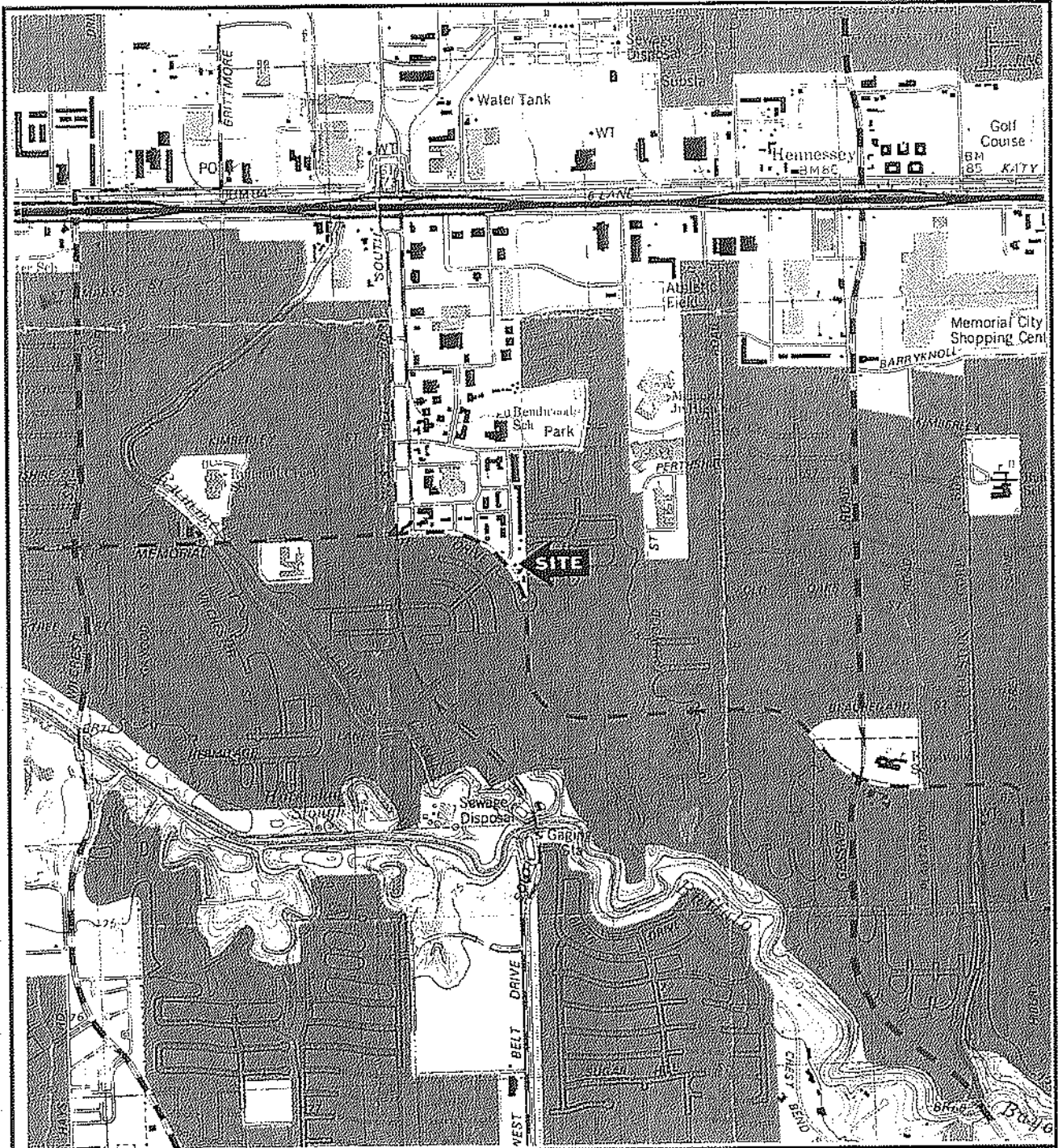
FIGURE 2  
 SITE DRAWING  
 HBC PROJECT NO. 21-3440-97





A-1 CLEANERS  
 12754 MEMORIAL DRIVE  
 HOUSTON, TEXAS

FIGURE 3  
 SOIL SAMPLE LOCATION MAP  
 HBC PROJECT NO. 21-3440-97



**USGS TOPOGRAPHIC QUADRANGLE MAP**

Hedwig Village, Texas

Photorevised: 1982

SCALE: 1" = 2000'



**HBC**  
ENGINEERING, INC.

**A-1 Cleaners**

12754 Memorial Drive, Houston, Texas

HBC PROJECT NO. 21-3440-97

**FIGURE 1: TOPOGRAPHIC MAP**

# **ANALYTICAL REPORT 1-84633**

for

**HBC Engineering Inc.**

**Project Manager: Charles F. Smith**

**Project Name: UST Pull/Memorial Dr.**

**Project Id: 21-3440-97**

**December 3, 1998**



HOUSTON - DALLAS - SAN ANTONIO

11381 Meadowglen Lane Suite L \* Houston, Texas 77082-2647  
Phone (281) 589-0692 Fax (281) 589-0695



11381 Meadowglen Suite L  
Houston, Texas 77082-2647  
(281) 589-0692 Fax: (281) 589-0695  
Houston - Dallas - San Antonio - Latin America

December 3, 1998

Project Manager: Charles F. Smith  
HBC Engineering Inc.  
2313 W. Sam Houston Pkwy. N. #107  
Houston, TX 77043

Reference: XENCO Report No.: 1-84633  
Project Name: UST Pull/Memorial Dr.  
Project ID: 21-3440-97

Dear Charles F. Smith:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84633. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.


All the results for the quality control samples passed thorough examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84633 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISQ/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

  
Eddie L. Clemons, II  
QA/QC Manager

*Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.  
Certified and approved by numerous States and Agencies.  
A Small Business and Minority Status Company that delivers SERVICE and QUALITY!*



CHAIN OF CUSTODY RECORD

ENVIRONMENTAL, GEOTECHNICAL AND CONSTRUCTION MATERIALS SERVICES



Office Location Houston

Laboratory: Xenico  
 Address: 11351 Masdenway, Suite 1  
Houston 77082  
 Contact: Debbie Simmons  
 Phone: (281) 589-0692

Project Manager Charles F. Smith

Sampler's Signature

Charles F. Smith

Project Name

UST Pull / Memorial Dr.

No/Type of Containers

VOA AG 250 ml P/O

Identifying Marks of Sample(s)

1 2 3 4 5

Temp. of coolers when received (C°)

Due Date:

Page 1 of 1

Lab Sample ID (Lab Use Only)

Analyses Requested

TPH (Total)

BTEX (Total)

Total Pb (Total)

Lab use only

Temp. of coolers when received (C°)

Due Date:

Page 1 of 1

Lab Sample ID (Lab Use Only)

Analyses Requested

TPH (Total)

BTEX (Total)

Total Pb (Total)

Lab use only

Temp. of coolers when received (C°)

Due Date:

Page 1 of 1

Lab Sample ID (Lab Use Only)

Analyses Requested

TPH (Total)

BTEX (Total)

Total Pb (Total)

Lab use only

Temp. of coolers when received (C°)

Due Date:

Page 1 of 1

Lab Sample ID (Lab Use Only)

Analyses Requested

TPH (Total)

BTEX (Total)

Total Pb (Total)

Lab use only

Temp. of coolers when received (C°)

Due Date:

Matrix	Date	Time	Identifying Marks of Sample(s)	VOA	AG 1 Lt.	250 ml	P/O
S	12/01/98	1345	T-1B (13')			2	
S		1335	T-2B (13')			2	
S		1355	NSW-1 (8')			2	
S		1400	ESW-1 (8')			2	
S		1405	SSW-1 (8')			2	
S		1420	ESW-1 (8')			2	
S		1250	SAC-1			2	
S		1255	SAC-2			2	
S		1300	SAC-3			2	

Relinquished by (Signature)	Date:	Time:	Received by (Signature)	Date:	Time:
<u>Charles F. Smith</u>	12/01/98	1700	<u>[Signature]</u>	12/01/98	17:00

W - Water  
 W - Wastewater  
 A/G - Amber / Or Glass 1 Liter  
 S - Soil  
 SD - Solid  
 L - Liquid  
 Air Bag  
 250 ml Glass wide mouth  
 C - Char-coal tube  
 P/O - Plastic or other

Raw Total pb on Highest Total BTEX Result on T-1B or T-2B sample.  
 Raw Total pb & BTEX on Highest TPH result on SAC samples.  
 Hold all Remaining samples.

Houston Office  
 2313 W. Sara Houston Pkwy N., Suite 107  
 Houston, Texas 77043  
 (713) 722-0700 Fax (713) 722-0788

Dallas Office  
 8901 Carpenter Freeway, Suite 100  
 Dallas, Texas 75247  
 (214) 630-1010 Fax (214) 630-7070

Fort Worth Office  
 2301 E. Loop 820 North  
 Fort Worth, Texas 76118  
 (817) 268-8600 Fax (817) 268-8602

Austin Office  
 3913 Todd Lane, Suite 312  
 Austin, Texas 78744  
 (512) 442-1122 Fax (512) 442-1181

Atlanta Office  
 2470 Windy Hill Road, Suite 300  
 Marietta, Georgia 30067  
 (770) 618-3055 Fax (770) 615-3015

# **ANALYTICAL REPORT 1-84634**

for

**HBC Engineering Inc.**

**Project Manager: Charles F. Smith**

**Project Name: UST Pull/Memorial Dr.**

**Project Id: 21-3440-97**

**December 7, 1998**



**11381 Meadowglen Lane Suite L \* Houston, Texas 77082-2647**  
**Phone (281) 589-0692 Fax (281) 589-0695**



11381 Meadowglen Suite L  
Houston, Texas 77082-2647  
(281) 589-0692 Fax: (281) 589-0695  
Houston - Dallas - San Antonio - Latin America

December 7, 1998

Project Manager: Charles F. Smith  
HBC Engineering Inc.  
2313 W. Sam Houston Pkwy. N. #107  
Houston, TX. 77043

Reference: **XENCO Report No.: 1-84634**  
**Project Name: UST Pull/Memorial Dr.**  
**Project ID: 21-3440-97**

Dear Charles F. Smith:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84634. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.

All the results for the quality control samples passed through examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84634 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISO/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

Eddie L. Clemons, II  
QA/QC Manager

*Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.*

*Certified and approved by numerous States and Agencies.*

*A Small Business and Minority Status Company that delivers SERVICE and QUALITY!*







**ANALYTICAL CHAIN OF CUSTODY REPORT**  
**CHRONOLOGY OF SAMPLES**

HBC Engineering Inc.

XENCO COC#: 1-84634

Project ID: 21-3440-97

Project Name: UST Pull/Memorial Dr.

Date Received in Lab: Dec 1, 1998 17:00 by SW

Project Manager: Charles F. Smith

XENCO contact : Debbie Simmons/Brent Barron

Project Location:

		Date and Time							
Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Sample Collected	Addition Requested	Extraction	Analysis
1 T-1B-1(15')	184634-001	BTEX	SW-846	ppm	48 hours	Dec 1, 1998 13:50	Dec 4, 1998 10:05	Dec 5, 1998 by RL	Dec 5, 1998 16:12 by RL
2 T-2B-1(15')	184634-002	BTEX	SW-846	ppm	48 hours	Dec 1, 1998 13:40	Dec 4, 1998 10:05	Dec 5, 1998 by RL	Dec 5, 1998 16:31 by RL



**CERTIFICATE OF ANALYSIS SUMMARY 1-84634**

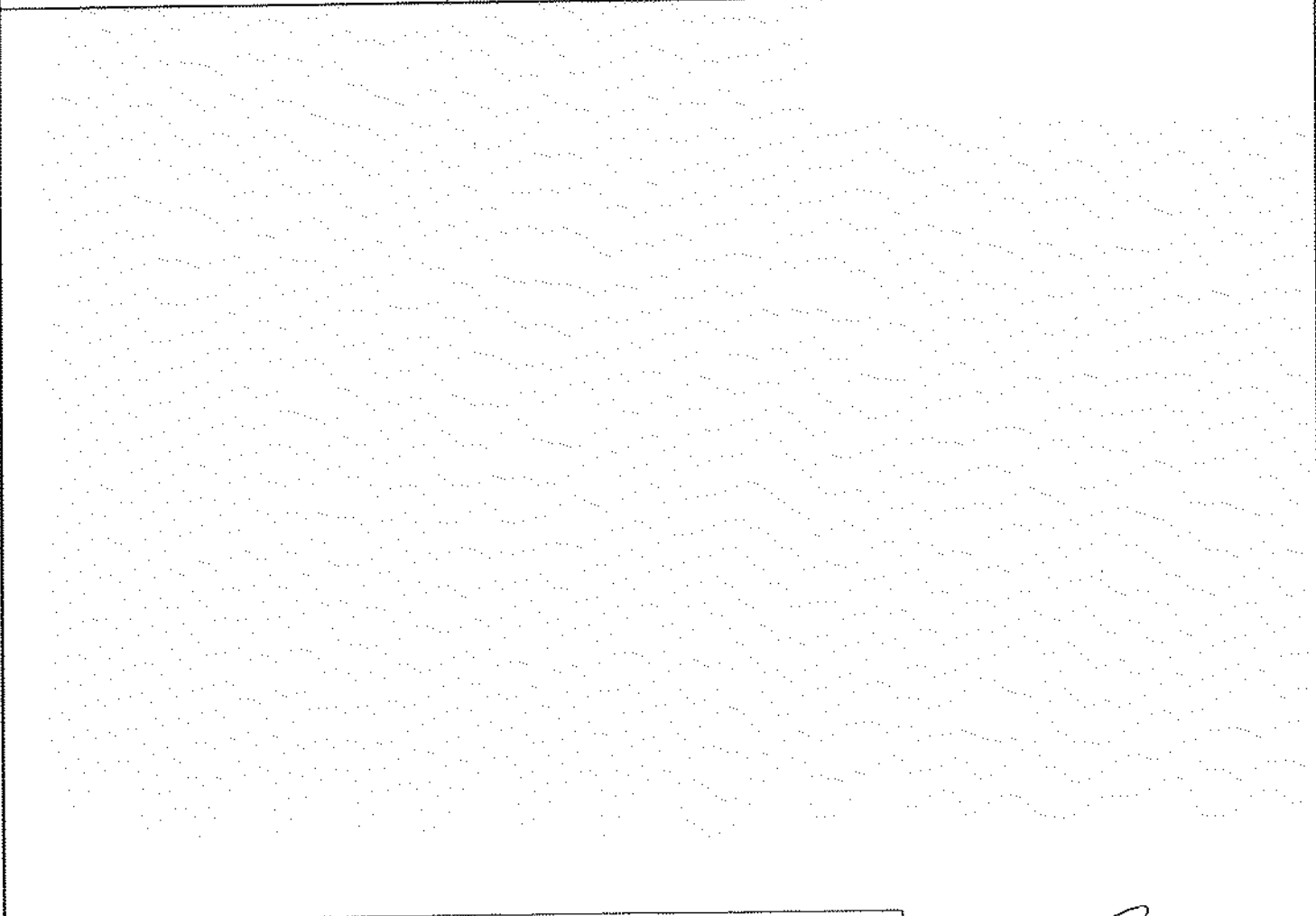
**HBC Engineering Inc.**  
*Project Name: UST Pull/Memorial Dr.*

Project ID: 21-3440-97  
 Project Manager: Charles F. Smith  
 Project Location:


Date Received in Lab : Dec 1, 1998 17:00  
 Date Report Faxed: Dec 7, 1998

**XENCO contact :** Debbie Simmons/Brent Barron.

Analysis Requested	Lab ID:	184634 001	184634 002		
	Field ID:	T-1B-1(15')	T-2B-1(15')		
	Depth:	15'	15'		
	Matrix:	Solid	Solid		
	Sampled:	12/01/98 13:50	12/01/98 13:40		
BTEX	Analyzed:	12/05/98	R.L.	12/05/98	R.L.
EPA 8021B	Units:	ppm		ppm	
Benzene		< 0.050 (0.050)		< 0.050 (0.050)	
Toluene		< 0.050 (0.050)		< 0.050 (0.050)	
Ethylbenzene		0.230 (0.050)		< 0.050 (0.050)	
m,p-Xylene		0.462 (0.100)		< 0.100 (0.100)	
o-Xylene		0.095 (0.050)		< 0.050 (0.050)	
Total BTEX		0.787		N.D.	



This report summary, and the entire report it represents, has been made for the exclusive and confidential use of HBC Engineering inc.. The interpretations and results expressed through this analytical report represent the best judgment of XENCO Laboratories. Xenco Laboratories, however, assumes no responsibility and makes no warranty to the end use of the data hereby presented.

  
 Eddie L. Clemons, II  
 QA/QC Manager



Certificate Of Quality Control for Batch : 18A29G06

SW- 846 5030/8021B BTEX

Date Validated: Dec 6, 1998 23:50
Date Analyzed: Dec 5, 1998 10:47

Analyst: RL
Matrix: Solid

BLANK SPIKE ANALYSIS

Table with 8 columns: Parameter, [A] Blank Result (ppm), [B] Blank Spike Result (ppm), [C] Blank Spike Amount (ppm), [D] Detection Limit (ppm), [E] Blank Spike Recovery (%), [F] Recovery Range (%), [G] Qualifier. Rows include Benzene, Toluene, Ethylbenzene, m,p-Xylene, and o-Xylene.

Blank Spike Recovery [E] = 100\*(B-A)/(C)
N.C. = Not calculated, data below detection limit
V.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager



Certificate of Quality Control for Batch : 18A29G06

**SW- 846 5030/8021B ITEX**

Date Validated: Dec 6, 1998 23:50  
 Date Analyzed: Dec 5, 1998 15:15

Analyst: RL  
 Matrix: Solid

Q.C. Sample ID 184692-032	Parameter	[A] Sample Result ppm	[B] Matrix Spike Result ppm	[C] Matrix Spike Duplicate Result ppm	[D] Matrix Spike Amount ppm	[E] Detection Limit ppm	Matrix Limit Relative Difference %	[F] QC		[G] QC		[H] QC		[I] Matrix Spike Recovery Range %		[J] Qualifier
								Spike Relative Difference %	QC	Matrix Spike Recovery %	QC	M.S.D. Recovery %	QC	M.S.D. Recovery %		
	Benzene	< 0.050	1.330	1.390	2.000	0.050	25.0	4.4	66.5	69.5	66.5	69.5	65-135			
	Toluene	< 0.050	1.480	1.540	2.000	0.050	25.0	4.0	74.0	77.0	74.0	77.0	65-135			
	Ethylbenzene	< 0.050	1.350	1.385	2.000	0.050	25.0	2.6	67.5	69.3	67.5	69.3	65-135			
	m,p-Xylene	< 0.100	1.310	1.330	2.000	0.100	25.0	1.5	65.5	66.5	65.5	66.5	65-135			
	o-Xylene	< 0.050	1.440	1.490	2.000	0.050	25.0	3.4	72.0	74.5	72.0	74.5	65-135			

Spike Relative Difference [F] =  $200 \cdot (B-C)/(B+C)$   
 Matrix Spike Recovery [G] =  $100 \cdot (B-A)/[D]$   
 M.S.D. = Matrix Spike Duplicate  
 M.S.D. Recovery [H] =  $100 \cdot (C-A)/[D]$   
 N.D. = Below detection limit or not detected  
 All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II  
 QA/QC Manager





# ANALYTICAL CHAIN OF CUSTODY REPORT CHRONOLOGY OF SAMPLES

HBC Engineering Inc.

XENCO COC#: 1-84633

Project Name: UST Pull/Memorial Dr.

Project ID: 21-3440-97

Project Manager: Charles F. Smith

Date Received in Lab: Dec 1, 1998 17:00 by SW

Project Location:

XENCO contact : Debbie Simmons/Brent Barron

										Date and Time	
Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Sample Collected	Addition Requested	Extraction	Analysis		
1 T-1B(13)	184633-001	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 13:45		Dec 1, 1998 by JM	Dec 2, 1998 20:14 by AM		
2		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 13:45		Dec 1, 1998 by OR	Dec 1, 1998 21:56 by OR		
3		Pb ICP-MS	EPA	mg/kg	48 hours	Dec 1, 1998 13:45	Dec 3, 1998 10:30	Dec 3, 1998 by ALO	Dec 3, 1998 13:50 by MAB		
4 T-2B(13)	184633-002	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 13:35		Dec 1, 1998 by JM	Dec 2, 1998 21:52 by AM		
5		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 13:35		Dec 1, 1998 by OR	Dec 1, 1998 22:15 by OR		
6 NSW-1(8')	184633-003	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 13:55		Dec 1, 1998 by JM	Dec 2, 1998 22:25 by AM		
7		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 13:55		Dec 1, 1998 by OR	Dec 1, 1998 22:34 by OR		
8 ESW-1(8')	184633-004	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 14:00		Dec 1, 1998 by JM	Dec 2, 1998 22:58 by AM		
9		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 14:00		Dec 1, 1998 by OR	Dec 1, 1998 22:53 by OR		
10 SSW-1(8')	184633-005	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 14:05		Dec 1, 1998 by JM	Dec 2, 1998 23:31 by AM		
11		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 14:05		Dec 1, 1998 by OR	Dec 1, 1998 23:11 by OR		
12 WSW-1(6')	184633-006	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 14:20		Dec 1, 1998 by JM	Dec 3, 1998 00:05 by AM		
13		BTEX	SW-846	ppm	48 hours	Dec 1, 1998 14:20		Dec 1, 1998 by OR	Dec 1, 1998 23:30 by OR		
14 SPC-1	184633-007	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 12:50		Dec 1, 1998 by JM	Dec 3, 1998 00:38 by AM		
15 SPC-2	184633-008	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 12:55		Dec 1, 1998 by JM	Dec 3, 1998 01:11 by AM		
16 SPC-3	184633-009	TPH 1005	TX 1005	ppm	48 hours	Dec 1, 1998 13:00		Dec 1, 1998 by JM	Dec 3, 1998 01:44 by AM		



**CERTIFICATE OF ANALYSIS SUMMARY 1-84633**

**HBC Engineering Inc.**

**Date Received in Lab :** Dec 1, 1998 17:00

**Project ID:** 21-3440-97

**Project Name:** UST Pull/Memorial Dr.

**Date Report Faxed:** Dec 3, 1998

**Project Manager:** Charles F. Smith

**XENCO contact:** Debbie Simmons/Brent Barron

**Project Location:** I

Lab ID: Field ID: Depth: Matrix: Sampled:	184633 001 T-1B(13') 13' Solid 12/01/98 13:45	184633 002 T-2B(13') 13' Solid 12/01/98 13:35	184633 003 NSW-1(8') 8' Solid 12/01/98 13:55	184633 004 ESW-1(8') 8' Solid 12/01/98 14:00	184633 005 SSW-1(8') 8' Solid 12/01/98 14:05	184633 006 WSW-1(8') 8' Solid 12/01/98 14:20
<b>Total Lead by ICP-MS EPA 6020-Pb</b>	Analyzed: Units: mg/kg	12/03/98 5.3 (1.0)				
<b>Lead</b>						
<b>BTEX EPA 8021B</b>	Analyzed: Units: ppm	12/01/98	12/01/98	12/01/98	12/01/98	12/01/98
<b>Benzene</b>		R.L.	R.L.	R.L.	R.L.	R.L.
<b>Toluene</b>		1.05 (0.50)	0.78 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
<b>Ethylbenzene</b>		1.09 (0.50)	1.02 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
<b>m,p-Xylene</b>		2.77 (0.50)	1.13 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
<b>o-Xylene</b>		3.43 (1.00)	2.06 (1.00)	< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)
<b>Total BTEX</b>		1.03 (0.50)	0.84 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
<b>TPH (Texas 1005) TX 1005</b>	Analyzed: Units: ppm	12/02/98	12/02/98	12/02/98	12/02/98	12/03/98
<b>C6 -- C10</b>		R.L.	R.L.	R.L.	R.L.	R.L.
<b>&gt;C10 -- C28</b>		< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)
<b>Total TPH 1005</b>		< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)	< 50.0 (50.0)
		N.D.	N.D.	N.D.	N.D.	N.D.

This report summary, and the entire report it represents, has been made for the exclusive and confidential use of HBC Engineering Inc.. The interpretations and results expressed through this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories, however, assumes no responsibility and makes no warranty to the end use of the data hereby presented.

  
**Eddie L. Clements, II**  
 QA/QC Manager



CERTIFICATE OF ANALYSIS SUMMARY 1-84633


HBC Engineering Inc.

Project Name: UST Pull/Memorial Dr. Date Received in Lab: Dec 1, 1998 17:00  
Date Report Faxed: Dec 3, 1998  
XENCO contact: Debbie Simmons/Brent Barron

Project ID: 21-3440-97  
Project Manager: Charles F. Smith  
Project Location: Y

Analysis Requested	Lab ID: 184633 007 SPC-1			184633 008 SPC-2			184633 009 SPC-3		
	Field ID:	Depth:	Matrix:	Field ID:	Depth:	Matrix:	Field ID:	Depth:	Matrix:
TPH (Texas 1005) TX 1005	12/01/98	12.50	Solid	12/01/98	12.55	Solid	12/01/98	13:00	Solid
	Analyzed:	12/03/98	R.L.	12/03/98	R.L.	12/03/98	R.L.		
	Units:	ppm		ppm		ppm			
C6 -- C10		< 50.0	(50.0)	< 50.0	(50.0)	< 50.0	(50.0)		
>C10 -- C28		< 50.0	(50.0)	< 50.0	(50.0)	< 50.0	(50.0)		
Total TPH 1005			N.D.						N.D.

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 Eddie L. Clemons, II  
 QA/QC Manager



Certificate Of Quality Control for Batch 18A48A36

EPA SW846/6020 Total Metals by ICP- MS

Date Validated: Dec 3, 1998 16:00

Analyst: MAB

Date Analyzed: Dec 3, 1998 12:46

Matrix: Solid

BLANK SPIKE ANALYSIS

Table with 8 columns: Parameter, [A] Blank Result, [B] Blank Spike Result, [C] Blank Spike Amount, [D] Detection Limit, [E] Blank Spike Recovery, [F] Recovery Range, [G] Qualifier. Rows include Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver.

Blank Spike Recovery [E] = 100\*(B-A)/(C)
N.C. = Not calculated, data below detection limit
I.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Signature of Edie L. Clemons, II
Edie L. Clemons, II
QA/QC Manager





**Certificate of Quality Control for Batch: 18A48A36**

**EPA SW846/6020 Total Metals by ICP- MS**

Date Validated: Dec 3, 1998 16:00  
 Date Analyzed: Dec 3, 1998 13:05

Analyst: MAB  
 Matrix: Solid

Q.C. Sample ID 184658- 001 Parameter	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS						
	[A] Sample Result mg/kg	[B] Duplicate Result mg/kg	[C] Detection Limit mg/kg	[D]		[E] LIMITS Relative Difference %	[F] Matrix Spike Result mg/kg	[G] Matrix Spike Amount mg/kg	[H]		[I] LIMITS Recovery Range %	[J] Qualifier
				QC Relative Difference %	Relative Difference %				QC Matrix Spike Recovery %	Recovery %		
Arsenic	< 5.00	< 5.00	5.00	N.C	25.0	82.00	100	82.0	70-125			
Barium	80.8	64.0	2.5	23.2	20.0	99.4	50	37.2	70-125	A,B		
Cadmium	0.70	< 0.50	0.50	N.C	25.0	17.50	20.0	84.0	70-125			
Chromium	13.75	6.95	2.50	65.7	25.0	46.50	50.0	65.5	70-125	A,B		
Lead	15.00	13.70	1.00	9.1	25.0	94.95	100	80.0	70-125			
Selenium	< 5.00	< 5.00	5.00	N.C	25.0	84.20	100	84.2	70-125			
Silver	< 2.50	< 2.50	2.50	N.C	25.0	9.95	50.0	19.9	70-125	B		

(A) Presence of a non-homogeneous sample affects duplicate/spike recovery.

(B) LCS within acceptance limits

Relative Difference [D] = 200\*(B-A)/(B+A)

Matrix Spike Recovery [H] = 100\*(F-A)/[G]

N.C. = Not calculated, data below detection limit

N.D. = Below detection limit

All results are based on MDL and validated for QC purposes only

Eagle L. Clerhens, II  
 QA/QC Manager



Certificate Of Quality Control for Batch : 18A29G00

SW- 346 5030/8021B BTEX

Date Validated: Dec 2, 1998 12:40  
Date Analyzed: Dec 1, 1998 15:49

Analyst: OR  
Matrix: Solid

BLANK SPIKE ANALYSIS

Parameter	[A]	[B]	[C]	[D]	[E]	[F]	[G]
	Blank Result	Blank Spike Result	Blank Spike Amount	Detection Limit	QC	LIMITS	Qualifier
	ppm	ppm	ppm	ppm	Blank Spike Recovery %	Recovery Range %	
Benzene	< 0.0010	0.1180	0.1000	0.0010	118.0	65-135	
Toluene	< 0.0010	0.1100	0.1000	0.0010	110.0	65-135	
Ethylbenzene	< 0.0010	0.1030	0.1000	0.0010	103.0	65-135	
m,p-Xylene	< 0.0020	0.1140	0.1000	0.0020	114.0	65-135	
o-Xylene	< 0.0010	0.1100	0.1000	0.0010	110.0	65-135	

Blank Spike Recovery [E] = 100\*(B-A)/(C)  
N.C. = Not calculated, data below detection limit  
N.D. = Below detection limit  
All results are based on MDL and validated for QC purposes only

Eddie L. Clemmons, II  
QA/QC Manager



**Certificate of Quality Control for Batch : 18A29G00**

**SW- 346 5030/8021B IFTEX**

Date Validated: Dec 2, 1998 12:40


Date Analyzed: Dec 1, 1998 19:19

Analyst: OR

Matrix: Solid

Q.C. Sample ID 184567-044		[A] Sample Result ppm	[B] Matrix Spike Result ppm	[C] Matrix Spike Duplicate Result ppm	[D] Matrix Spike Amount ppm	[E] Detection Limit ppm	Matrix Limit	[F]		[G]		[H]		[I]		[J] Qualifier
								Spike Relative Difference	%	QC	Matrix Spike Recovery	QC	M.S.D. Recovery	Matrix Spike Recovery	Matrix Spike Recovery Range	
Benzene		< 0.050	2.545	2.545	2.000	0.050	25.0	0.0	127.3	127.3	127.3	127.3	65-135			
Toluene		< 0.050	2.500	2.490	2.000	0.050	25.0	0.4	125.0	124.5	124.5	124.5	65-135			
Ethylbenzene		< 0.050	2.365	2.360	2.000	0.050	25.0	0.2	118.3	118.3	118.0	118.0	65-135			
m,p-Xylene		< 0.100	2.645	2.630	2.000	0.100	25.0	0.6	132.3	131.5	131.5	131.5	65-135			
o-Xylene		< 0.050	2.545	2.545	2.000	0.050	25.0	0.0	127.3	127.3	127.3	127.3	65-135			

Spike Relative Difference [F] =  $200 \cdot (B-C) / (B+C)$   
 Matrix Spike Recovery [G] =  $100 \cdot (B-A) / [D]$   
 M.S.D. = Matrix Spike Duplicate  
 M.S.D. Recovery [H] =  $100 \cdot (C-A) / [D]$   
 N.D. = Below detection limit or not detected  
 All results are based on MDL and validated for QC purposes

  
 Eddie L. Clemons, II  
 QA/QC Manager



Certificate Of Quality Control for Batch: 18A40129

TX 1005 TPH (Texas 1005)

Date Validated: Dec 3, 1998 09:10
Date Analyzed: Dec 2, 1998 19:09

Analyst: AM
Matrix: Solid

BLANK SPIKE ANALYSIS

Table with 8 columns: Parameter, [A] Blank Result, [B] Blank Spike Result, [C] Blank Spike Amount, [D] Detection Limit, [E] Blank Spike Recovery, [F] Recovery Range, [G] Qualifier. Rows include C6-C10 and >C10-C28.

Blank Spike Recovery [E] = 100\*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager





**Certificate of Quality Control for Batch: 18A40129**

**TX 1005 TPH (Texas 1005)**

Date Validated: Dec 3, 1998 09:10  
 Date Analyzed: Dec 2, 1998 20:14

Analyst: AM  
 Matrix: Solid

Q.C. Sample ID 184633-001	Parameter	[A]	[B]	[C]	[D]	[E]	[F]		[G]	[H]	[I]	[J]
		Sample Result ppm	Matrix Spike Result ppm	Matrix Spike Duplicate Result ppm	Matrix Spike Amount ppm	Detection Limit ppm	Matrix Limit Relative Difference %	Spike Relative Difference %	QC	QC	QC	Matrix Spike Recovery Range %
		< 50.00	900	933	1000	50.00	30.0	3.6	90.0	93.3	70-130	70-130
		< 50.00	911	947	1000	50.00	30.0	3.9	91.1	94.7	70-130	70-130

Spike Relative Difference [F] =  $200 \cdot (B-C)/(B+C)$   
 Matrix Spike Recovery [G] =  $100 \cdot (B-A)/D$   
 M.S.D. = Matrix Spike Duplicate  
 M.S.D. Recovery [H] =  $100 \cdot (C-A)/D$   
 N.D. = Below detection limit or not detected  
 All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II  
 QA/QC Manager

Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Zak Covar, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

July 25, 2014

12  
**RECEIVED**  
**AUG 18 2014**  
**REGION 12**

Mr. Dan Moody, III  
WB Holding Corporation  
3003 West Alabama  
Houston, Texas 77027-9008

Re: A-1 Cleaners, 12754 Memorial Drive, Houston, Harris County, Texas;  
Voluntary Cleanup Program (VCP) No. 1621; RN100459127; CN601253842

Dear Mr. Moody:

The VCP of the Texas Commission on Environmental Quality (TCEQ) has reviewed the has received and reviewed the *Annual Groundwater Monitoring Report* dated February 27, 2014, prepared by Westcon Solutions. This report documents the monitoring of the contaminant plume of chlorinated volatile organic compounds (VOCs) related to uses of the property as a dry cleaning facility. After careful review of the report, the TCEQ has determined that the report contains the necessary information for an annual groundwater monitoring report (AGWMR). Please note the following Comments.

1. **Change of Project Manager.** Previously, Christine Whitney managed your project. I, Alayna Goetsch, am the new project manager for VCP 1621. You will not be charged for any time spent reviewing previously submitted documentation necessary for me to become familiar with the project.
2. **Documented events at the facility during 2013.**
  - a. Semi-annual monitoring of 9 groundwater monitoring wells;
  - b. The quarterly monitoring of groundwater from 3 monitoring wells;
  - c. The groundwater recovery system activities and repairs from one extraction well at MW-119;
3. **Clarification of which Standard the Cleanup is Under.** The current submittal indicated that the program entered the Texas Risk Reduction Program (TRRP) and is operating under Risk Reduction Standard 2. However, historical information suggests that the site is under Risk Reduction Standard 3, to ensure closing under the same standards as VCP 152 Town and Country Village. Please clarify which rules are applicable to the site.
4. **Continuing Constituents of Concern (COC).** Tetrachloroethlyene and its degradation products of 1,2-cis-dichloroethene, trichloroethylene, and vinyl chloride were found in multiple wells across the site. Many of these constituents were above their respective media specific concentrations (MSC).

Mr. Dan Moody III

Page 2

July 25, 2014

VCP No. 1621

RECEIVED  
AUG 18 2014  
REGION 12

- a. Tetrachloroethylene was above its MSC of 0.005 mg/L in groundwater at monitoring wells MW-116, MW-117, MW-118, MW-120, MW-121, and MW-127. MW-120 is a well located off-site in a residential neighborhood and exceeded its MSC for the first time since 2003 during the November 2013 event.
  - b. Trichloroethylene was reported above its MSC of 0.005 mg/L in MW-1, MW-117, MW-118, MW-122, and MW-127. Please note, the chemical approached near its MSC in MW-120.
  - c. The degradation product of 1,2-cis-dichloroethene was found above its MSC of 0.070 mg/L at groundwater monitoring wells MW-1, MW-117, and MW-127.
  - d. Vinyl chloride was reported at concentrations above its MSC of 0.002 mg/L in MW-1, MW-115, MW-116, MW-117, MW-118, MW-119, and MW-127.
5. **Schedule Change of monitoring for MW-120.** The 2013 groundwater report recommended sampling MW-120 on a quarterly basis. The report indicated that additional delineation may be warranted. The TCEQ supports this requested change.

Currently, the TCEQ has no objections to your plans to continue the operation of the remediation system and monitoring program as proposed for 2014. The TCEQ concurs with your recommendations for the groundwater treatment system and the groundwater-monitoring program. Please note that if groundwater concentrations are indicative of plume growth, additional downgradient delineation may be necessary.

Please submit the next Annual Report no later than August 1, 2015. Please continue to reference VCP No. 1621 on the front of any future letters or reports. Future submittals should be mailed to my attention at the TCEQ, mail code MC 221, at the letterhead address. You may contact me at (512) 239-2236.

Sincerely,



Alayna M. Goetsch, Project Manager  
Voluntary Cleanup Program/ Corrective Action Section  
Remediation Division  
Texas Commission on Environmental Quality

AMG/jdm

- cc: Mr. Blake A. Dinwiddie, Weston Solutions, Inc., Houston  
Mr. Larry W. Nettles, Vinson & Elkins, LLP, 2300 First City Tower 1001 Fannin Street, Houston, TX 77002  
Mr. Jason Ybarra, TCEQ Waste Section Manager, Region 12 Office, Houston

Robert J. Huston, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
John M. Baker, *Commissioner*  
Jeffrey A. Saitas, *Executive Director*



12

## TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

*Protecting Texas by Reducing and Preventing Pollution*

March 26, 1999

RECEIVED  
MAR 31 1999  
REGION 12

5-1/0 }  
Mr. Alan Shelby  
1800 Bering, Suite 495  
Houston, Texas 77057

Re: File Review For Closure of Subsurface Release of Hydrocarbons at the A-1 Cleaners Facility at  
12754 Memorial Drive, Houston (Harris County), Texas  
(LPST ID No. 113777 - Facility ID No. 61076 - Priority 4.2)

Dear Mr. Shelby:

This letter confirms the completion of corrective action requirements for the release incident at the above-referenced facility. Although some contaminant concentrations exceed Plan A Target screening levels, the following criteria were used as justification for site closure:

- The site is 100% paved.
- There was no PSH encountered during the tank pull operation.
- Groundwater was not encountered during the tank pull operation.
- The only soil contamination of concern was benzene at 13 feet in the tank pit at 1.05 ppm. At 15 feet the benzene concentration was less than .05 ppm.

Based upon the submitted information and with the provision that the documentation provided to this agency was accurate and representative of site conditions, we accept your conclusion and recommendation that the site has met closure requirements. No further corrective action will be necessary. For any subsequent release from an underground or aboveground storage tank at this site, the deductible will be increased in accordance with Section 26.132 of the Texas Water Code. Please note that financial assurance must be maintained for all operational storage tanks at this site. Please be aware that case closure is based on identified exposure pathways and that any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at this site. Please ensure that any wastes generated from these activities are handled in compliance with all applicable regulations.

If any monitor well plugging or other necessary site restoration activities will be performed to complete site closure, complete a *Final Site Closure Report* and submit the report to both the local TNRCC Regional Field Office and the Central Office in Austin to document actual site closure. For sites eligible for reimbursement through the Petroleum Storage Tank Remediation Fund, written preapproval should be obtained prior to



Mr. Selby  
Page 2

initiation of site closure activities. Reimbursement claims for activities that are not preapproved will not be paid until all claims for preapproved work are processed and paid.

Please note that the *Final Site Closure Report*, if necessary, will be the last submittal associated with this case. This letter signifies the completion of corrective action associated with the release. No subsequent TNRCC correspondence will be issued in response to the *Final Site Closure Report*.

Please note that all correspondence must include the LPST and Facility ID Numbers and must be submitted to both the local TNRCC Regional Field Office and to the Central Office in Austin. Should you have any questions, please contact Mr. Dennis Rogers at 512/239-2200. **Please reference the LPST ID Number when making inquiries.** Your cooperation in this matter has been appreciated.

Sincerely,



Phyllis Cunningham  
Team Leader, Team II  
PST Responsible Party Remediation Section  
Remediation Division

DRR/mel  
113777.fnn

cc: Marsha Hill, TNRCC Region 12 Field Office, 713/767-3500  
(5425 Polk St., Ste. H, Houston, TX 77023-1486)

## SITE CLOSURE REQUEST FORM

### I. GENERAL INFORMATION

LPST ID No.: 113777 Facility ID No.: 0061076

Responsible Party: Estate of Alta Epstein

Responsible Party Address: 1800 Bering, Suite 495 City: Houston State: TX Zip: 77057

Facility Name: A-I Cleaners

Facility Street Address: 12754 Memorial Drive

Facility City: Houston County: Harris

What is the current use of site? (indicate all that apply):

Residence<sup>1</sup>  School or Day Care center  Commercial/Industrial<sup>1</sup>  Recreational  Agricultural

What is the anticipated future use of the site? (indicate all that apply):

Residence<sup>1</sup>  School or Day Care center  Commercial/Industrial<sup>1</sup>  Recreational  Agricultural

Adjacent property use (indicate all that apply):

Residence<sup>1</sup>  School or Day Care Center  Commercial/Industrial<sup>1</sup>  Recreational  Agricultural

Distance to nearest off-site residence from property line: 20 feet in east direction.

Distance to nearest school or day care center from property line: 1,500 feet in north direction.

### II. CLOSURE SCREENING INFORMATION

Based on the *Limited Site Assessment Report* form or the *Risk-Based Assessment Report Form* (TNRCC-0562), the site is currently a **Priority** 4.2 site. If the site priority has changed, list the other priorities that previously pertained to this site:

Yes  No Have non-aqueous phase liquids (NAPL) ever been present at this site (including tankpit observation wells)? If yes, is NAPL present now (thickness  $\geq 0.1$  feet)?  Yes  No Current thickness: \_\_\_\_\_ ft. If NAPL is currently present, stop here and do not submit this form for case closure. Initiate or continue activities necessary for the removal of all recoverable NAPL at the site.

Yes  No Were all soils, recovered contaminated groundwater, and any phase-separated hydrocarbons properly disposed of, treated, recycled or reused in accordance with TNRCC requirements? If No, stop here and do not submit this form. Provide a proposal (if the site is eligible for reimbursement) to properly dispose or otherwise manage the wastes/materials or, if the site is not eligible for reimbursement, provide documentation of proper disposition of the wastes.

Yes  No Do contaminant concentrations show a consistent decreasing or low static trend? If No, is the contaminant plume increasing in size?  Yes  No If Yes, stop here, do not submit this form, and initiate activities to control plume migration.

### III. RELEASE ABATEMENT/REMEDIATION

Date Release Discovered: 12/03/98

Substance(s) released: (check all that apply)  Gasoline  Alcohol-blended fuel (Type and percentage of alcohol: \_\_\_\_\_)  
 Diesel  Used Oil  Jet Fuel (type: \_\_\_\_\_)  Aviation Gasoline  Other: (be specific) \_\_\_\_\_

Source of Release (specify all that apply):  
 Spills/overfills  Piping leaks  Dispenser leaks  Tank corrosion  Other: \_\_\_\_\_

- Yes  No Has a receptor survey been conducted?  
 Yes  No Has a water well inventory been conducted?

Yes  No Have vapor impacts to buildings or utility lines ever been associated with this release? If Yes, specify the measures taken to abate the impact and indicate the latest date that an impact was noted:  
 \_\_\_\_\_  
 \_\_\_\_\_

Yes  No Have subsurface utilities ever been affected with NAPL or vapors by this release? If Yes, indicate the latest date that an impact was noted:  
 \_\_\_\_\_

If not already provided in *Release Determination Report Form* (TNRCC-0621), or if the information has changed since submittal of the *Release Determination Report*, indicate number of tanks currently and formerly located at this site (attach pages as necessary):

	Type (UST/AST)	Product Type	Size (approx. gal)	Date Removed from Service
Current:	_____	_____	_____	
	_____	_____	_____	
	_____	_____	_____	
	_____	_____	_____	
Former:	_____	_____	_____	
	_____	_____	_____	
	_____	_____	_____	
	_____	_____	_____	

Yes  No If the tanks were permanently removed from service, were native soil samples collected from beneath the tanks and the entire length of the piping? If No, explain why not:  
Approximately 2 feet between abandoned pump island and tankhold excavation. Pump island is part of the structure for the canopy.

Yes  No Was a new UST system installed? If Yes, indicate the date, number of tanks and their contents:  
 \_\_\_\_\_

Yes  No Are there any open excavations at the site? If Yes, state size, location, purpose, and status for each of the excavations:  
 \_\_\_\_\_

Type(s) of soil remediation and time periods the remediation method was operational (indicate all that apply):

- Excavation \_\_\_\_\_ to \_\_\_\_\_ (dates), and  
 Aboveground Bioremediation/Aeration \_\_\_\_\_ to \_\_\_\_\_ (dates), or  
 Thermal Treatment \_\_\_\_\_ to \_\_\_\_\_ (dates), or  
 Disposal \_\_\_\_\_ to \_\_\_\_\_ (dates).  
 Soil Vapor Extraction \_\_\_\_\_ to \_\_\_\_\_ (dates).  
 In-Situ Bioremediation \_\_\_\_\_ to \_\_\_\_\_ (dates).  
 None

III. RELEASE ABATEMENT/REMEDATION (Continued)

Type(s) of groundwater remediation and time periods the remediation method was operational (indicate all that apply):

- Groundwater Pump and Treat \_\_\_\_\_ to \_\_\_\_\_ (dates)
- Air Sparging/SVE \_\_\_\_\_ to \_\_\_\_\_ (dates)
- In-Situ Bioremediation \_\_\_\_\_ to \_\_\_\_\_ (dates)
- Other: \_\_\_\_\_ to \_\_\_\_\_ (dates)
- None

Yes  No Were copies of all receipts and manifests to document disposition of all wastes submitted to the TNRCC? If No, attach copies to this form.

Measured total volume of NAPL recovered: \_\_\_\_\_ 0 \_\_\_\_\_ gallons.

Estimated total volume of soil treated/removed: \_\_\_\_\_ 0 \_\_\_\_\_ cubic yards (exclude soil cuttings removed from borings).

Estimated total volume of groundwater treated/removed: \_\_\_\_\_ 0 \_\_\_\_\_ gallons (if known).

Estimated pounds of hydrocarbons removed or treated from soil (if known): \_\_\_\_\_ 0 \_\_\_\_\_

Estimated pounds of hydrocarbons removed or treated from groundwater (if known): \_\_\_\_\_ 0 \_\_\_\_\_

Estimated percent of total contaminants removed or treated (if known): \_\_\_\_\_ 0 \_\_\_\_\_



#### IV. SOIL DATA VALIDATION

Are there now affected surface soils (contamination exceeding health-based target concentrations) present within 2 feet below the ground surface?  Yes  No  Unknown

Type of surface cover over affected surface soil area:

Paved [ Asphalt or  Concrete] Percent of affected soils covered? 100  Unpaved  
 Other: \_\_\_\_\_

Is there public access to the uncovered affected surface soil area?  Yes  No

Total number of borings: \_\_\_\_\_ (including those completed as monitor wells)

Yes  No Was the vertical and horizontal extent of soil impacts defined (to the more stringent of health-based target or groundwater protective soil concentrations horizontally and to groundwater or nondetect vertically) by the borings?

Yes  No Are shallow (0-15 feet below ground surface) soils affected (contaminant levels exceed health-based target concentrations) on adjacent properties (including right-of-way properties).

Yes  No Were all soil sample collection, handling, transport, and analytical procedures conducted in accordance with TNRCC and EPA requirements? If No, provide justification: \_\_\_\_\_

#### MAXIMUM SOIL CONCENTRATION LEVELS

Soil Contaminants	Sample Date	Sample Location	Depth (in feet below ground surface)	Analytical Method	Maximum Concentration* (mg/kg)	Target Cleanup Goals** (indicate source of target cleanup goals: 1990 or 1994 [Plan A or B] guidance)
Benzene	12/01/98	T-1B	13	8020	1.05	Plan A Cat II (0.74 mg/kg)
Toluene	12/01/98	T-1B	13	8020	1.09	Plan A Cat II (503 mg/kg)
Ethylbenzene	12/01/98	T-1B	13	8020	2.77	Plan A Cat II (835 mg/kg)
Total Xylenes	12/01/98	T-1B	13	8020	4.46	Plan A Cat II (968 <sup>o</sup> mg/kg)
Total BTEX	12/01/98	T-1B	13	8020	9.37	
TPH	12/01/98	T-1B	13	1005	< 50.0	
Other Total lead	07/02/98	T-1B	13	6010	5.3	
Other						

\* Enter maximum soil analytical results for soils remaining beneath the site (take into account all available data, including information obtained during the release determination (tank removal from service, minimal site assessment, etc)).

\*\* If Plan A cleanup goals were used, provide the potential groundwater beneficial use category and a justification of how it was determined in Section VI.

1990 cleanup goals may be used only if all activities necessary to meet those goals were completed by November 8, 1995.

V. GROUNDWATER DATA VALIDATION

Is groundwater at the site impacted?  Yes  No

Did the assessment document that groundwater was not impacted?  Yes  No If No or unsure, provide justification for not determining whether there is a groundwater impact: The maximum hydrocarbon concentrations in the soil samples collected at a depth of 15 feet from the base of excavation were below action levels and/or below the laboratory equipment detection limits, and no groundwater was encountered in the excavation.

Total number of monitoring wells installed: 0 Number of monitor wells remaining at the site: 0

Will any of the remaining wells be used in the future?  Yes  No If Yes, specify exactly which well(s) will be used: \_\_\_\_\_

If No, they must be plugged in accordance with 30 TAC Chapter 338 after obtaining approval for site closure. Do not plug the wells until you receive concurrence on site closure. Costs of well plugging may be allowable for reimbursement if all eligibility requirements are met and if the wells were installed under the direction of the TNRCC specifically to address the confirmed release at the site. Provide a proposal with this form (if the site is eligible for reimbursement) for costs of the well plugging.

Measured total dissolved solids (TDS) concentration in groundwater: NA mg/l. From which monitor well(s) was/were the sample(s) collected? \_\_\_\_\_

Measured groundwater yield at the site: NA gallons/day (as determined from well adequately screened in the impacted aquifer).  Not determined.

Measured groundwater depth at the site ranges between NA and \_\_\_\_\_ feet below the top of well casing.

Time period of groundwater monitoring at the site (dates): NA to \_\_\_\_\_

Total number of groundwater monitoring events: 0

What type of aquifer is impacted? (unconfined, confined, semi-confined): \_\_\_\_\_

Distance from maximum plume concentration point to nearest existing downgradient well location (not monitor well): \_\_\_\_\_ ft. in \_\_\_\_\_ direction (Input ">0.5 mile" if there is no well within 0.5 mile downgradient)

Are any water supply wells impacted or immediately threatened?  Yes  No  
If Yes, specify type of well:  Drinking water  Non-drinking water

Are there any existing water wells located within the area of impacted groundwater?  Yes  No  
If Yes, specify type of well:  Drinking water  Non-drinking water

Has surface water been affected?  Yes  No

Will the groundwater contaminants likely discharge to a surface water body?  Yes  No

What is the potential impact of affected groundwater discharge on surface water?  
 Current impact  Discharges within 500 ft.  Discharges within 500 to 0.25 miles  
 No potential impact

Yes  No Were groundwater sample collection, handling, transport, and analytical procedures conducted and documented in accordance with TNRCC requirements? If no, provide justification: \_\_\_\_\_

**V. GROUNDWATER DATA VALIDATION (Continued)**

- Yes  No Is the extent of groundwater contamination defined (to MCL concentrations)? If No, provide justification for not defining the plume: NA
- 
- Yes  No Have groundwater impacts from this release been detected on adjacent properties? If No, is off-site migration probable?  Yes  No Is there documentation that off-site migration has not occurred (sample results from off-site sampling point)?  Yes  No
- Yes  No Was the static groundwater level above the top of the well screen in any monitor wells during any of the last 4 monitoring events? If Yes, provide a statement of validity regarding these samples:
- 
- Yes  No Have groundwater samples from all monitor wells met the target cleanup goals for the last four consecutive sampling events?

**MAXIMUM GROUNDWATER CONCENTRATIONS**

Groundwater Contaminants	Sample Date	Sample Location	Laboratory Method	Maximum Concentration* (mg/l)	Target Cleanup Goals** (indicate source of target cleanup goals: 1990 or 1994 [Plan A or B] guidance)
Benzene					
Toluene					
Ethylbenzene					
Total Xylenes					
Total BTEX					
TPH					
Other _____					
Other _____					

\* Enter maximum groundwater analytical results from the most recent 12 months of monitoring.

\*\* 1990 cleanup goals may be used only if all activities necessary to meet those goals were completed by November 8, 1995.

## VI. JUSTIFICATION FOR CLOSURE

Please provide a brief summary supporting this request for site closure, including footnoted discussions for the above entries as necessary. Include discussions providing necessary justifications for any site conditions which deviate from the specific requirements of TNRCC rules and policies, including the document *Risk-Based Corrective Action for Leaking Storage Tank Sites*. Provide documentation to justify case closure, including information which addresses the potential for future exposure, the existence of impervious cover or other actions which may prevent exposure or limit infiltration, the absence of receptors, etc.

Groundwater was not encountered during the UST removal activities. During the tank removal activities on December 1, 1998, discrete soil samples were collected from beneath the USTs and from the sidewalls of the excavation. The results of the laboratory analyses indicated that the BTEX and TPH concentrations exhibited by the discrete soil samples collected from the north, east, south and west walls of the tank hold (NSW-1, ESW-1, SSW-1, and WSW-1) and TPH concentrations exhibited by the discrete soil samples collected from the bottom of the tank hold were below the appropriate LPST Action Levels defined by the TNRCC and/or below the laboratory equipment detection limits. The results of the analyses indicated that the benzene (1.05 mg/kg) and (0.78 mg/kg) concentrations exhibited by the discrete soil samples (T-1B and T-2B) respectively, collected at a depth of 13 feet from the bottom of the tank hold exceeded the TNRCC LPST Action Levels for this compound in fine-grained soils. On December 1, 1998, two additional samples (confirmation samples) were collected at a depth of 15 feet from the bottom of the tank hold (T-1B-15' and T-2B-15') approximately 2 feet beyond the bottom of the tank hold from the original T-1B and T-2B locations. The results of the additional sampling and analysis indicated that the BTEX concentrations exhibited by the discrete (confirmation) soil samples T-1B-15' and T-2B-15' were below the appropriate LPST Action Levels defined by the TNRCC and/or below the laboratory equipment detection limits. Three stockpile soil samples (SPC-1, SPC-2 and SPC-3) were collected. The results of the analyses indicated that the total TPH(G) and TPH(D) concentration exhibited by the stockpile soil samples SPC-1, SPC-2 and SPC-3 were below the laboratory equipment detection limits and/or the TNRCC Standard 4 levels (1000 mg/kg) for this compound. Based on the field evidence the tank hold was backfilled with previously excavated materials and imported fill and the entire area covering the tank hold was replaced with asphalt. Mr. Ken Ausbie with the TNRCC Region 12 Office was notified and concurred that the next appropriate step for the site would be submittal of a Request for Site Closure.



### VII. REPORT PREPARATION

Based on the results of the site investigation and the additional information presented herein, I certify that the site investigation activities performed either by me, or under my direct supervision, including subcontracted work, were conducted in accordance with accepted industry standards/practices and further, that all such tasks were conducted in compliance with applicable TNRCC published rules, guidelines and the laws of the State of Texas. I have reviewed the information included within this report, and consider it to be complete, accurate and representative of the conditions discovered during the site investigation. I acknowledge that if I intentionally or knowingly make false statements, representations, or certifications in this report, I may be subject to administrative, civil, and/or criminal penalties. **I certify that the site has met all requirements for closure and that closure is appropriate.**

Project Manager: Thomas R. Martens CAPM No.: 01150 Expiration date: 12/13/99

Company: HBC Engineering, Inc.

Address: 2313 W. Sam Houston Pkwy. N. Ste. 107 City: Houston State: TX Zip: 77043

Telephone No.: (713) 722-0700 Fax No.: (713) 722-0788

Signature:  Date: 12/18/98

By my signature affixed below, I certify that I am the duly authorized representative of the Correction Action Specialist named and that I have personally reviewed the site investigation results and other relevant information presented herein and considered them to be in accordance with accepted standards/practices and in compliance with the applicable TNRCC published rules, guidelines and the laws of the State of Texas. Further, that the information presented herein is considered complete, accurate and representative of the conditions discovered during the site investigation. I acknowledge that if I intentionally or knowingly make false statements, representations, or certifications in this report, I may be subject to administrative, civil, and/or criminal penalties. **I certify that the site has met all requirements for closure and that closure is appropriate.**

Corrective Action Specialist: Richard M. Pollard CAS No.: 00387 Expiration date: 05/30/99

Company: HBC Engineering, Inc.

Address: 2313 W. Sam Houston Pkwy. N. Ste. 107 City: Houston State: TX Zip: 77043

Telephone No.: (713) 722-0700 Fax No.: (713) 722-0788

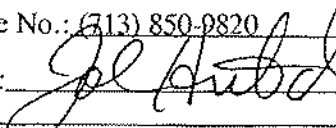
Signature:  Date: 12/17/98

By my signature affixed below, I certify that I have reviewed this report for accuracy and completeness of information regarding points of contact and the facility and storage tank system history and status. I acknowledge that if I intentionally or knowingly make false statements, representations, or certifications in this report related to the contact information, and the facility and storage tank system history and status information, I may be subject to administrative, civil, and/or criminal penalties. I attest that I have reviewed this report for accuracy and completeness. I understand that I am responsible for addressing this matter.

**I certify that the site has met all requirements for closure and that closure is appropriate.**

Name of Responsible Party contact: John Hutchison, Guardian for the Estate of Alta Epstein

Telephone No.: (713) 850-9820 Fax No.: (713)

Signature:  Date: 12-16-98

THE FOLLOWING ITEMS MUST BE SUBMITTED WITH THIS FORM IF NOT PREVIOUSLY SUBMITTED:

- A site map illustrating the locations of the entire UST and/or AST system (including piping, dispensers, observation wells, etc.), all soil borings and monitoring wells and all other sampling points, subsurface utilities, and surface water within 500 feet.
- A copy of the latest groundwater gradient map (if monitor wells were completed).
- Summary tables of all soil, groundwater and surface water analytical results, including samples collected from any tank removal from service activities, tank system repair activities, and those collected from borings and monitor wells. The tables must clearly identify the sample number, date of collection, sampling locations, depths (if applicable), and analytical results.
- Copies of any manifests or other waste receipts, and any other documents necessary for case closure.

Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas

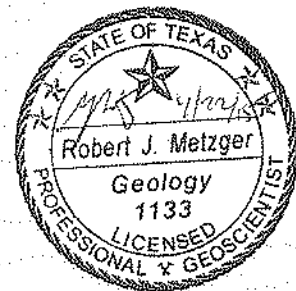
**PHASE I ENVIRONMENTAL SITE ASSESSMENT  
TIRZ 17 RECONSTRUCTION OF  
MEMORIAL DRIVE BETWEEN  
WEST SAM HOUSTON PARKWAY AND  
TALLOWOOD ROAD  
HOUSTON, TEXAS**

**Volume 2 of 2**

**Prepared for:  
Lockwood, Andrews, and Newnam, Inc.  
2925 Briarpark Drive, Suite 400  
Houston, Texas 77042**

**Prepared by**

**Aviles Engineering Corporation  
5790 Windfern Road  
Houston, Texas 77041  
Phone: (713) 895-7645  
Fax: (713) 895-7943  
AEC Project No. E112-14**



**Date: April 22, 2015**

## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN102353158  
**Name:** CONOCO 43059  
**Primary Business:** RETAIL  
**Street Address:** 12699 MEMORIAL DR, HOUSTON TX 77024 8818  
**County:** HARRIS  
**Nearest City:** HOUSTON  
**State:** TX  
**Near ZIP Code:** 77024  
**Physical Location:** 12699 MEMORIAL DR

### Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

#### 1-2 of 2 Records

CN Number	Customer Name	Customer Role	Details
CN600125512	CONOCO INC	OWNER	<a href="#">↗</a>
CN601674351	CONOCOPHILLIPS COMPANY	OWNER	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **3** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-3 of 3 Records

Program ▲	ID Type	ID Number	ID Status
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	104023	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	14936	INACTIVE
PETROLEUM STORAGE TANK STAGE II			

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Questions or Comments &gt;&gt;

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 [RE Search](#)  
 [ID Search](#)  
 [Search Results](#)  
 [ID Number Detail](#)  
 [TCEQ Home](#)

## Central Registry

### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 104023

For: **CONOCO 43059 (RN102353158)**

12699 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CONOCO INC (CN600125512)** Since 05/08/1986 [View Compliance History](#)

Mailing Address: PO BOX 4784 HOUSTON, TX 77210-4784

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
5518026	10/19/2007	OUTGOING	NLR			10/19/2007	10/19/2007	
5400761	08/29/2007	INCOMING	FSC			10/19/2007	08/27/2007	
5518025	10/23/2006	OUTGOING	RR - CAR			10/23/2006	10/23/2006	
5400760	09/14/2006	INCOMING	PROP ACT13			10/23/2006	09/12/2006	
5518023	09/01/2006	OUTGOING	FINAL			09/01/2006	09/01/2006	
5518024	09/01/2006	OUTGOING	REJ TECH			09/01/2006	09/01/2006	
5400758	08/04/2006	INCOMING	SCR			09/01/2006	03/20/2006	
5400759	08/04/2006	INCOMING	PROP ACT13			09/01/2006	03/20/2006	
5518022	05/19/2006	OUTGOING	REJ TECH			05/19/2006	05/19/2006	
5518021	05/18/2006	OUTGOING	REJ TECH			05/18/2006	05/18/2006	
5518004	05/16/2006	OUTGOING	NLR			05/16/2006	05/16/2006	
5518005	05/16/2006	OUTGOING	NLR			05/16/2006	05/16/2006	
5400756	03/23/2006	INCOMING	SCR			05/18/2006	03/20/2006	
5400757	03/23/2006	INCOMING	PROP ACT13			05/19/2006	03/20/2006	
5518019	11/04/2005	OUTGOING	RR			11/04/2005	11/04/2005	

5518020	10/14/2005	OUTGOING	MM - EXT		10/14/2005	10/14/2005
5400755	09/07/2005	INCOMING	TECH RESP		11/04/2005	09/06/2005
5518018	08/18/2005	OUTGOING	RR		08/18/2005	08/18/2005
5400754	06/21/2005	INCOMING	MONIT ANNL		08/18/2005	06/20/2005
5517932	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517933	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517934	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517935	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517936	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517998	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5517999	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5518000	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5518001	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5518002	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5518003	02/03/2005	OUTGOING	UNKNOWN		02/03/2005	02/03/2005
5518016	04/06/2004	OUTGOING	RR - CAR		04/06/2004	04/06/2004
5518017	04/06/2004	OUTGOING	RR - CAR		04/06/2004	04/06/2004
5400752	03/08/2004	INCOMING	OMPR		04/06/2004	03/03/2004
5400753	03/08/2004	INCOMING	PROP ACT18		04/06/2004	03/03/2004
5518015	04/01/2003	OUTGOING	RR		04/01/2003	04/01/2003
5400751	02/05/2003	INCOMING	TECH RESP		04/01/2003	01/31/2003
5518013	12/06/2002	OUTGOING	RR - CAR		12/06/2002	12/06/2002
5518014	12/06/2002	OUTGOING	RR - CAR		12/06/2002	12/06/2002
5400749	11/06/2002	INCOMING	OMPR		12/06/2002	10/30/2002
5400750	11/06/2002	INCOMING	PROP ACT12		12/06/2002	10/30/2002
5518007	10/23/2002	OUTGOING	RR - CAR		10/23/2002	10/23/2002
5518008	10/23/2002	OUTGOING	RR - CAR		10/23/2002	10/23/2002
5518009	10/23/2002	OUTGOING	RR - CAR		10/23/2002	10/23/2002
5518011	10/23/2002	OUTGOING	RR - CAR		10/23/2002	10/23/2002
5518012	10/23/2002	OUTGOING	RR - CAR		10/23/2002	10/23/2002
5400748	09/11/2002	INCOMING	PROP ACT12		10/23/2002	09/18/2001
5400747	12/10/2001	INCOMING	TECH RESP		10/23/2002	12/04/2001
5518010	11/12/2001	OUTGOING	MASSMAIL		11/12/2001	11/12/2001

5400745	10/30/2001	INCOMING	FAR		10/23/2002	10/09/2001
5400746	10/30/2001	INCOMING	PROP ACT13		10/23/2002	10/19/2001
5400744	10/17/2001	INCOMING	OMPR		10/23/2002	10/16/2001
5518006	10/09/2001	OUTGOING	RR - CAR		10/09/2001	10/09/2001
5400743	05/17/2000	INCOMING	RAP INSTAL		10/09/2001	05/02/2000
5400742	10/22/1999	INCOMING	NRSI		05/16/2006	10/20/1999
5400741	03/26/1999	INCOMING	NTO		05/16/2006	03/24/1999
5400740	03/23/1999	INCOMING	OTHER		02/03/2005	03/18/1999
5400739	03/10/1999	INCOMING	OTHER		02/03/2005	11/17/1998
5400738	11/23/1998	INCOMING	TECH RESP		02/03/2005	11/17/1998
5400737	11/20/1998	INCOMING	OTHER		02/03/2005	11/19/1998
5400735	11/09/1998	INCOMING	TECH RESP		02/03/2005	11/05/1998
5400736	11/09/1998	INCOMING	TECH RESP		02/03/2005	11/05/1998
5517995	10/09/1998	OUTGOING	RR - CAR		10/09/1998	10/09/1998
5517996	10/09/1998	OUTGOING	RR - CAR		10/09/1998	10/09/1998
5517997	10/09/1998	OUTGOING	RR - CAR		10/09/1998	10/09/1998
5400732	09/09/1998	INCOMING	PROP ACT11		10/09/1998	09/04/1998
5400733	09/09/1998	INCOMING	PROP ACT 5		10/09/1998	09/04/1998
5400734	09/09/1998	INCOMING	PROP ACT12		10/09/1998	09/04/1998
5517994	04/01/1998	OUTGOING	NLR		04/01/1998	04/01/1998
5400731	03/04/1998	INCOMING	ASS B-ADD		04/01/1998	02/23/1998
5517987	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5517988	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5517989	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5517990	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5517991	12/23/1997	OUTGOING	REJ TECH		12/23/1997	12/23/1997
5517992	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5517993	12/23/1997	OUTGOING	RR - CAR		12/23/1997	12/23/1997
5400730	12/22/1997	INCOMING	RAP - ADD		12/23/1997	12/17/1997
5400729	12/12/1997	INCOMING	ASS B RPT		12/23/1997	11/24/1997
5400724	12/05/1997	INCOMING	RAP		12/23/1997	11/25/1997
5400725	12/05/1997	INCOMING	PROP ACT 5		12/23/1997	11/29/1997
5400726	12/05/1997	INCOMING	PROP ACT11		12/23/1997	11/29/1997

	12/05/1997	INCOMING	PROP ACT12		12/23/1997	11/29/1997
5400727		INCOMING	PROP ACT12			
5400728	12/05/1997	INCOMING	PROP ACT13		12/23/1997	11/29/1997
5517982	10/02/1997	OUTGOING	NLR		10/02/1997	10/02/1997
5517983	10/02/1997	OUTGOING	RR - CAR		10/02/1997	10/02/1997
5517984	10/02/1997	OUTGOING	RR - CAR		10/02/1997	10/02/1997
5517985	10/02/1997	OUTGOING	RR - CAR		10/02/1997	10/02/1997
5517986	10/02/1997	OUTGOING	NLR		10/02/1997	10/02/1997
5400721	09/10/1997	INCOMING	RBA		10/02/1997	09/08/1997
5400722	09/10/1997	INCOMING	PROP ACT 9		10/02/1997	09/05/1997
5400723	09/10/1997	INCOMING	OTHER		10/02/1997	09/04/1997
5400720	09/08/1997	INCOMING	PROP ACT 6		10/02/1997	09/02/1997
5400719	09/04/1997	INCOMING	MPR		10/02/1997	08/14/1997
5517976	09/03/1997	OUTGOING	NLR		09/03/1997	09/03/1997
5517977	09/03/1997	OUTGOING	NLR		09/03/1997	09/03/1997
5517978	09/03/1997	OUTGOING	RR - CAR		09/03/1997	09/03/1997
5517979	09/03/1997	OUTGOING	RR - CAR		09/03/1997	09/03/1997
5517980	09/03/1997	OUTGOING	RR - CAR		09/03/1997	09/03/1997
5517981	09/03/1997	OUTGOING	REJ TECH		09/03/1997	09/03/1997
5400718	08/04/1997	INCOMING	PROP ACT12		09/03/1997	07/29/1997
5400714	07/24/1997	INCOMING	MONIT ANNL		09/03/1997	07/11/1997
5400715	07/24/1997	INCOMING	FAR		09/03/1997	07/18/1997
5400716	07/24/1997	INCOMING	PROP ACT 8		09/03/1997	07/18/1997
5400717	07/24/1997	INCOMING	PROP ACT15		09/03/1997	07/18/1997
5400713	06/30/1997	INCOMING	TECH RESP		09/03/1997	06/26/1997
5517969	06/27/1997	OUTGOING	RR - CAR		06/27/1997	06/27/1997
5517975	06/23/1997	OUTGOING	RR - CAR		06/23/1997	06/23/1997
5400712	06/13/1997	INCOMING	PROP ACT 5		06/23/1997	06/10/1997
5517973	06/06/1997	OUTGOING	REJ TECH		06/06/1997	06/06/1997
5517974	06/06/1997	OUTGOING	REJ TECH		06/06/1997	06/06/1997
5400711	05/16/1997	INCOMING	PROP ACT 5		06/06/1997	05/12/1997
5400710	05/14/1997	INCOMING	PROP ACT 6		06/06/1997	05/12/1997
5517970	04/09/1997	OUTGOING	REJ TECH		04/09/1997	04/09/1997
5517971	04/09/1997	OUTGOING	NLR		04/09/1997	04/09/1997



5517972	04/09/1997	OUTGOING	NLR			04/09/1997	04/09/1997
5400709	03/25/1997	INCOMING	TECH RESP			04/09/1997	03/18/1997
5400707	03/10/1997	INCOMING	PROP ACT19			04/09/1997	02/28/1997
5400708	03/10/1997	INCOMING	MPR			04/09/1997	02/28/1997
5517967	02/26/1997	OUTGOING	RR - CAR			02/26/1997	02/26/1997
5517968	02/26/1997	OUTGOING	RR - CAR			02/26/1997	02/26/1997
5400706	02/07/1997	INCOMING	PROP ACT 6			06/27/1997	01/30/1997
5400704	01/27/1997	INCOMING	PROP ACT 5			02/26/1997	12/04/1996
5400705	01/27/1997	INCOMING	FAR			02/26/1997	11/04/1996
5517963	12/19/1996	OUTGOING	NLR			12/19/1996	12/19/1996
5517964	12/19/1996	OUTGOING	NLR			12/19/1996	12/19/1996
5517965	12/19/1996	OUTGOING	RR - CAR			12/19/1996	12/19/1996
5517966	12/19/1996	OUTGOING	RR - CAR			12/19/1996	12/19/1996
5400703	11/19/1996	INCOMING	PROP ACT 5			12/19/1996	11/06/1996
5400702	10/18/1996	INCOMING	PROP ACT17			12/19/1996	10/09/1996
5400701	08/26/1996	INCOMING	MPR			12/19/1996	08/21/1996
5400700	06/03/1996	INCOMING	MONIT ANNL			12/19/1996	05/06/1996
5517961	04/03/1996	OUTGOING	NLR			04/03/1996	04/03/1996
5517962	04/03/1996	OUTGOING	RR - CAR			04/03/1996	04/03/1996
5400699	03/19/1996	INCOMING	PROP ACT19			04/03/1996	02/29/1996
5517959	03/16/1996	OUTGOING	NLR			03/16/1996	03/16/1996
5400698	03/14/1996	INCOMING	TECH RESP			04/03/1996	03/11/1996
5400697	03/06/1996	INCOMING	PROP ACT 8			03/06/1996	02/27/1996
5517951	03/06/1996	OUTGOING	NLR			03/06/1996	03/06/1996
5517952	03/06/1996	OUTGOING	NLR			03/06/1996	03/06/1996
5517953	03/06/1996	OUTGOING	NLR			03/06/1996	03/06/1996
5517954	03/06/1996	OUTGOING	NLR			03/06/1996	03/06/1996
5517955	03/06/1996	OUTGOING	NLR			03/06/1996	03/06/1996
5517956	03/06/1996	OUTGOING	RR - CAR			03/06/1996	03/06/1996
5517957	03/06/1996	OUTGOING	WITHDRAWN			03/06/1996	03/06/1996
5517958	03/06/1996	OUTGOING	RR - CAR			03/06/1996	03/06/1996
5517960	03/06/1996	OUTGOING	RR - CAR			03/06/1996	03/06/1996
5400696	03/01/1996	INCOMING	MPR			03/16/1996	02/12/1996

5400695	02/12/1996	INCOMING	PROP ACT 5		03/06/1996	02/06/1996
5400693	02/06/1996	INCOMING	PROP ACT12		03/06/1996	12/07/1995
5400694	02/06/1996	INCOMING	PROP ACT 8		03/06/1996	12/18/1995
5400690	01/30/1996	INCOMING	MPR		03/06/1996	01/25/1996
5400691	01/30/1996	INCOMING	MPR		03/06/1996	01/25/1996
5400692	01/30/1996	INCOMING	MPR		03/06/1996	01/25/1996
5400688	01/22/1996	INCOMING	MPR		03/06/1996	10/20/1995
5400689	01/22/1996	INCOMING	MES		03/06/1996	10/20/1995
5517937	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517938	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517939	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517940	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517941	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517942	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517943	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517944	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517945	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517946	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517947	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517948	07/17/1995	OUTGOING	RR		07/17/1995	07/17/1995
5517949	07/17/1995	OUTGOING	RR - CAR		07/17/1995	07/17/1995
5517950	06/12/1995	OUTGOING	RCPT		06/12/1995	06/12/1995
5400674	06/09/1995	INCOMING	MONIT ANNL		07/17/1995	06/09/1995
5400675	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400676	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400677	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400678	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400679	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400680	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400681	06/09/1995	INCOMING	MPR		07/17/1995	05/25/1995
5400682	06/09/1995	INCOMING	MES		07/17/1995	11/08/1994
5400683	06/09/1995	INCOMING	MES		07/17/1995	05/22/1995
5400684	06/09/1995	INCOMING	FAR		07/17/1995	05/08/1995

Case Number	Date	Status	LSA	Date	Date	Date
5400685	06/09/1995	INCOMING	LSA		07/17/1995	07/20/1994
5400686	06/09/1995	INCOMING	PROP ACT19		07/17/1995	05/22/1995
5400687	06/09/1995	INCOMING	PROP ACT 8		06/12/1995	05/08/1995
5400673	07/26/1994	INCOMING	MONIT ANNIL		02/03/2005	
5400671	07/12/1994	INCOMING	MPR		02/03/2005	
5400672	07/12/1994	INCOMING	MPR		02/03/2005	
5400670	03/04/1994	INCOMING	MPR		02/03/2005	
5400669	02/01/1994	INCOMING	MPR		02/03/2005	
5517915	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517916	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517923	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517927	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517928	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517930	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517931	01/14/1994	OUTGOING	RR		01/14/1994	01/14/1994
5517925	01/12/1994	OUTGOING	NLR		01/12/1994	01/12/1994
5517926	01/12/1994	OUTGOING	NLR		01/12/1994	01/12/1994
5400668	01/03/1994	INCOMING	MPR		01/14/1994	
5400667	12/16/1993	INCOMING	MPR		01/14/1994	
5517929	09/27/1993	OUTGOING	PREAPP DOC		09/27/1993	09/27/1993
5400666	07/23/1993	INCOMING	MES		01/14/1994	
5400665	05/06/1993	INCOMING	MES		01/14/1994	
5400663	04/06/1993	INCOMING	CONTINUE-Y		01/12/1994	
5400664	04/06/1993	INCOMING	QUEST		01/12/1994	
5517924	03/02/1993	OUTGOING	ACTN RQST		03/02/1993	03/02/1993
5400662	02/05/1993	INCOMING	QTR MONIT		01/14/1994	
5517922	12/28/1992	OUTGOING	CLARIFY1-6		12/28/1992	12/28/1992
5517921	11/09/1992	OUTGOING	NLR		11/09/1992	11/09/1992
5400661	11/04/1992	INCOMING	PHASE2RPT		11/09/1992	
5517920	10/23/1992	OUTGOING	STOP 5 AND 6		10/23/1992	10/23/1992
5400660	10/20/1992	INCOMING	PHASE1RPT		10/20/1992	
5517918	10/20/1992	OUTGOING	OTHER		10/20/1992	10/20/1992
5517919	10/20/1992	OUTGOING	REFERRAL		10/20/1992	10/20/1992

5400659	09/14/1992	INCOMING	RQT EXSTN	10/20/1992	
5517917	08/13/1992	OUTGOING	CAD	08/13/1992	08/13/1992
5400658	05/03/1992	INCOMING	TANK CLSR	01/14/1994	

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## SITE SEARCH:

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## SUBJECT INDEX

ALL WATER WASTE

Search TCEQ Data

Access Observation Map

The list below is not sorted.

Customer	Site Associated with This Customer					Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)			
	Name	City or Nearest City	County	TCEQ Region	Related Numbers	Rating	Classification	Date Rated	Date Posted
CONOCOPHILLIPS COMPANY	CONOCO 43059	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>14936</li> <li>104023</li> </ul>	0	UNCLASSIFIED	09/01/2014	11/15/2014
CONOCO INC	CONOCO 43059	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>104023</li> <li>14936</li> </ul>	0	UNCLASSIFIED	09/01/2014	11/15/2014

**What's a "site"?**

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

**What's a "customer"?**

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Cleaners, which owns several dry-cleaner locations

- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleaners

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 104023**

For: **CONOCO 43059 (RN102333158)**

12699 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CONOCO INC (CN600125512)** Since 05/08/1986 [View Compliance History](#)

Mailing Address: PO BOX 4784 HOUSTON, TX 77210-4784

Legal	Description	Start Date	End Date	Type	Status	Status Date
104023	LEAKING PETROLEUM STORAGE TANK	08/31/1992	09/01/2006	CLEANUP	INACTIVE	09/01/2006

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[Statewide Links](#): [Texas.gov](#) | [Texas Homeland Security](#) | [TRAIL Statewide Archive](#) | [Texas Veterans Portal](#)  
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**TEXAS NATURAL RESOURCE CONSERVATION COMMISSION  
 PETROLEUM STORAGE TANK DIVISION  
 CORRESPONDENCE IDENTIFICATION SHEET**

P = AV

Date: August 28, 2007  
 Site Name: Former ConocoPhillips Store #43059  
 Site Address: 12699 Memorial Drive  
Houston, Texas

LPST ID No.: 104023  
 Facility ID No.: 0014936

This checklist must accompany all correspondence submitted to the RPR Section and should be affixed to the front of your submittal as a cover page. Please check the appropriate box for the type of correspondence which you have submitted to the RPR Section. Check all boxes that apply if you are submitting more than one type of correspondence. If you cannot find an appropriate category, please complete the "other" section.

**PROPOSALS**

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Initial Abatement (1)     | <input type="checkbox"/> Tank Removal (2)         | <input type="checkbox"/> Excavation (3)         |
| <input type="checkbox"/> Waste Treatment (4)       | <input type="checkbox"/> Site Assessment (5)      | <input type="checkbox"/> Aquifer Testing (6)    |
| <input type="checkbox"/> VES/Sparge Testing (7)    | <input type="checkbox"/> Qtrly. GW Monitoring (8) | <input type="checkbox"/> CAP Prep. (9)          |
| <input type="checkbox"/> GW Extrac./Treatment (10) | <input type="checkbox"/> Soil Vapor Extrac. (11)  | <input type="checkbox"/> Operation & Main. (12) |
| <input type="checkbox"/> Site Closure (13)         | <input type="checkbox"/> Plan A Risk Ass. (14)    | <input type="checkbox"/> Plan B Risk Ass. (15)  |
| <input type="checkbox"/> Semi-annual GW Mon. (16)* | <input type="checkbox"/> Annual GW Mon. (18)      | <input type="checkbox"/> Product Recovery (19)  |
| <input type="checkbox"/> Other proposal _____      |   |   |

**REPORTING FORMS**

- |   |  |
|---|--|
| <input type="checkbox"/> Assessment Report Form (TNRCC-0562)                    | <input type="checkbox"/> LPST Case Questionnaire                                 |
| <input type="checkbox"/> Product Recovery Report Form (TNRCC-0016)              | <input type="checkbox"/> Release Report Form (TNRCC-0621)                        |
| <input type="checkbox"/> Site Closure Request Form (TNRCC-0028)                 | <input type="checkbox"/> Monitoring Event Summary and Status Report (TNRCC-0013) |
| <input checked="" type="checkbox"/> Final Site Closure Report Form (TNRCC-0030) | <input type="checkbox"/> Priority 4 LPST Case Closure Request Form (TNRCC-0461)  |
| <input type="checkbox"/> Other form _____                                       |  |

**REPORTS**

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Tank Closure/Removal             | <input type="checkbox"/> Plan A Risk Assessment       | <input type="checkbox"/> Annual Groundwater Monitoring |
| <input type="checkbox"/> O&M/Performance Mon.             | <input type="checkbox"/> Plan B Risk Assessment       | <input type="checkbox"/> CAP Installation/Modification |
| <input type="checkbox"/> Property Divestiture/Phase 1 ESA | <input type="checkbox"/> Corrective Action Plan (CAP) | <input type="checkbox"/> Aquifer/Pilot Test Results    |

**MISCELLANEOUS**

- |  |   |
|--|---|
| <input type="checkbox"/> Off-site access assistance  | <input type="checkbox"/> Deadline Extension Request                 |
| <input type="checkbox"/> Tank tightness test results   | <input type="checkbox"/> Request for State-Lead                     |
| <input type="checkbox"/> Request for LPST Waste Code   | <input type="checkbox"/> Class V ReInjection Request                |
| <input type="checkbox"/> Notice to Owner/Operator for CAS Services                           | <input type="checkbox"/> Petroleum-Substance Waste Manifest         |
| <input type="checkbox"/> Notice of Continuation of Groundwater Monitoring                    | <input type="checkbox"/> Underground Storage Tank Registration Form |
| <input type="checkbox"/> Notice of Continuation of Operation and Maintenance                 | <input type="checkbox"/> Aboveground Storage Tank Registration Form |
| <input type="checkbox"/> Other (anything that does not fit into one of the categories above) |   |

\* The proposal for semi-annual monitoring and annual report (Proposal Activity 17) has been discontinued. For semi-annual monitoring, use Proposal Activity 16.

**RECEIVED**

AUG 30 2007

DEPARTMENT OF



I attest that all work has been conducted in accordance with accepted industry standards/practices and adhered to TNRCC guidance and rules. I certify that I am aware that misrepresentation of any of the above claims is a violation of 30 TAC 33.4453(b)(1)(E) and that this violation may result in the disciplinary actions set forth in 30 TAC 334.453 and or 334.463 and 334.465.

If a proposal is attached for preapproval, has the proposed work, in part or in whole, already been performed or in progress?  Yes  No

If yes, what work? \_\_\_\_\_

Tana A. Riva, P.G. (#2496)

550

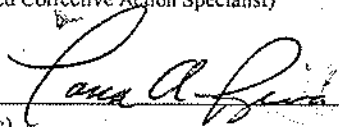
12/12/08

(Registered Corrective Action Specialist)

(RCAS Reg. No.)

(Expiration date)

(Signature)



8/28/07

(Date)

817-640-9621

817-640-9149

(Telephone #)

(FAX #)

Tana A. Riva, P.G. (#2496)

1109

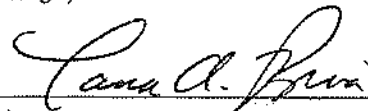
12/10/07

(Project Manager)

(CAPM Reg. No.)

(Expiration date)

(Signature)



8/28/07

(Date)

817-640-9621

817-640-9149

(Telephone #)

(FAX #)

By signature below, I certify that documents checked above are included.

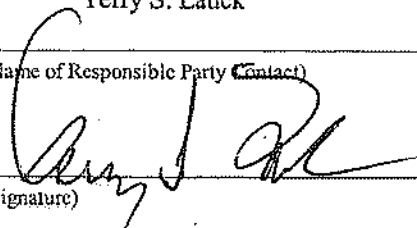
Terry S. Lauck

ConocoPhillips

(Name of Responsible Party Contact)

(Company)

(Signature)



8/24/2007

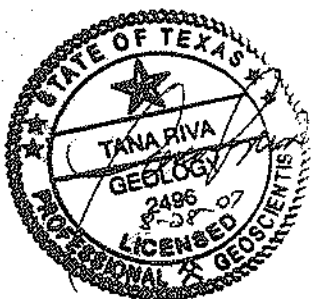
(Date)

918-661-0935

918-661-5746

(Telephone #)

(FAX #)



RECEIVED  
AUG 30 2007  
REGION 12

Texas Natural Resource Conservation Commission  
**PETROLEUM STORAGE TANK  
 FINAL SITE CLOSURE REPORT**

Use this form to provide information on LPST site closure activities after site closure has been authorized. To request authorization for site closure, complete and submit the *Site Closure Request* form (TNRCC-0028).

Complete All Applicable Blanks.

Date: 8-22-07

**GENERAL INFORMATION**

LPST ID No.: 104023

Facility ID No: 14936

Responsible Party: ConocoPhillips

RP Address: P.O. Box 2197

City: Houston

State: TX

Zip: 77252

Facility Name: Former Conoco Station #43059

Facility Address: 12699 Memorial Drive

Facility City: Houston

County: Harris

**CLOSURE ACTIVITY**

Was a remediation system installed?  YES  NO If yes, provide a description : Dual phase extraction (DPE) system. Groundwater is transferred from seven recovery wells (DPE-1 thru DPE-7) via top loading pneumatic submersible pumps in the recovery wells to an oil/water separator. The free phase hydrocarbons that accumulate in the oil/water separator flow by gravity into a free product holding tank. A transfer pump is used to pump the groundwater from the oil/water separator to the air stripper unit that removes dissolved hydrocarbons. A blower is used to supply air to the air stripper. The air stream is then processed through two, 2000-lb activated carbon vessels installed in series. The DPE system uses a regenerative blower to extract vapors from the seven remedial wells. Vapors are directed from the remedial wells to a moisture separator by way of a 4-inch Schedule 40 PVC header pipe. The moisture separator removes liquid from the airflow, should it be present. The vapors are then processed through a particulate filter before passing through the vacuum blower. The vapor stream is processed through two 1000-lb activated carbon vessels, installed in series, prior to discharge to the atmosphere.

Was this system removed?  YES  NO If no, explain why not: \_\_\_\_\_

What is the intended future use/disposition and location of the system: Salvageable equipment was packaged and is stored at ConocoPhillips' bulk terminal facility in Southlake, Texas. The stored equipment includes two Ingersoll Rand air compressors and two Ametek blowers and motors. All other equipment was disposed as scrap.

List the components of the remedial system removed: Two Ingersoll Rand air compressors, two Ametek blowers and motors, air stripper, oil/water separator, moisture knockout drum, storage tank, all control panels, fittings, valves, gauges, and other miscellaneous equipment. All underground SVE piping was tremie filled with a bentonite-grout and capped. All DPE boxes were removed. Recovery and monitoring wells were plugged and abandoned.

**RECEIVED**

List any of the remedial system components remaining at the site: None

Provide a description of site restoration activities: Restoration activities occurred in June and December 2006. The thermal oxidizer and carbon vessels were previously removed from the system. Partial restoration was performed in June due to the landowner repaving the surface cover at the site at that time. In June 2006, the PVC well casing and screen from MW-1 and MW-2 and P-1 through P-3 were removed from the ground along with the well covers and the borings were grouted with cement-bentonite to within approximately 3 inches from the surface. Due to overhead power lines, the well casing for P-4 was not removed and the well was grouted in place; however, the well cover was removed. In June 2006, bentonite grout was pumped through the underground lateral remedial lines for zone 1 (DPE-1 through DPE-4) and within wells DPE-1 through DPE-4. The DPE vault boxes were removed from the ground and the voids were filled with stabilizing sand and compacted on approximately 3 inch lifts. Rebar and concrete was used to restore the surface of each DPE location. In December 2006, the PVC well casing and screen from monitoring wells MW-10, MW-11, and MW-12 were removed from the ground. Attempts were made to remove the PVC casing and screen from monitoring wells MW-4, MW-6, MW-7, MW-9, MW-13 and MW-15; however, the PVC piping broke during the removal activities. Approximately 25 feet to 35 feet of PVC screen and/or casing per well remained in place. The boreholes/wells were filled with cement-bentonite grout to approximately 3 inches from the surface and concrete or soil was used to restore the surface of each former well location. In December 2006, bentonite grout was pumped through the underground lateral remedial lines for zone 2 (DPE-5 through DPE-7) and within wells DPE-5 through DPE-7. The DPE vault boxes were removed from the ground and the voids were filled with stabilizing sand and compacted on approximately 3 inch lifts. Rebar and concrete was used to restore the surface of each DPE location. All remediation equipment was deemed unsalvageable. All equipment and debris were transferred to a rolloff box and disposed at the Waste Management Landfill in Houston, Texas. The skid-mounted compound building was transferred on a flat-bed truck to Best Drilling's storage yard. The concrete foundation beneath the compound building was removed and repaved with asphalt.

Total number of monitoring wells installed at the site (both on and off site): 30 wells (MW-1, 2, 4, 6, 7, 9 through 15, DPE-1 through DPE-7 {DPE-3 was previously MW-5 and DPE-6 was previously MW-3}, and P-1 through P-4). Monitoring wells MW-8, and W-1 through W-6 were destroyed in 2000 due to city construction.

Out of that number, how many monitoring wells have been plugged: 22 (MW-14 was unable to be located)

Are there any remaining monitoring wells that have not been plugged?  YES  NO

If Yes, were the wells installed under the direction of the TNRCC specifically to address the confirmed release at this site?  YES  NO MW-14 is an off site 1.75-inch diameter Geoprobe point that was installed for delineation purposes, not to address on site release.

Attach copies of the signed State of Texas Well Plugging Reports for all wells that will no longer be utilized.

For any monitoring wells not plugged, indicate intended use: no intended use. 1.75-inch diameter Geoprobe well was unable to be located.

Have all wastes or other materials been properly disposed of, treated or recycled?  YES  NO If yes, attach documentation, if no, describe current status. Please note that site closure cannot be issued until all wastes and other materials have been properly disposed: \_\_\_\_\_

REPORT PREPARATION

Project Manager: Tana A. Riva, P.G. (#2496) CAPM No.: 1109 Expiration date: 12-12-07

Company: SECOR International Inc.

Address: 2225 E. Randol Mill Rd., Suite 530 City: Arlington State: TX Zip: 76011

Telephone No.: 817-640-9621 Fax No.: 817-640-9149

Signature: *Tana A. Riva* Date: 8-28-07

Corrective Action Specialist: Tana A. Riva, P.G. (#2496) CAS No.: 550 Expiration date: 12-10-08

Company: SECOR International Inc

Address: 2225 E. Randol Mill Rd., Suite 530 City: Arlington State: TX Zip: 76011

Telephone No.: 817-640-9621 Fax No.: 817-640-9149

Signature: *Tana A. Riva* Date: 8-28-07

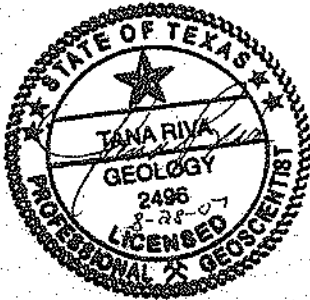
Name of Responsible Party contact: Terry S. Lauck (ConocoPhillips)

Telephone No.: 918-661-0935 Fax No.: 918-661-5746

Signature: *Terry S. Lauck* Date: 8/24/2007

ATTACHMENTS:

- Documentation of actual closure activities
- Documentation of waste disposal, treatment or recycling (if not previously submitted)
- State of Texas Plugging Reports







SECOR  
INTERNATIONAL  
INCORPORATED

WWW.SECOR.COM  
2225 E. Randal Mill Rd., Suite 530  
Arlington, TX 76011  
817-640-9621 TEL  
817-640-9149 FAX

August 28, 2007

Ms. Susan N. Longbine  
Remediation / PST Responsible Part Remediation Section  
Texas Commission on Environmental Quality  
12100 Park 35 Circle  
MC-137  
Austin, TX 78753

**RE: Final Site Closure Summary Letter for DPE Remediation System  
Former Conoco Store No. 43059  
12699 Memorial Drive  
Houston, Texas  
LPST ID No.: 104023  
Facility ID No.: 0014936**

Dear Ms. Longbine:

On behalf of ConocoPhillips, SECOR International Inc. (SECOR) is providing you this letter summarizing the site closure activities performed at the above referenced ConocoPhillips facility in Houston, Texas (see Figure 1).

### **Site Background**

A dual phase extraction (DPE) remediation system was installed on site to remove free product and volatile organic compounds (VOCs) from the subsurface saturated zone, vadose zone, and capillary fringe. The remediation system, which included seven DPE wells installed on two separate zones, operated from January 2000 to June 2003 and was shut down, with verbal concurrence from the TCEQ, due to the low constituent concentrations in vapor influent to the thermox unit and the reduction in groundwater hydrocarbon concentrations at the site. Site closure was received from the TCEQ in October 2006.

As you know, SECOR submitted a Site Closure Request to the TCEQ in March 2006 and is currently awaiting concurrence from the TCEQ. After submittal of the Site Closure Request, ConocoPhillips discovered that the landowner was preparing to repave the surface cover at the site. Therefore, prior to construction activities, the wells and underground remedial lateral lines located within the areas to be repaved were properly plugged and abandoned.

### **June 2006 Plug and Abandonment Activities**

Prior to receiving official site closure from the TCEQ, ConocoPhillips discovered that the landowner was preparing to repave the surface cover at the site. Therefore, prior to the landowner's construction activities, the wells and underground remedial lateral lines located within the areas to be repaved were properly plugged and abandoned. From June 28 through 30, 2006, four DPE wells (DPE-1 through DPE-4) and associated underground lateral remedial lines, four piezometer wells (P-1 through P-4) and two

monitoring wells (MW-1 and MW-2) were plugged and abandoned at the site. The plugging activities were performed by Best Drilling Services, Inc. (BDS) of Houston, Texas in accordance with all applicable regulations. The well casings and covers were completely removed from monitoring wells MW-1 and MW-2, and piezometer wells P-1 through P-3. The borings were grouted to within approximately three inches of the surface with a cement-bentonite grout. Due to overhead power lines, the well casing for P-4 was not removed and the well was grouted in-place; however, the well cover was removed.

The pumps and hoses were removed from DPE-1 through DPE-4 and the wells were plugged in-place with a cement-bentonite grout. Cement-bentonite grout was also pumped through the underground lateral remedial lines for DPE-1 through DPE-4 (zone 1 of the remediation system). The DPE vault boxes were removed from the ground and the voids were filled with stabilizing sand and compacted on approximately three inch lifts. Rebar and concrete were used to restore the surface of each former DPE and well location.

#### **December 2006 Site Closure Activities**

Upon receiving site closure from the TCEQ in October 2006, the remaining closure activities were performed by BDS under the supervision of SECOR personnel in December 2006. From December 11 through 14, 2006, the three remaining DPE wells (DPE-5 through DPE-7) and associated underground lateral remedial lines, and nine monitoring wells (MW-4, MW-6, MW-7, MW-9 through MW-13 and MW-15) were plugged and abandoned at the site. The well casings and covers were completely removed from monitoring wells MW-10, MW-11 and MW-12. Attempts were made to remove the PVC well casing and screen from monitoring wells MW-4, MW-6, MW-7, MW-9, MW-13 and MW-15; however, the PVC piping broke during the removal activities of these wells. Approximately 25 to 35 feet of PVC screen and/or casing remained in place for each well. The wells were grouted to within approximately three inches of the surface with a cement-bentonite and concrete or soil was used to restore the surface of each former well location. Attempts to locate MW-14, a 1.75-inch diameter Geoprobe™ point, were unsuccessful.

The pumps and hoses were removed from DPE-5 through DPE-7 and the wells were plugged in-place with a cement-bentonite grout. Cement-bentonite grout was also pumped through the underground lateral remedial lines for DPE-5 through DPE-7 (zone 2 of the remediation system). The DPE vault boxes were removed from the ground and the voids were filled with stabilizing sand and compacted on approximately three inch lifts. Rebar and concrete were used to restore the surface of each former DPE location.

All utilities (electric, natural gas and water) associated with the remediation system were disconnected prior to dismantlement of the equipment, including the removal of a utility pole by Reliant Energy. A plumbing permit was obtained from the City of Houston Department of Planning and Development Code Enforcement Division for the disconnection of the commercial discharge sewer line associated with the groundwater treatment portion of the DPE system. Co-Am Plumbing properly capped the discharge line at the connection point to the city sewer. Cement-bentonite grout was then pumped through the discharge line and left in place. A City of Houston Code Enforcement

Ms. Susan Longbine  
August 28, 2007  
Page 3 of 3

**S E C O R**

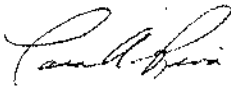
representative inspected and approved the capping of the discharge line on December 14, 2006. A copy of the plumbing permit and inspection tag are included in Attachment A.

The remediation system equipment including: two Ingersoll Rand air compressors, two Ametek blowers and motors, air stripper, oil/water separator, moisture knockout drum, storage tank, control panels, fittings, valves, gauges, and other miscellaneous equipment had deteriorated and was deemed unsalvageable. The items were placed in a rolloff box for disposal. The skid-mounted compound building was transferred on a flat-bed truck to Best Drilling's storage yard. The concrete foundation beneath the compound building was removed and repaved with asphalt. All concrete, metal and PVC waste generated from the site closure activities were transported placed in a roll-off box and transported by Excel Disposal to Waste Management Landfill for disposal. Photographic documentation is included in Attachment B. Documentation regarding disposal of the debris is included in Attachment C and Well Plugging Reports are included in Attachment D.

If you have questions or comments regarding these activities please contact me at (817) 640-9621 extension 22.

Sincerely,

**SECOR International Incorporated**




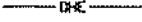
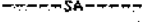



Tana A. Riya, P.G.  
Principal Geologist

Enclosures

cc: Mr. Terry S. Lauck, ConocoPhillips – electronic copy  
PST Division, TCEQ Region 12 Office, Houston – hard copy

**LEGEND:**

-  MONITORING WELL
-  PIEZOMETER
-  DESTROYED WELL
-  OVERHEAD ELECTRIC LINE
-  SANITARY SEWER LINE
-  DUAL PHASE EXTRACTION WELL

MW-13  
FAUST STREET

SA

2 STORY BRICK & FRAME

M2

MW-12

MW-11

ASPHALT

2 STORY BRICK FRAME

2 STORY APARTMENTS

2 STORY APTS.

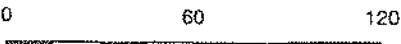
M1

UTILITY PILE

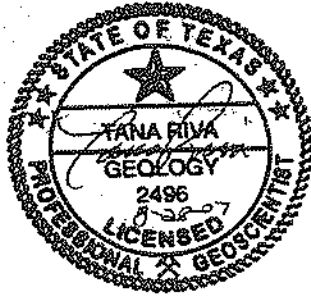
CONCRETE WALL

WOOD FENCE (TYP.)

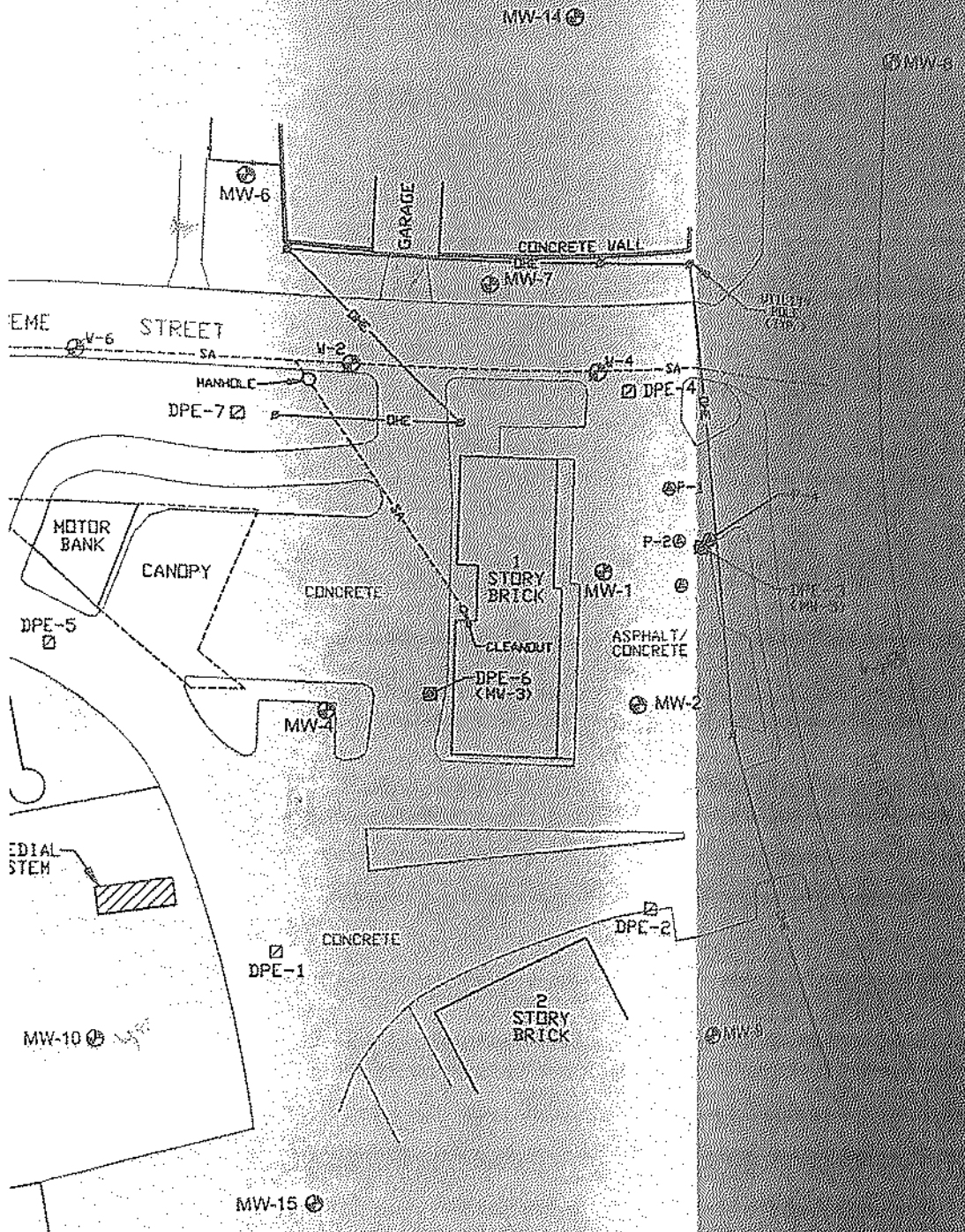
ASPH



APPROXIMATE SCALE (FEET)







2225 E. RANDOL MILL ROAD, SUITE 530  
 ARLINGTON, TEXAS  
 PHONE: (817) 640-9621/FAX (817) 640-9149

FOR  
**ConocoPhillips**

STATION NO. 43059  
 MEMORIAL DRIVE  
 HOUSTON, TEXAS

JOB NUMBER:  
 16CP.06332.02

DRAWN BY:

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN103960738

**Name:** POST OAK CLEANERS

**Primary Business:** No primary business description on file.

**Street Address:** 12699 MEMORIAL DR, HOUSTON TX 77024 8818

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** No near zip code on file.

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN602460727	D&S LEE CORPORATION	OWNER	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-2 of 2 Records

Program ▲	ID Type	ID Number	ID Status
DRY CLEANERS REGISTRATION	INTERNAL	103960738	CANCELLED
DRY CLEANERS REGISTRATION	REGISTRATION	DCR11765	ACTIVE

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11765

For: **POST OAK CLEANERS (RN103960738)**

12699 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
3007813	09/21/2004	INCOMING	DROP STATION REGISTRATION					
3007812	10/17/2003	INCOMING	DROP STATION REGISTRATION					

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11765

For: **POST OAK CLEANERS (RN103960738)**

12699 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Legal	Description	Start Date	End Date	Type	Status	Status Date
DCR11765	FY2005	09/01/2004		DROP STATION REGISTRATION	ACTIVE	09/21/2004
DCR11765	FY2004	09/01/2003		DROP STATION REGISTRATION	ACTIVE	10/17/2003

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## Central Registry

### Detail of: Petroleum Storage Tank Registration 29268

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **WHEATLEY INVESTMENTS LTD (CN602597478)**

**OWNER OPERATOR** Since 12/18/2003 [View Compliance History](#)

Mailing Address: 12860 MEMORIAL DR HOUSTON, TX 77024-4810

### Commissioners' Actions

Item Number	Item Type	Document Type	Status	TCEQ Docket Number	SOAH Docket Number
88214	ENFORCEMENT	ORDER	CLOSED	<a href="#">2013-1271-PST-E</a>	N/A

### Item 88214

#### Activity Actions

Action Date	Document Type	Action
03/06/2014	<a href="#">ED Order</a>	MAILED
03/04/2014	Executive Director	SIGNED
02/18/2014	Executive Director	SCHEDULED
07/08/2013	TCEQ DOCKET NUMBER	ISSUED

### Protestant Information

Request Type	Count
--------------	-------

No Protestant information exist for this item

### Filings

Date Received	Title
02/19/2014 7:33 AM	PCW, CH, AGREED ORDER
02/18/2014 3:27 PM	PCW, CH, AGREED ORDER

### Public Meeting

Meeting Type	Meeting Date	Meeting Time	Location	Total Attendance
No Public Meeting exist for this Item.				

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## Available Files

### For Docket Number 2013-1271-PST-E:

**Summary:** ... AN AGREED ORDER ASSESSING ADMINISTRATIVE PENALTIES AGAINST WHEATLEY INVESTMENTS LTD. IN HARRIS COUNTY; RN102441029; FOR PETROLEUM STORAGE TANK VIOLATIONS PURSUANT TO TEX. WATER CODE CHS. 7 AND 26 AND THE RULES OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, INCLUDING SPECIFICALLY 30 TEX. ADMIN. CODE CH. 60. (JACQUELYN GREEN, CANDY GARRETT)

If you require access of these documents using assistive technology, please contact the Chief Clerk's Office by phone at 512-239-3300, or by e-mail at [chiefclerk@tceq.state.tx.us](mailto:chiefclerk@tceq.state.tx.us).

All files open in a second window.

File Description	File Type
<a href="#">Commission Issued Order</a>	PDF

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## Central Registry

### Detail of: Petroleum Storage Tank Registration 29268

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **WHEATLEY INVESTMENTS LTD (CN602597478)**

**OWNER OPERATOR** Since 12/18/2003 [View Compliance History](#)

Mailing Address: 12860 MEMORIAL DR HOUSTON, TX 77024-4810

#### Effective Enforcement Orders [Current TCEQ Rules](#)

Type	Effective Date	Docket Number	Citation/Requirement Provision	Violation Allegation	Classification
ADMINISTRATIVE ORDER	03/09/2014	2013-1271-PST-E	2D TWC Chapter 26, SubChapter A 26.3475(c)(1) ; 30 TAC Chapter 334, SubChapter C 334.50(b)(1)(A) (Not applicable to CH)	Failed to monitor the USTs for releases at a frequency of at least once every month.	MODERATE

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## Central Registry

### Detail of: **Petroleum Storage Tank Registration 29268**

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **WHEATLEY INVESTMENTS LTD (CN602597478)**

**OWNER OPERATOR** Since 12/18/2003 [View Compliance History](#)

Mailing Address: 12860 MEMORIAL DR HOUSTON, TX 77024-4810

### Investigations

Investigation Date	Investigation Type
12/07/2009	Compliance Investigation
11/20/2012	Compliance Investigation
04/09/2013	Compliance Investigation

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## Central Registry

### Detail of: Petroleum Storage Tank Registration 29268

For: **WHEATLEY INVESTMENTS (RN1024441029)**

12860 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **WHEATLEY INVESTMENTS LTD (CN602597478)**

**OWNER OPERATOR** Since 12/18/2003 [View Compliance History](#)

Mailing Address: 12860 MEMORIAL DR HOUSTON, TX 77024-4810

### Financial Assurance

1,000,000 Insurance Or Risk Retention, expires 12/18/2014 (More)

### Self-Certification Status by Compartment

**Current: 1A 2A 3A** (through last day of 06/2015)

[View Complete Self-Certification History](#)

### Registered Tanks and Their Associated Systems

Table 1. Underground Storage Tank Summary

Tank	Capacity (Gallon)	Date Installed	Status	Substance Stored	Related Information
1	12000	11/01/1995	In Use	A: Gasoline	<a href="#">Tank Details</a> <a href="#">Compartment</a> <a href="#">Piping</a> <a href="#">Vapor Recovery</a>

Table 2. Tank Details

Tank	Design & Materials	Corrosion Protection	Release Detection	Spill Containment and Overflow Prevention	Installation Contractor	Installer	Test Result	Rel
1	1: Double Wall ( FRP )	FRP (Noncorrodible)	A: 2: Ext Groundwater Monitoring A: 4: Auto Tank Gauge & Inv Cntrl A: 5: Interstitial Monitoring	A: 1: Tight Fill Fitting 2: Fac Built Spill Cont/Bckt/Sumpp Valve 3: Delivery Shutoff Valve 4: Flow Restrictor Valve	B & F Maintenance (CRP000421)	JERRY ETHEREEDGE	Tank Tested	Tar Con Pip Val

Table 3. Compartment Details

Tank	Compartment	Capacity (gallons)	Principal Substance	Other Substance	Release Detection	Spill Containment and Overflow Prevention	Related Information
1	A	12000	Gasoline		1 : Ext Groundwater Monitoring 2 : Auto Tank Gauge & Inv Cntrl 3 : Interstitial Monitoring	1 : Tight Fill Fitting 2 : Fac Built Spill Cont/Bckt/Sumpp Valve 3 : Delivery Shutoff Valve 4 : Flow Restrictor Valve	Tank Summary Tank Details Piping Vapor Recovery

Table 4. Piping Systems

Tank	Type of Piping	Piping Material	Design and External Containment	Connectors and valves	Corrosion Protection	Release Detection	Related Infor
1	Pressurized	FRP	Double Wall	1: Shear Impact Valves 2: Flex Connectors	1: FRP (Noncorrodible)	A: Interstitial Monitoring A: Ann Pipe Tightness/Electr Non A: Auto Line Leak Detector	Tank Summary Tank Details Compartment Vapor Recovery

Table 5. Vapor Recovery Systems

Tank	Type of Stage 1	Date Installed	Type of Stage 2	Date Installed	Related Information
1	Two Point System		Assist System	03/02/1994	Tank Summary Tank Details Compartment Piping

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



IN THE MATTER OF AN                   §           BEFORE THE  
ENFORCEMENT ACTION               §  
CONCERNING                           §           TEXAS COMMISSION ON  
WHEATLEY INVESTMENTS LTD.       §  
RN102441029                         §           ENVIRONMENTAL QUALITY

AGREED ORDER  
DOCKET NO. 2013-1271-PST-E

I. JURISDICTION AND STIPULATIONS

On MAR 4 2014, the Texas Commission on Environmental Quality ("the Commission" or "TCEQ") considered this agreement of the parties, resolving an enforcement action regarding Wheatley Investments Ltd. ("Respondent") under the authority of TEX. WATER CODE chs. 7 and 26. The Executive Director of the TCEQ, through the Enforcement Division, and the Respondent together stipulate that:

1. The Respondent owns and operates a convenience store with retail sales of gasoline located at 12860 Memorial Drive in Houston, Harris County, Texas (the "Facility").
2. The Respondent's three underground storage tanks ("USTs") are not exempt or excluded from regulation under the Texas Water Code or the rules of the Commission.
3. The Executive Director and the Respondent agree that the Commission has jurisdiction to enter this Agreed Order, and that the Respondent is subject to the Commission's jurisdiction.
4. The Respondent received notice of the violations alleged in Section II ("Allegations") on or about June 3, 2013.
5. The occurrence of any violation is in dispute and the entry of this Agreed Order shall not constitute an admission by the Respondent of any violation alleged in Section II ("Allegations"), nor of any statute or rule.
6. An administrative penalty in the amount of Four Thousand Eight Hundred Seventy-Five Dollars (\$4,875) is assessed by the Commission in settlement of the violations alleged in Section II ("Allegations"). The Respondent has paid Three Thousand Nine Hundred Dollars (\$3,900) of the administrative penalty and Nine Hundred Seventy-Five Dollars

- (\$975) is deferred contingent upon the Respondent's timely and satisfactory compliance with all the terms of this Agreed Order. The deferred amount will be waived upon full compliance with the terms of this Agreed Order. If the Respondent fails to timely and satisfactorily comply with all requirements of this Agreed Order, the Executive Director may require the Respondent to pay all or part of the deferred penalty.
7. Any notice and procedures, which might otherwise be authorized or required in this action, are waived in the interest of a more timely resolution of the matter.
  8. The Executive Director and the Respondent agree on a settlement of the matters alleged in this enforcement action, subject to final approval in accordance with 30 TEX. ADMIN. CODE § 70.10(a).
  9. The Executive Director recognizes that on May 1, 2013, the Respondent implemented a release detection method for the USTs at the Facility.
  10. The Executive Director may, without further notice or hearing, refer this matter to the Office of the Attorney General of the State of Texas ("OAG") for further enforcement proceedings if the Executive Director determines that the Respondent has not complied with one or more of the terms or conditions in this Agreed Order.
  11. This Agreed Order shall terminate five years from its effective date or upon compliance with all the terms and conditions set forth in this Agreed Order, whichever is later.
  12. The provisions of this Agreed Order are deemed severable and, if a court of competent jurisdiction or other appropriate authority deems any provision of this Agreed Order unenforceable, the remaining provisions shall be valid and enforceable.

## II. ALLEGATIONS

As owner and operator of the Facility, the Respondent is alleged to have failed to monitor the USTs for releases at a frequency of at least once every month (not to exceed 35 days between each monitoring), in violation of 30 TEX. ADMIN. CODE § 334.50(b)(1)(A) and TEX. WATER CODE § 26.3475(c)(1), as documented during an investigation conducted on April 9, 2013.

## III. DENIALS

The Respondent generally denies each allegation in Section II ("Allegations").

#### IV. ORDERING PROVISIONS

1. It is, therefore, ordered by the TCEQ that the Respondent pay an administrative penalty as set forth in Section I, Paragraph 6 above. The payment of this administrative penalty and the Respondent's compliance with all the terms and conditions set forth in this Agreed Order resolve only the allegations in Section II. The Commission shall not be constrained in any manner from requiring corrective action or penalties for violations which are not raised here. Administrative penalty payments shall be made payable to "TCEQ" and shall be sent with the notation "Re: Wheatley Investments Ltd., Docket No. 2013-1271-PST-E" to:

Financial Administration Division, Revenue Operations Section  
Attention: Cashier's Office, MC 214  
Texas Commission on Environmental Quality  
P.O. Box 13088  
Austin, Texas 78711-3088

2. The provisions of this Agreed Order shall apply to and be binding upon the Respondent. The Respondent is ordered to give notice of the Agreed Order to personnel who maintain day-to-day control over the Facility operations referenced in this Agreed Order.
3. This Agreed Order, issued by the Commission, shall not be admissible against the Respondent in a civil proceeding, unless the proceeding is brought by the OAG to: (1) enforce the terms of this Agreed Order; or (2) pursue violations of a statute within the Commission's jurisdiction, or of a rule adopted or an order or permit issued by the Commission under such a statute.
4. This Agreed Order may be executed in separate and multiple counterparts, which together shall constitute a single instrument. Any page of this Agreed Order may be copied, scanned, digitized, converted to electronic portable document format ("pdf"), or otherwise reproduced and may be transmitted by digital or electronic transmission, including but not limited to facsimile transmission and electronic mail. Any signature affixed to this Agreed Order shall constitute an original signature for all purposes and may be used, filed, substituted, or issued for any purpose for which an original signature could be used. The term "signature" shall include manual signatures and true and accurate reproductions of manual signatures created, executed, endorsed, adopted, or authorized by the person or persons to whom the signatures are attributable. Signatures may be copied or reproduced digitally, electronically, by photocopying, engraving, imprinting, lithographing, electronic mail, facsimile transmission, stamping, or any other means or process which the Executive Director deems acceptable. In this paragraph exclusively, the terms "electronic transmission", "owner", "person", "writing", and "written" shall have the meanings assigned to them under TEX. BUS. ORG. CODE § 1.002.
5. Under 30 TEX. ADMIN. CODE § 70.10(b), the effective date is the date of hand-delivery of the Order to the Respondent, or three days after the date on which the Commission mails notice of the Order to the Respondent, whichever is earlier.

## SIGNATURE PAGE

### TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

\_\_\_\_\_  
For the Commission

*Pam Manning*  
For the Executive Director

3/4/14  
Date

I, the undersigned, have read and understand the attached Agreed Order. I am authorized to agree to the attached Agreed Order on behalf of the entity indicated below my signature, and I do agree to the terms and conditions specified therein. I further acknowledge that the TCEQ, in accepting payment for the penalty amount, is materially relying on such representation.

I also understand that failure to comply with the Ordering Provisions, if any, in this order and/or failure to timely pay the penalty amount, may result in:

- A negative impact on compliance history;
- Greater scrutiny of any permit applications submitted;
- Referral of this case to the Attorney General's Office for contempt, injunctive relief, additional penalties, and/or attorney fees, or to a collection agency;
- Increased penalties in any future enforcement actions;
- Automatic referral to the Attorney General's Office of any future enforcement actions; and
- TCEQ seeking other relief as authorized by law.

In addition, any falsification of any compliance documents may result in criminal prosecution.

*Mark Wheatley*  
Signature

10/25/2013  
Date

MARK WHEATLEY  
Name (Printed or typed)  
Authorized Representative of  
Wheatley Investments Ltd.

PARTNER  
Title

**Instructions:** Send the original, signed Agreed Order with penalty payment to the Financial Administration Division, Revenue Operations Section at the address in Section IV, Paragraph 1 of this Agreed Order.



The TCEQ is committed to accessibility.  
To request a more accessible version of this report, please contact the TCEQ Help Desk at (512) 239-4357.



## TCEQ Compliance History Report

**PUBLISHED** Compliance History Report for CN602597478, RN102441029, Rating Year 2012 which includes Compliance History (CH) components from September 1, 2007, through August 31, 2012.

**Customer, Respondent, or Owner/Operator:** CN602597478, Wheatley Investments, Ltd. **Classification:** HIGH **Rating:** 0.00

**Regulated Entity:** RN102441029, WHEATLEY INVESTMENTS **Classification:** HIGH **Rating:** 0.00

**Complexity Points:** 4 **Repeat Violator:** NO

**CH Group:** 14 - Other

**Location:** 12860 Memorial Drive in Houston, Harris County, Texas

**TCEQ Region:** REGION 12 - HOUSTON

**ID Number(s):**

PETROLEUM STORAGE TANK REGISTRATION  
REGISTRATION 29268

**Compliance History Period:** September 01, 2007 to August 31, 2012 **Rating Year:** 2012 **Rating Date:** 09/01/2012

**Date Compliance History Report Prepared:** July 15, 2013

**Agency Decision Requiring Compliance History:** Enforcement

**Component Period Selected:** July 05, 2008 to July 05, 2013

**TCEQ Staff Member to Contact for Additional Information Regarding This Compliance History.**

**Name:** Jacquelyn Green

**Phone:** (512) 239-2587

**Site and Owner/Operator History:**

- 1) Has the site been in existence and/or operation for the full five year compliance period? YES
- 2) Has there been a (known) change in ownership/operator of the site during the compliance period? NO
- 3) If YES for #2, who is the current owner/operator? N/A
- 4) If YES for #2, who was/were the prior owner(s)/operator(s)? N/A
- 5) If YES, when did the change(s) in owner or operator occur? N/A

**Components (Multimedia) for the Site Are Listed in Sections A - J**

**A. Final Orders, court judgments, and consent decrees:**

N/A

**B. Criminal convictions:**

N/A

**C. Chronic excessive emissions events:**

N/A

**D. The approval dates of investigations (CCEDS Inv. Track. No.):**

Item 1	December 19, 2008	(710041)
Item 2	December 14, 2009	(784865)
Item 3	November 30, 2012	(1037252)

**E. Written notices of violations (NOV) (CCEDS Inv. Track. No.):**

A notice of violation represents a written allegation of a violation of a specific regulatory requirement from the commission to a regulated entity. A notice of violation is not a final enforcement action, nor proof that a violation has actually occurred.

N/A

**F. Environmental audits:**

N/A

**G. Type of environmental management systems (EMSs):**

N/A

**H. Voluntary on-site compliance assessment dates:**

N/A

**I. Participation in a voluntary pollution reduction program:**

N/A

**J. Early compliance:**

N/A

**Sites Outside of Texas:**

N/A

Bryan W. Shaw, Ph.D., *Chairman*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*  
Richard A. Hyde, P.E., *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

March 6, 2014

### CERTIFIED MAIL RETURN RECEIPT REQUESTED

Mr. Mark Wheatley, Owner  
Wheatley Investments Ltd.  
12860 Memorial Drive  
Houston, Texas 77024

Re: TCEQ Enforcement Action  
Wheatley Investments Ltd.  
Docket No. 2013-1271-PST-E

Dear Mr. Wheatley:

Enclosed for your records is a fully-executed copy of the Agreed Order for the above-referenced matter.

Please review the enclosed Agreed Order, particularly the "Ordering Provisions" section, to determine if further action will be required of you, such as the completion of technical requirements to achieve compliance. When technical requirements are listed (usually Ordering Provision No. 2 or 3), a deadline will be provided based on a specific number of days after the effective date. The effective date of this Agreed Order is three days after the date printed at the top of this letter.

Should you have any questions, please contact Jacquelyn Green, the Enforcement Coordinator assigned to this matter, at (512) 239-2587.

Sincerely,

A handwritten signature in cursive script that reads "Candice Garrett".

Candice Garrett  
Enforcement Division

Enclosure

cc: Jacquelyn Green, Enforcement Division  
Petroleum Storage Tank Section Manager, Region 12

## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN102441029

**Name:** WHEATLEY INVESTMENTS [View Prior Names](#)

**Primary Business:** RETAIL

**Street Address:** 12860 MEMORIAL DR, HOUSTON TX 77024 4810

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

#### 1-2 of 2 Records

CN Number	Customer Name	Customer Role	Details
CN600126544	CHEVRON PRODUCTS COMPANY	OWNER	
CN602597478	WHEATLEY INVESTMENTS LTD	OWNER OPERATOR	

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **4** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-4 of 4 Records

Program	ID Type	ID Number	ID Status
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	116132	ACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	91934	ACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	29268	ACTIVE
PETROLEUM STORAGE TANK STAGE II			



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## Central Registry

**Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 116132**

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **CHEVRON PRODUCTS COMPANY (CN600126544)** [View Compliance History](#)

Mailing Address: 5959 CORPORATE DR HOUSTON, TX 77036-2302

## Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
6278081	11/04/2009	OUTGOING	FINAL			11/04/2009	11/04/2009	
6278080	03/07/2008	OUTGOING	RR			03/07/2008	03/07/2008	
6157710	01/11/2008	INCOMING	TECH RESP			03/07/2008	12/13/2007	
6278079	09/30/2004	OUTGOING	LAD			09/30/2004	09/30/2004	
6278078	09/24/2004	OUTGOING	REF - PRIV			09/24/2004	09/24/2004	
6157709	07/28/2004	INCOMING	REL DEF			09/30/2004	07/20/2004	

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 116132**

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **CHEVRON PRODUCTS COMPANY (CN600126544)** [View Compliance History](#)

Mailing Address: 5959 CORPORATE DR HOUSTON, TX 77036-2302

Legal	Description	Start Date	End Date	Type	Status	Status Date
116132	LEAKING PETROLEUM STORAGE TANK	09/24/2004		CLEANUP	ACTIVE	09/24/2004

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Site Associated with This Customer				Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)					
Customer	Name	City or Nearest City	County	TCEQ Region	Related Numbers	Rating	Classification	Date Rated	Date Posted
CHEVRON USA INC	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 116132</li> </ul>	0		09/01/2008	
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 91934</li> <li>▪ 29268</li> <li>▪ 91934</li> </ul>	9.00	SATISFACTORY	09/01/2009	11/15/2014
CHEVRON USA INC	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 91934</li> </ul>	0		09/01/2008	
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 29268</li> </ul>	9.00	SATISFACTORY	09/01/2010	11/15/2014
TOWN & COUNTRY CHEVRON	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 91934</li> </ul>	0		09/01/2008	
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 91934</li> </ul>	9.00	SATISFACTORY	09/01/2013	11/15/2014
			HARRIS			0	UNCLASSIFIED	09/01/2014	11/15/2014



CHEVRON PRODUCTS COMPANY	WHEATLEY INVESTMENTS			REGION 12 - HOUSTON	▪ 91934				
CHEVRON USA INC	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 29268	0	09/01/2008		
TOWN & COUNTRY CHEVRON	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 29268	0	09/01/2008		
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 116132 ▪ 91934 ▪ 116132 ▪ 29268 ▪ 91934 ▪ 116132	9.00	09/01/2010	SATISFACTORY	11/15/2014
CHEVRON PRODUCTS COMPANY	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 116132	0	09/01/2014	UNCLASSIFIED	11/15/2014
TOWN & COUNTRY CHEVRON	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 116132	0	09/01/2008		
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 91934	9.00	09/01/2010	SATISFACTORY	11/15/2014
CHEVRON PRODUCTS COMPANY	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 29268	0	09/01/2014	UNCLASSIFIED	11/15/2014
WHEATLEY INVESTMENTS LTD	WHEATLEY INVESTMENTS		HARRIS	REGION 12 - HOUSTON	▪ 29268 ▪ 29268 ▪ 116132 ▪ 116132 ▪ 29268 ▪ 116132	9.00	09/01/2009	SATISFACTORY	11/15/2014

[Redacted]

**What's a "site"?**

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

**What's a "customer"?**

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleeners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleeners

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## Central Registry

### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 91934

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **CHEVRON PRODUCTS COMPANY (CN600126544)** [View Compliance History](#)

Mailing Address: 4800 FOURNACE PL BELLAIRE, TX 77401-2324

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
4634180	11/04/2009	OUTGOING	FINAL			11/04/2009	11/04/2009	
4503427	09/11/2009	INCOMING	FSC			11/04/2009	04/27/2009	
4634179	05/22/2009	OUTGOING	DELTEE FNL			05/22/2009	05/22/2009	
4503426	04/23/2009	INCOMING	TECH RESP			05/22/2009	04/22/2009	
4634176	03/16/2009	OUTGOING	RR - CAR			03/16/2009	03/16/2009	
4634177	03/16/2009	OUTGOING	RR - CAR			03/16/2009	03/16/2009	
4634178	03/16/2009	OUTGOING	DELTEE OWE			03/16/2009	03/16/2009	
4503423	01/20/2009	INCOMING	MONIT ANNL			03/16/2009	12/30/2008	
4503424	01/20/2009	INCOMING	PROP ACT13			03/16/2009	01/13/2009	
4503425	01/20/2009	INCOMING	SCR			03/16/2009	01/13/2009	
4634172	07/02/2008	OUTGOING	RR - CAR			07/02/2008	07/02/2008	
4634173	07/02/2008	OUTGOING	RR - CAR			07/02/2008	07/02/2008	
4634174	07/02/2008	OUTGOING	RR - CAR			07/02/2008	07/02/2008	
4634175	07/02/2008	OUTGOING	RR - CAR			07/02/2008	07/02/2008	
4503420	06/09/2008	INCOMING	MPR			07/02/2008	06/02/2008	

4503421	06/09/2008	INCOMING	MONIT ANNL		07/02/2008	05/14/2008
4503422	06/09/2008	INCOMING	PROP ACT 8		07/02/2008	06/02/2008
4503419	05/21/2008	INCOMING	FAR		07/02/2008	05/08/2008
4634169	08/29/2007	OUTGOING	RR - CAR		08/29/2007	08/29/2007
4634170	08/29/2007	OUTGOING	RR - CAR		08/29/2007	08/29/2007
4634171	08/29/2007	OUTGOING	RR - CAR		08/29/2007	08/29/2007
4503416	08/02/2007	INCOMING	PROP ACT19		08/29/2007	07/27/2007
4503417	08/02/2007	INCOMING	TECH RESP		08/29/2007	07/27/2007
4503418	08/02/2007	INCOMING	PROP ACT 5		08/29/2007	07/27/2007
4634166	06/27/2007	OUTGOING	RR - CAR		06/27/2007	06/27/2007
4634167	06/27/2007	OUTGOING	REJ TECH		06/27/2007	06/27/2007
4634168	06/27/2007	OUTGOING	RR - CAR		06/27/2007	06/27/2007
4503413	06/04/2007	INCOMING	MONIT ANNL		06/27/2007	05/23/2007
4503414	06/04/2007	INCOMING	PROP ACT19		06/27/2007	05/25/2007
4503415	06/04/2007	INCOMING	PROP ACT 8		06/27/2007	05/25/2007
4634163	04/25/2007	OUTGOING	RR - CAR		04/25/2007	04/25/2007
4634164	04/25/2007	OUTGOING	REJ TECH		04/25/2007	04/25/2007
4634165	04/25/2007	OUTGOING	REJ TECH		04/25/2007	04/25/2007
4503410	03/27/2007	INCOMING	MPR		04/25/2007	03/06/2007
4503411	03/27/2007	INCOMING	SCR		04/25/2007	03/21/2007
4503412	03/27/2007	INCOMING	PROP ACT13		04/25/2007	03/21/2007
4503409	01/08/2007	INCOMING	SLSURVEY Y		01/08/2007	01/08/2007
4634162	01/08/2007	OUTGOING	NLR		01/08/2007	01/08/2007
4634161	12/01/2006	OUTGOING	SLSURVEY1		12/01/2006	12/01/2006
4634158	07/20/2006	OUTGOING	LAD		07/20/2006	07/20/2006
4634159	07/20/2006	OUTGOING	RR - CAR		07/20/2006	07/20/2006
4634160	07/17/2006	OUTGOING	REF - PRIV		07/17/2006	07/17/2006
4503407	06/27/2006	INCOMING	MPR		07/20/2006	06/12/2006
4503408	06/27/2006	INCOMING	PROP ACT19		07/20/2006	06/12/2006
4634157	09/13/2001	OUTGOING	NLR		09/13/2001	09/13/2001
4503406	09/07/2001	INCOMING	FSC		09/13/2001	08/29/2001
4634154	05/21/2001	OUTGOING	FINAL		05/21/2001	05/21/2001
4634155	05/14/2001	OUTGOING	RR - CAR		05/14/2001	05/14/2001



4634128	05/11/2001	OUTGOING	NLR			05/11/2001	05/11/2001
4634143	05/11/2001	OUTGOING	NLR			05/11/2001	05/11/2001
4634144	05/11/2001	OUTGOING	NLR			05/11/2001	05/11/2001
4634145	05/11/2001	OUTGOING	NLR			05/11/2001	05/11/2001
4634146	05/11/2001	OUTGOING	NLR			05/11/2001	05/11/2001
4634153	05/11/2001	OUTGOING	RR - CAR			05/11/2001	05/11/2001
4634156	05/01/2001	OUTGOING	REF - PRIV			05/01/2001	05/01/2001
4503403	03/19/2001	INCOMING	MONIT ANNL			05/11/2001	02/12/2001
4503404	03/19/2001	INCOMING	SCR			05/21/2001	03/09/2001
4503405	03/19/2001	INCOMING	PROP ACT13			05/14/2001	03/09/2001
4634152	10/30/2000	OUTGOING	NLR			10/30/2000	10/30/2000
4503402	09/28/2000	INCOMING	TECH RESP			10/30/2000	08/28/2000
4634150	11/09/1999	OUTGOING	NLR			11/09/1999	11/09/1999
4634151	11/09/1999	OUTGOING	RR - CAR			11/09/1999	11/09/1999
4503400	08/30/1999	INCOMING	MONIT ANNL			11/09/1999	04/14/1999
4503401	08/30/1999	INCOMING	PROP ACT17			11/09/1999	07/08/1999
4634149	01/22/1999	OUTGOING	NLR			01/22/1999	01/22/1999
4503399	12/10/1998	INCOMING	TECH RESP			01/22/1999	11/17/1998
4634148	11/13/1998	OUTGOING	RR - CAR			11/13/1998	11/13/1998
4503398	10/26/1998	INCOMING	PROP ACT 5			11/13/1998	10/15/1998
4634147	07/20/1998	OUTGOING	RR - CAR			07/20/1998	07/20/1998
4503396	05/27/1998	INCOMING	MONIT ANNL			05/11/2001	01/28/1998
4503397	05/27/1998	INCOMING	PROP ACT17			07/20/1998	04/02/1998
4503395	10/06/1997	INCOMING	OTHER			05/11/2001	10/03/1997
4503394	07/25/1997	INCOMING	TECH RESP			05/11/2001	07/02/1997
4503393	05/30/1997	INCOMING	MONIT ANNL			05/11/2001	02/26/1997
4634139	04/04/1997	OUTGOING	RR			04/04/1997	04/04/1997
4634140	04/04/1997	OUTGOING	RR			04/04/1997	04/04/1997
4634141	04/04/1997	OUTGOING	RR			04/04/1997	04/04/1997
4634142	01/27/1997	OUTGOING	RCPT			01/27/1997	01/27/1997
4503392	01/22/1997	INCOMING	PROP ACT 8			01/27/1997	01/06/1997
4503391	07/02/1996	INCOMING	TANK CLSR			04/04/1997	06/14/1996
4503390	03/29/1996	INCOMING	ASS B RPT			04/04/1997	01/12/1996

	03/15/1996	INCOMING	MONIT ANNL	04/04/1997	03/12/1996
4503389					
4634137	03/11/1996	OUTGOING	RCPT	03/11/1996	03/11/1996
4634138	03/11/1996	OUTGOING	RCPT	03/11/1996	03/11/1996
4503387	03/08/1996	INCOMING	PROP ACT12	03/11/1996	02/16/1996
4503388	03/08/1996	INCOMING	PROP ACT 8	03/11/1996	02/16/1996
4634136	11/06/1995	OUTGOING	RR - CAR	11/06/1995	11/06/1995
4503386	10/31/1995	INCOMING	PROP ACT15	11/06/1995	10/25/1995
4634131	09/28/1995	OUTGOING	RR	09/28/1995	09/28/1995
4634132	09/28/1995	OUTGOING	RR	09/28/1995	09/28/1995
4634133	09/28/1995	OUTGOING	RR	09/28/1995	09/28/1995
4634134	09/28/1995	OUTGOING	RR	09/28/1995	09/28/1995
4634135	09/28/1995	OUTGOING	RR	09/28/1995	09/28/1995
4634130	09/07/1995	OUTGOING	RR	09/07/1995	09/07/1995
4503380	09/06/1995	INCOMING	TANK CLSR	09/07/1995	08/31/1995
4503381	09/06/1995	INCOMING	PROP ACT 3	09/28/1995	08/29/1995
4503382	09/06/1995	INCOMING	PROP ACT 5	09/28/1995	08/29/1995
4503383	09/06/1995	INCOMING	PROP ACT 9	09/28/1995	08/29/1995
4503384	09/06/1995	INCOMING	PROP ACT13	09/28/1995	08/29/1995
4503385	09/06/1995	INCOMING	PROP ACT 7	09/28/1995	08/29/1995
4634129	07/03/1995	OUTGOING	RR - CAR	07/03/1995	07/03/1995
4503379	05/24/1995	INCOMING	PROP ACT 5	07/03/1995	04/10/1995
4503378	04/03/1995	INCOMING	MONIT ANNL	05/11/2001	03/24/1995
4634121	04/14/1994	OUTGOING	RR	04/14/1994	04/14/1994
4634124	04/14/1994	OUTGOING	RR	04/14/1994	04/14/1994
4634125	04/14/1994	OUTGOING	RR	04/14/1994	04/14/1994
4634126	04/14/1994	OUTGOING	RR	04/14/1994	04/14/1994
4634120	04/13/1994	OUTGOING	NLR	04/13/1994	04/13/1994
4634122	04/13/1994	OUTGOING	NLR	04/13/1994	04/13/1994
4634123	04/13/1994	OUTGOING	NLR	04/13/1994	04/13/1994
4634127	04/13/1994	OUTGOING	NLR	04/13/1994	04/13/1994
4503377	03/31/1994	INCOMING	QUEST	04/13/1994	
4503376	03/08/1994	INCOMING	PROPOSAL	04/14/1994	
4503375	02/23/1994	INCOMING	MONIT ANNL	04/14/1994	

4503373	09/22/1993	INCOMING	CONTINUE-Y		04/13/1994	
4503374	09/22/1993	INCOMING	MES		04/14/1994	
4503372	06/24/1993	INCOMING	OTHER		04/13/1994	
4503370	04/02/1993	INCOMING	QUEST		04/13/1994	
4503371	04/02/1993	INCOMING	QTR MONIT		04/14/1994	
4634119	03/02/1993	OUTGOING	ACTN RQST		03/02/1993	03/02/1993
4634118	12/28/1992	OUTGOING	CLARIFY1-6		12/28/1992	12/28/1992
4503369	11/25/1992	INCOMING	QTR MONIT		11/25/1992	
4634108	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634109	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634110	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634111	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634112	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634113	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634114	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634115	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634116	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4634117	11/25/1992	OUTGOING	RR		11/25/1992	11/25/1992
4503367	09/01/1992	INCOMING	QTR MONIT		11/25/1992	
4503368	09/01/1992	INCOMING	TECH RESP		11/25/1992	
4503366	04/10/1992	INCOMING	QTR MONIT		11/25/1992	
4503365	01/30/1992	INCOMING	QTR MONIT		11/25/1992	
4503364	08/21/1991	INCOMING	QTR MONIT		11/25/1992	
4503363	06/03/1991	INCOMING	QTR MONIT		11/25/1992	
4503362	03/26/1991	INCOMING	QTR MONIT		11/25/1992	
4503361	01/14/1991	INCOMING	TECH RESP		11/25/1992	
4503360	05/19/1989	INCOMING	COMP ASMNT		11/25/1992	
4634106	05/12/1989	OUTGOING	NLR		05/12/1989	05/12/1989
4634107	05/12/1989	OUTGOING	OD		05/12/1989	05/12/1989
4503359	07/15/1988	INCOMING	GENL INFO		05/12/1989	
4634104	06/22/1988	OUTGOING	NLR		06/22/1988	06/22/1988
4634105	06/22/1988	OUTGOING	CAD		06/22/1988	06/22/1988
4503358	05/25/1988	INCOMING	GENL INFO		06/22/1988	

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 91934**

For: **WHEATLEY INVESTMENTS (RN102441029)**

12860 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **CHEVRON PRODUCTS COMPANY (CN600126544)** [View Compliance History](#)

Mailing Address: 4800 FOURNACE PL BELLAIRE, TX 77401-2324

Legal	Description	Start Date	End Date	Type	Status	Status Date
91934	LEAKING PETROLEUM STORAGE TANK	06/10/1988		CLEANUP	ACTIVE	06/10/1988

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**TEXAS NATURAL RESOURCE CONSERVATION COMMISSION  
PETROLEUM STORAGE TANK DIVISION  
CORRESPONDENCE IDENTIFICATION SHEET**

Date: May 26, 2009  
 Site Name: Chevron Facility No. 60108123  
 Site Address: 12860 Memorial, Houston, Texas

LPST ID No.: 91934  
 Facility ID No.: 0029268

This checklist must accompany all correspondence submitted to the RPR Section and should be affixed to the front of your submittal as a cover page. Please check the appropriate box for the type of correspondence which you have submitted to the RPR Section. Check all boxes that apply if you are submitting more than one type of correspondence. If you cannot find an appropriate category, please complete the "other" section.

PROPOSALS		
<input type="checkbox"/> Initial Abatement (1)	<input type="checkbox"/> Tank Removal (2)	<input type="checkbox"/> Excavation (3)
<input type="checkbox"/> Waste Treatment (4)	<input type="checkbox"/> Site Assessment (5)	<input type="checkbox"/> Aquifer Testing (6)
<input type="checkbox"/> VES/Sparge Testing (7)	<input type="checkbox"/> Qtrly. GW Monitoring (8)	<input type="checkbox"/> CAP Prep. (9)
<input type="checkbox"/> GW Extrac./Treatment (10)	<input type="checkbox"/> Soil Vapor Extrac. (11)	<input type="checkbox"/> Operation & Main. (12)
<input type="checkbox"/> Site Closure (13)	<input type="checkbox"/> Plan A Risk Ass. (14)	<input type="checkbox"/> Plan B Risk Ass. (15)
<input type="checkbox"/> Semi-annual GW Mon. (16)*	<input type="checkbox"/> Annual GW Mon. (18)	<input type="checkbox"/> Product Recovery (19)
<input type="checkbox"/> Other proposal _____		

REPORTING FORMS	
<input type="checkbox"/> Assessment Report Form (TNRCC-0562)	<input type="checkbox"/> LPST Case Questionnaire
<input type="checkbox"/> Product Recovery Report Form (TNRCC-0016)	<input type="checkbox"/> Release Report Form (TNRCC-0621)
<input type="checkbox"/> Site Closure Request Form (TNRCC-0028)	<input type="checkbox"/> Monitoring Event Summary and Status Report (TNRCC-0013)
<input checked="" type="checkbox"/> Final Site Closure Report Form (TNRCC-0038)	<input type="checkbox"/> Priority 4 LPST Case Closure Request Form (TNRCC-0461)
<input type="checkbox"/> Other form _____	

REPORTS		
<input type="checkbox"/> Tank Closure/Removal	<input type="checkbox"/> Plan A Risk Assessment	<input type="checkbox"/> Annual Groundwater Monitoring
<input type="checkbox"/> O&M/Performance Mon.	<input type="checkbox"/> Plan B Risk Assessment	<input type="checkbox"/> CAP Installation/Modification
<input type="checkbox"/> Property Divestiture/Phase I ESA	<input type="checkbox"/> Corrective Action Plan (CAP)	<input type="checkbox"/> Aquifer/Pilot Test Results

MISCELLANEOUS	
<input type="checkbox"/> Off-site access assistance	<input type="checkbox"/> Deadline Extension Request
<input type="checkbox"/> Tank tightness test results	<input type="checkbox"/> Request for State-Lead
<input type="checkbox"/> Request for LPST Waste Code	<input type="checkbox"/> Class V Reinjection Request
<input type="checkbox"/> Notice to Owner/Operator for CAS Services	<input type="checkbox"/> Petroleum-Substance Waste Manifest
<input type="checkbox"/> Notice of Continuation of Groundwater Monitoring	<input type="checkbox"/> Underground Storage Tank Registration Form
<input type="checkbox"/> Notice of Continuation of Operation and Maintenance	<input type="checkbox"/> Aboveground Storage Tank Registration Form
<input type="checkbox"/> Other (anything that does not fit into one of the categories above) _____	

\* The proposal for semi-annual monitoring and annual report (Proposal Activity 17) has been discontinued. For semi-annual monitoring, use Proposal Activity 16.

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I attest that all work has been conducted in accordance with accepted industry standards/practices and adhered to TNRCC guidance and rules. I certify that I am aware that misrepresentation of any of the above claims is a violation of 30 TAC 33.4453(b)(1)(E) and that this violation may result in the disciplinary actions set forth in 30 TAC 334.453 and or 334.463 and 334.465.

If a proposal is attached for pre-approval, has the proposed work, in part or in whole, already been performed or in progress?  Yes  No

If yes, what work? \_\_\_\_\_

Stantec Consulting Corporation  
(Registered Corrective Action Specialist)

RCAS 00550  
(RCAS Reg. No.)

12/10/11  
(Expiration date)

Mark Smith

4-27-09

(Signature)

(Date)

(713) 937-7973

(713) 983-8328

(Telephone #)

(FAX #)

Mark Smith  
(Project Manager)

CAPM 1344  
(CAPM Reg. No.)

12/31/09  
(Expiration date)

Mark Smith

4-27-09

(Signature)

(Date)

(713) 937-7973

(713) 983-8328

(Telephone #)

(FAX #)

By signature below, I certify that documents checked above are included.

Ravelle Jones  
(Name of Responsible Party Contact)

Chevron Environmental Management Co.  
(Company)

R Jones

5-7-09

(Signature)

(Date)

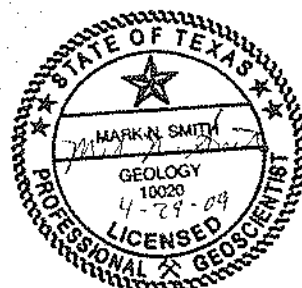
(713) 423-2641

(866) 390-8082

(Telephone #)

(FAX #)

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29268



Stantec Consulting Corporation  
10235 West Little York Road Suite 400  
Houston TX 77040-3251  
Tel: (713) 937-7973  
Fax: (713) 983-8328

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TEXAS COMMISSION ON  
ENVIRONMENTAL QUALITY  
ABILENE REGION

Stantec

$\rho = AV$

May 26, 2009

Stantec Project No. 213201027.203.450

Attn: Ms. Trudy Hasan  
Texas Commission on Environmental Quality  
Responsible Party Remediation Section, MC-137  
Petroleum Storage Tank Division  
Post Office Box 13087  
Austin, Texas 78711-3087

Final Site Closure Report  
Chevron Products Company Facility No. 60108123  
12860 Memorial Drive, Houston, Harris County, Texas  
LPST No. 091934 Facility ID 0029268

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Dear Ms. Hasan:

Stantec Consulting Corporation (Stantec) is pleased to submit the Final Site Closure Report documenting the plugging of the six (6) remaining site monitor wells at the above referenced facility. Monitor wells MW-2, and MW-4 through MW-8 were plugged and abandoned on April 14, 2009. The site closure activities and this report are being submitted in accordance with the Texas Commission on Environmental Quality Corrective Action Response Form dated March 16, 2009.

Stantec is under contract with Chevron Environmental Management Company (CEMC) to provide the environmental consulting services at this site and is submitting this report on behalf of CEMC. If you have any questions, please call Ravelle Jones of CEMC at (713) 432-2641 or myself at (713) 494-0969.

Very truly yours,

Stantec Consulting Corporation

*Julie Radloff*  
Julie Radloff  
Senior Project Manager

*Mark Smith*  
Mark Smith, P.G., CAPM #1344  
Senior Project Manager

Enclosures: as stated  
cc: Ravelle Jones (CEMC)



Texas Natural Resource Conservation Commission  
PETROLEUM STORAGE TANK DIVISION  
FINAL SITE CLOSURE REPORT

Use this form to provide information on LPST site closure activities after site closure has been authorized. To request authorization for site closure, complete and submit the *Site Closure Request* form (TNRCC-0028).

Complete All Applicable Blanks.

Date: May 26, 2009

GENERAL INFORMATION		
LPST ID No.: 091934	Facility ID No: 0029268	
Responsible Party: Chevron Products Company		
RP Address: 4800 Fournace Place	City: Bellaire	State: TX Zip: 77401
Facility Name: Former Chevron Facility No. 60108123		
Facility Address: 12860 Memorial Drive		
Facility City: Houston	County: Harris	

CLOSURE ACTIVITY
Was a remediation system installed? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, provide a description : _____
Was this system removed? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If no, explain why not: <u>N/A</u>
What is the intended future use/disposition and location of the system: <u>N/A</u>
List the components of the remedial system removed: <u>N/A</u>
List any of the remedial system components remaining at the site: <u>N/A</u>
Provide a description of site restoration activities: <u>N/A</u>

Total number of monitoring wells and piezometers installed at the site (both on and off site): 10  
Out of that number, how many monitoring wells/piezometers have been plugged: 6 plugged, 4 previously destroyed

Are there any remaining monitoring wells that have not been plugged?  YES  NO

If Yes, were the wells installed under the direction of the TCEQ specifically to address the confirmed release at this site?  YES  NO

Attach copies of the signed State of Texas Well Plugging Reports (Form No. TNRCC-0055) for all wells that will no longer be utilized.

For any monitoring wells not plugged, indicate intended use: N/A

Have all wastes or other materials been properly disposed of, treated or recycled?  YES  NO If yes, attach documentation, if no, describe current status. Please note that site closure cannot be issued until all wastes and other materials have been properly disposed: Disposed as construction waste by driller

### REPORT PREPARATION

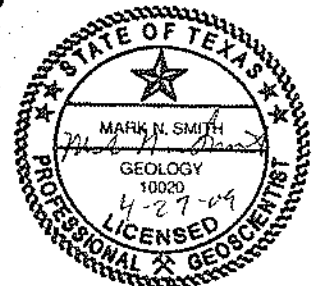
Project Manager: Mark Smith CAPM No.: 1344 Expiration date: 12/31/09  
Company: Stantec Consulting Corporation  
Address: 10235 W. Little York City: Houston State: TX Zip: 77040  
Telephone No.: (713) 937-7973 Fax No.: (713) 983-8328  
Signature: Mark Smith Date: 4-27-09

Corrective Action Specialist: Mark Smith CAS No.: 0550 Expiration date: 12/10/11  
Company: Stantec Consulting Corporation  
Address: 10235 W. Little York City: Houston State: TX Zip: 77040  
Telephone No.: (713) 937-7973 Fax No.: (713) 983-8328  
Signature: Mark Smith Date: 4-27-09

Name of Responsible Party contact: Ravelle Jones  
Telephone No.: (713) 432-2641 Fax No.: (866) 390-8082  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### ATTACHMENTS:

- Site Map
- State of Texas Plugging Reports (Form No. TNRCC-0055)
- Agency Correspondence
- Photographs

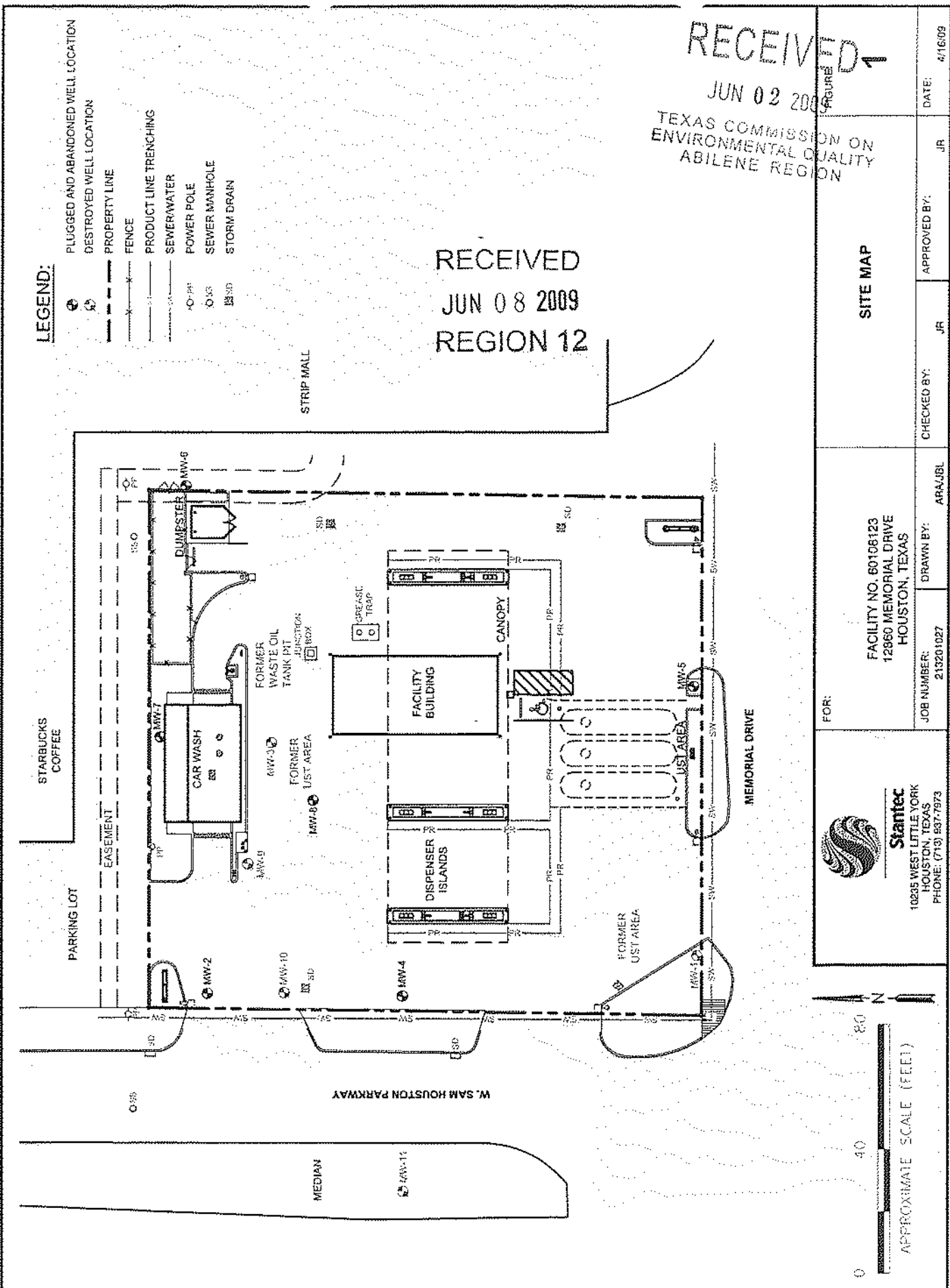


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**LEGEND:**

- PLUGGED AND ABANDONED WELL LOCATION
- DESTROYED WELL LOCATION
- PROPERTY LINE
- FENCE
- PRODUCT LINE TRENCHING
- SEWER WATER
- POWER POLE
- SEWER MANHOLE
- STORM DRAIN



FOR:

**Stantec**  
 10235 WEST LITTLE YORK  
 HOUSTON, TEXAS  
 PHONE: (713) 897-7973

FACILITY NO. 60106123  
 12860 MEMORIAL DRIVE  
 HOUSTON, TEXAS

**SITE MAP**

CHECKED BY: JR  
 APPROVED BY: JR  
 DATE: 4/16/09

Buddy Garcia, *Chairman*  
Larry R. Soward, *Commissioner*  
Bryan W. Shaw, Ph.D., *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



29268

p=AV

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 22, 2009

### CERTIFIED MAIL

91 7108 2133 3935 2305 1868

Ms. Ravelle Jones  
Chevron EMC  
4800 Fournace Place  
Bellaire, Texas 77401

RECEIVED  
JUN 15 2009  
REGION 12

Re: Leaking Petroleum Storage Tank (LPST) Case Closure of Subsurface Release of Hydrocarbons at Chevron Facility #60108123, 12860 Memorial Dr., Houston (Harris County), Texas  
LPST ID No. 091934; Facility ID No. 29268; Priority 4.1; R-12

Dear Ms. Jones:

This letter confirms the completion of corrective action requirements for the release incident at the above-referenced facility. Based upon information submitted and with the provision that the documentation provided to this agency was accurate and representative of site conditions, we concur with the conclusions and recommendations that the site has met closure requirements. Therefore, no further corrective action is necessary. The justification for final closure includes, but is not limited to, the following criteria:

- The maximum soil contaminant concentrations in the 0 to 15 foot interval were below health-based target levels.
- There appears to be no threat of explosive vapors.
- There is no documented use of the affected zone within 0.5-mile, and future use is not considered likely.
- Non-aqueous phase liquids have been removed to the maximum extent practicable.
- The dissolved-phase plume is adequately delineated and appears stable or decreasing over time.
- Identified potential receptors do not appear threatened by this release.

Please note that financial assurance must be maintained for all operational storage tanks at this site. Please be aware that case closure is based on identified exposure pathways and that any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at this site. Please ensure that any wastes generated from these activities are handled in compliance with all applicable regulations.

Please be advised that all monitor wells which are not now in use and/or will not be used in the next 180 days must be properly plugged and abandoned pursuant to Chapter 32.017 of the Texas Water Code and in accordance with Title 16, Texas Administrative Code (TAC), Section 76.1004. A State of Texas Plugging Report (Form No. TCEQ-0055) is required to be submitted to the Water Well Drillers Section of the Texas



Ms. Ravelle Jones  
May 22, 2009

Page 2

LPST ID No. 091934

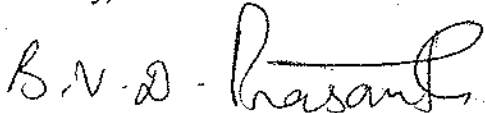
Department of Licensing and Regulation, P.O. Box 12157, Capitol Station, Austin, Texas 78711, within thirty (30) days of plugging completion. If you have any questions regarding the future use of an existing monitor well, please contact the Texas Department of Licensing and Regulation at 512/463-7880 or 800/803-9202.

If any monitor well plugging or other necessary site restoration activities will be performed to complete site closure, complete a *Final Site Closure Report* and submit the report to the Central Office in Austin to document actual site closure. For sites eligible for reimbursement through the Petroleum Storage Tank Remediation Fund, written preapproval should be obtained prior to initiation of site closure activities. Reimbursement claims for activities that are not preapproved will not be paid until all claims for preapproved work are processed and paid.

Please note that the *Final Site Closure Report*, if necessary, will be the last submittal associated with this case. This letter signifies the completion of corrective action associated with the release. No subsequent TCEQ correspondence will be issued in response to the *Final Site Closure Report*.

Should you have any questions, please contact Ms. Trudy Hasan of Darcy Environmental Group (TCEQ Privatization Contractor) at 512/342-8585, extension 204. **Please reference the LPST ID Number when making inquiries.** Your cooperation in this matter has been appreciated.

Sincerely,



Prasanthi Bollineni or Susan Longbine  
PST Privatization Contract Manager  
Environmental Cleanup Section I  
Remediation Division  
Texas Commission on Environmental Quality

PVB/SNL/th2  
091934.fm.wpd

# Texas Commission on Environmental Quality

## INTEROFFICE MEMORANDUM

TO : FILE

DATE: February 13, 2009

see file for previous CFMs

THRU : Prasanthi Bollineni or Susan Longbine, TCEQ On Site Supervisor  
David Bratberg, Project Manager, Darcy Environmental Group

FROM : Trudy Hasan, Case Coordinator, Darcy Environmental Group  
David Bratberg, Case Coordinator, Darcy Environmental Group

RE : File Review of Subsurface Release of Hydrocarbons at Chevron Facility #60108123, 12860 Memorial Dr., Houston (Harris County), Texas  
LPST ID No. 091934; Facility ID No. 29268; Priority 4.1; R-12

### Site History

- March 1987 - one 10,000 gallon gasoline UST and one 550 gallon waste oil tank were removed and a new UST system was installed.
- June 1988 - LPST 091934 was issued following a May 1988 report of hydrocarbons present in storm drains adjacent to the site. MW-1 through MW-5 were installed. NAPL was discovered in MW-3 and a skimmer was installed in the well. MW-6 through MW-8 were installed in August 1988.
- A remediation system was installed and the system was started in February 1990. Surface water discharge of the recovered groundwater was permitted. *The system operated from February 1990 until October 1995.*
- October 1995 - four USTs (three 10,000 gallon and one 1,000 gallon tank) were removed. Maximum concentrations of BTEX and TPH were 2.91 ppm (south of dispensers) and 3,800 ppm (north wall of waste oil tankhold). Excavated materials were returned to the tankhold. The current UST system consisting of three 12,000 gallon gasoline USTs was installed.
- LPST 091934 was finalized as a 4.1 site on 5/21/2001.
- Chevron plugged and abandoned three of nine monitor wells and have been sampling the remaining wells periodically.

#### Exposure Pathways Open:

- GW Ingestion (onsite - current)
- GW Ingestion (onsite- future)
- GW Ingestion (offsite - current)
- GW Ingestion (offsite - future)
- Construction Worker
- Plume stability monitoring
- Soils- Exp. Vapor
- Soils - Health
- NAPL, DTW > 15'
- GW to surface water
- Other \_\_\_\_\_

### Release Determination

- November 2003 - during a groundwater sampling event, MW-8 was found to contain 0.81 ft. NAPL. Initially assigned new LPST # 116132. However, hydrocarbon fingerprinting shows product to be weathered, leaded gasoline. Not likely from a new release. A tank tightness test was performed after the product was discovered. All lines passed. The test results are not included in the RDR.
- Because it appears that the NAPL in MW-8 is from the original release, LPST 091934 was re-opened on 7/20/2006. LPST 116132 was cross-referenced to this case.

### Site Characteristics

- Active UST facility with three 12,000-gallon gasoline tanks located at the south central portion of the property. The former tankholds are located at the southwest corner and north central portion of the property.
- 75-100% impervious cover.
- Surrounding land use is mixed commercial and residential.
- The site lithology consists of clay and sandy clay to 35' bgs.

**Soil Assessment**

- Maximum soil concentrations:
  - benzene 87 ppm (B-8/MW-8, 25', 8/5/88)
  - BTEX 1,294 ppm (B-8/MW-8, 25', 8/5/88)
  - TPH 259 ppm (MW-1, 10'-12.5', 10/17/96)
  - PAH <action level (MW-1, 10'-12.5', 10/17/96)
- There has been no apparent threat of explosive vapors since the 1988 incident.
- Soil wastes were properly disposed.

**Groundwater Assessment**

- Six MWs remain at this site: MW-2, MW-4, MW-5, MW-6, MW-7, and MW-8. MW-1 was plugged or destroyed during the October 1995 tank removal. MW-3, MW-9, and MW-10 were plugged in 2001 following initial site closure. Offsite MW-11 was apparently destroyed.
- DTW ranges from 22' to 33' btoc. MW-2, MW-5, and MW-7 were re-developed in 2007 after being silted in. MW-7 has remained dry/obstructed about 26' bgs.
- GW gradient: Generally to the north and west
- TDS is 1,200 ppm
- Groundwater sampling was initiated in 1988. 21 GWM events were conducted between 1990 and 2000. 9 GWM events have been conducted since the case was re-opened in 2006. NAPL has been reported in MW-3 (historically) and MW-8.
- Maximum groundwater concentrations:

	<u>Historical (1990-2007)</u>	<u>Current (2008)</u>
Benzene	22.0 (MW-8, 01/25/96)	4.30 ppm (MW-8, 11/25/08)
BTEX	182 ppm (MW-8, 1988)	23.77 ppm (MW-8, 4/25/08)
MTBE	14.8 ppm (MW-8, 1988)	1.50 ppm (MW-8, 4/25/08)
TPH	230 ppm (MW-8, 6/5/95)	discontinued

- MW-8 is located adjacent to the former tankhold located near the north-central portion of the property.
- The construction worker pathway is closed since the DTW is >15' bgs.
- Current groundwater data indicate that the plume is stable and adequately delineated.
- Fluid wastes were properly disposed.

**NAPL**

- NAPL has been reported in MW-3 and MW-8.
- A groundwater pump and treat system operated from February 1990-September 1995. No NAPL was reported after 1991, until 2008 when 0.81' of NAPL was detected in MW-8. Hydrocarbon fingerprinting shows product to be weathered, leaded gasoline with no oxygenates - from the old release.
- Six 8-hour MDPE events conducted 2005-2006 recovered about 83 gallons of product. Product recovery appears to be limited due to the IC unit used.
- A 24-hour MDPE event conducted in March 2008 using a liquid ring pump system recovered 1,447 gallons of product (73 gallons as liquid).
- An estimated 1,530 gallons of product have been recovered to date by MDPE; an unknown volume was recovered prior to 2001.
- No NAPL has been detected since the March 2008 MDPE event; it appears that NAPL has been removed to the maximum extent practicable.

**Receptors and Site Priority/Category**

- Site is located over the Beaumont Formation; future use is not likely.
- Four water supply wells were identified within 0.5-mile, all >1,200 feet from the site. They are all deeply screened (>250'bgs) and do not appear threatened by this release.

<u>Map ID #</u>	<u>Owner</u>	<u>Well use</u>	<u>TD</u>	<u>Screening</u>	<u>Cementing</u>
65 12 802	City Houston	Public supply	780	597-780	?

February 13, 2009

65 12 802	C. Stanley	Domestic	271	260-271	0-253
65 12 8J	R Ljungdahl	Industrial	415	390-415	0-390
65 12 8J	M. Kindred	Domestic	295	275-295	0-280

- The City of Houston provides municipal water to the site and surrounding area.
- Surface water w/in 1,200 feet: none
- Subsurface utilities are located around site perimeter.
- Priority 4.1; Category II groundwater.

#### Recent Submittals

FAR (rec'd 5/21/08) and MPR, AGMR, PA8 (rec'd 6/9/08)

- FAR is for rehab of MW-2, MW-5, & MW-7; data shows MW-7 still "dry", need DTdry data. Vac truck used as proposed; ok. MPR documents a 24-hr MDPE (03/18/08), lab data super high (1.82 gr/L); data appears correct, super high recovery, no NAPL after. AGMR documents four quarters of monitoring. Approve limited GWM to show NAPL has been removed. *CARF issued 7/2/08.*

AGMR, SCR, PA13 (rec'd 01/20/09)

- *Two quarters of monitoring were completed as preapproved. MW-7 has some sort of blockage about 26' bgs; dry and not sampled. No NAPL reported during last three quarters, and contaminant concentrations in MW-8 appear stable.*
- *Site closure is appropriate. Issue final letter and CARF to plug the six remaining MWs.*

#### Exposure Pathway Evaluation

- *soils: maximum soil concentrations 0-15' < health-based targets; closed*
- *soils: no apparent threat of explosive vapors; closed*
- *current groundwater ingestion: no existing receptors; closed.*
- *future groundwater ingestion: future use is not likely; closed.*
- *construction worker: DTW > 15' bgs; closed.*
- *NAPL: removed to the maximum extent practicable; closed.*
- *plume stability: stable and delineated; closed.*

#### Conclusions/Recommendations

- *NAPL was originally reported at this site in 1988, and a treatment system operated from ~1991 to 1995 recovering an unknown volume of product. No NAPL was detected between 1992 and 2001, and the site was closed in May 2001 as the dissolved-phase plume appeared stable. Note that a Plan A RBA was never completed for this release.*
- *In 2003, NAPL was detected again in MW-8, prompting this case to be re-opened. MDPE and groundwater monitoring was conducted 2005-2008, recovering more than 1,500 gallons of product. No NAPL was detected during the last three quarters of monitoring, and concentrations appear stable in MW-8. The plume has remained adequately delineated. Site closure is appropriate based on the current data.*



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## Central Registry Query - Customer Information


### Customer Information

**CN Number:** CN600241822  
**Name:** SPRINT COM INC  
**Legal Name:** Sprintcom, Inc.  
**Customer Type:** ORGANIZATION

### Affiliated Regulated Entities - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

RN Number	Regulated Entity Name	County	Location	Role	Details
RN100521491	SPRINT PCS TOWER SITE	HARRIS	608 W BOUGH LN HOUSTON TX 77024 4056	VOLUNTEER CLEANUP APPLICANT	

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100521491

**Name:** SPRINT PCS TOWER SITE

**Primary Business:** No primary business description on file.

**Street Address:** 608 W BOUGH LN, HOUSTON TX 77024 4056

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN600241822	SPRINT COM INC	VOLUNTEER CLEANUP APPLICANT	<a href="#">Details</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.

#### 1-1 of 1 Records

Program	ID Type	ID Number	ID Status
INNOCENT OWNER/OPERATOR PROGRAM	ID NUMBER	249	INACTIVE

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## Central Registry

### Detail of: Innocent Owner/Operator Program ID Number 249

For: **SPRINT PCS TOWER SITE (RN100521491)**

608 W BOUGH LN, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **SPRINT COM INC (CN600241822)**

Mailing Address: 1341 W MOCKINGBIRD LN DALLAS, TX 75247-6913

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
10040825	10/29/2001	OUTGOING	INTRA-AGENCY COMM	CLOSE PCA MEMO		10/29/2001	10/29/2001	FAX
10040823	10/26/2001	OUTGOING	IOC			10/26/2001	10/26/2001	USPS
10035871	09/18/2001	OUTGOING	AFFIDAVIT			09/18/2001	09/18/2001	
10035872	09/18/2001	INCOMING	SIGNED AFFIDAVIT		11/17/2001	10/26/2001		
10034059	08/24/2001	OUTGOING	INTRA-AGENCY COMM	IOC MEMO		09/18/2001	08/24/2001	INTRA-AGENCY
10030615	07/18/2001	OUTGOING	APPLICATION ACCEPTANCE			07/18/2001	07/18/2001	FAX
10030618	07/18/2001	INCOMING	PROOF OF NOTICE		08/15/2001	08/17/2001		LETTER
10030513	07/17/2001	INCOMING	TOP APPLICATION		08/31/2001	07/18/2001	07/13/2001	OVERNIGHT
10031118	07/17/2001	INCOMING	SIR			09/18/2001	06/28/2001	USPS
10031120	07/17/2001	INCOMING	PHASE I			08/20/2001	06/28/2001	USPS

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## Central Registry

### Detail of: Innocent Owner/Operator Program ID Number 249

For: **SPRINT PCS TOWER SITE (RN100521491)**

608 W BOUGH LN, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **SPRINT COM INC (CN600241822)**

Mailing Address: 1341 W MOCKINGBIRD LN DALLAS, TX 75247-6913

Legal	Description	Start Date	End Date	Type	Status	Status Date
249	INNOCENT OWNER PROGRAM	07/17/2001	10/29/2001	CLEANUP	INACTIVE	10/29/2001

Tracking No.	Type	Value	Start Date	End Date
9311903	ADMINISTRATIVE STATUS	INACTIVE	10/29/2001	
10030525	PROJECT MANAGER	ECORR	07/13/2001	10/29/2001
10030501	APPLICATION RECEIVED DATE	07/17/01	07/17/2001	
10030499	CASHIER RECEIVED DATE	07/13/2001	07/17/2001	
10030502	PCA NUMBER	32249	07/17/2001	
10030503	PROJECT NUMBER	322490	07/17/2001	
10030498	APPLICANT INTEREST IN SITE	CURRENT OPERATOR	07/17/2001	
10030526	FILE LOCATION	200-38	07/13/2001	
10030500	FILE MEDIA	PAPER	07/17/2001	

Physical	Description	Start Date	Type	Status	Status Date
----------	-------------	------------	------	--------	-------------



GRASS MEDIAN/PARKING LOT | 07/17/2001 | IOP APPLICANT | COMPLETED | 10/29/2001

Tracking No.	Type	Value	Start Date	End Date
9312816	PROJECT PHASE	COMPLETED	10/29/2001	
10030509	SITE SIZE	400 SQ FT	07/17/2001	
10030512	CURRENT FACILITY TYPE	PROPERTY COMMERCIAL	07/17/2001	
9313883	GROUNDWATER COCS IN APPLICATION	TETRACHLOROETHYLENE	07/17/2001	

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN103953188  
**Name:** MW CLEANERS 10244   [View Prior Names](#)  
**Primary Business:** DRY CLEANING  
**Street Address:** 12534 MEMORIAL DR, HOUSTON TX 77024 6000  
**County:** HARRIS  
**Nearest City:** HOUSTON  
**State:** TX  
**Near ZIP Code:** 77024  
**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **3** Current Affiliation Records ([View Affiliation History](#))

#### 1-3 of 3 Records

CN Number	Customer Name	Customer Role	Details
CN60248680S	PRO CLEANERS	VOLUNTEER CLEANUP APPLICANT	<a href="#">ⓘ</a>
CN60265698S	DIFFERENTIAL DEVELOPMENT 1994 LTD	OWNER OPERATOR	<a href="#">ⓘ</a>
CN60270440S	MWDC TEXAS INC	OWNER OPERATOR	<a href="#">ⓘ</a>

### Industry Type Codes

Code	Classification	Name
812320	NAICS	Drycleaning and Laundry Services (except Coin-Operated)

### Permits, Registrations, or Other Authorizations

There are a total of **4** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-4 of 4 Records

Program <a href="#">▲</a>	ID Type	ID Number	ID Status
DRY CLEANERS REGISTRATION	INTERNAL	103953188	CANCELLED
DRY CLEANERS REGISTRATION	REGISTRATION	DCR11287	ACTIVE
IHW CORRECTIVE ACTION	ID NUMBER	T1936	INACTIVE
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	1714	ACTIVE

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11287

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

Registration **ACTIVE**  
Status:

Held by: **MWDC TEXAS INC (CN602704405)**

**OWNER OPERATOR** Since 03/10/2008

Mailing Address: 210 SPRING HILL DR STE 135 SPRING, TX 77386-2385

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18938109	01/20/2015	OUTGOING	DROP STATION CERT	2015 Q - 2				
18599331	10/15/2014	OUTGOING	DROP STATION CERT	2015 Q - 1				
18439833	07/28/2014	INCOMING	DROP STATION REGISTRATION				07/24/2014	
18380917	07/17/2014	OUTGOING	DROP STATION CERT	2014 Q - 4				
18242718	06/24/2014	OUTGOING	RENEWAL REG LETTER	FY2015				EMAIL
18062398	04/11/2014	OUTGOING	DROP STATION CERT	2014 Q - 3				
17799962	01/15/2014	OUTGOING	DROP STATION CERT	2014 Q - 2				
17528071	10/09/2013	OUTGOING	DROP STATION CERT	2014 Q - 1				
17329277	07/22/2013	OUTGOING	COMPT FILE CREATION					
17326600	07/19/2013	OUTGOING	DROP STATION CERT	2013 Q - 4				
17327536	07/15/2013	INCOMING	DROP STATION REGISTRATION				07/10/2013	
17264192	06/21/2013	OUTGOING	RENEWAL REG LETTER	FY2014				EMAIL
17133738	05/03/2013	OUTGOING	DROP STATION CERT	2013 Q - 3				
16671091	01/18/2013	OUTGOING	DROP STATION CERT	2013 Q - 2				
16511716	11/14/2012	OUTGOING	DROP STATION CERT	2013 Q - 1				
15972945	07/18/2012	OUTGOING	DROP STATION CERT	2012 Q - 4				
15968656	07/16/2012	OUTGOING	COMPT FILE CREATION					
15966603	07/09/2012	INCOMING	DROP STATION REGISTRATION				07/05/2012	
15914512	06/13/2012	OUTGOING	RENEWAL REG LETTER	FY2013				EMAIL
15836695	05/02/2012	OUTGOING	DROP STATION CERT	2012 Q - 3				
15179456	01/20/2012	OUTGOING	DROP STATION CERT	2012 Q - 2				
14985566	10/17/2011	OUTGOING	DROP STATION CERT	2012 Q - 1				
14970992	10/05/2011	OUTGOING	COMPT FILE CREATION					
14965012	10/03/2011	OUTGOING	COMPT FILE CREATION					
14960227	09/28/2011	INCOMING	DROP STATION REGISTRATION				09/27/2011	
14815233	07/21/2011	OUTGOING	DROP STATION CERT	2011 Q - 4				



14755879	06/23/2011	OUTGOING	RENEWAL REG LETTER	FY2012	LETTER
14671572	04/20/2011	OUTGOING	DROP STATION CERT	2011 Q - 3	
14565804	01/12/2011	OUTGOING	DROP STATION CERT	2011 Q - 2	
14478074	10/21/2010	OUTGOING	DROP STATION CERT	2011 Q - 1	
13139191	07/20/2010	OUTGOING	DROP STATION CERT	2010 Q - 4	
13142299	07/12/2010	INCOMING	DROP STATION REGISTRATION		06/26/2010
13098952	06/15/2010	OUTGOING	RENEWAL REG LETTER	FY2011	LETTER
13075903	05/20/2010	OUTGOING	DROP STATION CERT	2010 Q - 3	
13026052	03/26/2010	OUTGOING	DROP STATION CERT	2010 Q - 1	
13026062	03/26/2010	OUTGOING	DROP STATION CERT	2010 Q - 2	
12962300	01/20/2010	OUTGOING	COMPT FILE CREATION		
12960152	01/19/2010	OUTGOING	COMPT FILE CREATION		
12959152	01/15/2010	OUTGOING	COMPT FILE CREATION		
12954105	01/11/2010	INCOMING	DROP STATION REGISTRATION		12/15/2009
12763209	07/23/2009	OUTGOING	DROP STATION CERT	2009 Q - 4	
12729809	06/24/2009	OUTGOING	RENEWAL REG LETTER	FY2010	
12670058	04/24/2009	OUTGOING	DROP STATION CERT	2009 Q - 3	
12657455	04/15/2009	OUTGOING	DROP STATION CERT	2009 Q - 1	
12657651	04/15/2009	OUTGOING	DROP STATION CERT	2009 Q - 2	
3005609	12/31/2008	INCOMING	DROP STATION REGISTRATION		
3031055	09/26/2006	INCOMING	FACILITY REGISTRATION		
3520208	07/24/2006	OUTGOING	FACILITY CERT	2006 Q - 4	
3521086	04/10/2006	OUTGOING	FACILITY CERT	2006 Q - 3	
3514937	01/04/2006	OUTGOING	FACILITY CERT	2006 Q - 1	
3005608	09/08/2005	INCOMING	FACILITY REGISTRATION		
3500293	10/29/2004	OUTGOING	FACILITY CERT	2005	
3005607	09/21/2004	INCOMING	FACILITY REGISTRATION		
3504906	11/07/2003	OUTGOING	FACILITY CERT	2004	
3005606	10/17/2003	INCOMING	FACILITY REGISTRATION		

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11287

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

Registration **ACTIVE**

Status:

Held by: **MWDC TEXAS INC (CN602704405)**

**OWNER OPERATOR** Since 03/10/2008

Mailing Address: 210 SPRING HILL DR STE 135 SPRING, TX 77386-2385

Legal	Description	Start Date	End Date	Type	Status	Status Date
DCR11287	FY2015	08/06/2014		DROP STATION REGISTRATION	ACTIVE	08/06/2014
DCR11287	FY2014	07/19/2013		DROP STATION REGISTRATION	ACTIVE	07/22/2013
DCR11287	FY2013	07/13/2012		DROP STATION REGISTRATION	ACTIVE	07/16/2012
DCR11287	FY2012	09/29/2011		DROP STATION REGISTRATION	ACTIVE	10/06/2011
DCR11287	FY2011	07/21/2010		DROP STATION REGISTRATION	ACTIVE	07/21/2010
DCR11287	FY2010	01/11/2010		DROP STATION REGISTRATION	ACTIVE	01/22/2010
DCR11287	FY2009	09/01/2008		DROP STATION REGISTRATION	ACTIVE	12/31/2008
DCR11287	FY2007	09/01/2006	05/30/2007	FACILITY REGISTRATION	INACTIVE	05/30/2007
DCR11287	FY2006	09/01/2005		FACILITY REGISTRATION	ACTIVE	09/08/2005
DCR11287	FY2005	09/01/2004		FACILITY REGISTRATION	ACTIVE	09/21/2004
DCR11287	FY2004	09/01/2003		FACILITY REGISTRATION	ACTIVE	10/17/2003

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## Central Registry

### Detail of: IHW Corrective Action ID Number T1936

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **PRO CLEANERS (CN602486805)**

Mailing Address: Not on file

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
14745112	06/21/2011	INCOMING	AGENCY MEMO/FILE		07/21/2011	06/21/2011	06/21/2011	INTRA-AGENCY
10877378	01/14/2005	OUTGOING	LATE LETTER 1			01/14/2005		
10541574	03/12/2004	OUTGOING	COMMENTS/NOO			03/12/2004		
10530472	02/20/2004	INCOMING	NOTICE OF RELEASE	SUSPECTED IMPACT TO WATERS OF THE STATE	04/05/2004	03/12/2004	01/22/2004	

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## Central Registry

### Detail of: IHW Corrective Action ID Number T1936

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **PRO CLEANERS (CN602486805)**

Mailing Address: Not on file

Legal	Description	Start Date	End Date	Type	Status	Status Date
T1936	IHW CORRECTIVE ACTION	03/10/2004		CLEANUP	INACTIVE	06/21/2011

Tracking No.	Type	Value	Start Date	End Date
9317716	ADMINISTRATIVE STATUS	INACTIVE	06/21/2011	
12127826	PROJECT MANAGER	RCIAMPLI	07/27/2007	06/21/2011
10536799	PROJECT MANAGER	PSHINABE	03/08/2004	06/01/2007
10530474	PROJECT MANAGER	CREMMERT	02/27/2004	03/09/2004

Physical	Description	Start Date	Type	Status	Status Date
PRO CLEANERS		02/27/2004	IHW CA	TRANSFERRED	06/21/2011

Tracking No.	Type	Value	Start Date	End Date
9338880	PROJECT PHASE	TRANSFERRED	06/21/2011	
10530470	CURRENT FACILITY TYPE	DRY CLEANER	02/27/2004	

9328927 | SOURCE OF RELEASE | PRO CLEANERS | 03/10/2004 |

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 1714

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **DIFFERENTIAL DEVELOPMENT 1994 LTD (CN602656985)** Since 10/03/2006

Mailing Address: 2001 KIRBY DR STE 1200 HOUSTON, TX 77019-6044

### Correspondence Tracking

Tracking No.	Received/Seat	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18992207	01/26/2015	OUTGOING	COMMENTS/NOD			01/26/2015	01/26/2015	USPS
18992208	01/26/2015	PENDING	P RESPONSE TO COMMENTS		04/15/2015			
18656692	10/30/2014	INCOMING	RESPONSE TO COMMENTS	AUG 27, 2014 LTR	12/29/2014	01/26/2015	10/27/2014	OVERNIGHT
18495981	08/27/2014	OUTGOING	COMMENTS/NOD			08/27/2014	08/27/2014	ELECTRONIC SUBMITTAL
18495982	08/27/2014	PENDING	P TECHNICAL RPT		10/30/2014			
18343673	07/01/2014	INCOMING	RESPONSE TO COMMENTS	JUNE 10, 2014 LTR	08/30/2014	08/27/2014	06/24/2014	OVERNIGHT
18343677	06/27/2014	INCOMING	MSD REV		08/11/2014	08/27/2014	01/09/2012	OVERNIGHT
18200069	06/10/2014	OUTGOING	COMMENTS/NOD			06/10/2014	06/10/2014	USPS
18200070	06/10/2014	PENDING	P TECHNICAL CORRESPONDENCE		08/20/2014			
18063223	04/07/2014	INCOMING	TECHNICAL CORRESPONDENCE	REVISED MSD ORDINANCE W/ ADDITIONAL PROPERTIES	06/06/2014	06/10/2014	03/21/2014	
17465465	09/12/2013	INCOMING	TECHNICAL CORRESPONDENCE	ADDING ADDL PROPERTIES TO COC	02/10/2014	06/10/2014	09/11/2013	
17290157	07/02/2013	INCOMING	APAR	REQUEST TO REISSUE COC FOR ALL TRACTS A-B,C	01/08/2014	06/10/2014		ELECTRONIC SUBMITTAL
16500396	11/01/2012	OUTGOING	APPROVAL		12/31/2012	11/01/2012	11/01/2012	EMAIL
16488397	10/26/2012	INCOMING	PROOF OF FILING	COC	12/29/2012	11/01/2012	10/11/2012	
16479844	10/11/2012	OUTGOING	COC			10/11/2012	10/11/2012	
16093298	09/04/2012	INCOMING	SIGNED AFFIDAVIT	SIGNED AFFIDAVIT	11/03/2012	10/11/2012	08/30/2012	
16088769	08/28/2012	OUTGOING	AFFIDAVIT			08/28/2012		USPS
16033898	07/24/2012	INCOMING	VCP APPLICATION AMENDMENT	VCP AMENDED APPLICATION & AGREEMENT	09/22/2012	08/28/2012	07/24/2012	
15908764	06/11/2012	INCOMING	APAR REV	REVISED APAR	08/10/2012	08/28/2012	06/01/2012	
15730091	03/28/2012	INCOMING	MSD REV	REVISED APPLICATION FOR MSD 191	05/12/2012	07/12/2012		

15545235	03/20/2012	OUTGOING	COMMENTS/NOB	MSD APPLICATION 191 (FOR VCP 1714)	03/20/2012	03/20/2012	USPS
15481095	01/20/2012	INCOMING	MSD APPLICATION		04/19/2012	03/20/2012	
15492454	01/11/2012	OUTGOING	APPROVAL			01/11/2012	EMAIL
15085219	11/30/2011	OUTGOING	APPROVAL			11/30/2011	EMAIL
15078366	11/28/2011	INCOMING	GW/MEDIA MONITORING RPT	OCT 2011 GW MON RPT	01/27/2012	01/11/2011	
15078378	11/28/2011	INCOMING	STATUS UPDATE	NOV 2011 STATUS UPDATE	01/27/2012	01/11/2011	
15013633	11/01/2011	INCOMING	RESPONSE TO COMMENTS	EST SCHEDULE TO OBTAIN COC	12/31/2011	11/30/2011	
14760675	06/01/2011	OUTGOING	APPROVAL			06/01/2011	
14677375	04/27/2011	INCOMING	GW/MEDIA MONITORING RPT	MARCH 2011 GW MON RPT	06/26/2011	06/01/2011	
12629100	03/09/2009	INCOMING	STATUS UPDATE	MARCH 09 STATUS UPDATE	05/08/2009	03/25/2009	
12607852	02/11/2009	INCOMING	TECHNICAL RPT	MSR	04/12/2009	02/18/2009	
12573012	01/12/2009	INCOMING	TECHNICAL CORRESPONDENCE	TECHNICAL CORRESPONDENCE	03/13/2009	02/18/2009	
12550006	12/11/2008	INCOMING	STATUS UPDATE	DEC 08 STATUS UPDATE	02/09/2009	12/16/2008	
12525158	11/07/2008	INCOMING	STATUS UPDATE	OCT08ER STATUS RPT	01/06/2009	12/16/2008	
12455387	09/22/2008	INCOMING	SURVEY/PLAT	SURVEY	11/21/2008	10/06/2008	
12438083	08/28/2008	INCOMING	RESPONSE TO COMMENTS	RESPONSE TO TCRQ LTR DTD JULY 21, 2008	10/27/2008	10/07/2008	
12420662	08/18/2008	INCOMING	TECHNICAL CORRESPONDENCE	350.55 ADJACENT PROP OWNER NOTICE	10/17/2008	09/09/2008	
12336638	06/17/2008	INCOMING	APAR	APAR	08/16/2008	07/21/2008	
12148361	12/18/2007	OUTGOING	INTRA-AGENCY COMM			12/19/2007	MEETING
12147692	12/14/2007	INCOMING	TRRP 350.55 NOTIFICATION		02/12/2008	01/09/2008	
12016028	09/29/2006	INCOMING	VCP APPLICATION AMENDMENT		11/13/2006	11/06/2006	
12014118	09/13/2006	INCOMING	PROOF OF FILING			09/28/2006	
12012432	08/30/2006	INCOMING	TRRP 350.55 NOTIFICATION		10/28/2006	10/02/2006	
11328503	04/21/2006	INCOMING	RESPONSE TO COMMENTS		10/14/2006	10/02/2006	
11283675	03/02/2006	INCOMING	DRINKING WATER SURVEY RPT		06/05/2006	05/19/2006	
11241822	02/01/2006	INCOMING	APAR			03/06/2006	
11120437	10/06/2005	INCOMING	REQUEST FOR EXTENSION	APAR/OPERATOR GOING BANKRUPT	03/18/2006	03/15/2006	
10893369	06/01/2005	INCOMING	TECHNICAL CORRESPONDENCE	WATER WELL SEARCH	07/16/2005	06/29/2005	
10935099	04/11/2005	INCOMING	REQUEST FOR EXTENSION		05/26/2005	05/09/2005	
10859352	12/27/2004	INCOMING	REQUEST FOR EXTENSION		02/10/2005	12/30/2004	
10742602	08/31/2004	INCOMING	REQUEST FOR EXTENSION		10/15/2004	09/15/2004	
10686208	07/16/2004	INCOMING	AGREEMENT			07/20/2004	
10674998	07/01/2004	INCOMING	VCP APPLICATION		08/15/2004	07/19/2004	



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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 1714

For: **MW CLEANERS 10244 (RN103953188)**

12534 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **DIFFERENTIAL DEVELOPMENT 1994 LTD (CN602656985)** Since 10/03/2006

Mailing Address: 2001 KIRBY DR STE 1200 HOUSTON, TX 77019-6044

Legal	Description	Start Date	End Date	Type	Status	Status Date
1714	VOLUNTARY CLEANUP	07/05/2004		CLEANUP	ACTIVE	07/02/2013

Tracking No.	Type	Value	Start Date	End Date
17290160	PROJECT MANAGER	CSWIDERS	07/02/2013	
12039054	PROJECT MANAGER	MARTHUR	03/20/2007	12/31/2012
11245160	PROJECT MANAGER	EWEHNER	02/02/2006	03/20/2007
10674982	PROJECT MANAGER	DCHRISTI	07/05/2004	02/01/2006
9288068	ADMINISTRATIVE STATUS	ACTIVE	07/02/2013	
10674981	PCA NUMBER	33914	07/05/2004	
10674983	PROJECT NUMBER	339140	07/05/2004	
10674978	CASHIER RECEIVED DATE	06/25/2004	07/05/2004	
10674986	APPLICATION RECEIVED DATE	07/01/2004	07/05/2004	
9285985	APPLICANT INTEREST IN SITE	LESSEE	07/05/2004	
10674984	REGION NOTIFIED	07/05/2004	07/05/2004	

10674985	REGION NOTIFIED	07/05/2004	07/05/2004
17290161	FILE LOCATION	D/215 & D/200-25	07/02/2013
10674980	FILE MEDIA	PAPER	07/05/2004
19036461	VCP EMPLOYEE TIME	15 HRS	01/31/2015
18974378	VCP EMPLOYEE TIME	1.5 HRS	12/31/2014
18564207	VCP EMPLOYEE TIME	13.5 HRS	08/31/2014
18427519	VCP EMPLOYEE TIME	5.5 HRS	06/30/2014
18346655	VCP EMPLOYEE TIME	1.5 HRS	05/31/2014
18171703	VCP EMPLOYEE TIME	3 HRS	04/30/2014
18106345	VCP EMPLOYEE TIME	1.5 HRS	03/31/2014
17852570	VCP EMPLOYEE TIME	2 HRS	12/31/2013
17772033	VCP EMPLOYEE TIME	8.5 HRS	11/30/2013
16641333	VCP EMPLOYEE TIME	1 HRS	11/30/2012
16551348	VCP EMPLOYEE TIME	2 HRS	10/31/2012
16499765	VCP EMPLOYEE TIME	3 HRS	09/30/2012
16084744	VCP EMPLOYEE TIME	10.5 HRS	07/31/2012
15496375	VCP EMPLOYEE TIME	3 HRS	01/31/2012
15084657	VCP EMPLOYEE TIME	.5 HRS	10/31/2011
14833083	VCP EMPLOYEE TIME	1.5 HRS	06/30/2011
14786242	VCP EMPLOYEE TIME	2 HRS	05/31/2011

Physical	Description	Start Date	Type	Status	Status Date
LANTERN LANE SHOPPING CENTER PRO CLEANERS		07/05/2004	AFFECTED PROPERTY	INVESTIGATION	07/02/2013

Tracking No.	Type	Value	Start Date	End Date
9290593	PROJECT PHASE	INVESTIGATION	07/02/2013	
10674988	APPLICABLE PROGRAM RULES	TRRP	07/05/2004	



18424822	MSD CERTIFICATE NUMBER	191		06/25/2012
10674996	CURRENT FACILITY TYPE	DRY CLEANER		07/05/2004
10674992	SITE SIZE	6.75 ACRES		07/05/2004
9296597	SOILS CHEMICAL OF CONCERN CLASSIFICATION	CHLORINATED SOLVENTS		07/05/2004
9296598	GW BEARING UNIT	DEFAULT GW BEARING UNIT 1		07/05/2004

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Toby Baker, *Commissioner*  
Zak Covar, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

August 27, 2014

Mr. Michael Marcon  
[mmarcon@incontroltech.com](mailto:mmarcon@incontroltech.com)  
InControl Technologies, Inc.  
3845 FM 1960 W., Suite 195  
Houston, TX 77002

Re: Lantern Lane Shopping Center, 12534 Memorial Drive, Houston, Harris County, Texas;  
Voluntary Cleanup Program (VCP) No. 1714; Customer No. CN602656985; Regulated  
Entity No. RN103953188

Dear Mr. Marcon:

The VCP of the Texas Commission on Environmental Quality (TCEQ) has reviewed the June 27, 2014 submittal entitled Municipal Settings Designation Application, prepared by InControl Technologies, Inc.

The TCEQ has reviewed the submitted documents and historical documents. The TCEQ has determined that although the properties were included in the original MSD application they did not in the end receive the MSD certification. Therefore the well owners within a 5-mile radius need to be notified of the changes that have been made and the new sites receiving the MSD. Please make sure that if there are any new wells in place since the last round of notifications that they receive the proper notifications.

A response should be submitted to my attention at the TCEQ at the letterhead address using mail code MC-221. Your response must be received on or before October 30, 2014. Should you need additional information or wish to discuss these comments or due date, please call me at (512)239-2241.

Sincerely,

Chris Swiderski, Project Manager  
VCP-CA Section  
Remediation Division

**RECEIVED**  
**SEP 03 2014**  
**REGION 12**

CS/jdm

cc: Mr. Jason Ybarra, TCEQ, Waste Section Manager, Houston Regional Office, MC R-12

Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Zak Covar, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



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## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 10, 2014

**RECEIVED**

**JUN 20 2014**

**REGION 12**

Mr. Michael Marcon  
mmarcon@incontroltech.com  
InControl Technologies, Inc.  
3845 FM 1960 W., Suite 195  
Houston, TX 77002

Re: Lantern Lane Shopping Center, 12534 Memorial Drive, Houston, Harris County, Texas;  
Voluntary Cleanup Program (VCP) No. 1714; Customer No. CN602656985; Regulated  
Entity No. RN103953188

Dear Mr. Marcon:

The VCP of the Texas Commission on Environmental Quality (TCEQ) has reviewed the March 21, 2014 report entitled Technical Correspondence, prepared by InControl Technologies, Inc.

1. The TCEQ has reviewed the submitted documents and historical documents and has been unable to locate the original MSD application which would verify the original boundaries. If the original MSD application does not contain boundaries which include these new properties, a new MSD application will need to be submitted. The new MSD application would need to include notification letters to the existing well owners not previously notified within the new 5-mile radius of the site (as modified by the inclusion of additional acreage).
2. Tetrachloroethene was detected in monitor well 1-MW-9 at a concentration of 2.6 mg/L, during the October 2011 sampling event. This concentration is in shallow groundwater located beneath an adjacent residential property sought to be added to the MSD. The TCEQ understands that the site has previously received a VCP certificate of completion (COC) for the Lantern Lane Shopping Center property. Please be aware that there may be a vapor intrusion issue on the adjacent property which may require mitigation by a responder in order to be protective of indoor receptors, regardless of whether the VCP applicant intends to secure COCs for the residential properties. If the applicant seeks to obtain COCs for the adjacent residential properties, the potential for vapor intrusion must be evaluated and, if necessary, mitigated by the VCP applicant prior to certification.

A response should be submitted to my attention at the TCEQ at the letterhead address using mail code MC-221. Your response must be received on or before August 20, 2014.

Mr. Michael Marcon

Page 2

June 10, 2014

VCP ID No. 1714

Should you need additional information or wish to discuss these comments or due date, please call me at (512)239-2241.

Sincerely,



Chris Swiderski, Project Manager

VCP-CA Section

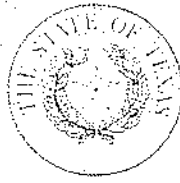
Remediation Division

Texas Commission on Environmental Quality

CS/mdh

Cc: Mr. Jason Ybarra, TCEQ, Waste Section Manager, Houston Regional Office, MC R-12

Bryan W. Shaw, Ph.D., *Chairman*  
Carlos Rubinstein, *Commissioner*  
Toby Baker, *Commissioner*  
Zak Covar, *Executive Director*



VCP17142

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

October 11, 2012

Mr. Tenel Tayar  
Senior Vice President – Chief Investment Officer  
AmREIT Lantern Lane, LP  
8 Greenway Plaza, Suite 1000  
Houston, TX 77046

Re: Certificate of Completion (COC) for Lantern Lane Shopping Center, 12534 Memorial Drive, Houston, Harris County, TX; Voluntary Cleanup Program (VCP) No.1714; Customer No. CN602656985; Regulated Entity No. RN103953188

Dear Mr. Tayar:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the June 1, 2012 report entitled *Revised Affected Property Assessment Report* for the Lantern Lane Shopping Center as well as other requested information. Based on this review, the TCEQ has determined that the site has attained Texas Risk Reduction Program Remedy Standard A residential land use standards for all exposure pathways except the groundwater ingestion ( $^{GW}GW_{Ing}$ ) pathway, in accordance with 30 Texas Administrative Code §350.32 (Remedy Standard A). The  $^{GW}GW_{Ing}$  pathway has been satisfactorily addressed through the issuance of a Municipal Setting Designation (MSD) certificate pursuant to Texas Health and Safety Code §361.807. Therefore, the TCEQ issues the enclosed final COC. The TCEQ records for this site will be maintained at the Central Records office of the TCEQ in Austin, Texas.

Response actions performed in the VCP which rely upon non-permanent institutional controls require filing of the certificate in the real property records of the county in which the site is located in accordance with 30 TAC §333.9. Please submit proof of filing the certificate in the real property records no later than 90 days from the date of the certificate to the TCEQ, VCP-CA Section, mail code MC-221, at the letterhead address. Failure to submit proof of filing demonstrating that the certificate was filed within 90 days of issuance may result in termination of the VCP agreement and an enforcement action.



Mr. Tenel Tayar

Page 2

October 11, 2012

VCP No. 1714

Please be aware that there may be outstanding charges reflecting TCEQ oversight activities that may still be forthcoming. You may contact Mr. Mark Arthur of my staff with any questions or comments you have at (512) 239-2362.

Sincerely,



Beth Seaton, Director  
Remediation Division  
Texas Commission on Environmental Quality

BS/MA/del

cc: Mr. Michael Marcon, InControl Technologies, 3845 FM 1960 W, Suite 195,  
Houston, TX 77068  
Ms. Nicole Bealle, Waste Section Manager, TCEQ Region 12 Office, Houston

Enclosure: COC

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



VOLUNTARY CLEANUP PROGRAM  
FINAL CERTIFICATE OF COMPLETION

This Final Certificate of Completion (Certificate) applies to the tract of land described in Exhibit "A", attached hereto and incorporated herein by reference. This Certificate and the related protection described herein apply solely to releases at the tract of land described in Exhibit "A" prior to the execution date of this Certificate. This Certificate shall be a covenant that runs with the land.

As provided in Section 361.609 of the Texas Health and Safety Code:

I, Beth Seaton, Director, Remediation Division, TCEQ, certify as follows:

Response actions have been completed for VCP No. 1714 as of August 29, 2012, for the tract of land described in Exhibit "A" so that the tract is acceptable for residential land use.

This certification is based on the Affidavit of Completion of Response Actions (Exhibit "B"), and is reliant upon a Municipal Setting Designation that has been certified by the TCEQ under Section 361.807 of the Health and Safety Code for this tract of land to prohibit use of groundwater. The Municipal Setting Designation Certificate is included as Exhibit "C", attached hereto and incorporated herein by reference, and on additional site information in TCEQ files.

The following persons are qualified to obtain the protection from liability described in Section 361.610 of the Texas Health and Safety Code:

- 1) An applicant who on the date of submittal of an application to the Voluntary Cleanup Program was not a responsible party under Sections 361.271 or 361.275(g) of the Texas Health and Safety Code; and
- 2) All persons (e.g., future owners, future lessees, future operators and lenders) who on the date of issuance of this Certificate were not responsible parties under Sections 361.271 or 361.275(g) of the Texas Health and Safety Code.

Further information concerning this matter may be found at the TCEQ Central File Room in Building E, Room 103, 12100 Park 35 Circle, Austin, Texas 78753 under Voluntary Cleanup Program No.1714.

EXECUTED this the 11<sup>th</sup> day of October, 2012

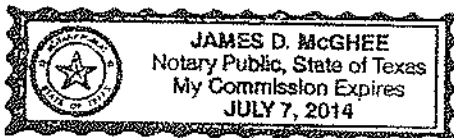
*Beth Seaton*

Beth Seaton, Director  
Remediation Division

STATE OF TEXAS  
TRAVIS COUNTY

BEFORE ME, on this the 11<sup>th</sup> day of October, personally appeared, Beth Seaton, Director, Remediation Division, of the Texas Commission on Environmental Quality, known to me to be a representative of said commission whose name is subscribed to the foregoing instrument and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11<sup>th</sup> day of October, 2012



Notary without Bond

*James D. McGhee*  
Notary Public in and for the State of Texas

## Exhibit A

### Legal Description

A TRACT OR PARCEL OF LAND CONTAINING 6.7624 ACRES OR 294,570 SQUARE FEET OF LAND, SITUATED IN THE GEORGE BELLOW'S SURVEY, ABSTRACT NO. 3, HARRIS COUNTY, TEXAS BEING OUT OF AND A PART OF LOT 2D OF BENIGNUS ACRES, MAP OR PLAT THEREOF RECORDED IN VOL. 15, PG. 8 OF THE HARRIS COUNTY MAP RECORDS SAID 6.7624 ACRE TRACT BEING THAT SAME TRACT OF LAND CONVEYED TO AMREIT LANTERN LANE, LP IN THAT CERTAIN WARRANTY DEED FILED UNDER HARRIS COUNTY CLERKS FILE NO 2DD6DD846D2 AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING AT A 5/8 INCH IRON ROD FOUND ON THE WESTERLY RIGHT OF WAY LINE OF BENIGNUS ROAD (BASED ON WIDTH OF 60 FEET) MARKING THE SOUTHEAST CORNER OF MEMORIAL PINES, SECTION TWO, MAP OR PLAT THEREOF RECORDED IN VOL. 68, PG. 1, H.C.M.R. FOR THE NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE SOUTH, ALONG AND WITH THE SAID WESTERLY RIGHT OF WAY LINE OF BENIGNUS ROAD, A DISTANCE OF 350.90 FEET TO A 3/4 INCH IRON PIPE FOUND MARKING THE NORTHWEST CORNER OF THE INTERSECTION OF THE SAID WESTERLY RIGHT OF WAY LINE OF BENIGNUS ROAD, WITH THE NORTHERLY RIGHT OF WAY LINE OF MEMORIAL DRIVE (BASED ON A WIDTH OF 100 FEET) FOR THE SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE WEST, ALONG AND WITH THE SAID NORTHERLY RIGHT OF WAY LINE OF MEMORIAL DRIVE, A DISTANCE OF 839.32 FEET TO A 5/8 INCH IRON ROD FOUND MARKING THE NORTHEAST CORNER AT THE INTERSECTION OF THE SAID NORTHERLY RIGHT OF WAY LINE OF MEMORIAL DRIVE WITH THE EASTERLY RIGHT OF WAY LINE OF TALLOWOOD ROAD (BASED ON A WIDTH OF 60 FEET) FOR THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE NORTH 00 DEG. 17 MIN. 0 SEC. EAST, ALONG AND WITH THE SAID EASTERLY RIGHT OF WAY LINE OF TALLOWOOD ROAD, A DISTANCE OF 351.76 FEET TO A 5/8 INCH IRON ROD FOUND MARKING THE SOUTHWEST CORNER OF SAID MEMORIAL PINES, SECTION TWO FOR THE NORTHWEST CORNER OF THE HEREIN DESCRIBED TRACT, FROM WHICH A 5/8 INCH IRON ROD FOUND FOR REFERENCE BEARS SOUTH 22 DEG. 13 MIN. EAST 1.6 FEET;

THENCE SOUTH 89 DEG. 56 MIN. 30 SEC. EAST, ALONG AND WITH THE SOUTHERLY LINE OF SAID MEMORIAL PINES, SECTION TWO, A DISTANCE OF 837.58 FEET TO THE POINT OF BEGINNING AND CONTAINING 6.7624 ACRES OR 294,570 SQUARE FEET OF LAND.





*Exhibit "B"*  
*Affidavit of Completion of Response Actions*  
*VCP No. 1714*

BEFORE ME, the undersigned authority, on this day personally appeared Chad Braun, as an authorized representative of AmREIT Lantern Lane, LP, known to me to be the person whose name is subscribed below who being by me first duly sworn, upon their oath, stated as follows:


I am over the age of 18 and legally competent to make this affidavit. I have personal knowledge of the facts stated herein.

AmREIT Lantern Lane, LP (Applicant) has completed response actions pursuant to Chapter 361, Subchapter S, Texas Health and Safety Code, at the tract of land described in Exhibit "A" to this certificate that pertains to Lantern Lane Shopping Center (Site), VCP No. 1714 located at 12534 Memorial Drive, Houston, Harris County, Texas. The Site was owned by Differential Development - 1994, Ltd at the time the application to participate in the Voluntary Cleanup Program was filed. The Applicant has submitted and received approval from the Texas Commission on Environmental Quality (TECQ) Remediation Division on all plans and reports required by the Voluntary Cleanup Agreement. The plans and reports were prepared using a prudent degree of inquiry of the Site consistent with accepted industry standards to identify all hazardous substances, waste and contaminated media of regulatory concern. The response actions for the Site have achieved standards acceptable for residential land use as determined by the TECQ.

The response actions substantially eliminated present or future risk to public health and safety and to the environment from releases and threatened releases of hazardous substances and/or contaminants at or from the Site. The Applicant has not acquired this certificate of completion by fraud, misrepresentation or knowing failure to disclose material information. Further information concerning the response action at this Site may be found in the final report at the central office of the TCEQ under VCP No. 1714.

The preceding is true and correct to the best of my knowledge and belief.

Applicant

  
(Signature)

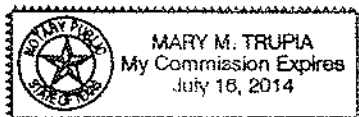
Chad Braun  
(Printed Name)

Vice President  
(Title)

STATE OF TEXAS

COUNTY OF HARRIS

SUBSCRIBED AND SWORN before me on this the 29 day of August 2012,  
to which witness my hand and seal of office.



Mary Trupia  
Notary Public in and for the State of Texas

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100658335

**Name:** PILGRAM WYCLIFFE

**Primary Business:** No primary business description on file.

**Street Address:** 12647 MEMORIAL DR, HOUSTON TX 77024 4800

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12647 Memorial Dr, Houston, TX

### Affiliated Customers - Current

Your Search Returned **3** Current Affiliation Records ([View Affiliation History](#))

#### 1-3 of 3 Records

CN Number	Customer Name	Customer Role	Details
CN600367312	PILGRAM WYCLIFFE	OWNER OPERATOR	<a href="#">↗</a>
CN600610935	OG FARINE JR	OWNER OPERATOR	<a href="#">↗</a>
CN602502486	PILGRIM CLEANERS INC	OWNER OPERATOR	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **3** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-3 of 3 Records

Program ▲	ID Type	ID Number	ID Status
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD982552382	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	70231	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	70233	INACTIVE

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 70233

For: **PILGRAM WYCLIFFE (RN100658335)**

12647 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **PILGRAM WYCLIFFE (CN600367312)**

**OWNER OPERATOR** Since 08/23/2001

Mailing Address: 12647 MEMORIAL DR HOUSTON, TX 77024-4800

#### Facility Information

**Registration Number:** 70233

**Status:** Inactive

**Site Name:** PILGRAM WYCLIFFE

**Company Name:** PILGRAM WYCLIFFE

**Site Street Address:** 12647 MEMORIAL DR, HOUSTON, TX, 77024

**Site Location:** 12647 Memorial Dr, Houston, TX

**County:** HARRIS

**EPA Number:** TXD98252382

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:**

[View Annual Waste Summary](#) not available

[View Waste Receipt Report](#)   **Waste Receipt Report not available**

[View Waste Management Units](#) [View Waste Types](#)

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 70231

For: **PILGRAM WYCLIFFE (RN1006583335)**

12647 MEMORIAL DR, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **OG FARINE JR (CN600610935)**

**OWNER OPERATOR**

Mailing Address: Not on file

**PILGRIM CLEANERS INC (CN602502486)**

**OWNER OPERATOR** Since 08/23/2001

Mailing Address: 12647 MEMORIAL DR HOUSTON, TX 77024-4800

#### Facility Information

**Registration Number:** 70231

**Status:** Inactive

**Site Name:** PILGRIM CLEANERS

**Company Name:** PILGRIM CLEANERS INC

**Site Street Address:** 12647 MEMORIAL DR, HOUSTON, TX, 77024

**Site Location:** 12647 Memorial Dr, Houston, TX

**County:** HARRIS

**EPA Number:** TXD982552382

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:**

[View Annual Waste Summary](#) not available

[View Waste Receipt Report](#)   [Waste Receipt Report not available](#)

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100704626

**Name:** YOUR VALET CLEANERS

**Primary Business:** No primary business description on file.

**Street Address:** 614 W BOUGH LN, HOUSTON TX 77024 4017

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 614 W Bough, Houston, TX

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN600329072	THE CHOY CORPORATION	OWNER	<a href="#">↔</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-2 of 2 Records

Program <a href="#">▲</a>	ID Type	ID Number	ID Status
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD987989621	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	90546	INACTIVE

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 90546

For: **YOUR VALET CLEANERS (RN100704626)**

614 W BOUGH LN, HOUSTON

Solid Waste **INACTIVE**  
Registration

Status:

Held by: **THE CHOY CORPORATION (CN600329072)**

**OWNER** Since 08/23/2001

Mailing Address: 614 W BOUGH LN HOUSTON, TX 77024-4017

#### Facility Information

Registration Number: 90546

Status: Inactive

Site Name: YOUR VALET CLEANERS

Company Name: THE CHOY CORPORATION

Site Street Address: 614 W BOUGH LN, HOUSTON, TX, 77024

Site Location: 614 W Bough, Houston, TX

County: HARRIS

EPA Number: TXD987989621

Registration Type: Generator

Generator Type: Non-Industrial

SIC Code:

NAICS Code:

View Annual Waste Summary not available

View Waste Receipt Report

View Waste Management Units

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN107854168

**Name:** MEMORIAL GREEN

**Primary Business:** No primary business description on file.

**Street Address:** 12601 MEMORIAL DR, HOUSTON TX 77024

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
<a href="#">CN604709402</a>	LITCHFIELD MEMORIAL PARTNERS LP	VOLUNTEER CLEANUP APPLICANT	

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.



**1-1 of 1 Records**

Program	ID Type	ID Number	ID Status
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	2700	ACTIVE

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## Central Registry

### Detail of: **Voluntary Cleanup Program ID Number 2700**

For: **MEMORIAL GREEN (RN107854168)**

12601 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **LITCHFIELD MEMORIAL PARTNERS LP (CN604709402)** Since 11/26/2014

Mailing Address: 800 TOWN AND COUNTRY BLVD STE 200 HOUSTON, TX 77024-4556

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
18768115	10/22/2014	INCOMING	VCP APPLICATION		12/06/2014		10/22/2014	USFS
18768118	10/22/2014	INCOMING	AGREEMENT		11/21/2014		10/17/2014	USFS

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 2700

For: **MEMORIAL GREEN (RN107854168)**

12601 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**

Responsible Parties: **LITCHFIELD MEMORIAL PARTNERS LP (CN604709402)** Since 11/26/2014

Mailing Address: 800 TOWN AND COUNTRY BLVD STE 200 HOUSTON, TX 77024-4556

Legal	Description	Start Date	End Date	Type	Status	Status Date
2700	VOLUNTARY CLEANUP	11/26/2014		CLEANUP	ACTIVE	11/26/2014

Tracking No.	Type	Value	Start Date	End Date
18911280	PROJECT MANAGER	RSCHARLA	12/10/2014	
18768104	PROJECT MANAGER	DCHRISTI	11/26/2014	12/10/2014
18768113	ADMINISTRATIVE STATUS	ACTIVE	11/26/2014	
18768099	PCA NUMBER	34893	11/26/2014	
18768100	PROJECT NUMBER	348930	11/26/2014	
18768101	CASHIER RECEIVED DATE	11/26/2014	11/26/2014	
18768102	APPLICATION RECEIVED DATE	11/26/2014	11/26/2014	
18768105	FILE LOCATION	D2/200-22	11/26/2014	
18768106	FILE MEDIA	PAPER	11/26/2014	
18974450	VCP EMPLOYEE TIME	3 HRS	12/31/2014	

Physical	Description	Start Date	Type	Status	Status Date
MEMORIAL GREEN		11/26/2014	AFFECTED PROPERTY	INVESTIGATION	11/26/2014

Tracking No.	Type	Value	Start Date	End Date
18768114	PROJECT PHASE	INVESTIGATION	11/26/2014	
18768112	APPLICABLE PROGRAM RULES	TRRP	11/26/2014	
18768109	CURRENT FACILITY TYPE	VACANT PROPERTY	11/26/2014	
18768108	SITE SIZE	13.46	11/26/2014	
18768107	CURRENT ONSITE LAND USE	RESIDENTIAL	11/26/2014	
18768110	GW BEARING UNIT	DEFAULT GW BEARING UNIT 1	11/26/2014	

18768103 | REAL ESTATE TRANSACTION | YES | 11/26/2014

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 2700

For: **MEMORIAL GREEN (RN107854168)**

12601 MEMORIAL DR, HOUSTON

ID Number Status: **ACTIVE**Responsible Parties: **LITCHFIELD MEMORIAL PARTNERS LP (CN604709402)** Since 11/26/2014

Mailing Address: 800 TOWN AND COUNTRY BLVD STE 200 HOUSTON, TX 77024-4556

### GW BEARING UNIT - DEFAULT GW BEARING UNIT 1 - 11/26/2014 - Tracking No. 18768110

Tracking No.	Type	Value	Start Date	End Date
18768111	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	VOCS	11/26/2014	

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN103957502

**Name:** PILGRIM CLEANERS 128

**Primary Business:** No primary business description on file.

**Street Address:** 650 W BOUGH LN STE 116, HOUSTON TX 77024 4098

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** No near zip code on file.

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **2** Current Affiliation Records ([View Affiliation History](#))

#### 1-2 of 2 Records

CN Number	Customer Name	Customer Role	Details
CH600610935	OG FARINE JR	OWNER	<a href="#">↔</a>
CH602502486	PILGRIM CLEANERS INC	OWNER	<a href="#">↔</a>

### Industry Type Codes

Code	Classification	Name
812320	NAICS	Drycleaning and Laundry Services (except Coin-Operated)

### Permits, Registrations, or Other Authorizations

There are a total of **2** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-2 of 2 Records

Program <sup>a</sup>	ID Type	ID Number	ID Status
DRY CLEANERS REGISTRATION	INTERNAL	103957502	CANCELLED
DRY CLEANERS REGISTRATION	REGISTRATION	DCR11618	ACTIVE

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11618

For: **PILGRIM CLEANERS 128 (RN103957502)**

650 W BOUGH LN STE 116, HOUSTON

Registration **ACTIVE**  
Status:

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
3515644	04/01/2008	OUTGOING	DROP STATION CERT	2006 Q - 4				
3524677	04/01/2008	OUTGOING	DROP STATION CERT	2006 Q - 3				
3523710	02/14/2006	OUTGOING	DROP STATION CERT	2006 Q - 2				
3007108	09/09/2005	INCOMING	DROP STATION REGISTRATION					
3007107	09/16/2004	INCOMING	DROP STATION REGISTRATION					
3007106	12/23/2003	INCOMING	DROP STATION REGISTRATION					

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## Central Registry

### Detail of: Dry Cleaners Registration Registration DCR11618

For: **PILGRIM CLEANERS 128 (RN103957502)**

650 W BOUGH LN STE 116, HOUSTON

Registration **ACTIVE**

Status:

Legal	Description	Start Date	End Date	Type	Status	Status Date
DCR11618	FY2006	09/01/2005		DROP STATION REGISTRATION	ACTIVE	09/09/2005
DCR11618	FY2005	09/01/2004		DROP STATION REGISTRATION	ACTIVE	09/16/2004
DCR11618	FY2004	09/01/2003		DROP STATION REGISTRATION	ACTIVE	12/23/2003

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100714401  
**Name:** SHELL 101101 [View Prior Names](#)  
**Primary Business:** RETAIL  
**Street Address:** 12859 KIMBERLEY LN, HOUSTON TX 77024 3901  
**County:** HARRIS  
**Nearest City:** No near city on file.  
**State:** TX

**Near ZIP Code:** 77024  
**Physical Location:** 12859 Kimberley Lane, Houston, TX

### Affiliated Customers - Current

Your Search Returned **4** Current Affiliation Records ([View Affiliation History](#))

#### 1-4 of 4 Records

CN Number	Customer Name	Customer Role	Details
CNS00124051	MOTIVA ENTERPRISES LLC	OWNER OPERATOR	<a href="#">Details</a>
CNS01311277	STAR ENTERPRISES INC	OWNER OPERATOR	<a href="#">Details</a>
CNS01311277	STAR ENTERPRISES INC	OWNER OPERATOR	<a href="#">Details</a>
CNS04405134	SHELL OIL PRODUCTS/MOTIVA	OWNER	<a href="#">Details</a>

### Industry Type Codes

Code	Classification	Name
447110	NAICS	Gasoline Stations with Convenience Stores
5541	SIC	Gasoline Service Stations

### Permits, Registrations, or Other Authorizations

There are a total of **5** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-5 of 5 Records

Program	ID Type	ID Number	ID Status
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TX0000994699	ACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	84066	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	91860	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	23106	INACTIVE

[PETROLEUM STORAGE TANK STAGE II](#)

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 84066

For: **SHELL 101101 (RN100714401)**

12859 KIMBERLEY LN, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **STAR ENTERPRISES INC (CN601311277)**

**OWNER OPERATOR** Since 03/25/1995 [View Compliance History](#)

Mailing Address: 333 RESEARCH CT NORCROSS, GA 30092-7000

#### Facility Information

**Registration Number:** 84066

**Status:** Inactive

**Site Name:** TEXACO SERVICE STATION 42 049 0390

**Company Name:** STAR ENTERPRISES INC

**Site Street Address:** 12859 KIMBERLEY LN, HOUSTON, TX, 77024

**Site Location:** 12859 Kimberley Lane, Houston, TX

**County:** HARRIS

**EPA Number:** TX0000994699

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:** 447110 Gasoline Stations with Convenience Stores

[View Annual Waste Summary](#) not available

[View Waste Receipt Report](#)   **Waste Receipt Report not available**

[View Waste Management Units](#) [View Waste](#)

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 84066

For: **SHELL 101101 (RN100714401)**

12859 KIMBERLEY LN, HOUSTON

Solid Waste **INACTIVE**  
Registration

Status:

Held by: **STAR ENTERPRISES INC (CN601311277)**

**OWNER OPERATOR** Since 03/25/1995 [View Compliance History](#)

Mailing Address: 333 RESEARCH CT NORCROSS, GA 30092-7000

#### Facility Information

##### IHW Waste

Texas Waste Code	Waste Description
0001205H	Periodic or occasional generator of tank water bottoms from condensation and contaminated soil during tank replacement.

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100579259

**Name:** C O POLYDOROS & ASSOCIATES

**Primary Business:** No primary business description on file.

**Street Address:** 12727 KIMBERLEY LN, HOUSTON TX 77024 4047

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12727 Kimberley Ln, Houston, TX

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN600289607	ESSO EXPLORATION INC	OWNER OPERATOR	<a href="#">↔</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations

There is **1** program and ID for this regulated entity.

#### 1-1 of 1 Records

Program	ID Type	ID Number	ID Status
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	90100	INACTIVE

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 90100

For: **C O POLYDOROS & ASSOCIATES (RN100579259)**

12727 KIMBERLEY LN, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **ESSO EXPLORATION INC (CN600289607)**

**OWNER OPERATOR**

Mailing Address: PO BOX 27845 HOUSTON, TX 77227-7845

#### Facility Information

**Registration Number:** 90100

**Status:** Inactive

**Site Name:** C O POLYDOROS & ASSOCIATES

**Company Name:** ESSO EXPLORATION INC

**Site Street Address:** 12727 KIMBERLEY LN, HOUSTON, TX, 77024

**Site Location:** 12727 Kimberley Ln, Houston, TX

**County:** HARRIS

**EPA Number:**

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:**

[View Annual Waste Summary](#) not available

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN102337805

**Name:** MOBIL OIL 00BLY [View Prior Names](#)

**Primary Business:** No primary business description on file.

**Street Address:** No street address on file.

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77024

**Physical Location:** 12860 KIMBERLY & W BELT HOUSTON TX

### Affiliated Customers - Current

Your Search Returned **1** Current Affiliation Records ([View Affiliation History](#))

#### 1-1 of 1 Records

CN Number	Customer Name	Customer Role	Details
CN601047954	EXXONMOBIL OIL CORPORATION	OWNER OPERATOR	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations



There are a total of **3** programs and IDs for this regulated entity. Click on a column name to change the sort order.

**1-3 of 3 Records**

Program <a href="#">▲</a>	ID Type	ID Number	ID Status
AIR NEW SOURCE PERMITS	REGISTRATION	54680	ACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD988038857	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	80248	INACTIVE

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### Central Registry

#### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 80248**

For: **MOBIL OIL 00BLY (RN102337805)**

12860 KIMBERLY & W BELT HOUSTON TX

Solid Waste **INACTIVE**

Registration

Status:

Held by: **EXXONMOBIL OIL CORPORATION (CN601047954)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: 3225 GALLOWS RD FAIRFAX, VA 22037-0001

#### Facility Information

Registration Number: 80248

Status: Inactive

Site Name: MOBIL OIL 00BLY

Company Name: EXXONMOBIL OIL CORPORATION

Site Street Address: 12860 KIMBERLY & W BELT, HOUSTON, TX, 77024

Site Location: 12860 Kimberly & W Belt, Houston, TX

County: HARRIS

EPA Number: TXD988038857

Registration Type: Generator

Generator Type: Non-Industrial

SIC Code:

NAICS Code:

[View Annual Waste Summary](#) not available

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 80248

For: **MOBIL OIL 00BLY (RN1023337805)**

12860 KIMBERLY & W BELT HOUSTON TX

Solid Waste **INACTIVE**

Registration

Status:

Held by: **EXXONMOBIL OIL CORPORATION (CN601047954)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: 3225 GALLOWS RD FAIRFAX, VA 22037-0001

#### Facility Information

##### IHW Waste Management Units

Sequence Number	Description	Unit Type	Status
001		Miscellaneous storage containers	ACTIVE

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## 03/16/2015 -----AirPermits IMS - PROJECT RECORD -----

Customer Name: **EXXON MOBIL CORPORATION**  
 Legal Name: **Exxon Mobil Corporation**  
 CN Number: **CM620123339**

Region: **HOUSTON**      Account: **Central Registry Id: EN102337805**  
 County Name: **HARRIS**      City:

Location: **12660 KIMBERLY S.W. BELT HOUSTON TX**

## PROJECT INFORMATION

Project Administrative Name: **FORMER SHELL OIL STATION 12-SLY-REMEDIATION PROJECT**  
 Project Technical Name: **FORMER SHELL OIL STATION 12-SLY-REMEDIATION PROJECT**

Project Number: **98754**      Permit Number: **54680**      Issued Date: **07/03/2003**  
 Project Received Date: **06/12/2003**      Renewal Date:

Project Type: **INITIAL**      Permit Type: **PERMIT BY RULE**

Project Status: **COMPLETE**

Assigned Staff:

REVIEWER\_2: **MARTIN , PATRICIA**      REVIEW ENG: **TEWOLDE-BERHAN , HELEN**

Staff Group:

FEE

Reference	Fee Receipt Number	Amount	Fee Receipt Date	Fee Payment Type
TRACKING ELEMENTS				
TE Name			Start Date	Complete Date
			07/03/2003	
			06/30/2003	
			06/18/2003	
			06/13/2003	
			06/12/2003	

PROJECT RULES:

Unit Desc	Rule Desc	On Application	Approve
WATER AND SOIL REMEDIATION	196.533	N	Y

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**03/16/2015 -----AirPermits IMS - PROJECT RECORD -----**

Customer Name: **EXXONMOBIL REFINING AND SUPPLY**  
 Legal Name: **ExxonMobil Oil Corporation**  
 CN Number : **CN601047954**

Region: **HOUSTON**    Account:    Central Registry Id: **RN1023337805**  
 County Name: **HARRIS**    City:

Location : **12860 KIMBERLY & W BELT HOUSTON TX**  
 PROJECT INFORMATION

Project Administrative Name: **FORMER SHELL OIL STATION 12-BLY**  
 Project Technical Name: **FORMER SHELL OIL STATION 12-BLY**

Project Number: **96610**    Permit Number: **54680**    Issued Date: **04/07/2003**  
 Project Received Date: **03/31/2003**    Renewal Date:

Project Type: **INITIAL**    Permit Type: **PERMIT BY RULE**  
 Project Status: **VOID**

Assigned Staff:

**REVIEWER1: BOWERS, JOHNNY**    **REVIEWER2: MARTIN, PATRICIA**

Staff Group:

**AP INITIAL REVIEW PERM SUPP SECTION**

FEE

Reference	Fee Receipt Number	Amount	Fee Receipt Date	Fee Payment Type
TRACKING ELEMENTS				
TE Name	Start Date	Complete Date		
<b>ADMIN DEFICIENCY CYCLE</b>	<b>04/01/2003</b>	<b>04/07/2003</b>		
<b>AP INT RECEIVED PROJECT (DATE)</b>	<b>03/31/2003</b>			
PROJECT RULES:				
Unit Desc	Rule Desc	On Application	Approve	
WATER AND SOIL REMEDIATION	106.533	N	Y	

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Customer		Site Associated with This Customer					Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)		
Name	City or Nearest City	County	TCEQ Region	Related Numbers	Rating	Classification	Date Rated	Date Posted	
EXXONMOBIL OIL CORPORATION		HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 80248</li> <li>▪ 54680</li> <li>▪ 54680</li> <li>▪ 80248</li> <li>▪ 54680</li> <li>▪ 54680</li> <li>▪ TXD988038857</li> <li>▪ TXD988038857</li> <li>▪ TXD988038857</li> <li>▪ 80248</li> <li>▪ 80248</li> <li>▪ 54680</li> <li>▪ TXD988038857</li> <li>▪ 80248</li> <li>▪ 54680</li> <li>▪ 80248</li> <li>▪ TXD988038857</li> <li>▪ 54680</li> <li>▪ TXD988038857</li> <li>▪ 80248</li> <li>▪ TXD988038857</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014	

**What's a "site"?**

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

**What's a "customer"?**

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleeners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleeners

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100675230

**Name:** WEATHERFORD US HOUSTON [View Prior Names](#)

**Primary Business:** No primary business description on file.

**Street Address:** 10802 KATY FWY, HOUSTON TX 77043 5007

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** 77079

**Physical Location:** No physical location description on file.

### Affiliated Customers - Current

Your Search Returned **3** Current Affiliation Records ([View Affiliation History](#))

#### 1-3 of 3 Records

CN Number	Customer Name	Customer Role	Details
CNS00288302	WEATHERFORD US LP	VOLUNTEER CLEANUP APPLICANT	<a href="#">Details</a>
CNS000919369	WEATHERFORD US INC	OWNER OPERATOR	<a href="#">Details</a>
CNS02856288	FOMER WEATHERFORD FACILITY	OWNER OPERATOR	<a href="#">Details</a>

### Industry Type Codes

Code	Classification	Name
333132	NAICS	Oil and Gas Field Machinery and Equipment Manufacturing
3533	SIC	Oil and Gas Field Machinery and Equipment

### Permits, Registrations, or Other Authorizations

There are a total of **9** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-9 of 9 Records

Program <a href="#">^</a>	ID Type	ID Number	ID Status
IHW CORRECTIVE ACTION	SOLID WASTE REGISTRATION # (SWR)	31159	ACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD0053628467	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	31159	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	38731	INACTIVE
PETROLEUM STORAGE TANK STAGE II			



UNDERGROUND INJECTION CONTROL	PERMIT	5X2600344	ACTIVE
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	1137	INACTIVE
WASTEWATER	EPA ID	TX0092983	ACTIVE
WASTEWATER	PERMIT	WQ0002627000	EXPIRED

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## Central Registry

Detail of: **Voluntary Cleanup Program ID Number 1137**

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **WEATHERFORD US LP (CN600288302)**

Mailing Address: 1301 MCKINNEY ST HOUSTON, TX 77010-3031

## Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
12036740	03/05/2007	INCOMING	WITHDRAWAL		05/04/2007	05/02/2007	02/26/2007	
11128352	10/12/2005	OUTGOING	COMMENTS/NOI			10/12/2005	10/12/2005	
11075205	08/23/2005	INCOMING	RACR A		10/07/2005	10/12/2005	06/01/2005	
11037567	07/25/2005	INCOMING	TECHNICAL CORRESPONDENCE	CHANGE OF CONTACT	09/08/2005	08/15/2005	07/19/2005	
10948954	04/27/2005	INCOMING	RESPONSE TO COMMENTS		06/11/2005	06/30/2005	04/22/2005	
10861360	12/30/2004	INCOMING	USC AUTHORIZATION		02/13/2005	01/05/2005	12/28/2004	
10801565	11/12/2004	INCOMING	GW/MEDIA MONITORING RPT		12/27/2004	12/13/2004	07/31/2004	
10801567	11/12/2004	INCOMING	APAR		01/11/2005	02/28/2005	12/31/2003	
10801571	11/12/2004	INCOMING	RAP A		12/27/2004	02/28/2005	10/15/2004	
10671301	07/01/2004	OUTGOING	COMMENTS/NOI			07/01/2004	07/01/2004	
10429412	12/16/2003	INCOMING	APAR		02/14/2004	07/01/2004	12/15/2003	
10398829	11/18/2003	INCOMING	TECHNICAL CORRESPONDENCE		01/02/2004	12/17/2003	11/11/2003	
10318168	09/09/2003	INCOMING	TECHNICAL CORRESPONDENCE	TXDOT ISSUES	10/23/2003	10/14/2003	09/05/2003	
10309323	08/20/2003	INCOMING	TECHNICAL CORRESPONDENCE		08/20/2003	08/20/2003	08/20/2003	PHONE
10305589	08/05/2003	INCOMING	GW/MEDIA MONITORING RPT	MARCH 2003	09/19/2003	09/11/2003	07/29/2003	OVERNIGHT
10241749	03/13/2003	INCOMING	TECHNICAL CORRESPONDENCE	ADJACENT SITE SAMPLING	04/27/2003	04/17/2003	03/10/2003	USPS
10231445	03/11/2003	OUTGOING	COMMENTS/NOI		03/26/2003	03/11/2003	03/11/2003	PHONE
10235139	03/06/2003	INCOMING	SITE INVEST WORK PLAN LETTER		04/20/2003	03/11/2003	02/27/2003	USPS
10207206	11/18/2002	OUTGOING	ACCESS	ACCESS UPDATE INQUIRY		11/18/2002	11/18/2002	PHONE
10203273	10/28/2002	INCOMING	TECHNICAL CORRESPONDENCE	OFFSITE ACCESS	12/12/2002	11/18/2002	10/28/2002	PHONE
10050165	12/28/2001	INCOMING	STATUS UPDATE			01/22/2002	12/19/2001	USPS

10043680	11/12/2001	INCOMING	TECHNICAL CORRESPONDENCE	PROPERTY CONTRACT LETTER	11/28/2001	11/09/2001	FAX
10042432	11/06/2001	INCOMING	ACCESS ASSISTANCE	ACCESS AGREEMENT	12/21/2001	10/25/2001	USPS
10032793	08/13/2001	INCOMING	RESPONSE TO COMMENTS	RESPONSE TO COMMENTS AND SCHEDULE	09/27/2001	08/09/2001	USPS
10029897	07/09/2001	INCOMING	TECHNICAL CORRESPONDENCE	RESIDENTIAL LAND USE NOTIFICATION		07/06/2001	USPS
12007671	03/29/2001	OUTGOING	COMMENTS/NOI		03/29/2001		PHONE
10018620	03/07/2001	INCOMING	TECHNICAL CORRESPONDENCE	REQUEST FOR OFF-SITE ACCESS HELP		03/07/2001	PHONE
10015023	01/25/2001	INCOMING	INVESTIGATION RPT		03/11/2001	01/24/2001	USPS
10013495	01/17/2001	INCOMING	REQUEST FOR EXTENSION			01/17/2001	EMAIL
10008521	01/10/2001	OUTGOING	AGREEMENT AMENDMENT		11/30/2000	11/22/2000	PHONE
10012388	01/09/2001	OUTGOING	LATER LETTER 1	NEED FOR SCHEDULE AMENDMENT		01/17/2001	USPS
10013488	01/09/2001	INCOMING	INVESTIGATION RPT		01/26/2001	01/25/2001	
12007670	12/14/2000	OUTGOING	AGREEMENT AMENDMENT			12/14/2000	
12007668	11/22/2000	INCOMING	SCHEDULE AMENDMENT		01/06/2001	12/14/2000	
12007666	10/25/2000	INCOMING	INVESTIGATION PLAN REV		12/09/2000	10/19/2000	
10086364	10/04/2000	INCOMING	INVESTIGATION PLAN	FURTHER ON-SITE INVESTIGATION	11/18/2000	10/15/2000	USPS
1005814	04/07/2000	INCOMING	RAWP	WORK PLAN FOR OFF-SITE GW INVESTIGATION		04/07/2000	USPS
1005812	03/08/2000	OUTGOING	AGREEMENT			03/08/2000	USPS
10002592	03/08/2000	OUTGOING	APPLICATION ACCEPTANCE			03/08/2000	USPS
1005811	02/14/2000	INCOMING	VCP APPLICATION			03/08/2000	USPS
1005813	02/14/2000	INCOMING	AGREEMENT	WEATHERFORD FACILITY		02/03/2000	USPS
10006080	02/14/2000	INCOMING	INVESTIGATION RPT	SUMMARY REPORT W/APP		02/03/2000	USPS
						02/04/2000	USPS

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 1137

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **WEATHERFORD US LP (CN600288302)**

Mailing Address: 1301 MCKINNEY ST HOUSTON, TX 77010-3031

Legal	Description	Start Date	End Date	Type	Status	Status Date
1137	VOLUNTARY CLEANUP	02/07/2000	05/02/2007	CLEANUP	INACTIVE	05/02/2007

Tracking No.	Type	Value	Start Date	End Date
10091734	PROJECT MANAGER	VRORICK	03/25/2002	05/02/2007
10015337	PROJECT MANAGER	YSETSER	01/31/2001	03/25/2002
1007064	PROJECT MANAGER	BELLINGT	02/07/2000	01/31/2001
9287501	ADMINISTRATIVE STATUS	INACTIVE	05/02/2007	
1005905	PCA NUMBER	33260	02/07/2000	
1008223	PROJECT NUMBER	332600	02/07/2000	
1002098	CASHIER RECEIVED DATE	02/07/2000	02/07/2000	
1010799	APPLICATION RECEIVED DATE	02/14/2000	02/14/2000	
9285483	APPLICANT INTEREST IN SITE	LESSEE	02/07/2000	
1011959	REGION NOTIFIED	02/07/2000	02/07/2000	
1013924	FILE MEDIA	PAPER	02/07/2000	
9311027	OTHER PROGRAM	EPA	02/07/2000	

Physical	Description	Start Date	Type	Status	Status Date
WEATHERFORD FACILITY - OLD KAT	VCP SITE	02/07/2000	AFFECTED PROPERTY	WITHDRAWN	05/02/2007

Tracking No.	Type	Value	Start Date	End Date
9290027	PROJECT PHASE	WITHDRAWN	05/02/2007	
1009196	APPLICABLE PROGRAM RULES	RRR	02/07/2000	
1011446	CURRENT FACILITY TYPE	SUPPORT OIL & GAS	02/07/2000	
1001006	SITE SIZE	7.54 ACRES	02/07/2000	

9294341	SOILS CHEMICAL OF CONCERN CLASSIFICATION	CHLORINATED SOLVENTS	02/07/2000
9294342	SOILS CHEMICAL OF CONCERN CLASSIFICATION	VOCS	02/07/2000
9294343	GW BEARING UNIT	DEFAULT GW BEARING UNIT 1	02/07/2000

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## Central Registry

### Detail of: **Voluntary Cleanup Program ID Number 1137**

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **WEATHERFORD US LP (CN600288302)**

Mailing Address: 1301 MCKINNEY ST HOUSTON, TX 77010-3031

### GW BEARING UNIT - DEFAULT GW BEARING UNIT 1 - 02/07/2000 - Tracking No. 9294343

Tracking No.	Type	Value	Start Date	End Date
9294344	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	CHLORINATED SOLVENTS	02/07/2000	
9294345	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	VOCS	02/07/2000	

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## Central Registry

### Detail of: **IHW Corrective Action Solid Waste Registration 31159**

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **ACTIVE**

Registration

Status:

Responsible Parties: **WEATHERFORD US INC (CN600919369)** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Related Information:

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## Central Registry

### Detail of: IHW Corrective Action Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **ACTIVE**  
Registration  
Status:

Responsible Parties: **WEATHERFORD US INC (CN600919369)** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
19004474	02/11/2015	INCOMING	GW/MEDIA MONITORING RPT	GW MON RPT	05/12/2015		02/06/2015	USPS
18992634	01/26/2015	OUTGOING	REQUEST FOR INFORMATION			01/26/2015	01/26/2015	USPS
18992642	01/26/2015	PENDING	P GW/MEDIA MONITORING RPT		04/01/2015			
18811427	12/05/2014	INCOMING	GW/MEDIA MONITORING RPT		03/05/2015	01/26/2015	11/26/2014	OVERNIGHT
17343658	07/24/2013	INCOMING	TECHNICAL CORRESPONDENCE		08/23/2013	08/19/2013	07/22/2013	
14708501	05/17/2011	OUTGOING	APPROVAL			05/17/2011		
14669737	04/18/2011	INCOMING	STATUS UPDATE	STATUS UPDATE	05/18/2011	05/17/2011	04/13/2011	
12751090	07/14/2009	INCOMING	TECHNICAL CORRESPONDENCE	PROJ RE-ACTIV UNDER CA PROG	08/13/2009	07/15/2009	07/14/2009	
1085835	05/26/2000	OUTGOING	APPROVAL CONDITIONAL			05/26/2000		USPS

1088172	05/19/1999	OUTGOING	APPROVAL			05/19/1999		USPS
1062419	04/09/1999	INCOMING	RRS FINAL RPT STD 1	CONSIDERATION FOR STD 1 CLOSURE FOR FACILITY WATSO	07/08/1999	05/19/1999	04/06/1999	USPS
1060082	06/10/1994	INCOMING	RRS FINAL RPT STD 2	RRS2 FINAL REPORT	12/01/2002	05/26/2000		USPS

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## Central Registry

### Detail of: IHW Corrective Action Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **ACTIVE**

Registration

Status:

Responsible Parties: **WEATHERFORD US INC (CN600919369)** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

Legal	Description	Start Date	End Date	Type	Status	Status Date
31159	IHW CORRECTIVE ACTION	11/22/2002		CLEANUP	ACTIVE	07/14/2009

Tracking No.	Type	Value	Start Date	End Date
9315932	ADMINISTRATIVE STATUS	ACTIVE	07/14/2009	
18829016	PROJECT MANAGER	MDUFFIN	12/09/2014	
1061022	PROJECT MANAGER	KCOULTER	12/08/1998	12/08/2014
1057216	EPA ID	TXD053628467	01/01/1901	

Physical	Description	Start Date	Type	Status	Status Date
WEATHERFORD US INC HOUSTON		01/01/1901	IHW CA	ONGOING WORKLOAD	07/14/2009

Tracking No.	Type	Value	Start Date	End Date
9336128	PROJECT PHASE	ONGOING WORKLOAD	07/14/2009	
1214643	APPLICABLE PROGRAM RULES	RRR	09/30/2014	
9326109	SOURCE OF RELEASE	UNIT PRJ 3555 - Rule: RRS Std: 1 Land Use: C/1	01/01/1901	
1232255	SOILS CHEMICAL OF CONCERN CLASSIFICATION - RRR	CHLORINATED SOLVENTS	01/01/1901	
1229729	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	TRICHLOROETHYLENE	01/01/1901	

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Site Associated with This Customer				Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)					
Customer	Name	City or Nearest City		TCEQ Region	Related Numbers	Rating	Classification	Date	
		County	City					Rated	Posted
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HARRIS	HOUSTON	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>38731</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
WEATHERFORD US INC	WEATHERFORD US HOUSTON	HARRIS	HOUSTON	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>TXD053628467</li> <li>1137</li> <li>WQ0002627000</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HARRIS	HOUSTON	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>WQ0002627000</li> <li>TX0092983</li> <li>38731</li> </ul>	0	UNCLASSIFIED	09/01/2013	11/15/2014
WEATHERFORD US INC	WEATHERFORD US HOUSTON	HARRIS	HOUSTON	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>TXD053628467</li> <li>31159</li> <li>38731</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HARRIS	HOUSTON	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>38731</li> <li>1137</li> <li>WQ0002627000</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014

WEATHERFORD US INC	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ WQ0002627000</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD053628467</li> <li>▪ 5X2600344</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
WEATHERFORD US INC	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 1137</li> <li>▪ 1137</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 31159</li> <li>▪ 5X2600344</li> <li>▪ 5X2600344</li> </ul>	0	UNCLASSIFIED	09/01/2013	11/15/2014
WEATHERFORD US INC	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 31159</li> <li>▪ WQ0002627000</li> <li>▪ 38731</li> </ul>	0	UNCLASSIFIED	09/01/2014	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 1137</li> </ul>	0	UNCLASSIFIED	09/01/2013	11/15/2014
WEATHERFORD US INC	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TX0092983</li> <li>▪ 5X2600344</li> <li>▪ TX0092983</li> <li>▪ 38731</li> <li>▪ 5X2600344</li> <li>▪ 31159</li> <li>▪ TX0092983</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TX0092983</li> <li>▪ TXD053628467</li> <li>▪ 5X2600344</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014



WEATHERFORD US INC	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>WQ0002627000</li> </ul>	0	UNCLASSIFIED	09/01/2013	11/15/2014
FOMER WEATERFORD FACILITY	WEATHERFORD US HOUSTON	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>TXD053628467</li> <li>TX0092983</li> <li>1137</li> </ul>	0	UNCLASSIFIED	09/01/2012	11/15/2014

#### What's a "site"?

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

#### What's a "customer"?

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleanners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleanners

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## Central Registry

Detail of: **Industrial and Hazardous Waste Solid Waste Registration 31159** [View Solid Waste Registration](#)

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Related Information:

#### [Solid Waste Registration Information](#)

There is no information related to this Solid Waste Registration in the following categories:

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

#### Facility Information

**Registration Number:** 31159

**Status:** Inactive

**Site Name:** TUBULAR PRODUCTS & EQUIPMENT

**Company Name:** WEATHERFORD US INC

**Site Street Address:** 10802 KATY FWY, HOUSTON, TX, 77043

**Site Location:** 10802 Katy Fwy, Houston, TX

**County:** HARRIS

**EPA Number:** TXD053628467

**Registration Type:** Generator

**Generator Type:** Industrial

**SIC Code:**

**NAICS Code:** 332721 Precision Turned Product Manufacturing

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

#### [BACK TO:](#) Facility Information

#### IHW Waste Management Units

Sequence Number	Description	Unit Type	Status
001		Tank	ACTIVE
002		Tank	ACTIVE
003		Container storage area	ACTIVE

## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### [BACK TO](#) Facility Information

#### IHW Waste Management Unit

Sequence Number: 001	Unit Type: Tank	Unit Status: ACTIVE	Description:		
Permit Number	UIC Number	Manages Off-Site Waste	Management	Capacity	Regulatory Status
		No	141 (Storage, bulking, and/or transfer off site - no treatment/recovery, fuel blending or disposal at this site.)		

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

[BACK TO:](#) Facility Information

### IHW Waste Management Unit

Sequence Number: 002	Unit Type: Tank	Unit Status: ACTIVE	Description:	Capacity	Regulatory Status
Permit Number	UIC Number	Manages Off-Site Waste	Management		
		No	141 (Storage, bulking, and/or transfer off site - no treatment/recovery, fuel blending or disposal at this site.)		

### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31159

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration  
Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Facility Information

#### IHW Waste Management Unit

Sequence Number: 003	Unit Type: Container storage area	Unit Status: ACTIVE	Description:
Permit Number	UIC Number	Manages Off-Site Waste	Capacity
		No	141 (Storage, bulking, and/or transfer off site - no treatment/recovery, fuel blending or disposal at this site.)
			Regulatory Status

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: **Petroleum Storage Tank Registration 38731**

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Registration **INACTIVE**

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Related Information:

#### [Registration Information](#)

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## Central Registry

### Detail of: Petroleum Storage Tank Registration 38731

For: **WEATHERFORD US HOUSTON (RN100675230)**

10802 KATY FWY, HOUSTON

Registration **INACTIVE**

Status:

Held by: **WEATHERFORD US INC (CN600919369)**

**OWNER OPERATOR** [View Compliance History](#)

Mailing Address: PO BOX 27608 HOUSTON, TX 77227-7608

### Financial Assurance

None

### Self-Certification Status by Compartment

None

### Registered Tanks and Their Associated Systems

Table 1. Underground Storage Tank Summary

Tank	Capacity (Gallon)	Date Installed	Status	Substance Stored	Related Information
1	10000	01/01/1981	Removed from Ground (11/18/1991)	A:Gasoline	Tank Details Compartment Piping Vapor Recovery

Table 2. Tank Details

Tank	Design & Materials	Corrosion Protection	Release Detection	Spill Containment and Overfill Prevention	Installation Contractor	Installer	Test Result	Related Information ^
1	1:Single Wall ( Steel )							Tank Summary Compartment Piping Vapor Recovery

Table 3. Compartment Details

Tank	Compartment	Capacity (gallons)	Principal Substance	Other Substance	Release Detection	Spill Containment and Overfill Prevention	Related Information ^
1	A	10000	Gasoline				Tank Summary Tank Details Piping Vapor Recovery

Table 4. Piping Systems

Tank	Type of Piping	Piping Material	Design and External Containment	Connectors and valves	Corrosion Protection	Release Detection	Related Inform ^



Tank	Type of Piping	Piping Material	Design and External Containment	Connectors and valves	Corrosion Protection	Release Detection	Related Information

Table 5. Vapor Recovery Systems

Tank	Type of Stage 1	Date Installed	Type of Stage 2	Date Installed	Related Information
1	Not Reported				<a href="#">Tank Summary</a> <a href="#">Tank Details</a> <a href="#">Compartment</a> <a href="#">Piping</a>

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## Central Registry

**Detail of: Wastewater Permit WQ0002627000**  
 For: **WEATHERFORD US HOUSTON (RN100675230)**  
 10802 KATY FWY, HOUSTON  
 Permit Status: **EXPIRED**  
 Held by: **WEATHERFORD US INC (CN600919369)**  
**OWNER OPERATOR** [View Compliance History](#)  
 Mailing Address: 10802 KATY FWY HOUSTON, TX 77043-5007

### Related Information:

[Permit Information](#)

There is no information related to this Permit in the following categories:

- [Commissioners' Actions](#)
- [Correspondence Tracking](#)
- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
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## Water Quality Permit Query

The queries allow you to check the status of a water quality permit. The database includes real time information about individual permits, registrations and authorizations (it does not include authorizations under a general permit) for:

- Concentrated Animal Feeding Operation (CAFO)
- Conventional Water Treatment
- Domestic Reuse
- Municipal Separate Storm Sewer System (MS4) Phase I
- Industrial Stormwater
- Industrial Wastewater
- Public Domestic Wastewater
- Private Domestic Wastewater
- Reverse Osmosis Water Treatment
- Sludge Class A
- Sludge Class B
- Sludge Disposal
- Sludge Processing

Your request may take a few minutes to process. The results will appear in the search results section at the bottom of the page.

State Permit No.	<input type="text"/>	<a href="#">Add</a>
OR		
	<input type="text"/>	<a href="#">Remove</a>

EPA ID.	<input type="text"/>	<a href="#">Add</a>
OR		
	<input type="text"/>	<a href="#">Remove</a>




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Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Zak Covar, *Commissioner*  
Richard A. Hyde, P.E., *Executive Director*



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*  
January 26, 2015

Ms. Karin Whitton  
Weatherford  
2000 St. James Place  
Houston, Texas 77056

Re: Comments with Request for Information  
*Groundwater Monitoring Report*, dated November 26, 2014  
Former Weatherford Site,  
10802 Old Katy Road, Houston, Texas 77043  
SWR No. 31159; RN100675230; CN600919369

Dear Ms. Whitton:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced report. A summary of the site conditions is provided below followed by comments with a request for additional delineation of chemicals of concern (COCs) in groundwater.

Nine wells are screened in the first groundwater bearing unit (GWBU), which is at approximately 24 to 45 feet below ground surface (bgs). Ten wells are screened in the second GWBU, which is at approximately 58 to 70 feet bgs.

The following summary is for the last sampling event completed in October 2014 for the first GWBU. The well (MW-22S) in the apparent source area is impacted by the following COCs: tetrachloroethene (PCE); trichloroethene (TCE); cis-1, 2-dichloroethene (cis-DCE); trans-1, 2-dichloroethene (trans-DCE); 1, 1-dichloroethene (1, 1 DCE) and vinyl chloride (VC). All of those chemicals were reported with concentrations exceeding the residential assessment level (RAL). PCE was reported with a concentration of 8.59 mg/l. One or more of the above chemicals were reported above the RAL in all of the other on-site wells, exclusive of MW-27S which is located furthest from the apparent source area. The down gradient boundary of the plume is shown to extend approximately 150 feet off-site, although there is no well control to support the boundary shown. The two wells off-site are located a substantial distance from the site, ranging from approximately 550 feet to 700 feet.

The same chemicals given above are present in the second GWBU. Three of the on-site wells were reported with concentrations of PCE; TCE; 1, 1 DCE and VC above the RAL. Similar to the first GWBU, PCE was reported with the highest concentrations (ranging from 0.782 mg/l to 0.981 mg/l) in three of the on-site wells. The down gradient boundary of the plume is shown to

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**FEB 05 2015**



extend further than the first GWBU, approximately 350 feet off-site. Similar to the first GWBU, there is no well control to support the boundary shown. The three wells off-site are located a substantial distance from the site, ranging from approximately 550 feet to 800 feet. PCE was detected in one of those wells (MW-26D) at a concentration (0.026 mg/l) above the RAL. The PCE is shown on the site figure as not being associated with the on-site plume.

#### Comments

1. Based on the site figure, it appears that lateral delineation wells for both the first and second GWBU were not installed closer to the site because of the Katy Freeway.
2. The TCEQ notes that the consultant is recommending that Weatherford pursue a City of Houston Municipal Setting Designation (MSD).
3. As of the date of this letter, the TCEQ has not been notified that a MSD application has been/will be completed.
4. The TCEQ does not concur that the second GWBU has been delineated either laterally or vertically.

#### Request for Information

1. With the following exception (see below), please install a well near the source area in the next deeper groundwater bearing unit and collect a groundwater sample for analysis of COCs. However, if COCs are delineated vertically in the unsaturated soil profile to below the RAL before reaching the third GWBU unit, then a well is not necessary.
2. With respect to lateral delineation, it needs to be determined if the PCE in the off-site well (MW-26D; located approximately 550 feet off-site) is part of the on-site plume. In order to do so a well needs to be installed off-site. The best location for the well would be in the northeast section of the *Houston Garden Centers* property.

Please provide the requested information within 60 days from the date of this letter.

Please note that it is the continuing obligation of persons associated with a site to ensure that municipal hazardous waste and industrial solid waste are managed in a manner which does not cause the discharge or imminent threat of discharge of waste into or adjacent to waters in the state, a nuisance, or the endangerment of the public health and welfare as required by 30 TAC §335.4.

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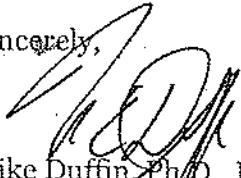
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Ms. Whitton  
Page 3  
January 26, 2015  
SWR No. 31159

Questions concerning this letter should be directed to me at (512) 239-2378. When responding by mail, please submit an original and one copy of all correspondence and reports to the TCEQ Remediation Division at Mail Code MC-127 with an additional copy submitted to the local TCEQ Region Office.

Sincerely,



Mike Duffin, Ph.D., P.G.  
Corrective Action, VCP-CA Section  
Remediation Division  
Texas Commission on Environmental Quality

MED/mdh

cc: Mr. Michael Marcon, InControl Technologies, 3845 Cypress Creek Pkwy., Suite 195,  
Houston, TX 77068  
Mr. Jason Ybarra, Waste Section Manager, TCEQ Region 12 Office, Houston

**Table 1. Summary of Detected Volatile Organic and Semivolatile Organic Compounds in Subsurface Soil Samples**  
 Former Weatherford Corporation Facility  
 10802 Old Katy Road  
 Houston, Texas

Sample Number	Sample Date	Sample Depth feet BGS	Acetone	Benzene	2-Butanone	Chlorobenzene	Ethylbenzene	Naphthalene	Phenanthrene	Tetrachloroethene	Trichloroethene	Xylene	1,1-Dichloroethane
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Machine Shop Area Borings													
PB-1	9/12/96	0-5	0.066	<0.005	0.018	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		5-10	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-2	9/12/96	4-8	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		8-12	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
Maintenance-Assembly Building Area Borings													
PB-3	9/13/96	5	<0.010	<0.005	<0.010	<0.005	0.031	0.005	na	na	<0.005	<0.020	<0.005
		10-15	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.020	<0.005
PB-4	9/13/96	5-7.5	<0.010	<0.005	<0.010	<0.005	<0.005	<0.330	<0.330	<0.005	<0.005	<0.020	<0.005
		15-20	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		25	<0.050	<0.020	<0.050	<0.020	0.080	1.040	1.190	<0.020	<0.020	<0.080	<0.005
PB-5	9/12/96	0-5	0.032	<0.005	<0.010	<0.005	<0.005	<0.660	<0.660	<0.005	<0.005	<0.020	<0.005
		10-15	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
MW-8	9/16/96	24-25	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
MW-6 Area Confirmation Boring													
PB-10	9/11/96	29-29.5	<0.010	<0.005	<0.010	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
Groundwater VOC Source Area Determination Borings													
PB-6	9/18/96	5-6.5	0.258	0.035	<0.050	3.960	<0.020	0.032	0.032	na	0.030	0.056	<0.005
		20-24	<0.010	<0.005	<0.010	<0.005	<0.005	0.035	<0.005	na	<0.005	<0.020	<0.005
PB-7	9/10/96	7-8	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	na	<0.005	<0.020	<0.005
		26-28	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	na	<0.005	<0.020	<0.005
PB-8	9/18/96	1-6	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.020	<0.005
PB-9	9/13/96	30-31.5	<0.010	<0.005	<0.010	<0.005	<0.005	<0.330	<0.330	<0.005	<0.005	<0.020	<0.005
PB-11	9/11/96	32-35	<0.010	<0.005	<0.010	<0.005	<0.005	0.007	na	1.620	0.005	0.036	<0.005
		35-38	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	0.012	<0.005	<0.020	<0.005
PB-12	9/11/96	16-20	<0.010	<0.005	<0.010	<0.005	0.045	<0.005	na	<0.005	<0.005	<0.020	0.007
		23-26	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.020	<0.005
MW-11	9/17/96	10-15	<0.010	<0.005	<0.010	<0.005	0.259	<0.005	na	0.430	0.091	<0.020	<0.005
		40-41.5	<0.050	<0.020	<0.050	<0.020	<0.020	<0.020	na	21.200	<0.020	<0.080	<0.005
SAI-Ind			4160	1.62	1400	256	108	17000	7120	207	2.85	5800	2040
GWP-Ind			1020	0.5	511	10	7	70	409	0.5	0.5	1000	1020

Ind-Ind = Soil-Air Ingestion Standard-Industrial  
 GWP-Ind = Groundwater Protection Standard-Industrial  
 Bold face indicates a result that exceeds either the SAI-Ind or the GWP-Ind  
 X05 = below ground surface  
 na = not analyzed  
 n = not established

**Table 2. Groundwater Level Elevations**

Former Weatherford Corporation Site  
 10802 Old Katy Road  
 Houston, Texas

Well Number	Date	Casing Elevation (a) (feet)	Depth		Depth To Water Below Casing (feet)	Product Thickness (feet)	Potentiometric Surface Elevation (b) (feet)
			To Product Below Casing (feet)	To Water Below Casing (feet)			
MW-1	9/24/96	80.09	np	26.50	np	53.59	
MW-2	9/24/96	83.24	np	24.22	np	59.02	
MW-3	9/24/96	82.99	np	32.70	np	50.29	
MW-4	9/24/96	83.64	np	22.92	np	60.72	
MW-5	9/12/96	84.23	23.51	27.99	4.48	52.21	
MW-6	9/24/96	80.51	np	26.69	np	53.82	
MW-7	9/24/96	80.55	np	26.71	np	53.84	
MW-8	9/24/96	83.70	np	22.39	np	61.31	
MW-9	9/24/96	84.19	np	23.89	np	60.30	
MW-10	9/24/96	85.54	np	25.60	np	59.94	
MW-11	9/24/96	81.64	np	24.62	np	57.02	
TW-1	9/24/96	86.78	np	21.16	np	65.62	
TW-2	9/24/96	81.61	np	27.29	np	54.32	

(a) Per survey conducted by Bowes & Associates, RPLS, 1996.

(b) Corrected for the presence of hydrocarbons using a product specific gravity of 0.90.

np - not present





1

**Table 3. Summary of Field Measured Groundwater Quality Parameters**  
**Former Weatherford Corporation Facility**  
**10802 Old Katy Road**  
**Houston, Texas**

Well Number	Date	pH (su)	Conductivity (umhos/cm)	Temperature (degrees F)	Appearance
TW-1	9/24/96	6.33	1035	76	colorless
TW-2	9/25/96	9.83	637	84	whitish
MW-1	9/24/96	6.85	1415	75	reddish
MW-2	9/25/96	6.79	966	78	reddish
MW-3	9/24/96	6.74	909	78	reddish
MW-4	9/24/96	6.87	875	76	reddish
MW-5	ns	ns	ns	ns	ns
MW-6	9/24/96	6.75	957	76	reddish
MW-7	9/25/96	6.72	940	75	colorless
MW-8	9/24/96	6.61	975	83	colorless
MW-9	9/24/96	6.62	948	81	nr
MW-10	9/24/96	6.69	1189	82	colorless
MW-11	9/25/96	12.04	4960	81	colorless

su = standard units

umhos/cm = micromhos per centimeter

degrees F = degrees fahrenheit

ns = not sampled

nr = not recorded

Table 4. Summary of Detected Volatile Organic and Semivolatile Organic Compounds in Groundwater Samples

Former Weatherford Corporation Facility  
10602 Old Katy Road  
Houston, Texas

Sample Number	Sample Date	Benzene	Chloro-benzene	Chloroethane	Dichlorofluoro-methane	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	1,2-Dichloro-ethene	Ethyl benzene	Isopropyl benzene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	n-Butyl benzene
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PB-2	9/12/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	0.006	<0.005	<0.005	na	<0.005	na	na	na
PB-4	9/13/95	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	0.044	na	<0.005	na	na	na
PB-5	9/12/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	0.006	<0.005	<0.005	na	<0.005	na	na	na
PB-7	9/10/96	<0.005	<0.005	<0.005	na	0.025	<0.005	0.025	0.054	<0.005	na	<0.005	na	na	na
PB-8	9/18/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
PB-9	9/13/96	<0.005	<0.005	<0.005	na	0.008	<0.005	0.009	0.689	<0.005	na	<0.005	na	na	na
PB-11	9/11/96	<0.005	<0.005	<0.005	na	0.008	<0.005	<0.005	0.058	<0.005	na	<0.005	na	na	na
PB-12	9/11/96	<0.005	<0.005	<0.005	na	0.093	<0.005	0.056	0.135	<0.005	na	<0.005	na	na	na
MW-1	2/18/94	<0.0003	<0.0003	<0.001	<0.005	<0.0005	<0.0003	0.0037	0.0160	<0.0003	<0.0001	<0.005	na	<0.0003	<0.0003
	11/94	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	<0.005	<0.005	<0.005	0.014	0.0088	<0.005	<0.005
	9/23/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-2	2/19/94	0.0006	0.0012	<0.001	<0.005	0.0070	<0.0003	0.0032	0.0389	<0.0003	<0.0001	<0.005	na	<0.0003	<0.0003
	11/94	<0.005	<0.005	<0.005	<0.005	0.0420	<0.005	0.019	0.061	<0.005	<0.005	0.014	0.0082	<0.005	<0.005
	9/25/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	0.012	<0.005	na	<0.005	na	na	na
MW-3	2/18/94	<0.0003	<0.0003	<0.001	<0.005	0.0011	<0.0003	<0.0002	0.0044	<0.0003	<0.0001	<0.005	na	<0.0003	<0.0003
	11/94	<0.005	<0.005	<0.005	<0.005	0.012	<0.005	0.029	0.076	<0.005	<0.005	0.016	0.0085	<0.005	<0.005
	9/24/96	<0.005	<0.005	<0.005	na	0.144	<0.005	0.112	0.213	<0.005	na	<0.005	na	na	na
MW-4	2/19/94	0.0005	<0.0011	0.0074	<0.005	0.020	0.0005	0.013	0.0012	<0.0003	<0.0007	<0.005	na	<0.0003	<0.0003
	11/94	<0.005	<0.005	0.0210	<0.005	0.048	<0.005	0.026	<0.005	<0.005	<0.005	0.014	<0.005	<0.005	<0.005
	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-5	2/19/94	0.0006	<0.0003	<0.001	<0.005	0.0008	<0.0003	<0.0020	0.0007	0.0029	0.0013	<0.005	na	0.0012	0.0051
	11/94	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0100	<0.005	<0.005	<0.005
	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-7	11/94	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	0.019	0.0190	<0.005	<0.005	<0.0100	<0.005	<0.005	<0.005
	9/25/96	<0.005	<0.005	<0.005	na	0.020	<0.005	0.034	0.030	<0.005	na	<0.005	na	na	na
MW-8	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-9	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-10	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
MW-11	9/24/96	<0.005	<0.005	<0.005	na	0.045	<0.005	0.049	0.949	<0.005	na	<0.005	na	na	na
TW-1	11/94	<0.005	<0.005	<0.005	<0.005	0.0065	<0.005	<0.005	<0.005	<0.005	<0.005	0.015	0.0090	<0.005	<0.005
	2/18/94	<0.0003	<0.0003	<0.001	<0.005	0.011	<0.0003	0.0076	<0.005	<0.0003	<0.0003	<0.005	na	<0.0003	<0.0003
	9/24/96	<0.005	<0.005	<0.005	na	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	na	na	na
TW-2	11/94	<0.005	<0.005	<0.005	<0.005	0.094	<0.005	0.140	0.130	<0.005	<0.005	0.019	0.0086	<0.005	<0.005
	2/18/94	0.0091	<0.0003	<0.001	0.0110	0.011	0.0014	0.230	0.0938	<0.0003	0.0031	0.022	<0.0003	<0.0003	<0.0003
	9/25/96	<0.005	<0.005	<0.005	na	0.128	<0.005	0.196	0.010	<0.005	na	<0.005	na	na	na
GW MSC		0.005	0.1	0.73	7.3	3.65	0.005	0.007	0.07	0.7	no	0.005	na	1.46	no

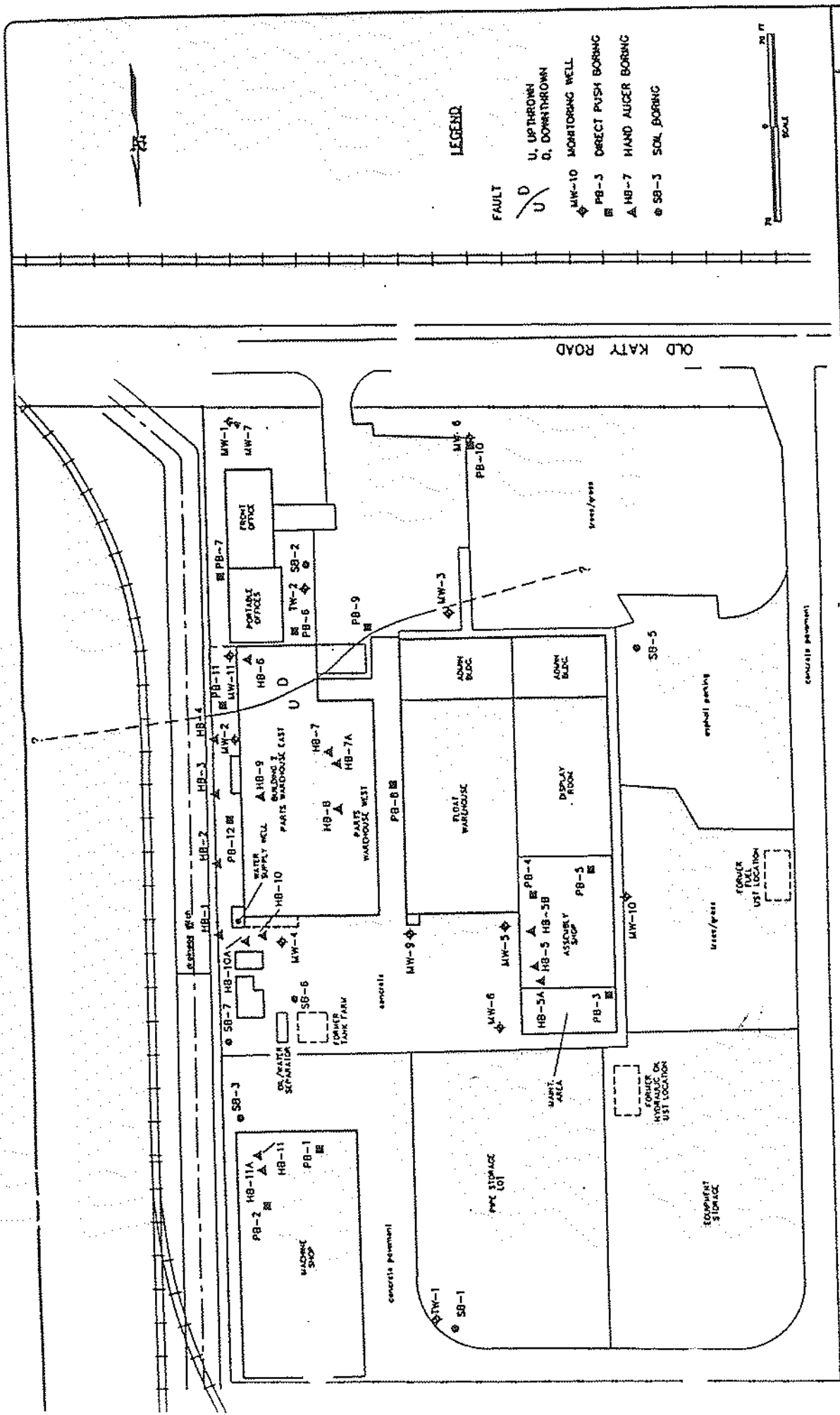
GW MSC = Groundwater Media Specific Concentration

na = not analyzed

no = not established

bold face indicates a concentration that exceeds the GW MSC

mg/L = milligrams per liter



**LEGEND**

- FAULT
- U UP THROWN
- D DOWN THROWN
- MW-10 MONITORING WELL
- PB-3 DIRECT PUSH BORING
- HB-7 HAND AUGER BORING
- SB-3 SOIL BORING

**GERAGHTY & MILLER, INC.**  
Environmental Services

**PROJECT NO. HT0240.000**

---

**SAMPLE LOCATION MAP.**  
FORMER WEATHERFORD FACILITY  
10802 OLD KATY ROAD  
HOUSTON, TEXAS

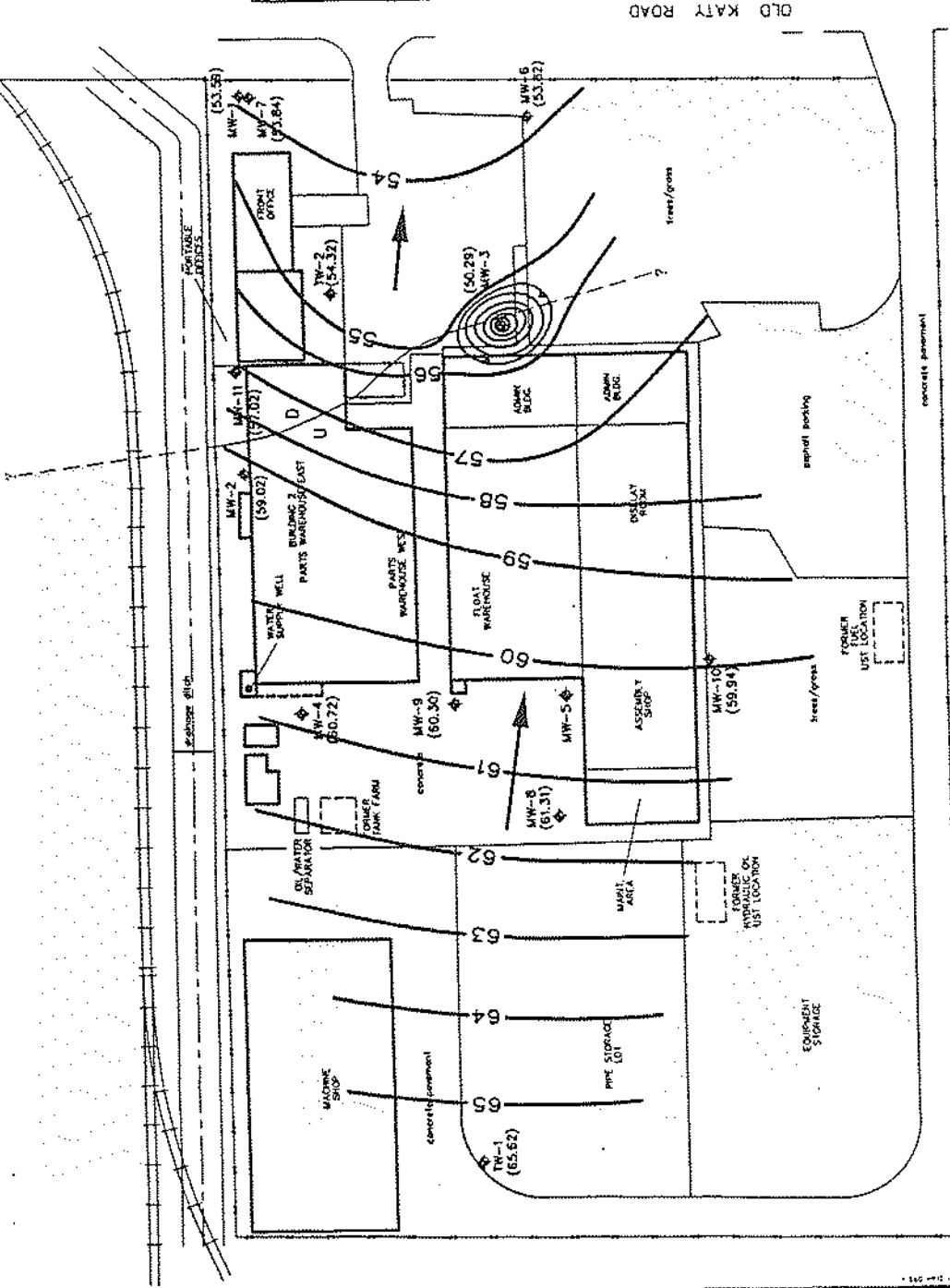
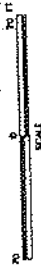
---

FIGURE  
**2**

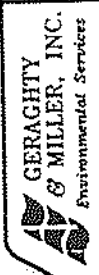


LEGEND

- ↑ GROUNDWATER ARROW INDICATES FLOW DIRECTION
- U. UP-THROWN
- D. DOWN-THROWN
- ◆ MONITORING WELL AND GROUNDWATER ELEVATION 9/24/96 (ft. MSL)



POTENTIOMETRIC SURFACE MAP  
 FORMER WEATHERFORD FACILITY  
 10802 OLD KATY ROAD  
 HOUSTON, TEXAS

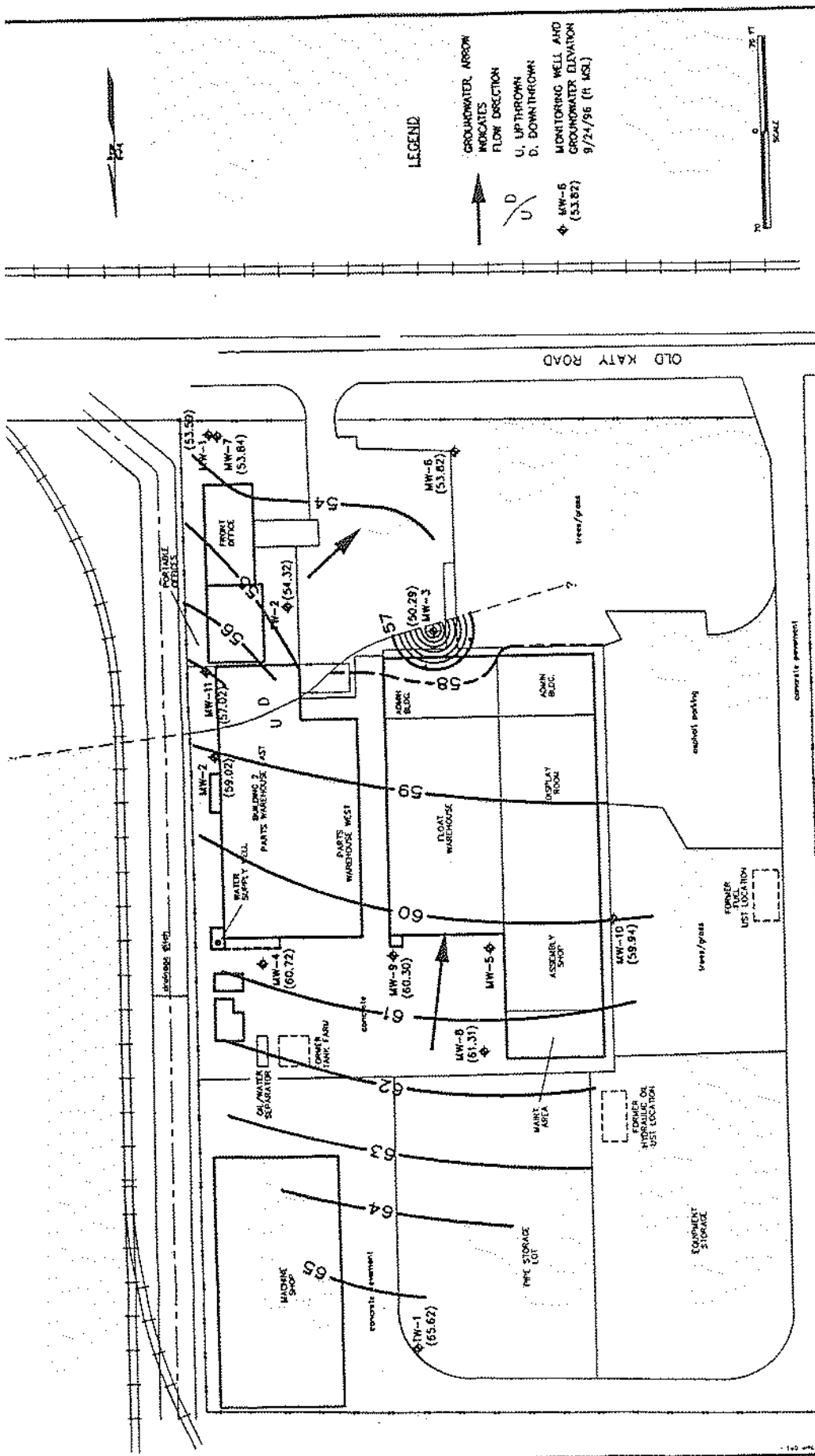


PROJECT NO. HT0240.000

FIG. 7

Benchmark Reference: FEMA RM604  
 Basecamp Reference: Bowers & Associates, 1996





**POTENTIOMETRIC SURFACE MAP**  
 FORMER WEATHERFORD FACILITY  
 10802 OLD KATY ROAD  
 HOUSTON, TEXAS

**GERAGHTY & MILLER, INC.**  
 Environmental Services  
 PROJECT NO. H10240.000

Benchmark Reference: FEMA RM604  
 Basemap Reference: Dues & Associates, 1996

**KEY**

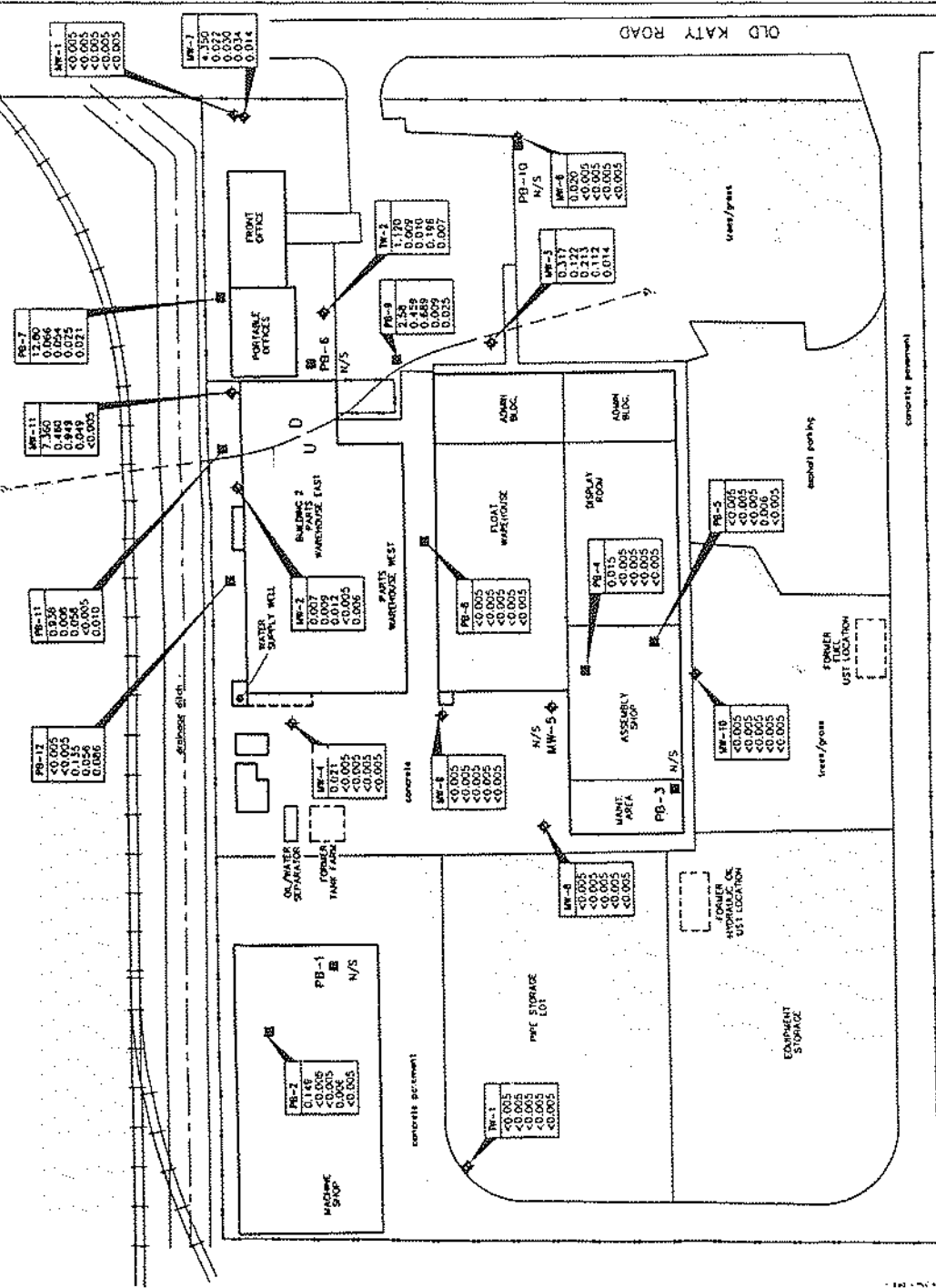
MW-7	SAMPLE NUMBER
4.350	Tetrahydroethene
0.022	Trichloroethene
0.022	1,1-Dichloroethene
0.034	1,2-Dichloroethene
0.014	Vinyl Chloride

Concentrations in mg/L

N/S NOT SAMPLED

**LEGEND**

- FAULT
- U UP THROWN
- D DOWN THROWN
- MW-10 MONITORING WELL
- PB-3 DIRECT PUSH BORING



**VOC CONCENTRATIONS IN GROUNDWATER  
SEPTEMBER 1996**

**GERAGHTY & MILLER, INC.**  
Environmental Services

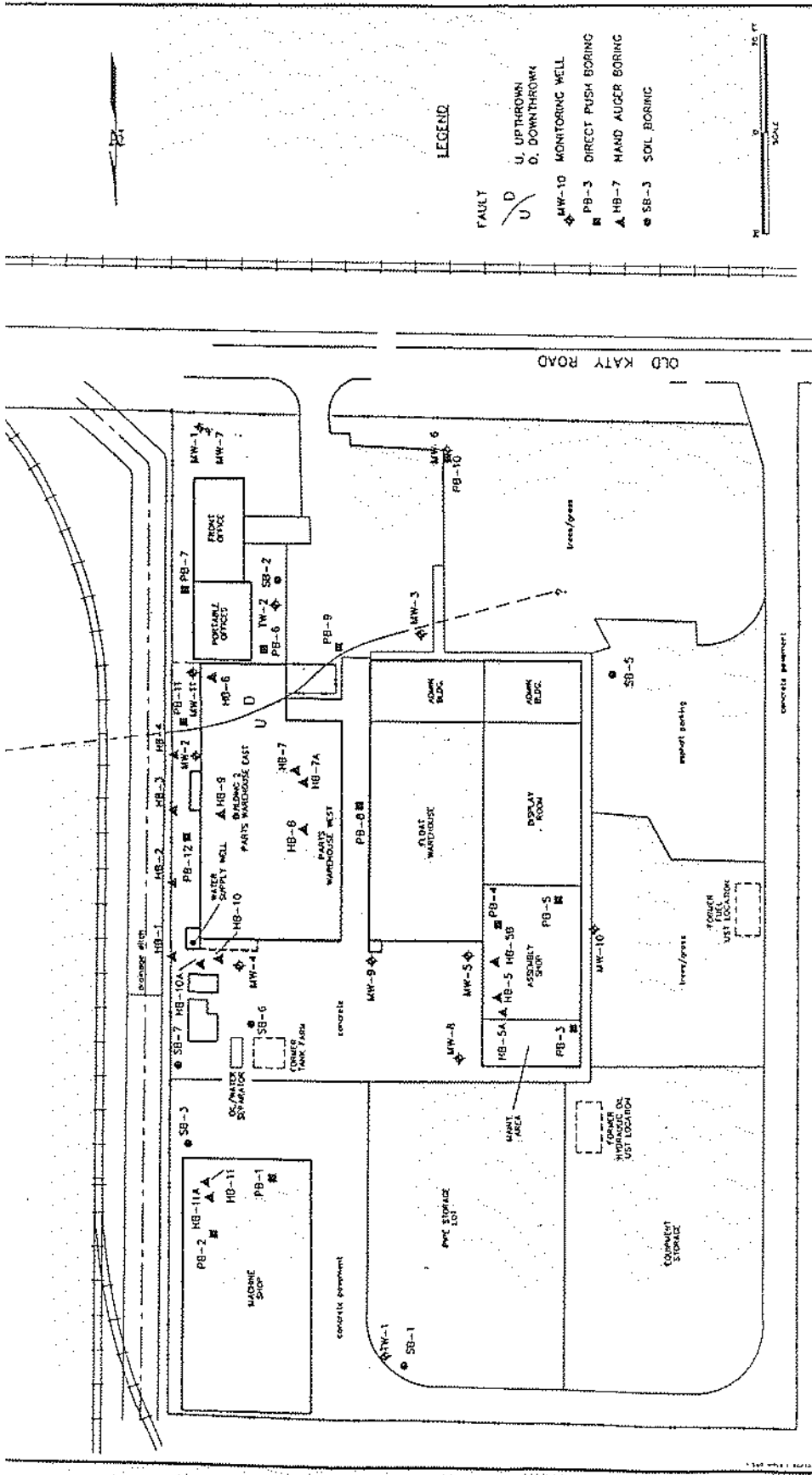
FORMER WEATHERFORD FACILITY  
10802 OLD KATY ROAD  
HOUSTON, TEXAS

PROJECT NO. HTD240.000

Former Weatherford Corporation Facility  
 10802 Old Katy Road  
 Houston, Texas

Sample Number	Sample Date	Depth feet BGS	Acetone	Benzene	2-Butanone	Chlorobenzene	1,2-Dichloroethene	Ethylbenzene	Naphthalene	Phenanthrene	Tetrachloroethene	Trichloroethene	Xylene	1,1-Dichloroethane
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Machine Shop Area Borings														
PB-1	9/12/96	0-5	0.066	<0.005	0.018	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		5-10	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-2	9/12/96	4-8	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		8-12	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
Maintenance-Assembly Building Area Borings														
PB-3	9/13/96	5	<0.010	<0.005	<0.010	<0.005	0.031	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		10-15	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-4	9/13/96	5-7.5	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.330	<0.330	<0.005	<0.005	<0.020	<0.005
		15-20	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		25	<0.050	<0.020	<0.050	<0.020	<0.020	0.080	1.040	1.190	<0.020	<0.020	<0.080	<0.005
PB-5	9/12/96	0-5	0.032	<0.005	<0.010	<0.005	<0.005	<0.005	<0.660	<0.660	<0.005	<0.005	<0.020	<0.005
		10-15	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
MW-8	9/16/96	24-25	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
MW-6 Area Confirmation Boring														
PB-10	9/11/96	29-29.5	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
Groundwater VOC Source Area Determination Borings														
PB-6	9/18/96	5-6.5	0.258	0.035	3.960	<0.050	0.032	<0.020	na	na	0.030	0.056	<0.080	<0.005
		20-24	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-7	9/10/96	7-8	<0.010	<0.005	<0.010	<0.005	0.035	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		26-28	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-8	9/18/96	1-6	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-9	9/13/96	30-31.5	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
PB-11	9/11/96	32-35	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	<0.330	<0.330	<0.005	<0.005	<0.020	<0.005
		35-38	<0.010	<0.005	<0.010	<0.005	0.007	0.007	na	na	1.620	0.005	0.036	<0.005
PB-12	9/11/96	16-20	<0.010	<0.005	<0.010	<0.005	<0.005	<0.005	na	na	0.012	<0.005	<0.020	<0.005
		23-26	<0.010	<0.005	<0.010	<0.005	0.045	<0.005	na	na	<0.005	<0.005	<0.020	0.007
MW-11	9/17/96	10-15	<0.010	<0.005	<0.010	<0.005	0.259	<0.005	na	na	<0.005	<0.005	<0.020	<0.005
		40-41.5	<0.050	<0.020	<0.050	<0.020	<0.020	<0.020	na	na	21.200	0.091	<0.080	<0.005
SAL-1nd			4160	1.62	1400	256	108	17600	7720	pe	207	2.85	5800	2040
GWP-1nd			1020	0.5	511	10	7	70	409	pe	0.5	0.5	1000	1020

SAL-1nd = Soil-Air Ingestion Standard (Industrial)  
 GWP-1nd = Groundwater Protection Standard (Industrial)  
 Bold face indicates a result that exceeds either the SAL-1nd or the GWP-1nd  
 BGS = below ground surface  
 na = not analyzed  
 pe = not established



**LEGEND**

- FAULTY
  - U UPTHROWN
  - D DOWNTHROWN
- MW-10 MONITORING WELL
- PB-3 DIRECT PUSH BORING
- HB-7 HAND AUGER BORING
- SB-3 SOIL BORING

**SAMPLE LOCATION MAP**  
 FORMER WEATHERFORD FACILITY  
 10802 OLD KATY ROAD  
 HOUSTON, TEXAS

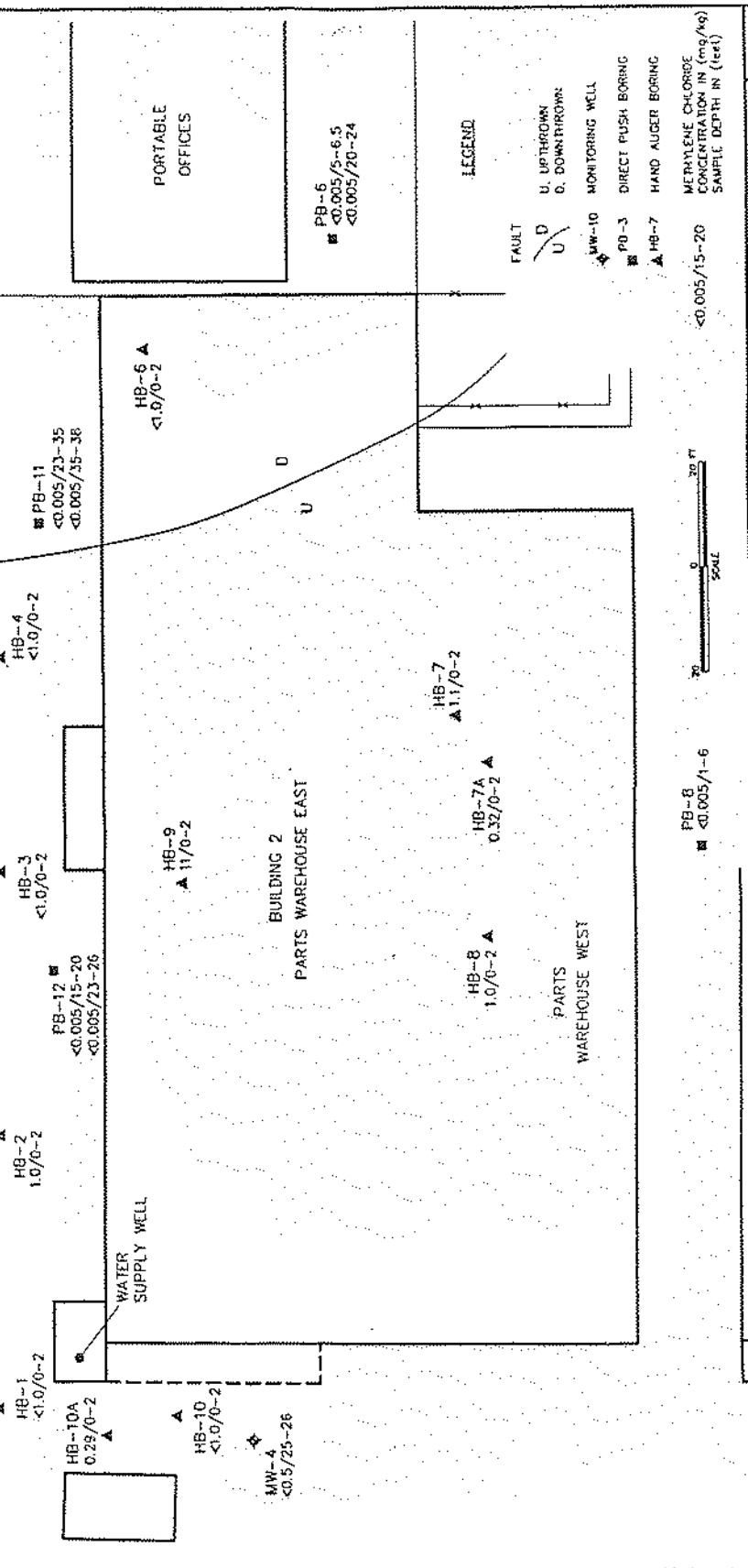
**GERAGHTY & MILLER, INC.**  
 Environmental Services

FIGURE  
 2

PROJECT NO. H10240.000



drainage ditch



HB-10A 0.25/0-2  
 HB-10 <1.0/0-2  
 MW-4 <0.5/25-26

HB-2 1.0/0-2  
 HB-3 <1.0/0-2  
 PB-12 <0.005/15-20  
 <0.005/23-26

HB-9 11/0-2  
 HB-8 1.0/0-2  
 HB-7A 0.32/0-2

HB-4 <1.0/0-2  
 PB-11 <0.005/23-35  
 <0.005/35-36

HB-6 A <1.0/0-2

PB-5 <0.005/5-6.5  
 <0.005/20-24

**LEGEND**  
 FAULT  
 U UP THROWN  
 D DOWN THROWN  
 MW-10 MONITORING WELL  
 PB-3 DIRECT PUSH BORING  
 HB-7 HAND AUGER BORING  
 METHYLENE CHLORIDE CONCENTRATION IN (mg/kg) SAMPLE DEPTH IN (feet)

70 FT SCALE

PB-8 <0.005/1-6

<0.005/15-20

**GERAGHTY & MILLER, INC.**  
 Environmental Services

**EXTENT OF METHYLENE CHLORIDE IN SOIL**

PARTS WAREHOUSE AREA  
 FORMER WEATHERFORD FACILITY  
 10802 OLD KATY ROAD  
 HOUSTON, TEXAS

FIGURE

3

PROJECT NO. HT0240.000

drainage ditch

SB-3  
<0.5/27

1.8/0-2  
HB-11A ▲

HB-11  
8.7/0-2 ▲

PB-2  
<0.005/4-5  
<0.005/8-12

MACHINE  
SHOP

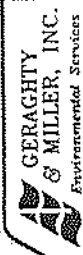
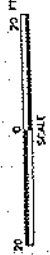
PB-1  
<0.005/0-5  
<0.005/5-10

OIL/WATER  
SEPARATOR

FORMER  
TANK FARM

LEGEND

- PB-3 DIRECT PUSH BORING
- ▲ HB-7 HAND AUGER BORING
- SB-5 SOIL BORING
- <0.005/5-10 METHYLENE CHLORIDE CONCENTRATION IN (mg/kg) SAMPLE DEPTH IN (feet)



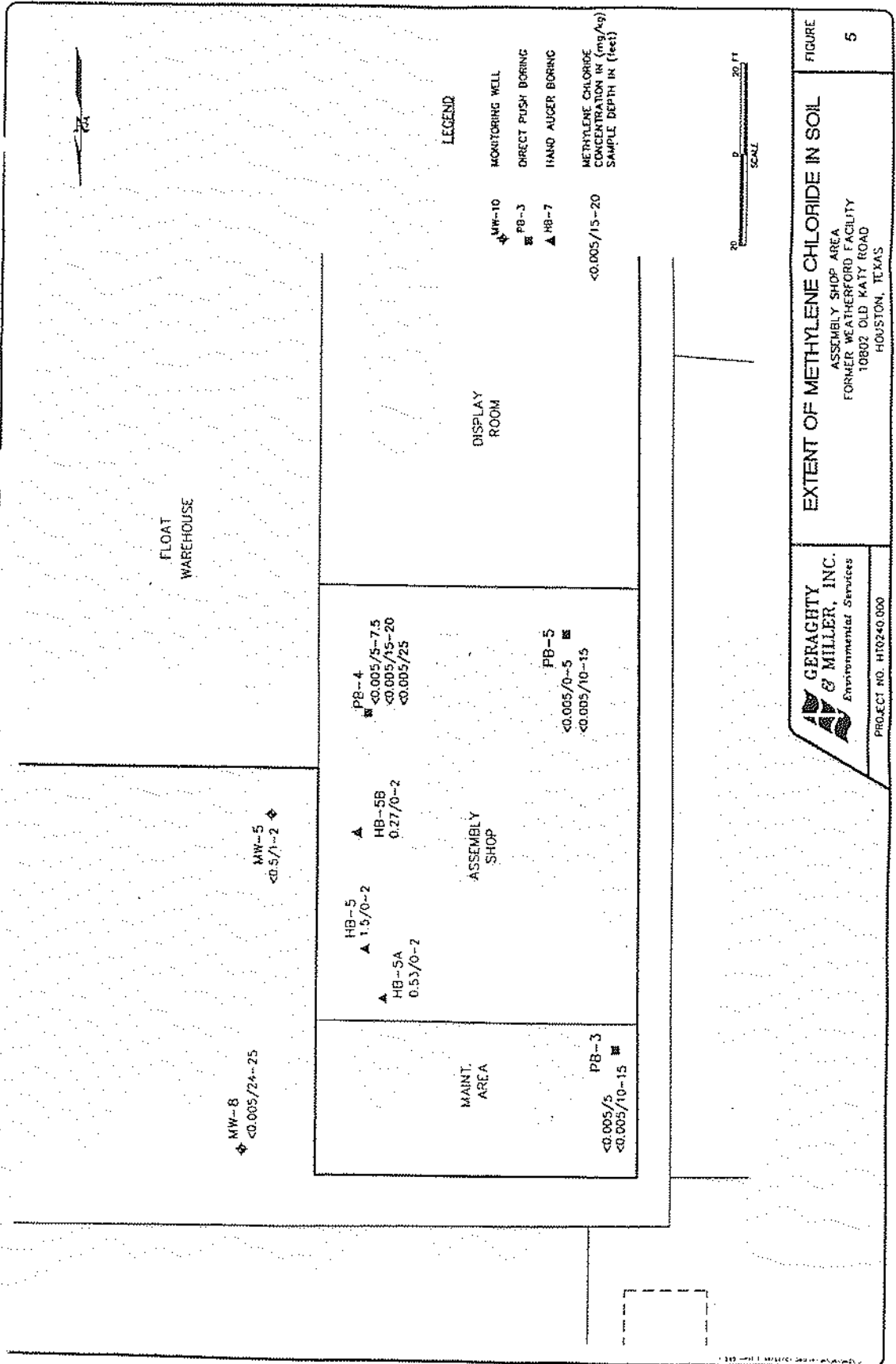
PROJECT NO. H10240.000

EXTENT OF METHYLENE CHLORIDE IN SOIL

MACHINE SHOP AREA  
FORMER WEATHERFORD FACILITY  
10802 OLD KATY ROAD  
HOUSTON, TEXAS

FIGURE

4



## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100663798

**Name:** FLUOROCARBON PLASTIC & RUBBER PRODUCTION   [View Prior Names](#)

**Primary Business:** No primary business description on file.

**Street Address:** 10420 KATY FWY, HOUSTON TX 77043 5106

**County:** HARRIS

**Nearest City:** No near city on file.

**State:** TX

**Near ZIP Code:** 77043

**Physical Location:** 10420 Old Katy Rd, Houston, TX

### Affiliated Customers - Current

Your Search Returned 2 Current Affiliation Records ([View Affiliation History](#))

#### 1-2 of 2 Records

CN Number	Customer Name	Customer Role	Details
CN600372205	PRP INC	OWNER	<a href="#">↗</a>
CN600395438	THE FLUOROCARBON COMPANY	OWNER OPERATOR	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
No NAICS or SIC Codes on file.		

### Permits, Registrations, or Other Authorizations



There are a total of 4 programs and IDs for this regulated entity. Click on a column name to change the sort order.

**1-4 of 4 Records**

<a href="#">Program</a>	<a href="#">ID Type</a>	<a href="#">ID Number</a>	<a href="#">ID Status</a>
IHW CORRECTIVE ACTION	SOLID WASTE REGISTRATION # (SWR)	31402	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD089799522	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	31402	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	71589	CANCELLED

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## Central Registry

Detail of: **IHW Corrective Action Solid Waste Registration 31402**  
For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Responsible Parties: **THE FLUOROCARBON COMPANY (CN600395438)** Since 11/06/1998  
Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### Related Information:

#### [Corrective Action Information](#)

There is no information related to this Corrective Action in the following categories:

- [Commissioners' Actions](#)
- [Correspondence Tracking](#)
- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
- [Proposed Enforcement Orders](#)
- [Complaints](#)
- [Discharges](#)
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- [Emission Events](#)
- [Fish Kills](#)
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## Central Registry

**Detail of: IHW Corrective Action Solid Waste Registration 31402**  
**For: FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
 Registration  
 Status:

Responsible Parties: **THE FLUOROCARBON COMPANY (CN600395438)** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

Legal	Description	Start Date	End Date	Type	Status	Status Date
31402	IHW CORRECTIVE ACTION	11/22/2002		CLEANUP	INACTIVE	12/08/1998

Tracking No.	Type	Value	Start Date	End Date
9315984	ADMINISTRATIVE STATUS	INACTIVE	12/08/1998	
1057266	EPA ID	TXD089799522	01/01/1901	

Physical	Description	Start Date	Type	Status	Status Date
FLUORACARBON CO HOUSTON		01/01/1901	IHW CA	TRANSFERRED	11/22/2002

Tracking No.	Type	Value	Start Date	End Date
9336195	PROJECT PHASE	TRANSFERRED	11/22/2002	
1214152	APPLICABLE PROGRAM RULES	RRR	09/30/2014	
9326204	SOURCE OF RELEASE	UNIT PRJ 765 - Rule: RRS Std: 3	01/01/1901	

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 31402**

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration

Status:

Held by: **THE FLUOROCARBON COMPANY (CN600395438)**

**OWNER OPERATOR** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### Related Information:

#### [Solid Waste Registration Information](#)

There is no information related to this Solid Waste Registration in the following categories:

- [Commissioners' Actions](#)
- [Correspondence Tracking](#)
- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
- [Proposed Enforcement Orders](#)
- [Complaints](#)
- [Discharges](#)
- [Emergency Response Events](#)
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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31402

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **THE FLUOROCARBON COMPANY (CN600395438)**

**OWNER OPERATOR** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### Facility Information

**Registration Number:** 31402

**Status:** Inactive

**Site Name:** FLUOROCARBON PLASTIC & RUBBER PRODUCTION

**Company Name:** THE FLUOROCARBON COMPANY

**Site Street Address:** 10420 KATY FWY, HOUSTON, TX, 77043

**Site Location:** 10420 Old Katy Rd, Houston, TX

**County:** HARRIS

**EPA Number:** TXD089799522

**Registration Type:** Generator and Transporter

**Generator Type:**

**SIC Code:**

**NAICS Code:** 326199 All Other Plastics Product Manufacturing

[View Annual Waste Summary not available](#)

<a href="#">View Waste Receipt Report</a> <input type="button" value="Year"/> <input type="button" value="Month"/> <b>Waste Receipt Report not available</b>
<a href="#">View Waste Management Units</a> <a href="#">View Waste Types</a>

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 31402**

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **THE FLUOROCARBON COMPANY (CN600395438)**

**OWNER OPERATOR** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### [IHW](#) Facility Information

#### IHW Waste Management Units

Sequence Number	Description	Unit Type	Status
001		Tank	ACTIVE
003		Tank	ACTIVE

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 31402

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **THE FLUOROCARBON COMPANY (CN600395438)**

**OWNER OPERATOR** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### Facility Information

#### IHW Waste Management Unit

Sequence Number: 001	Unit Type: Tank	Unit Status: ACTIVE	Description:
Permit Number	UIC Number	Manages Off-Site Waste	Management
		No	
			Capacity
			Regulatory Status

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 31402**

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN1006663798)**

10420 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Held by: **THE FLUOROCARBON COMPANY (CN600395438)**

**OWNER OPERATOR** Since 11/06/1998

Mailing Address: PO BOX 3402 HOUSTON, TX 77253-3402

### Facility Information

#### IHW Waste Management Unit

Sequence Number: 003	Unit Type: Tank	Unit Status: ACTIVE	Description:
Permit Number	UIC Number	Manages Off-Site Waste	Management
		No	Capacity
			Regulatory Status

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 71589**

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **CANCELLED**  
Registration

Status:

Held by: **PRP INC (CN600372205)**

**OWNER** Since 08/23/2001

Mailing Address: Not on file

### Related Information:

#### [Solid Waste Registration Information](#)

There is no information related to this Solid Waste Registration in the following categories:

- [Commissioners' Actions](#)
- [Correspondence Tracking](#)
- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
- [Proposed Enforcement Orders](#)
- [Complaints](#)
- [Discharges](#)
- [Emergency Response Events](#)
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## Central Registry

### Detail of: **Industrial and Hazardous Waste Solid Waste Registration 71589**

For: **FLUOROCARBON PLASTIC & RUBBER PRODUCTION (RN100663798)**

10420 KATY FWY, HOUSTON

Solid Waste **CANCELLED**  
Registration

Status:

Held by: **PRP INC (CN600372205)**

**OWNER** Since 08/23/2001

Mailing Address: Not on file

---

### Program Area Data not available for this Additional ID

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0W055D

TEXAS WATER COMMISSION  
NOTICE OF REGISTRATION  
SOLID WASTE MANAGEMENT

10-20-87

THIS IS NOT A PERMIT AND DOES NOT CONSTITUTE AUTHORIZATION OF ANY WASTE MANAGEMENT ACTIVITIES OR FACILITIES LISTED BELOW. REQUIREMENTS FOR SOLID WASTE MANAGEMENT ARE PROVIDED BY TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TEXAS WATER COMMISSION (TWC). CHANGES OR ADDITIONS TO WASTE MANAGEMENT METHODS REFERRED TO IN THIS NOTICE REQUIRE WRITTEN NOTIFICATION TO THE TWC.

DATE OF NOTICE: 10-02-87

REGISTRATION DATE: 01-05-79

REGISTRATION NUMBER: 31402

EPA I.D. NUMBER: TXDD89799522

THE REGISTRATION NUMBER PROVIDES ACCESS TO STORED INFORMATION PERTAINING TO YOUR OPERATION. PLEASE REFER TO THAT NUMBER IN ANY CORRESPONDENCE.

COMPANY NAME: FLUOROCARBON COMPANY, THE  
MAILING ADDRESS: PLASTIC & RUBBER PRODUCTS DIV.

P.O. BOX 13402  
HOUSTON, TEXAS 77253

GENERATING SITE LOCATION: 10420 OLD KATY ROAD, HOUSTON, TEXAS

CONTACT PERSON: ELTON HUEGELE  
PHONE: (713) 466-4365

NUMBER OF EMPLOYEES: GREATER THAN 100  
TWC DISTRICT: D7

REGISTRATION STATUS: INACTIVE  
REGISTRATION TYPE: GENERATOR/TRANSPORTER  
HAZARDOUS WASTE STATUS: SMALL QUANTITY GENERATOR

I. WASTE GENERATED:

WASTE NUMBER	DESCRIPTION	CLASS	CODE	DISPOSITION
001	PLANT REFUSE, GENERAL MISC.	II	279760	OFF-SITE
002	SUMP SLUDGE, CONTAINING MISC. CHEMICALS	I	14105D	ON-SITE/OFF-SITE/SDL D FOR RECOVERY
003	ACIO, ORGANIC (ACETIC, FORMIC, PROPIONIC & BUTYRIC)	IH	911840	ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): F004, F002

SHIPPING/REPORTING: NOT APPLICABLE

III. ON-SITE WASTE MANAGEMENT FACILITIES:

FAC NO.	FACILITY	STATUS
01	TANK STORAGE OF WASTE NUMBER(S) 002, 003	ACTIVE
03	TANK STORAGE OF WASTE NUMBER(S) 002	ACTIVE

UNLESS OTHERWISE STATED ABOVE, FACILITIES ARE LOCATED AT 10420 OLD KATY ROAD, HOUSTON, TEXAS COUNTY OF HARRIS

IV. RECORDS.

A. FOR PURPOSES OF FILING ANNUAL REPORTS PURSUANT TO TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TWC PERTAINING TO INDUSTRIAL SOLID WASTE MANAGEMENT, RECORDS SHOULD BE MAINTAINED FOR STORAGE, PROCESSING AND/OR DISPOSAL OF THE FOLLOWING WASTE(S) LISTED IN PART I:

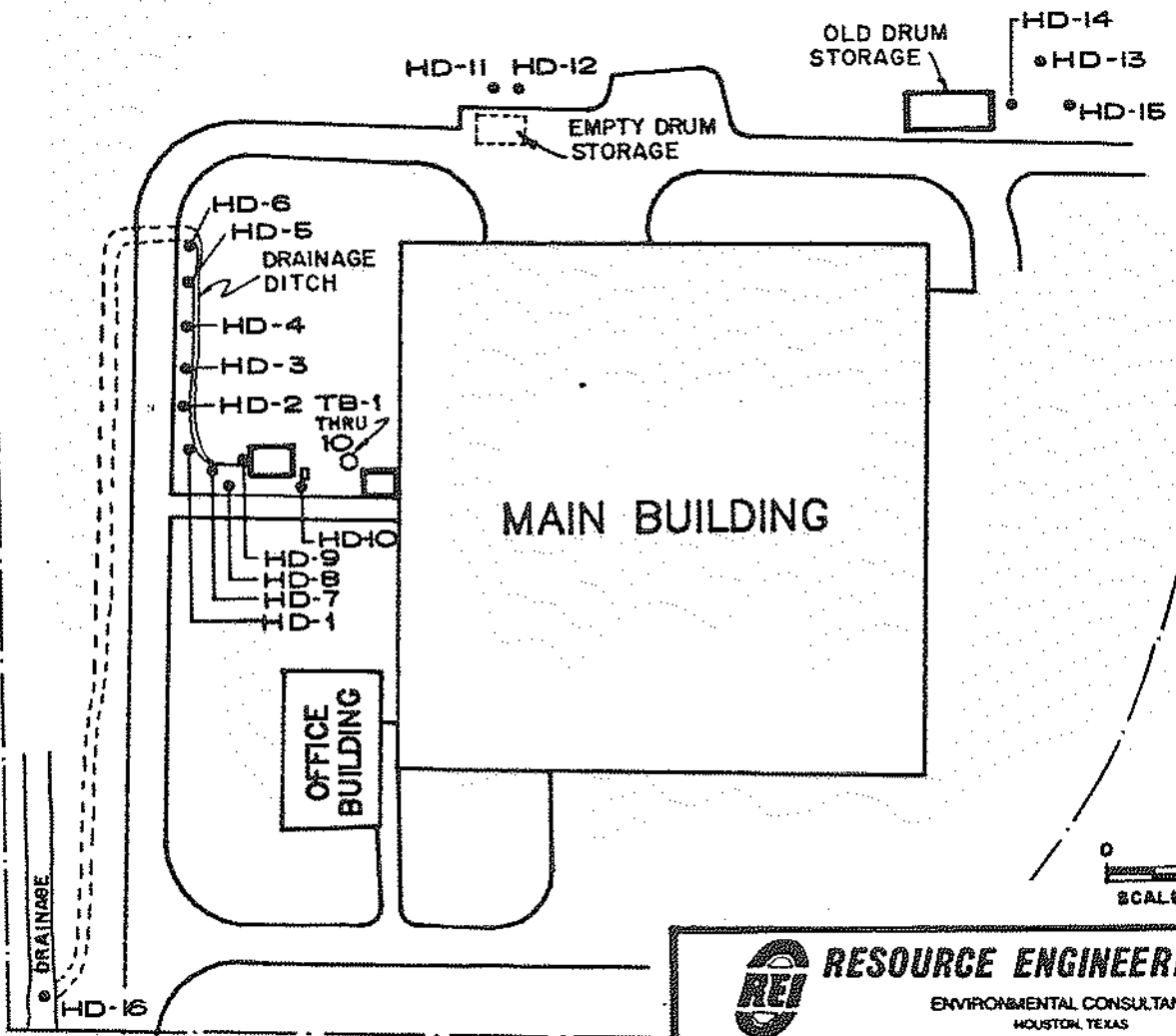
001 279760 PLANT REFUSE, GENERAL MISC.

002 141050 SUMP SLUDGE, CONTAINING MISC. CHEMICALS

003 911840 ACID, ORGANIC (ACETIC, FORMIC, PROPIONIC & BUTYRIC)

100-100

UNDEVELOPED AREA



**LEGEND**

• SAMPLE LOCATION



**RESOURCE ENGINEERING INC.**

ENVIRONMENTAL CONSULTANTS  
HOUSTON, TEXAS

FIGURE 1

**SOILS SAMPLING LOCATIONS  
HOUSTON PROPERTY DEVELOPMENT**

DRAWN BY:

DATE:

PROJECT NO.

413-01



Sample Number	Depth (feet)	Methylene Chloride (ppm)	1,1,1-Trichloroethane (ppm)	Trichloroethylene (ppm)
TB-1	0-1	3.8	<0.05	<0.05
TB-2	1-2	1.0	<0.05	<0.05
TB-3	2-3	0.9	<0.05	<0.05
TB-4	3-4	0.5	<0.05	<0.05
TB-5	4-5	0.7	<0.05	<0.05
TB-6	5-6	0.7	<0.05	<0.05
TB-7	6-7	1.0	<0.05	<0.05
TB-8	7-8	0.8	<0.05	<0.05
TB-9	8-9	1.4	<0.05	<0.05
TB-10	9-10	1.2	<0.05	<0.05
HD-1-01	0-1	1.0	NR <sup>1</sup>	NR
HD-1-02	1-2	1.5	NR	NR
HD-1-03	2-3	2.0	NR	NR
HD-2-01	0-1	1.4	NR	NR
HD-2-02	1-2	1.0	NR	NR
HD-2-03	2-3	0.9	NR	NR
HD-3-01	0-1	0.8	NR	NR
HD-3-02	1-2	0.8	NR	NR
HD-3-03	2-3	1.0	NR	NR
HD-4-01	0-1	0.8	NR	NR
HD-4-02	1-2	1.0	NR	NR
HD-4-03	2-3	0.7	NR	NR
THD-5-01	0-1	1.0	NR	NR
HD-5-02	1-2	4.6	NR	NR
HD-5-03	2-3	1.3	NR	NR
HD-6-01	0-1	0.5	NR	NR
HD-6-02	1-2	0.5	NR	NR
HD-6-03	2-3	1.0	NR	NR
HD-7-01	0-1	1.2	NR	NR
HD-7-02	1-2	0.6	NR	NR
HD-7-03	2-3	3.7	NR	NR
HD-8-01	0-1	1.5	NR	NR
HD-8-02	1-2	1.3	NR	NR
HD-8-03	2-3	1.0	NR	NR
HD-9-01	0-1	1.2	NR	NR
HD-9-02	1-2	0.8	NR	NR
HD-9-03	2-3	6.8	NR	NR
HD-10-01	0-1	1.2	NR	NR
HD-10-02	1-2	7.1	NR	NR
HD-10-03	2-3	2.4	NR	NR
HD-10-04	3-4	2.9	NR	NR
HD-11	0-0.5	4.4	<0.05	NR
HD-12	0-0.5	1.9	<0.05	NR
HD-13-01	0-1	1.9	<0.05	NR
HD-13-02	1-2	5.7	<0.05	NR
HD-13-03	2-3	1.4	<0.05	NR
HD-14-01	0-1	1.5	<0.05	NR
HD-14-02	1-2	1.3	<0.05	NR
HD-14-03	2-3	1.5	<0.05	NR
HD-15	0-1	2.8	<0.05	NR
HD-16	0-0.5	6.6	<0.05	NR

<sup>1</sup>NR - Not Reported



**RESOURCE ENGINEERING INC.**

ENVIRONMENTAL CONSULTANTS  
HOUSTON, TEXAS

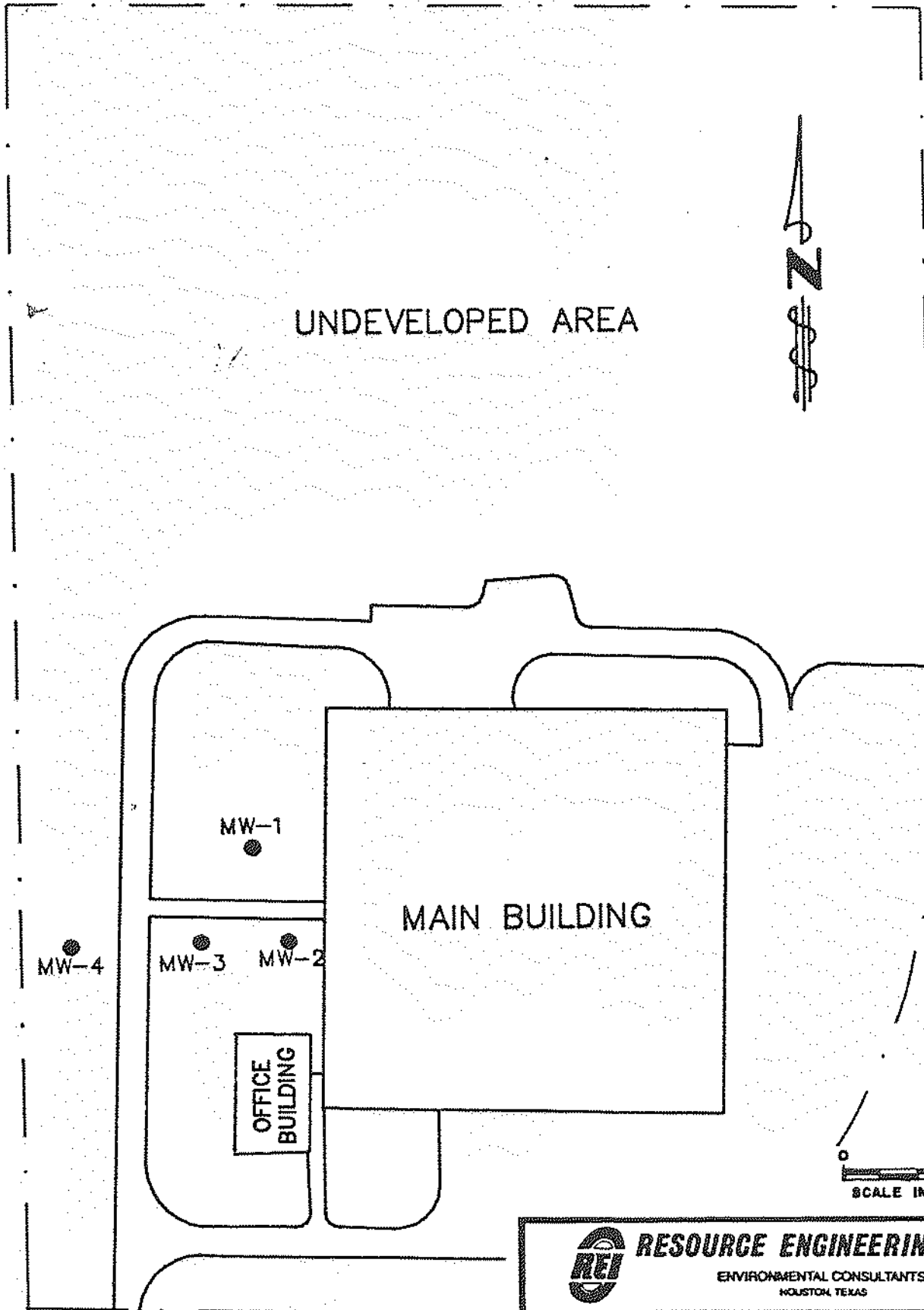
FIGURE 2

**SOILS CHEMICAL ANALYSIS**  
**HOUSTON PROPERTY DEVELOPMENT**

DRAWN BY:

DATE:

PROJECT NO.



● MONITORING WELL LOCATION

 **RESOURCE ENGINEERING INC.**  
 ENVIRONMENTAL CONSULTANTS  
 HOUSTON, TEXAS

**FIGURE 5**  
**MONITORING WELL LOCATIONS**  
**HOUSTON PROPERTY DEVELOPMENT**

DRAWN BY:	DATE:	PROJECT NO. 413-01
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### Analytical Lab Results

Date Sampled: 4-8-85  
 Date received: 4-8-85  
 Lab Number 6249

<u>Sample Number/ Description</u>	<u>PCBs (ppb)</u>	<u>Methylene Chloride (ppb)</u>	<u>Oil &amp; Grease (mg/l)</u>	<u>Trichloroethylene (ppb)</u>
MW-1/water	<0.1	<10.0	12.0	206.0
MW-2/water	NT	<10.0	<1.0	26.0
MW-3/water	NT	<10.0	<1.0	<10.0
MW-4/water	NT	<10.0	<1.0	<10.0

NT - Not Tested



**RESOURCE ENGINEERING INC.**

ENVIRONMENTAL CONSULTANTS  
 HOUSTON, TEXAS

**FIGURE 6  
 MONITORING WELL  
 ANALYTICAL RESULTS**

**HOUSTON PROPERTY DEVELOPMENT**

DRAWN BY:

DATE:

PROJECT NO.

413-01

TABLE 3.4  
PREVIOUS SOIL SAMPLE TEST RESULTS

Forster Fluorocarbon Property  
10420 Old Katy Rd., Houston, Texas

GSI Job No. G-1050  
Issued: 9/1/88  
Revised: 9/25/88  
Page 1 of 4

SAMPLE NUMBER	DEPTH INTERVAL (FT)	DATE SAMPLED	METHYLENE CHLORIDE (PPH)			1,1,1-TRI-ETHANE (PPH)			1,1,2-TRI-CHLORO-1,2-TRIFLUORO (PPH)			PH (S.U.)	DATE ANALYZED	FCBS (PPM)
			ANALYZED	DATE ANALYZED	DATE ANALYZED	ANALYZED	DATE ANALYZED	ANALYZED	ANALYZED					
HO-1	0-8	3/19/85	0.7	3/22/85	NT	NT	NT	6.75	3/22/85	NT				
HO-2	0-5	3/19/85	<0.1	3/22/85	NT	NT	7.06	3/22/85	NT					
HO-3	0-8	3/19/85	NT	3/22/85	NT	NT	6.59	3/22/85	<1.0			3/22/85		
HO-4	0-8	3/19/85	NT	3/22/85	NT	NT	6.92	3/22/85	<1.0			3/22/85		
HO-5	0-7	3/19/85	2.3	3/22/85	NT	NT	6.49	3/22/85	NT					
HO-6	0-4	3/19/85	NT	3/22/85	NT	NT	6.37	3/22/85	42			3/22/85		
HO-1-01	0-1	5/06/85	1.0	5/17/85	NT	NT	NT	NT	NT					
HO-1-02	1-2	5/06/85	1.5	5/17/85	NT	NT	NT	NT	NT					
HO-1-03	2-3	5/06/85	2.0	5/17/85	NT	1.6	5/21/85	NT	NT					
HO-2-01	0-1	5/06/85	1.4	5/17/85	NT	0.9	5/21/85	NT	NT					
HO-2-02	1-2	5/06/85	1.0	5/17/85	NT	1.0	5/21/85	NT	NT					
HO-2-03	2-3	5/06/85	0.9	5/17/85	NT	NT	NT	NT	NT					
HO-3-01	0-1	5/06/85	0.8	5/17/85	NT	1.6	5/21/85	NT	NT					
HO-3-02	1-2	5/06/85	0.8	5/17/85	NT	0.9	5/21/85	NT	NT					
HO-3-03	2-3	5/06/85	1.0	5/17/85	NT	1.0	5/21/85	NT	NT					
HO-4-01	0-1	5/06/85	0.8	5/17/85	NT	NT	NT	NT	NT					
HO-4-02	1-2	5/06/85	1.0	5/17/85	NT	NT	NT	NT	NT					
HO-4-03	2-3	5/06/85	0.7	5/17/85	NT	NT	NT	NT	NT					
HO-5-01	0-1	5/06/85	1.0	5/22/85	NT	0.6	5/22/85	NT	NT					
HO-5-02	1-2	5/06/85	4.6	5/17/85	NT	1.7	5/21/85	NT	NT					
HO-5-03	2-3	5/06/85	1.3	5/17/85	NT	0.7	5/21/85	NT	NT					
HO-6-01	0-1	5/06/85	0.5	5/17/85	NT	NT	NT	NT	NT					
HO-6-02	1-2	5/06/85	0.5	5/17/85	NT	NT	NT	NT	NT					
HO-6-03	2-3	5/06/85	1.0	5/17/85	NT	0.4	5/21/85	NT	NT					

NOTE:

- 1) Samples collected by Resource Engineering, Inc., in 1985 and 1986.
- 2) All analyses performed by Southern Petroleum Laboratories in accordance with EPA Guidelines.
- 3) x - Excavation sample. Approximately 2 to 3 ft. of soil was removed from excavations 9,10, and 11, approximately 7 ft. from excavation 12. Exact depth of sample not reported.
- 4) Abbreviations: NR - not reported  
NT - not tested



OSJ Job No. 6-1050  
 Issued: 9/1/88  
 Revised: 9/23/88  
 Page 2 of 4

TABLE 3.4  
 PREVIOUS SOIL SAMPLE TEST RESULTS  
 Former Fluorocarbon Property  
 10420 Old Katy Rd., Houston, Texas

SAMPLE NUMBER	DEPTH INTERVAL (FT)	DATE SAMPLED	METHYLENE CHLORIDE		1,1,1-TRI-ETHANE		1,1,2-TRI-CHLORO-1,2,2-TRIFLUOROETHANE		PH (S.U.)	DATE ANALYZED	PCBS (ppb)	DATE ANALYZED
			(PPM)	ANALYZED	(PPM)	ANALYZED	(PPM)	ANALYZED				
HO-7-01	0-1	5/06/85	1.2	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-7-02	1-2	5/06/85	0.6	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-7-03	2-3	5/06/85	3.7	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-8-01	0-1	5/06/85	1.5	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-8-02	1-2	5/06/85	1.3	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-8-03	2-3	5/06/85	1.0	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-9-01	0-1	5/06/85	1.2	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-9-02	1-2	5/06/85	0.8	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-9-03	2-3	5/06/85	6.8	5/17/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-10-01	0-1	5/06/85	1.2	5/22/85	NT	1.1	5/22/85	NT	NT	NT	NT	NT
HO-10-02	1-2	5/06/85	7.1	5/22/85	NT	2.3	5/21/85	NT	NT	NT	NT	NT
HO-10-03	2-3	5/06/85	2.4	5/22/85	NT	1.0	5/21/85	NT	NT	NT	NT	NT
HO-10-04	3-4	5/06/85	2.9	5/22/85	NT	NT	NT	NT	NT	NT	NT	NT
HO-11	0-0.5	5/06/85	4.4	5/22/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-12	0-0.5	5/06/85	1.9	5/22/85	<0.05	5/23/85	0.1	5/21/85	NT	NT	NT	NT
HO-13-01	0-1	5/06/85	1.9	5/17/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-13-02	1-2	5/06/85	5.7	5/22/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-13-03	2-3	5/06/85	1.4	5/22/85	<0.05	5/23/85	0.8	5/22/85	NT	NT	NT	NT
HO-14-01	0-1	5/06/85	1.5	5/22/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-14-02	1-2	5/06/85	1.3	5/22/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-14-03	2-3	5/06/85	1.5	5/22/85	<0.05	5/23/85	0.6	5/22/85	NT	NT	NT	NT
HO-15	0-1	5/06/85	2.8	5/23/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT
HO-16	0-0.5	5/06/85	6.6	5/22/85	<0.05	5/23/85	NT	NT	NT	NT	NT	NT

NOTE:  
 1) Samples collected by Resource Engineering, Inc., in 1985 and 1986.  
 2) All analyses performed by Southern Petroleum Laboratories in accordance with EPA Guidelines.  
 3) x - Excavation sample. Approximately 2 to 3 ft. of soil was removed from excavations 9,10, and 11, approximately 7 ft. from excavation 12. Exact depth of sample not reported.  
 4) Abbreviations: NR - not reported  
 NT - not tested

SAMPLE NUMBER	DEPTH INTERVAL (FT)	DATE SAMPLED	METHYLENE CHLORIDE (PPM)		1,1,1-TRIETHANE (PPM)		1,1,2-TRI-CHLORO-1,2-DIFLORO (PPM)		DATE ANALYZED	PH (S.U.)	DATE ANALYZED	PCBS (PPB)	DATE ANALYZED
			ANALYZED	DATE ANALYZED	ANALYZED	DATE ANALYZED	ANALYZED	DATE ANALYZED					
1B-1	0-1	5/08/85	3.8	5/17/85	<0.05	5/22/85	1.7	5/21/85					
1B-2	1-2	5/08/85	1.0	5/17/85	<0.05	5/22/85	3.8	5/21/85					
1B-3	2-3	5/08/85	0.9	5/17/85	<0.05	5/22/85	NT						
1B-4	3-4	5/08/85	0.5	5/17/85	<0.05	5/22/85	NT						
1B-5	4-5	5/08/85	0.7	5/17/85	<0.05	5/22/85	NT						
1B-6	5-6	5/08/85	0.7	5/17/85	<0.05	5/22/85	NT						
1B-7	6-7	5/08/85	1.0	5/17/85	<0.05	5/22/85	NT						
1B-8	7-8	5/08/85	0.8	5/17/85	<0.05	5/22/85	NT						
1B-9	8-9	5/08/85	1.4	5/17/85	<0.05	5/22/85	NT						
1B-10	9-10	5/08/85	1.2	5/17/85	<0.05	5/22/85	NT						
9C	x	7/29/86	NT		NT		NT		6.1	NR		NT	
9D	x	7/29/86	12	NR	NT		<10	NR	NT	NR		NT	
9E	x	7/29/86	NT	NR	NT		NT	NR	7.1	NR		NT	
9F	x	7/29/86	12	NR	NT		15	NR	NT	NR		NT	
9G	x	7/29/86	NT	NR	NT		NT	NR	7.7	NR		NT	
9H	x	7/29/86	14	NR	NT		15	NR	NT	NR		NT	
10C	x	7/29/86	NT		NT		NT		6.1	NR		NT	
10D	x	7/29/86	14	NR	NT		14	NR	NT	NR		NT	
10E	x	7/29/86	NT	NR	NT		NT	NR	7.9	NR		NT	
10F	x	7/29/86	13	NR	NT		<10	NR	NT	NR		NT	
10G	x	7/29/86	NT	NR	NT		NT	NR	7.8	NR		NT	
10H	x	7/29/86	<10	NR	NT		<10	NR	NT	NR		NT	
11C	x	7/29/86	NT		NT		NT		6.3	NR		NT	
11D	x	7/29/86	13	NR	NT		<10	NR	NT	NR		NT	
11E	x	7/29/86	NT	NR	NT		NT	NR	8.3	NR		NT	
11F	x	7/29/86	12	NR	NT		<10	NR	NT	NR		NT	
11G	x	7/29/86	NT	NR	NT		NT	NR	8.6	NR		NT	
11H	x	7/29/86	10	NR	NT		<10	NR	NT	NR		NT	

NOTE:  
 1) Samples collected by Resource Engineering, Inc., in 1985 and 1986.  
 2) All analyses performed by Southern Petroleum Laboratories in accordance with EPA Guidelines.  
 3) x - Excavation sample. Approximately 2 to 3 ft. of soil was removed from excavations 9,10, and 11, approximately 7 ft. from excavation 12. Exact depth of sample not reported.  
 4) Abbreviations: NR - not reported  
 NT - not tested

TABLE 3.4  
 PREVIOUS SOIL SAMPLE TEST RESULTS

Former Fluorocarbon Property  
 10420 Old Katy Rd., Houston, Texas

SAMPLE NUMBER	DEPTH INTERVAL (FT)	METHYLENE CHLORIDE		1,1,1-TRI-ETHANE		1,1,2-TRI-CHLORO-1,2,2-TRIFLUOROETHANE		pH (S.U.)	DATE ANALYZED	PCBs (ppm)	DATE ANALYZED
		(PPM)	ANALYZED (PPM)	DATE ANALYZED	DATE ANALYZED	DATE ANALYZED	DATE ANALYZED				
9-A	x	8/12/86	NT	NT	NT	NT	7.7	NR	NT	NT	NT
9-B	x	8/12/86	1.0x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
9-C	x	8/12/86	1.1x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
9-D	x	8/12/86	2.2x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
10-A	x	8/12/86	NT	NT	NT	NT	6.4	NR	NT	NT	NT
10-B	x	8/12/86	1.3x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
10-C	x	8/12/86	6.6x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
10-D	x	8/12/86	1.7x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
11-A	x	8/12/86	NT	NT	NT	NT	9.0	NR	NT	NT	NT
11-B	x	8/12/86	4.6x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
11-C	x	8/12/86	1.5x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
11-D	x	8/12/86	1.2x10(-2)	NT	NT	NT	NT	NT	NT	NT	NT
12-A	x	8/12/86	NT	NT	NT	NT	6.0	NR	NT	NT	NT
12-B	x	8/12/86	1.3	NT	NT	NT	NT	NT	NT	NT	NT
12-C	x	8/12/86	11.1	NT	NT	NT	NT	NT	NT	NT	NT
12-D	x	8/12/86	2.3	NT	NT	NT	NT	NT	NT	NT	NT
S-1	x	11/16/86	4x10(-2)	11/19/86	NT	NT	NT	NT	NT	NT	NT

- NOTE:
- 1) Samples collected by Resource Engineering, Inc., in 1985 and 1986.
  - 2) All analyses performed by Southern Petroleum Laboratories in accordance with EPA Guidelines.
  - 3) x - Excavation sample. Approximately 2 to 3 ft. of soil was removed from excavations 9, 10, and 11, approximately 7 ft. from excavation 12. Exact depth of sample not reported.
  - 4) Abbreviations: NR - not reported  
 NT - not tested

TABLE 3.5 SOIL SAMPLE TEST RESULTS  
 SOIL SAMPLE TEST RESULTS  
 VOLATILE ORGANIC ANALYSES

Former Fluorocarbon Property  
 10420 Old Katy Road, Houston, Texas

	MIN. DETEC- TION LIMIT (UG/KG)	CLOSURE	CLOSURE	CLOSURE	CLOSURE	AREA A	AREA B	OIL REL. AREA	HW-15 AREA	COOLING POSD	FIELD BLANK	LAB BLANK
		AREA 9	AREA 10	AREA 11	AREA 12							
DATE SAMPLED:		8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	--
DATE ANALYZED:		8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88
COMPOUNDS												
Chloroethane	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Bromoethane	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Vinyl Chloride	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Chloroethane	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Methylene Chloride	11-12	2 B =	6 B	10 B	14 B	12 B	9 B	13 B	9 B	9 B	13 B	4 =
Acetone	11-12	21 B	35 B	38 B	36 B	150 B	34 B	38 B	29 B	25 B	31 B	31
Carbon Disulfide	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,1-Dichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,1-Dichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Trans-1,2-Dichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Chloroform	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,2-Dichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
2-Butanone	11-12	15 B	10 B =	11 B =	12 B =	18 B	12 B	17 B	11 B =	9 B =	11 B	14
1,1,1-Trichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Carbon Tetrachloride	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Vinyl Acetate	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Bromodichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,2-Dichloropropane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Trans-1,3-Dichloropropene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Trichloroethene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Dibromochloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,1,2-Trichloroethane	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Benzene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Cis-1,3-Dichloropropene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Bromoform	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
4-Methyl-2-Pentanone	10-12	<11	<11	<12	<12	8 =	<11	<11	<12	<11	<11	<10
2-Hexanone	10-12	<11	<11	<12	<12	<11	<11	<11	<12	<11	<11	<10
Tetrachloroethene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
1,1,2,2-Tetrachloroethane	5-6	<5	<5	<6	<6	5 B	<6	<6	<6	<6	<5	<5
Toluene	5-6	<5	<5	<6	<6	3 =	<6	<6	<6	2 =	<5	<5
Chlorobenzene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Ethylbenzene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Styrene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
Xylene	5-6	<5	<5	<6	<6	<6	<6	<6	<6	<6	<5	<5
TOTAL VOLATILES DETECTED:		38	51	49	62	221	55	68	49	45	55	49
TOTAL CORRECTED FOR LAB BLANKS:		ND	ND	ND	ND	160	ND	ND	ND	2	ND	--

NOTE:

- All analyses performed in accordance with EPA method 824 at Southern Petroleum Laboratories, Inc. in Houston, Texas.
- Abbreviations:  
 ND( ) - not detected at dilution factor indicated ( )  
 B - Compound detected in laboratory GC blank.  
 = - Reported value is less than the detection limit.  
 ( - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.



TABLE 3.6 SOIL SAMPLE TEST RESULTS  
 POLYCHLORINATED BIPHENYL  
 TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS  
 GSI Job No. G-1050  
 Issued: 9/23/88  
 Page 1 of 1

Former Fluorocarbon Property  
 10420 Old Katy Road, Houston, Texas

MIN. DETECTION LIMIT (MG/KG)	CLOSURE AREA		CLOSURE AREA		CLOSURE AREA		OIL RCL. AREA		KW-15 AREA		COOLING POND		FIELD BLANK	
	9	10	11	12	A	B	A	B	A	B	AREA	AREA	AREA	AREA
	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88	8/10/88
	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88	8/15/88

DATE SAMPLED:  
 DATE ANALYZED:

COMPOUNDS

Polychlorinated Biphenyl	1	NT	NT	NT	NT	<1	NT	<1	NT	NT	NT	NT	<1
Total Extractable Petroleum Hydrocarbons	20	<20	<20	110	140	3700	420	14,745	4730	1740	51		

NOTE:

1) All analyses performed in accordance with EPA methods 608 (for PCB) and 418-1 (for TPH) at Southern Petroleum Laboratories, Inc., Houston, Texas

2) NT = Not Tested

TABLE 3.7A  
 PREVIOUS GROUNDWATER SA TEST RESULTS  
 VOLATILE ORGANIC ANALYSES (UG/L)  
 Former Fluorocarbon Property  
 10420 Old Katy Road, Houston, Texas

BSI Job No G-1050  
 Issued: 1/88  
 Revised: 9/23/88  
 Page 1 of 1

	REI BLANK	WELL MW-1	WELL MW-2	WELL MW-3	WELL MW-4
DATE SAMPLED:		4-8-85	4-8-85	4-8-85	4-8-85
DATE ANALYZED:		4-9-85	4-9-85	4-9-85	4-9-85
Chloromethane	1	<1	<1	<1	1
Bromomethane	7	ND	17	22	31
Vinyl Chloride	2	4	16	ND	<1
Chloroethane	<1	2	1	<1	1
Methylene Chloride	10	12	13	11	12
Acetone	4	4	4	4	6
Carbon Disulfide	NT	NT	NT	NT	NT
1,1-Dichloroethene	ND	3	<1	ND	ND
1,1-Dichloroethane	ND	<1	2	<1	ND
Trans-1,2-Dichloroethene	<1	73	5	<1	<1
Chloroform	<1	ND	ND	ND	ND
1,2-Dichloroethane	<1	<1	<1	ND	ND
2-Butanone	<1	1	<1	<1	1
1,1,1-Trichloroethane	5	6	5	5	6
Carbon Tetrachloride	3	ND	<1	3	ND
Vinyl Acetate	NT	NT	NT	NT	NT
Broaddichloroethane	<1	ND	ND	ND	ND
1,2-Dichloropropane	1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	<1	ND	ND	ND	ND
Trichloroethene	<1	206	26	2	<1
Dibromochloroethane	<1	ND	ND	ND	ND
1,1,2-Trichloroethane	<1	ND	ND	ND	ND
Benzene	3	2	3	2	3
Cis-1,3-Dichloropropene	ND	<1	ND	ND	ND
Bromoform	<1	ND	ND	ND	ND
4-Methyl-2-Pentanone	2	4	ND	2	4
2-Hexanone	NT	NT	NT	NT	NT
Tetrachloroethene	<1	ND	ND	<1	<1
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1	<1
Toluene	3	3	3	2	3
Chlorobenzene	15	11	7	8	7
Ethylbenzene	<1	<1	<1	<1	<1
Styrene	NT	NT	NT	NT	NT
Xylene	2	1	<1	<1	<1
Dichlorodifluoromethane	7	9	3	ND	7
Trichlorofluoromethane	1	1	1	<1	<1
4-Bromofluorobenzene	67	14	85	69	97
TOTAL VOLATILES CORRECTED FOR BLANK:		279	50	15	24

- NOTES: 1) Samples collected by Resource Engineering, Inc., in 1985.  
 2) All analyses performed by Southern Petroleum Laboratories, Inc., in accordance with EPA guidelines.  
 3) Abbreviations: NT - not tested  
 ND = not detected

TABLE 3.7 B  
 SUMMARY OF PREVIOUS GROUNDWATER SAMPLE TEST RESULTS  
 Former Fluorocarbon Property  
 10420 Old Katy Road, Houston, Texas

SSI Job No. G-1050  
 Issued: 9/1/88  
 Revised: 9/23/88  
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SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	METHYLENE CHLORIDE (ppb)	TRICHLORO-ETHENE (ppb)	PCBs (ppb)	BIL & GREASE (ug/l)
MW-1	4/08/85	4/09/85	<10	206	<1	12.0
MW-1	9/23/86	NR	NT	600	NT	NT
MW-1	NR	NR	NT	1380	NT	NT
MW-2	4/08/85	4/09/85	<10	26	NT	<1.0
MW-2	9/23/86	**	NT	<10	NT	NT
MW-2	*	*	NT	< 7	--	--
MW-3	4/08/85	4/09/85	<10	<10	NT	<1.0
MW-4	4/08/85	4/09/85	<10	<10	NT	<1.0
MW-5	4/16/85	4/18/85	NT	<10	NT	NT
MW-6	4/16/85	4/18/85	NT	<10	NT	NT
MW-7	4/16/85	4/18/85	NT	<10	NT	NT
MW-7	NR	NR	NT	< 7	NT	NT
MW-8	4/16/85	4/18/85	NT	<10	NT	NT
MW-8	9/23/86	**	NT	<10	NT	NT
MW-8	NR	NR	NT	< 7	NT	NT

NOTES:

- 1) Samples collected by Resource Engineering, Inc.
- 2) All analyses performed by Southern Petroleum Laboratories, Inc.,
- 3) Sources of data are REI/ERT reports, and/or REI/ERT transmittals to Houston Property Development/Old Katy Road 28 Ltd.
- 4) Abbreviations: NT - not tested  
 NR - not reported

SUMMARY OF PREVIOUS GROUNDWATER SAMPLE TEST RESULTS  
Former Fluorocarbon Property  
10420 Old Katy Road, Houston, Texas

Issued: 9/1/88

Revised: 9/23/88

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SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	METHYLENE CHLORIDE (ppb)	TRICHLORO-ETHENE (ppb)	PCBs (ppb)	OIL & GREASE (ug/l)
NW-9	*	*	--	370	--	--
NW-10	*	*	--	NA	--	--
NW-11	*	*	--	< 7	--	--
NW-12	*	*	--	NA	--	--
NW-13	*	*	--	NA	--	--
NW-14	9/23/86	**	NT	<10	NT	NT
NW-14	*	*	--	< 7	--	--
NW-15	9/23/86	**	NT	7800	NT	NT
NW-15	10/23/86	**	NT	4640	NT	NT
NW-15	*	*	--	26100	--	--
NW-16	10/24/86	**	NT	<10	NT	NT
NW-16	*	*	--	< 7	--	--
NW-17	10/24/86	**	NT	<10	NT	NT
NW-17	*	*	--	< 7	--	--
NW-18	10/24/86	**	NT	3000	NT	NT
NW-18	*	*	--	3000	--	--
NW-19	10/24/86	**	NT	29000	NT	NT
NW-19	*	*	--	29000	--	--

## NOTES:

- 1) Samples collected by Resource Engineering, Inc.
- 2) All analyses performed by Southern Petroleum Laboratories, Inc.,
- 3) Sources of data are REI/ERT reports, and/or REI/ERT transmittals to Houston Property Development/Old Katy Road 28 Ltd.
- 4) Abbreviations: NT - not tested  
NR - not reported



TABLE 3.7 B  
 SUMMARY OF PREVIOUS GROUNDWATER SAMPLE TEST RESULTS  
 Former Fluorocarbon Property  
 10420 Old Katy Road, Houston, Texas

BSI Job No. G- 20  
 Issued: 9/1/88  
 Revised: 9/23/88  
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SAMPLE NUMBER	DATE SAMPLED	DATE ANALYZED	METHYLENE CHLORIDE (ppb)	TRICHLORO-ETHENE (ppb)	PCBs (ppb)	OIL & GREASE (mg/l)
HC-1	*	*	--	< 5	--	--
HC-2	*	*	--	< 5	--	--
HC-3	*	*	--	380	--	--
HC-4	*	*	--	42	--	--
HC-5	*	*	--	< 5	--	--
HC-6	*	*	--	75	--	--
HC-7	*	*	--	45	--	--
HC-8	*	*	--	< 5	--	--
HC-9	*	*	--	< 5	--	--
GW-1	**	**	NT	111	NT	NT
GW-2	**	**	NT	< 7	NT	NT
MW-20	*	*	--	< 7	--	--
MW-21	*	*	--	28	--	--
MW-22	*	*	--	31	--	--
MW-23	*	*	--	2200	--	--
MW-24	*	*	--	290	--	--
MW-25	*	*	--	4600	--	--
DW-1	4/16/86	4/18/85	NT	<10	NT	NT

NOTES:

- 1) Samples collected by Resource Engineering, Inc.
- 2) All analyses performed by Southern Petroleum Laboratories, Inc.,
- 3) Sources of data are REI/ERT reports, and/or REI/ERT transmittals to Houston Property Development/Old Katy Road 28 Ltd.
- 4) Abbreviations: NT - not tested  
NR - not reported
- 5) Well DW-1 located on adjacent Wyatt Industries property.  
Reported depth 600 ft. (REI)

TABLE 3-B GROUNDWATER SAMPLE TEST RESULTS  
VOLATILE ORGANIC ANALYSIS

Former Fluorocarbon Properly  
10420 Old Katy Road, Houston, Texas

ESI Job No. G-1050  
Issued: 9/02/88  
Revised: 9/23/88  
Page 1 of 2

COMPOUNDS	MIX. DETECTION LIMIT (UG/KG)										WELL	DATE	WELL	DATE	WELL	DATE	WELL	DATE
	7/21/88	7/20/88	7/20/88	7/20/88	7/21/88	7/20/88	7/20/88	7/20/88	7/21/88	7/20/88								
Chloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(100)	7/21/88	ND(100)	<10	<10	ND(100)	7/21/88	
Bromoethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(100)	7/21/88	ND(100)	<10	<10	ND(100)	7/21/88	
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(100)	7/21/88	ND(100)	<10	<10	ND(100)	7/21/88	
Chloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(100)	7/21/88	ND(100)	<10	<10	ND(100)	7/21/88	
Methylene Chloride	30 B	11 B	13 B	13 B	13 B	13 B	13 B	13 B	13 B	13 B	3600 B	7/20/88	3600 B	11 B	10 B	1500 B	7/20/88	
Acetone	10	20 B	13 B	12 B	14 B	15 B	15 B	15 B	15 B	17 B	14000 B	7/20/88	14000 B	10 B	10 B	2800 B	7/20/88	
Carbon Disulfide	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,1-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,1-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Trans-1,2-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Chloroform	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,2-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
2-Butanone	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	2200 B	7/20/88	2200 B	<10	<10	ND(100)	7/20/88	
1,1,1-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Carbon Tetrachloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Vinyl Acetate	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(500)	7/20/88	ND(500)	<10	<10	ND(100)	7/20/88	
Bromoethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,2-Dichloropropane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Trans-1,3-Dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Trichloroethane	5	220	<5	<5	<5	<5	<5	<5	<5	<5	53000	7/20/88	53000	<5	<5	3200	7/20/88	
Dibromochloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,1,2-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Benzene	5	8	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Cis-1,3-Dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Bromoform	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
4-Methyl-2-Pentanone	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(500)	7/20/88	ND(500)	<10	<10	ND(100)	7/20/88	
2-Hexanone	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ND(500)	7/20/88	ND(500)	<10	<10	ND(100)	7/20/88	
Tetrachloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,1,2,2-Tetrachloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Toluene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Chlorobenzene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Ethylbenzene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Styrene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
Xylene (Total)	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ND(500)	7/20/88	ND(500)	<5	<5	ND(100)	7/20/88	
1,2,2-Trifluoroethane	10	13 B	6 B <sup>a</sup>	6 B <sup>a</sup>	6 B <sup>a</sup>	7 B <sup>a</sup>	7 B <sup>a</sup>	7 B <sup>a</sup>	7 B <sup>a</sup>	3 B <sup>a</sup>	3500 B <sup>a</sup>	7/20/88	3500 B <sup>a</sup>	6 B <sup>a</sup>	6 B <sup>a</sup>	390 B	7/20/88	
TOTAL VOLATILES DETECTED:	274	30	31	43	166	76300	25	20	14	11390	25	28	11390	25	28	11390	28	
TOTAL CORRECTED FOR LAB BLANKS:	231	ND	ND	10	134	53000	ND	ND	ND	6700	ND	ND	6700	ND	ND	6700	15840	

NOTE:  
 1) All analysis performed in accordance with EPA Method 824 at Southern Petroleum Laboratories, Inc., in Houston, Texas.  
 2) Abbreviations: ND() - Not detected at dilution factor indicated in parentheses.  
 B - Compound detected in laboratory QC blank.  
 \* - Reported value is less than the detection limit.  
 < - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

TABLE 3.8 GROUNDWATER SAMPLE TEST RESULTS  
VOLATILE ORGANIC ANALYSIS

Former Fluorocarbon Property  
10420 Old Katy Road, Houston, Texas

ESI Job No. 6-1050  
Issued: 9/02/88  
Revised: 9/23/88  
Page 2 of 2

COMPOUNDS	MIN. DETECTION LIMIT (UG/KG)	WELL MW-19		WELL MW-21		WELL MW-22		WELL MW-23		WELL MW-24		WELL MW-25		FIELD NO. 1		FIELD NO. 2		LAB NO. 1		LAB NO. 2		LAB NO. 3	
		7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88	7/21/88 8/03/88	7/21/88 8/02/88
Chloroethane	10	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromoethane	10	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	ND(300)	<10	<10	<10	2*	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloroethane	10	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene Chloride	10	5400 B	3 B=	4 B=	7 B=	5 B=	3 B=	3 B=	5 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=	3 B=
Acetone	10	7400 B	9 B=	11 B	18 B	15 B	14 B	20 B	8 B=	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Carbon Disulfide	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	5	ND(300)	<5	3=	9	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trans-1,2-Dichloroethane	5	ND(300)	<5	<5	33	51	110	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	5	ND(300)	<5	3=	3=	2=	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone	5	ND(300)	<10 B	<10 B	<10 B	<10 B	10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B	<10 B
1,1,1-Trichloroethane	10	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Tetrachloride	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate	5	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bromodichloroethane	10	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trans-1,3-Dichloropropene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	5	28000	5	4=	480	350	410	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dibromochloroethane	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	5	ND(300)	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	5	ND(300)	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cis-1,3-Dichloropropene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-Pentane	11	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	11	ND(300)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Tetrachloroethene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Styrene	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Xylene (total)	5	ND(300)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trifluoroethane	10	1100 B	8 B=	7 B=	13 B	13 B	29 B	8 B=	8 B=	4 B=	10	4=	4=	4=	4=	4=	4=	4=	4=	4=	4=	4=	4=
TOTAL VOLATILES DETECTED:		41900	25	38	569	438	576	31	40	59	37	38	38	38	38	38	38	38	38	38	38	38	38
TOTAL CORRECTED FOR LAB BLANKS:		28000	5	16	531	410	520	NO	28	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

NOTE:  
 1) All analysis performed in accordance with EPA Method 824 at Southern Petroleum Laboratories, Inc. in Houston, Texas.  
 2) Abbreviations:  
 ND ) - not detected at dilution factor indicated in parentheses.  
 B - Compound detected in laboratory DC blank.  
 \* - Reported value is less than the detection limit.  
 ( - Compound analyzed but not detected. The reported value is the minimum attainable detection limit for the sample.

Revised: 10/7/88

## 1.0 EXECUTIVE SUMMARY

During the period of 1962 to 1986, the former Fluorocarbon Co. property, located at 10420 Old Katy Road in Houston, Texas, was occupied by several commercial industrial companies involved in the manufacture of plastic and rubber products. Industrial operations were discontinued on this site in December, 1985, and all facilities dismantled the following year. However, site investigations conducted since the time of facility closure have detected residual concentrations of hazardous chemical substances within the surface soils and shallow groundwater underlying this property. In order to identify the potential sources of this contamination and confirm current contaminant concentrations, Groundwater Services, Inc. (GSI), has compiled available information on past waste handling practices at this facility and conducted a preliminary soil and groundwater testing program. This report details the procedures and results of this preliminary site investigation.

Existing historical information has been collected and reviewed to identify past owners of the former Fluorocarbon property and characterize their hazardous substance and waste handling practices. Principal sources of historical data included property deed records, state and local environmental agency files, commercial aerial photographs, and previous environmental site investigations. Within the scope of the GSI investigation, no direct interviews were conducted with former property owners, operators, or employees. Available records show this 12-acre tract to have been used for industrial operations from 1952 to 1986. A molded plastics manufacturing plant constructed on this site in 1962 and operated successively by Wyatt Metal & Boiler Works, Inc., U.S. Industries, Inc., Plastic & Rubber Products, Inc., and the Fluorocarbon Company. Past operating practices that potentially contributed to soil and groundwater contamination at this site include discharge of industrial wastewater into earthen drainage ditches, overflows from an underground acid waste holding tank, oil spillage from hydraulic presses and a waste oil recycling facility, and alleged disposal of degreasing agents (trichloroethylene) on the ground surface. The Fluorocarbon Co. discontinued manufacturing operations at this site in December, 1985, and all industrial facilities were dismantled by the end of the following year.

Home Depot, Inc., entered negotiations for the purchase of the Fluorocarbon site in 1985 and completed the transaction in January, 1986. During 1985, a series of environmental site investigations were conducted by Resource Engineering, Inc. (REI), to evaluate the potential environmental liabilities associated with this property. The property was purchased by Old Katy Road 28 Limited Partnership in late



Revised: 10/7/88

January, 1986, and site investigations were continued to facilitate formal closure of the industrial plant in accordance with state industrial waste regulations. The Texas Water Commission (TWC) approved soil excavation at four locations to remedy soil contamination by methylene chloride but required that additional investigations be conducted to determine the full extent of groundwater contamination detected in the vicinity of the former acid waste tank. Subsequent monitoring well installations showed trichloroethylene contamination of near-surface groundwater to be far more extensive than previously inferred. The property remains undeveloped at the present time.

In June-August, 1988, GSI conducted a preliminary site investigation at the former Fluorocarbon property to characterize general hydrogeologic site conditions and confirm soil and groundwater contamination levels. Geologic data presented in previous site reports show the site stratigraphy to consist of a surface layer of silty, sandy clay approximately 10 ft in thickness, underlain by a 5-7 ft thick sand deposit, in turn underlain by a second clay layer. Static water level measurements conducted by GSI indicate the sand layer to be saturated, with groundwater moving in a general southeast direction beneath the site under a lateral flow gradient of 0.005 - 0.01 ft/ft. Laboratory analyses of soil samples confirm oil contamination of surface soils at several locations in the vicinity of the former manufacturing facility. Total petroleum hydrocarbon (TPH) concentrations in areas of visible soil contamination range from 1740 to over 14,000 ppm. Volatile organic analyses of soil samples obtained from depths of 0.5 to three feet below grade found no residual waste solvents (i.e. methylene chloride, trichloroethylene, etc.) in the vicinities of the four closure excavations completed in 1986. However, measurable concentrations of trichloro-ethylene were detected in 12 of the 19 existing site monitoring wells, confirming relatively extensive contamination of groundwater within the near-surface sand layer underlying the site. A maximum trichloroethylene concentration of 53,000 ppb was measured in groundwater collected from well MW-10 located north of the former manufacturing building. Field and laboratory analyses completed to date are not adequate to define the full extent of soil and groundwater contamination beneath the former Fluorocarbon property.

The conclusions of this report are based solely upon available documentation and preliminary analytical data. GSI offers no warranty for the accuracy or completeness of this available information.

# LEGEND

--- X X X X ---  
FENCE LINE AT BOUNDARY.

▲ 3  
SOIL SAMPLE LOCATION AND DESIGNATION, MARCH, 1985.  
Sample depths 5 to 10 inches.  
Sample and analysis dates not specified in REI report.

■ HD-3  
SOIL SAMPLE LOCATION AND DESIGNATION, MAY, 1985.  
HD sample depths 0 to 3 feet.  
TB sample depths 0 to 10 feet.  
Sample dates 5-6-85 to 5-8-85.  
Analysis dates 5-17-85 to 5-23-85.

● 9 B-D  
SOIL SAMPLE LOCATION AND DESIGNATION, NOVEMBER, 1986.  
Sample depths 2 inches below Closure Area excavation surface.  
Sample date 8-12-86.  
Individual sample locations not specified in ERT report.

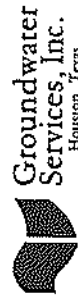
(MC:3.5)  
METHYLENE CHLORIDE, REPORTED IN PPM.  
(PCB:<1.0)  
POLYCHLORINATED BIPHENYL, NOT DETECTED AT DETECTION LIMIT OF 1.0 ppm.

NOTE:  
AT LOCATIONS WHERE MULTIPLE SAMPLES WERE ANALYZED, VALUE SHOWN IS THE HIGHEST VALUE REPORTED.

ALL DATA ARE FROM REI/ERT REPORTS, MARCH, 1985 THROUGH JANUARY, 1987. SEE TABLE 3.5.

SCALE, FT. 0 50 100 200

NOTE: SITE FEATURES LOCATED FROM AERIAL PHOTOGRAPHS, KOEHN ENGINEERING, INC. SURVEY DATA, REI/ERT REPORTS AND TEXAS WATER COMMISSION FILES.



JOB NO.: G-1050 SCALE: 1 in.=100 ft.

DATE: 9-23-88 FIGURE NO: 3.7

## RESULTS OF PREVIOUS SOIL SAMPLING AND TESTING PROGRAM

FORMER FLUOROCARBON PROPERTY  
10420 OLD KATY ROAD, HOUSTON, TEXAS

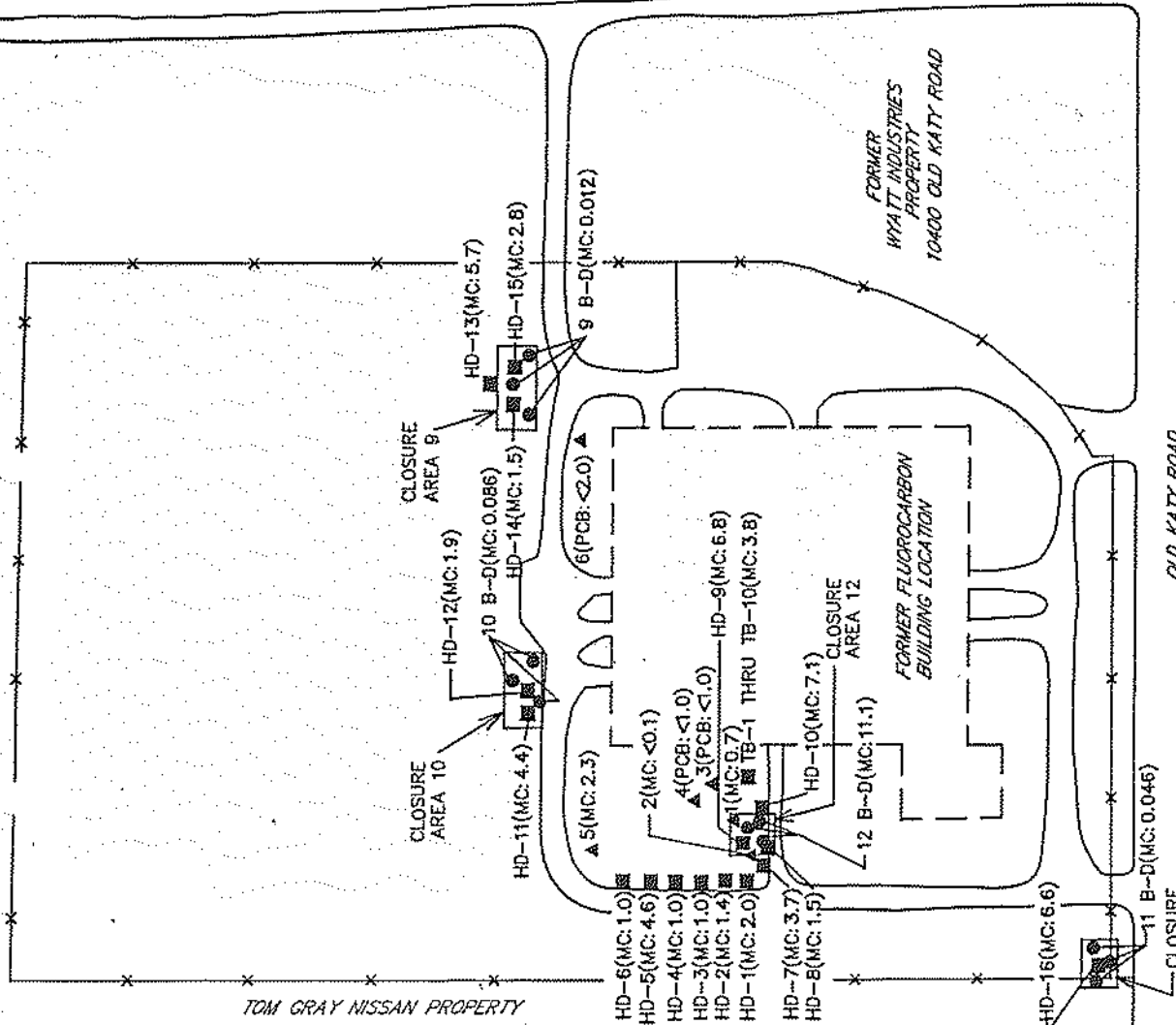
DRAWN BY: J.A.M.

CHECKED BY: RSC

APPROVED BY: ROL

HL&P PROPERTY

SHADOWDALE DITCH - HARRIS COUNTY FLOOD CONTROL DISTRICT



TOM GRAY NISSAN PROPERTY

FORMER INDUSTRIES PROPERTY  
10400 OLD KATY ROAD

OLD KATY ROAD

I-10 W. R.O.W.

# LEGEND

---\*---\*---\*  
FENCE LINE AT PROPERTY BOUNDARY.

HA-9  
△

HAND AUGER SAMPLE LOCATION AND DESIGNATION.

▲  
HAND AUGER LOCATION WITH VISIBLY CONTAMINATED SOIL.

TVO: 160

TOTAL VOLATILE ORGANIC CONCENTRATION, PPB.

TPH: 1740

TOTAL EXTRACTABLE PETROLEUM HYDROCARBON CONCENTRATION, PPM.

PCB:

POLYCHLORINATED BIPHENYL.

ND

NOT DETECTED AT MINIMUM DETECTION LIMITS.

TVO < 5 ppb (METHOD 524)

TPH < 20 ppm (METHOD 418 1)

PCB < 1 ppm (METHOD 608)

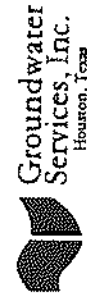
SEE TABLES 3.6 AND 3.7.

SCALE, FT. 0 50 100 200

NOTE: SITE FEATURES LOCATED FROM AERIAL PHOTOGRAPHS, KOEHN ENGINEERING, INC. SURVEY DATA, REI/ERT REPORTS, AND TEXAS WATER COMMISSION FILES.

JOB NO.: G-1050 SCALE: 1 in=100 ft.

DATE: 9-23-88 FIGURE NO.: 3.9



## SOIL SAMPLE TEST RESULTS

GROUNDWATER SERVICES, INC. JULY-AUGUST 1988

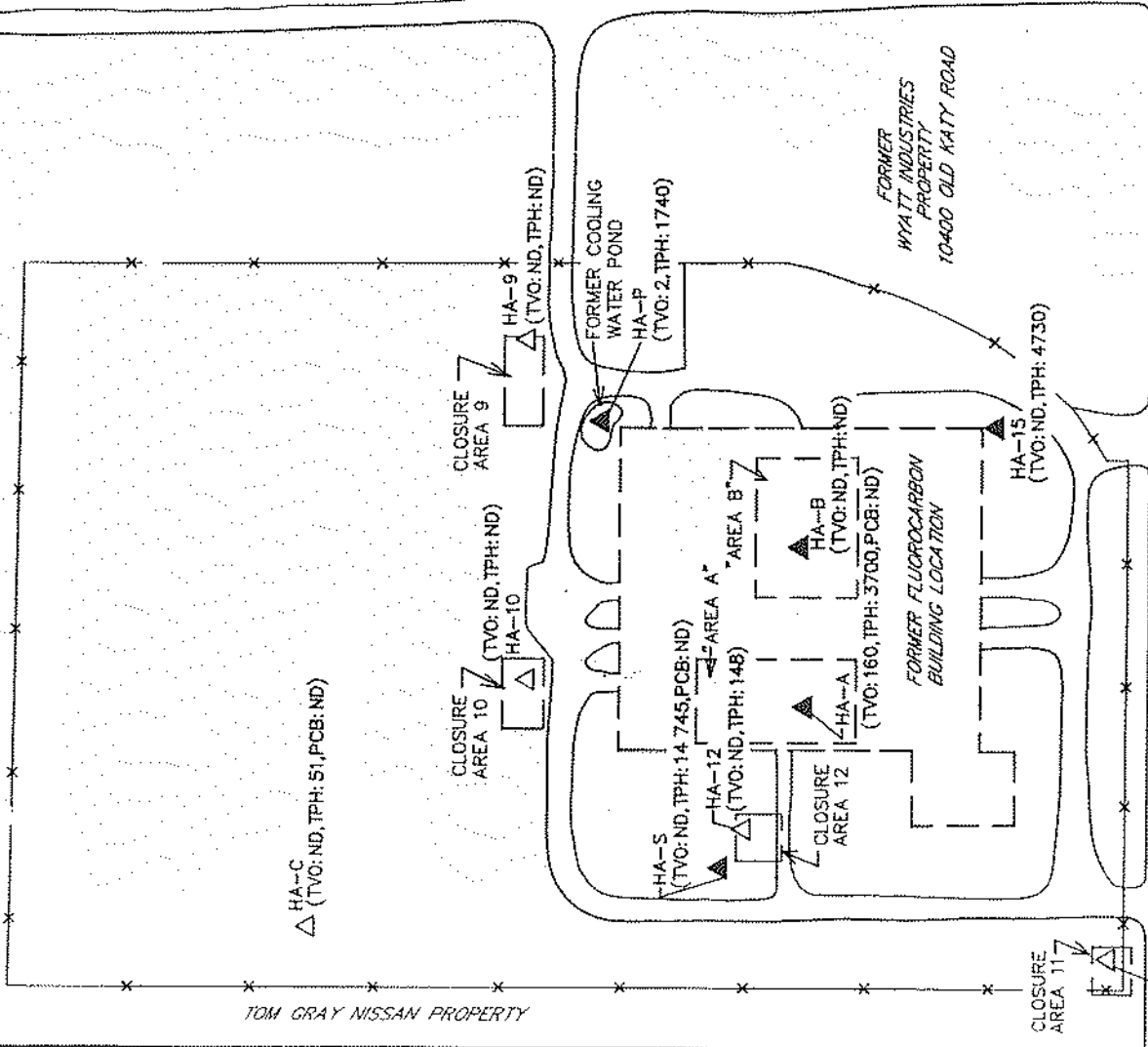
FORMER FLUOROCARBON PROPERTY

10420 OLD KATY ROAD, HOUSTON, TEXAS

DRAWN BY: J.A.M. CHECKED BY: J.S.L. APPROVED BY: J.S.L.

HL&P PROPERTY

SHADOWDALE DITCH - HARRIS COUNTY FLOOD CONTROL DISTRICT



HA-C  
△  
(TVO: ND, TPH: 51, PCB: ND)

CLOSURE AREA 10  
△  
(TVO: ND, TPH: ND)  
HA-10

CLOSURE AREA 9  
△  
(TVO: ND, TPH: ND)  
HA-9

FORMER COOLING WATER POND  
HA-P  
(TVO: 2, TPH: 1740)

FORMER FLUOROCARBON BUILDING LOCATION  
HA-A  
(TVO: 160, TPH: 3700, PCB: ND)

HA-12  
△  
(TVO: ND, TPH: 148)

AREA A

AREA B

HA-B  
△  
(TVO: ND, TPH: ND)

HA-15  
△  
(TVO: ND, TPH: 4730)

CLOSURE AREA 12  
△  
(TVO: ND, TPH: ND)

FORMER WYATT INDUSTRIES PROPERTY  
10400 OLD KATY ROAD

OLD KATY ROAD

HA-11  
△  
(TVO: ND, TPH: 110)

CLOSURE AREA 11  
△

HA-11  
△  
(TVO: ND, TPH: 110)

OLD KATY ROAD

1-10 W. R.O.W.

TOM GRAY NISSAN PROPERTY

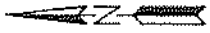






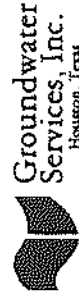
LEGEND

FENCE LINE AT PROPERTY BOUNDARY



SCALE, FT. 0 50 100 200

NOTE: SITE FEATURES LOCATED FROM AERIAL PHOTOGRAPHS, KOEHN ENGINEERING, INC. SURVEY DATA, RE/ERT REPORTS, AND TEXAS WATER COMMISSION FILES.



Groundwater Services, Inc. Houston, Texas

JOB NO.: G-1050

SCALE: 1 in. = 100 ft.

DATE: 9-23-88

FIGURE NO.: 2.1

GENERAL SITE MAP

FORMER FLUOROCARBON PROPERTY  
10420 OLD KATY ROAD, HOUSTON, TEXAS

DRAWN BY: J.A.M. | CHECKED BY: R.J.L. | APPROVED BY: R.S.L.

HL&P PROPERTY

SHADOWDALE DITCH - HARRIS COUNTY FLOOD CONTROL DISTRICT

FORMER WYATT INDUSTRIES PROPERTY  
10400 OLD KATY ROAD

FORMER FLUOROCARBON BUILDING LOCATION  
10420 OLD KATY ROAD

OLD KATY ROAD

I-10 W. R.O.W.

TOM GRAY NISSAN PROPERTY

Questions or Comments &gt;&gt;

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 [Customer Search](#)  
 [RE Search](#)  
 [ID Search](#)  
 [Document Search](#)  
 [Search Results](#)  
 [TCEQ Home](#)

## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100666924  
**Name:** SPRING BRANCH SERVICE CENTER  
**Primary Business:** FLEET REFUELING  
**Street Address:** 10310 KATY FWY, HOUSTON TX 77043 5105  
**County:** HARRIS  
**Nearest City:** HOUSTON  
**State:** TX  
**Near ZIP Code:** 77043  
**Physical Location:** 10310 OLD KATY RD HOUSTON TX

### Affiliated Customers - Current

Your Search Returned **3** Current Affiliation Records ([View Affiliation History](#))

#### 1-3 of 3 Records

CN Number	Customer Name	Customer Role	Details
CM600276653	HOUSTON LIGHTING & POWER COMPANY	OWNER OPERATOR	<a href="#">Details</a>
CM600591820	BOYER INC	OWNER OPERATOR	<a href="#">Details</a>
CM601095797	CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	OWNER OPERATOR	<a href="#">Details</a>

### Industry Type Codes

Code	Classification	Name
3273	SIC	Ready-Mixed Concrete

### Permits, Registrations, or Other Authorizations

There are a total of **11** programs and IDs for this regulated entity. Click on a column name to change the sort order.

#### 1-11 of 11 Records

Program ▲	ID Type	ID Number	ID Status
AIR NEW SOURCE PERMITS	ACCOUNT NUMBER	HG9849V	ACTIVE
IHW CORRECTIVE ACTION	SOLID WASTE REGISTRATION # (SWR)	34348	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD981518566	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	34348	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	103725	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	107730	INACTIVE

LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	96181	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	33347	INACTIVE
PETROLEUM STORAGE TANK STAGE II			
STORMWATER	PERMIT	TXR05T311	CANCELLED
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	2100	INACTIVE

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## Central Registry Query - Regulated Entity Information

### Regulated Entity Information

**RN Number:** RN100666924

**Name:** SPRING BRANCH SERVICE CENTER

**Primary Business:** FLEET REFUELING

**Street Address:** 10310 KATY FWY, HOUSTON TX 77043 5105

**County:** HARRIS

**Nearest City:** HOUSTON

**State:** TX

**Near ZIP Code:** 77043

**Physical Location:** 10310 OLD KATY RD HOUSTON TX

### Affiliated Customers - Current

Your Search Returned **3** Current Affiliation Records ([View Affiliation History](#))

#### 1-3 of 3 Records

CN Number	Customer Name	Customer Role	Details
CN600276653	HOUSTON LIGHTING & POWER COMPANY	OWNER OPERATOR	<a href="#">↗</a>
CN600591820	BOYER INC	OWNER OPERATOR	<a href="#">↗</a>
CN601095797	CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	OWNER OPERATOR	<a href="#">↗</a>

### Industry Type Codes

Code	Classification	Name
3273	SIC	Ready-Mixed Concrete

## Permits, Registrations, or Other Authorizations

There are a total of **11** programs and IDs for this regulated entity. Click on a column name to change the sort order.

### 1-11 of 11 Records

Program ▲	ID Type	ID Number	ID Status
AIR NEW SOURCE PERMITS	ACCOUNT NUMBER	HG9849V	ACTIVE
IHW CORRECTIVE ACTION	SOLID WASTE REGISTRATION # (SWR)	34348	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	EPA ID	TXD981518566	INACTIVE
INDUSTRIAL AND HAZARDOUS WASTE	SOLID WASTE REGISTRATION # (SWR)	34348	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	103725	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	107730	INACTIVE
LEAKING PETROLEUM STORAGE TANKS REMEDIATION	ID NUMBER	98181	INACTIVE
PETROLEUM STORAGE TANK REGISTRATION	REGISTRATION	33347	INACTIVE
<b>PETROLEUM STORAGE TANK STAGE II</b>			
STORMWATER	PERMIT	TXR05T311	CANCELLED
VOLUNTARY CLEANUP PROGRAM	ID NUMBER	2100	INACTIVE

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## Central Registry

### Detail of: IHW Corrective Action Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

---

### Related Information:

[Correspondence Tracking](#)

[Corrective Action Information](#)

There is no information related to this Corrective Action in the following categories:

**Commissioners' Actions**

**Effective Enforcement Orders**

**Criminal Convictions**

**Proposed Enforcement Orders**

**Complaints**

**Discharges**

**Emergency Response Events**

**Emission Events**

**Fish Kills**

**Other Incidents**

**Investigations**

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## Central Registry

### Detail of: IHW Corrective Action Solid Waste Registration 34348

For: [SPRING BRANCH SERVICE CENTER \(RN100666924\)](#)

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration

Status:

Responsible Parties: [CENTERPOINT ENERGY HOUSTON ELECTRIC LLC \(CN601095797\)](#) Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
14819008	07/18/2011	OUTGOING	APPROVAL			07/18/2011		
14782129	07/01/2011	INCOMING	UNIT CLOSURE RPT	WMU CLOSURE REQUEST; NOR INACTIVATION REQUEST	09/29/2011	07/18/2011	06/30/2011	CERTIFIED
1084907	08/09/1999	OUTGOING	APPROVAL			08/09/1999		USPS
1059154	05/20/1996	INCOMING	BRS FINAL RPT STD 1	CLOSURE REPORT SMALL QTY GENERATOR	12/01/2002	08/09/1999	05/14/1996	USPS

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## Central Registry

### Detail of: IHW Corrective Action Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

Legal	Description	Start Date	End Date	Type	Status	Status Date
34348	IHW CORRECTIVE ACTION	11/22/2002		CLEANUP	INACTIVE	07/18/2011

Tracking No.	Type	Value	Start Date	End Date
9316284	ADMINISTRATIVE STATUS	INACTIVE	07/18/2011	
14782128	PROJECT MANAGER	EWEHNER	07/01/2011	
1061497	PROJECT MANAGER	XWANG	05/28/1999	07/01/2011
1057547	EPA ID	TXD981518566	01/01/1901	

Physical	Description	Start Date	Type	Status	Status Date
HOUSTON INDUSTRIES INC OLD KATY RD HOUSTON		01/01/1901	IHW CA	COMPLETED WORKLOAD	07/18/2011

Tracking No.	Type	Value	Start Date	End Date
9336672	PROJECT PHASE	COMPLETED WORKLOAD	07/18/2011	
1214887	<a href="#">APPLICABLE PROGRAM RULES</a>	RRR	09/30/2014	
9326920	SOURCE OF RELEASE	SQG CONTAINER STORAG - Rule: RRS Std: 1	01/01/1901	
1231511	SOILS CHEMICAL OF CONCERN CLASSIFICATION - RRR	METALS	01/01/1901	
1231973	SOILS CHEMICAL OF CONCERN CLASSIFICATION - RRR	TPH	01/01/1901	

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## Central Registry

Detail of: **Industrial and Hazardous Waste Solid Waste Registration 34348** [View Solid Waste Registration](#)

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

[View Earlier Holders](#)

### Related Information:

#### [Solid Waste Registration Information](#)

There is no information related to this Solid Waste Registration in the following categories:

- [Commissioners' Actions](#)
- [Correspondence Tracking](#)
- [Effective Enforcement Orders](#)
- [Criminal Convictions](#)
- [Proposed Enforcement Orders](#)
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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

#### Facility Information

**Registration Number:** 34348

**Status:** Closed

**Site Name:** CENTERPOINT ENERGY HOUSTON ELECTRIC SPRING BRANCH

**Company Name:** CENTERPOINT ENERGY HOUSTON ELECTRIC LLC

**Site Street Address:** 10310 KATY FWY, HOUSTON, TX, 77043

**Site Location:** 10310 Old Katy Rd, Houston, TX 77043

**County:** HARRIS

**EPA Number:** TXD981518566

**Registration Type:** Generator

**Generator Type:** Non-Industrial

**SIC Code:**

**NAICS Code:** 221122 Electric Power Distribution

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[View Waste Receipt Report](#)   **Waste Receipt Report not available**

[View Waste Management Units](#) [View Waste](#)

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

#### Facility Information

#### IHW Waste Management Units

Sequence Number	Description	Unit Type	Status
001	WASTE OIL COLLECTION TANK	Tank (sub-surface)	CLOSED
002	Car wash sump	Sump	CLOSED
003	Drum storage area	Container storage area	CLOSED
004	PCB storage area	Container storage area	CLOSED
005	BINS	Container storage area	CLOSED
006	Lift rack sump	Sump	CLOSED

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## Central Registry

Detail of: **Industrial and Hazardous Waste Solid Waste Registration 34348**

For: **SPRING BRANCH SERVICE CENTER (RN1006669224)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CNG601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### [BACK TO:](#) Facility Information

#### IHW Waste Management Unit

Sequence Number: 001	Unit Type: Tank (sub-surface)	Unit Status: CLOSED	Description: WASTE OIL COLLECTION TANK
Permit Number	UIC Number	Manages Off-Site Waste	Management
		No	Capacity
			Regulatory Status

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		



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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### Facility Information

#### IHW Waste Management Unit

Sequence Number: 002	Unit Type: Sump	Unit Status: CLOSED	Description: Car wash sump
Permit Number	UIC Number	Manages Off-Site Waste	Management
		No	Capacity
			Regulatory Status

### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN1006669224)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### [BACK TO](#) Facility Information

#### IHW Waste Management Unit

<b>Sequence Number:</b> 003	<b>Unit Type:</b> Container storage area	<b>Unit Status:</b> CLOSED	<b>Description:</b> Drum storage area	
<b>Permit Number</b>	<b>UIC Number</b>	<b>Manages Off-Site Waste</b>	<b>Management</b>	<b>Capacity</b>
		No		
			<b>Regulatory Status</b>	

#### IHW Waste Detail

<b>Waste Code:</b>	<b>Company:</b>	<b>Description:</b>
No Waste Stream Information exists for this Waste Management Unit		



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## Central Registry

Detail of: **Industrial and Hazardous Waste Solid Waste Registration 34348**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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#### IHW Waste Management Unit

<b>Sequence Number:</b> 004	<b>Unit Type:</b> Container storage area	<b>Unit Status:</b> CLOSED	<b>Description:</b> PCB storage area	
<b>Permit Number</b>	<b>UIC Number</b>	<b>Manages Off-Site Waste</b>	<b>Management</b>	<b>Capacity</b>
		No		
			<b>Regulatory Status</b>	

#### IHW Waste Detail

<b>Waste Code:</b>	<b>Company:</b>	<b>Description:</b>
No Waste Stream Information exists for this Waste Management Unit		

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: [SPRING BRANCH SERVICE CENTER \(RN1006669224\)](#)

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**OWNER OPERATOR Since 12/02/1986 [View Compliance History](#)

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#### IHW Waste Management Unit

<b>Sequence Number:</b> 005	<b>Unit Type:</b> Container storage area	<b>Unit Status:</b> CLOSED	<b>Description:</b> BINS	
<b>Permit Number</b>	<b>UIC Number</b>	<b>Manages Off-Site Waste</b>	<b>Management</b>	<b>Capacity</b>
		No		
				<b>Regulatory Status</b>

#### IHW Waste Detail

<b>Waste Code:</b>	<b>Company:</b>	<b>Description:</b>
No Waste Stream Information exists for this Waste Management Unit		



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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**  
Registration  
Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

#### [BACK TO](#) Facility Information

#### IHW Waste Management Unit

Sequence Number: 006	Unit Type: Sump	Unit Status: CLOSED	Description: Lift rack sump
Permit Number	UIC Number	Manages Off-Site Waste	Management
		No	141 (Storage, bulking, and/or transfer off site - no treatment/recovery, fuel blending or disposal at this site.)
			Capacity
			Regulatory Status
			Non-Hazardous Regulated

#### IHW Waste Detail

Waste Code:	Company:	Description:
No Waste Stream Information exists for this Waste Management Unit		

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Compliance History for Customer at this Site (If no Site appears in the same row, this is the Customer's overall compliance history.)									
Site Associated with This Customer					Site				
Customer	Name	City or Nearest City	County	TCEQ Region	Related Numbers	Rating	Classification	Date Rated	Date Posted
HOUSTON LIGHTING & POWER COMPANY	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 98181</li> <li>▪ TXR05T311</li> <li>▪ 107730</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
RELIANT ENERGY INCORPORATED	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 98181</li> </ul>			09/01/2011	
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD981518566</li> <li>▪ HG9849V</li> <li>▪ 33347</li> <li>▪ TXD981518566</li> <li>▪ 103725</li> <li>▪ 103725</li> <li>▪ 107730</li> <li>▪ 98181</li> <li>▪ 33347</li> <li>▪ 98181</li> <li>▪ 2100</li> </ul>	0	HIGH	09/01/2008	11/15/2014



Compliance History Report

BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXD981518566</li> </ul>	0		09/01/2011	
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXR05T311</li> <li>▪ 2100</li> <li>▪ 98181</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
HOUSTON LIGHTING & POWER COMPANY	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 33347</li> <li>▪ HG9849V</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
RELIANT ENERGY INCORPORATED	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 34348</li> <li>▪ TXR05T311</li> </ul>			09/01/2011	
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 2100</li> <li>▪ 34348</li> <li>▪ 2100</li> <li>▪ 103725</li> </ul>	0	HIGH	09/01/2008	11/15/2014
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 2100</li> <li>▪ 98181</li> </ul>	0		09/01/2011	
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ HG9849V</li> <li>▪ 33347</li> </ul>	0		09/01/2011	

BOYER INC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0			09/01/2011	
BOYER INC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0	UNCLASSIFIED		09/01/2010	11/15/2014
HOUSTON LIGHTING & POWER COMPANY	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0	UNCLASSIFIED		09/01/2011	11/15/2014
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0	HIGH		09/01/2009	11/15/2014
BOYER INC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0			09/01/2011	
BOYER INC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0			09/01/2011	
BOYER INC	SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	0	UNCLASSIFIED		09/01/2009	11/15/2014

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HOUSTON LIGHTING & POWER COMPANY	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 34348</li> <li>▪ 2100</li> <li>▪ 107730</li> <li>▪ HG9849V</li> <li>▪ TXD981518566</li> <li>▪ 34348</li> <li>▪ 98181</li> <li>▪ 2100</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
RELIANT ENERGY INCORPORATED	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXR05T311</li> <li>▪ 34348</li> <li>▪ 98181</li> </ul>			09/01/2011	
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ HG9849V</li> <li>▪ 33347</li> <li>▪ 2100</li> <li>▪ 107730</li> </ul>			09/01/2011	
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 2100</li> <li>▪ 98181</li> <li>▪ TXD981518566</li> <li>▪ HG9849V</li> <li>▪ 34348</li> <li>▪ 103725</li> <li>▪ HG9849V</li> <li>▪ TXD981518566</li> <li>▪ 2100</li> </ul>	0	HIGH	09/01/2008	11/15/2014
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 33347</li> <li>▪ TXR05T311</li> <li>▪ 103725</li> <li>▪ 107730</li> </ul>	0		09/01/2011	
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 2100</li> <li>▪ 103725</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014

HOUSTON LIGHTING & POWER COMPANY	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 107730</li> <li>▪ 33347</li> <li>▪ TXR05T311</li> <li>▪ 103725</li> <li>▪ 98181</li> <li>▪ HG9849V</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
HOUSTON LIGHTING & POWER COMPANY	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ HG9849V</li> <li>▪ 103725</li> <li>▪ 107730</li> <li>▪ 103725</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 34348</li> <li>▪ TXR05T311</li> <li>▪ 107730</li> <li>▪ 2100</li> <li>▪ 107730</li> </ul>	0	HIGH	09/01/2008	11/15/2014
BOYER INC	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 107730</li> </ul>	0		09/01/2011	
BOYER INC	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXR05T311</li> <li>▪ 107730</li> </ul>	0		09/01/2011	
BOYER INC	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 34348</li> <li>▪ 2100</li> <li>▪ 107730</li> <li>▪ 33347</li> <li>▪ TXR05T311</li> <li>▪ 33347</li> </ul>	0	UNCLASSIFIED	09/01/2008	11/15/2014
HOUSTON LIGHTING & POWER COMPANY	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ 34348</li> <li>▪ 107730</li> <li>▪ 34348</li> </ul>	0	UNCLASSIFIED	09/01/2011	11/15/2014



CENTERPOINT ENERGY HOUSTON ELECTRIC LLC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ TXR05T311</li> <li>▪ 98181</li> <li>▪ 33347</li> <li>▪ TXR05T311</li> <li>▪ 33347</li> <li>▪ 2100</li> <li>▪ 103725</li> <li>▪ HG9849V</li> <li>▪ 33347</li> <li>▪ TXR05T311</li> <li>▪ 103725</li> <li>▪ 107730</li> </ul>	0	HIGH	09/01/2009	11/15/2014
BOYER INC	SPRING BRANCH SERVICE CENTER	HOUSTON	HARRIS	REGION 12 - HOUSTON	<ul style="list-style-type: none"> <li>▪ HG9849V</li> </ul>	0		09/01/2011	

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#### What's a "site"?

A "site" (sometimes called a "regulated entity") is any person or thing that is of environmental interest to the TCEQ. At a "site", one or more regulatory activities of interest to us occur or have occurred in the past. Some examples of sites are:

- Industrial plants, such as the Exxon Baytown Facility
- Small businesses, such as Texaco Gas Station #200 or Elroy's Dry Cleaning & Laundry
- Public facilities, such as the City of Austin's Hornsby Bend Wastewater Treatment Plant

#### What's a "customer"?

A "customer" owns, operates, is responsible for, or is affiliated with a regulated entity. Examples include:

- Major industrial corporations, such as Exxon USA, Exxon Inc, or Texaco Inc
- Small businesses, such as Karl Redmond dba Karl's Kleeners, which owns several dry-cleaner locations
- Governmental bodies, such as the City of Austin, the United States Air Force, or a municipal utility district
- Individuals, such as Karl A. Redmond, owner of Karl Redmond dba Karl's Kleeners

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## Central Registry

### Detail of: Industrial and Hazardous Waste Solid Waste Registration 34348

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Solid Waste **INACTIVE**

Registration

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### Facility Information

#### IHW Waste

Texas Waste Code	Waste Description
0005409H	Solvent contaminated rags are rags contaminated with solvent, dried paint, and oily residues. Rags are used during painting for cleanup activities, and they are also used in maintenance-related activities for cleaning or degreasing equipment. Existing wastestream on Notice of Registration.
0006204H	Spent solvent is a clear and colorless to dark gray/black opaque liquid and has a strong organic odor. Spent solvents are generated during various painting and maintenance activities (i.e., cleaning, degreasing, etc.). Existing wastestream on Notice of Registration.
0008209H	Liquid paint waste includes unused paint that has not hardened and still flows. This waste will also include paint thinner that is not used as a cleaning solvent but as a thinning agent for the paint. Periodically paint that is not used must be disposed of. Existing wastestream on Notice of Registration.
0010219H	Waste diesel is a liquid with either one or two visible phases. If two phases are present, the lighter (upper) phase is diesel and the heavier (lower) phase is water. Diesel is used throughout the facility in various pieces of equipment. Occasionally this fuel becomes contaminated with water due to condensation, water leaking into tanks, or equipment damage allowing coolant to contaminate the fuel.
0011219H	Waste gasoline is a liquid with either one or two visible phases. If two phases are present, the lighter (upper) phase is gasoline and the heavier (lower) phase is water. Gasoline is used throughout the facility in various pieces of equipment. Occasionally this fuel becomes contaminated with water due to condensation, water leaking into tanks, or equipment damage allowing coolant to contaminate the fuel.
0013307H	Metal grinding waste is powdery brown/black metal fines. It is generated from the various types of grinding equipment utilized in the machine shops, and field locations for smoothing and finishing metal surfaces. This waste is composed of grinding fines, cutting oil, coolant, solvents, and degreasers. Initial generation December, 1993.
0014101H	Machine coolant is a liquid which is composed of water, machine coolant, cutting oils, solvents, and grinding fines. It is generated from the various machining operations as a function of a heat transfer medium. First generated approximately December, 1993.
0020409H	Paint waste, solid includes dry, unused paint that is hardened and no longer flows. Periodically paint that is not used loses its solvents and will no longer flow. This dry, unused paint is disposed. The composition



	of this waste will vary with each shipment but will consist mainly of dry paint. Existing wastestream on Notice of Registration.
0030409H	Paint waste debris is comprised of used plastic and cloth drop cloths used to cover equipment and floors during painting activities. Paint waste debris also includes any rags, filters, stirring sticks, and paint brushes. Existing wastestream.
01013111	Asbestos
01031191	Diesel contaminated with water (Class 1)
01061191	Gasoline contaminated with water (Class 1)
01073011	Hydrocarbon contaminated soil
01083011	Mineral oil contaminated soil (<1 ppm PCBs) has an oily hydrocarbon odor and the color varies from light brown to black. This waste has been generated by spill/cleanup activities. Existing wastestream on Notice of Registration.
01093191	Blast Grit (Class 1) is dry blast media contam. w/rust, debris & paint chips & is generated from surface preparation. Recycling: Waste is recycled by Southern Crushed Concrete in Houston, TX as feedstock for road aggregate per notification 14Jul98.
01103101	Used oil filters is composed of used vehicle or machine oil filters. Used oil filters are generated during routine vehicle or machinery maintenance when they are removed for disposal. Existing wastestream on Notice of Registration.
01133081	RCRA empty metal containers of all types and sizes that meet all requirements of RCRA empty (31 TAC 335.41(f)(2)). This waste is generated by general plant operations and maintenance activities. Existing wastestream on Notice of Registration.
01144061	RCRA empty plastic or fiber containers of all types and sizes that meet all requirements of RCRA empty (31 TAC 335.41(f)(2)). This waste is generated by general plant operations and maintenance activities. Existing wastestream on Notice of Registration.
01166031	Lift rack sump waste is brown to black sludge material with a strong hydrocarbon odor. Hydraulic lift seals and cylinders periodically leak oil into the lift rack. Oil is also released into the lift rack during vehicle maintenance activities. Additionally, this waste is comprised of rinse water from floor washing activities. Existing wastes stream on Notice of Registration.
01172961	Spent antifreeze is a liquid with low viscosity. It is also opaque and green to brown in color. Antifreeze (ethylene glycol) is used in various pieces of equipment as a coolant and/or as instrumentation liquid to lower the freezing point and raise the boiling point of the coolant and/or liquid. Periodically this material must be drained and disposed of. Existing wastestream on Notice of Registration.
01194091	Waste grease
01202061	Waste oil is used hydraulic, mineral or motor oils from vehicles, electrical equipment or any other mechanical equipment. Any oil in this category contains less than 1 ppm PCBs. Used oil is drained from various pieces of equipment or vehicles periodically. Existing wastestream on Notice of Registration.
01216031	Vehicle wash rack sludge
01234091	Spent roofing material varies in size and shape. It is composed of tar paper, asphalt, gravel, and foam insulation. It is a dark brown to black and has a slight hydrocarbon odor. It is generated from replacing worn or damaged roofs. Existing wastestream on Notice of Registration.
01254891	Floorsweep is a brown/red saw dust with a hydrocarbon odor. Floorsweep is generated as a result of dust and dirt control from floor sweeping activities. Existing wastestream on Notice of Registration.
01273071	Metal grinding waste (dry) are powdery brown/black metal fines. It is generated from the various types of grinding equipment utilized in the machine shops, and field locations for smoothing and finishing metal surfaces. It also includes welding slag that is chipped or ground from surface welds, and boiler rust from the surface preparation of boiler tubes. These machining operations use no coolant
01284091	



01294091	Asbestos roofing material with Asphalt varies in size and shape. It is dark brown and has a slight hydrocarbon odor. Spent roofing material is generated from replacing worn or damaged roofs. Existing wastestream.
01403091	Paint waste debris is comprised of used plastic & fabric drop cloths, contam.rags, filters, stir sticks & brushes.
01504891	Used carbon zinc batteries that are removed from service when their useful life has expired. 1st gen. Feb. 96
02013902	Hydrocarbon contaminated rags/ Absorbent material; Maintenance related activities. Existing wastestream on notice of registration.
02033082	Construction Debris is made up of various non-inert debris form construction/renovation activities such as rock, brick, concrete, dirt and certain plastics and rubber, which meet the Class 2 classification criteria. Existing wastestream. May include used asphalt, and spent roofing material. Recycling: Waste is recycled by Southern Crushed Concrete in Houston, TX as feedstock for road aggregate per
02044062	Class 2 empty metal containers that are 5 gallons or greater and meet all requirements of a Class 2 empty container (31 TAC 335.508(2)). This waste is generated by general plant operations and maintenance activities. Existing wastestream on Notice of Registration.
02053012	Class 2 fiber or plastic containers that are 5 gallons or greater and meet all requirements of a 'Class 2 empty container (31 TAC 335.508(2)). This waste is generated by general plant operations and maintenance activities. Existing wastestream on Notice of Registration.
02063192	Mineral oil contaminated soil (Class 2) contains less than one ppm PCBs. The soil has an oily hydrocarbon odor and the color varies from light brown to black. This waste has been generated by oil spill cleanup activities. It is comprised of soil with hydrocarbons present at levels below 1,500 ppm. Existing wastestream on Notice of Registration. Waste is recycled into TxDOT spec items 247 and/or 2
02099022	Blast Grit (Class 2) is dry blast media contam. w/rust, debris & paint chips & is generated from surface preparation. Recycling: Waste is recycled by Southern Crushed Concrete in Houston, TX as feedstock for road aggregate per notification 14Jul98.
02174882	General miscellaneous plant trash
02183012	Creosote treated wood will include pieces of cylindrical poles, cross-arms, railroad ties, etc. These pieces will vary in size, shape and color. The wood may have a strong creosol/creosote odor. This waste is primarily generated from replacing utility poles but may also, at times, be generated during construction/renovation activities. Existing wastestream on Notice of Registration.
02404882	Hydrocarbon contaminated soil is contaminated with petroleum based oils and fuels. The soil has an oily hydrocarbon odor and the color varies from light brown to black. This waste has been generated by spill cleanup activities or by underground storage tank construction/remediation projects. Total petroleum hydrocarbon is less than 1500 ppm. Existing wastestream on Notice of Registration.
02474092	Penta treated wood will include pieces of cylindrical poles, cross-arms, railroad ties, etc. These pieces will vary in size, shape and color. This waste is primarily generated as a function of replacement activities but may also at times be generated during construction/renovation activities. Existing wastestream on Notice of Registration.
02484092	Padcrete (reacted portion) is a solid, yellow, light weight material; 7/93
02494092	Reacted Poly set that remained from utility pole straightening activities
02604092	Paint waste debris
04023081	100% Medical Waste (wastes associated with first aid station, medical emergencies, or other non-surgical medical treatment)
04032981	PCB contaminated containers (<50 ppm PCBs)
04062191	PCB capacitors (>500 ppm)
	Non-PCB capacitors

04112971	PCB contaminated oil (>=50 and <500 ppm PCBs)
04133941	PCB contaminated soil/debris (>50 ppm PCBs)
04144071	PCB contaminated soil/debris (1 ppm to <50 ppm PCBs)
04154072	PCB contaminated soil/debris (1 ppm to <50 ppm PCBs)
04192191	PCB contaminated oil (<50 ppm PCBs)
0501203H	Waste naphtha

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 103725**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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## Central Registry

### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 103725

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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5397479	03/04/1993	INCOMING	RATR			08/25/1992		
5397478	03/03/1993	INCOMING	OTHER			08/25/1992		
5513440	01/25/1993	OUTGOING	RR			01/25/1993	01/25/1993	
5397477	10/22/1992	INCOMING	QTR MONIT			01/25/1993		
5513439	08/25/1992	OUTGOING	FINAL			08/25/1992	08/25/1992	
5513441	08/25/1992	OUTGOING	NLR			08/25/1992	08/25/1992	
5513442	08/25/1992	OUTGOING	NLR			08/25/1992	08/25/1992	

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### Central Registry

#### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 103725

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HDUSTON LIGHTING & POWER CDMPCANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

Legal	Description	Start Date	End Date	Type	Status	Status Date
103725	LEAKING PETROLEUM STORAGE TANK	07/07/1992	08/25/1992	CLEANUP	INACTIVE	08/25/1992

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 107730**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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### Central Registry

#### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 107730

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CNG00276653)** Since 08/25/1993 View Compliance History

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
5566868	02/01/1994	OUTGOING	FINAL			02/01/1994	02/01/1994	

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## Central Registry

### Detail of: Leaking Petroleum Storage Tanks Remediation ID Number 107730

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

Legal	Description	Start Date	End Date	Type	Status	Status Date
107730	LEAKING PETROLEUM STORAGE TANK	02/16/1994	02/01/1994	CLEANUP	INACTIVE	02/01/1994

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## Central Registry

Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 98181**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 98181**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
4745288	03/21/2008	OUTGOING	FINAL			03/21/2008	03/21/2008	
4745287	01/03/2008	OUTGOING	NLR			01/03/2008	01/03/2008	
4591133	12/07/2007	INCOMING	TECH RESP			01/03/2008	10/30/2007	
4745286	11/05/2007	OUTGOING	FINAL			11/05/2007	11/05/2007	
4591132	09/06/2007	INCOMING	REL DET			11/05/2007	07/27/2007	
4745285	09/29/1999	OUTGOING	NLR			09/29/1999	09/29/1999	
4591131	07/07/1999	INCOMING	FSC			09/29/1999	06/29/1999	
4745248	01/15/1999	OUTGOING	NLR			01/15/1999	01/15/1999	
4745283	01/15/1999	OUTGOING	RR - CAR			01/15/1999	01/15/1999	
4745284	01/15/1999	OUTGOING	FINAL			01/15/1999	01/15/1999	
4745282	01/14/1999	OUTGOING	RR			01/14/1999	01/14/1999	
4591128	11/10/1998	INCOMING	ASS A - ADD			01/14/1999	11/09/1998	
4591129	11/09/1998	INCOMING	PROP ACT13			01/15/1999	11/09/1998	
4591130	11/09/1998	INCOMING	SCR			01/15/1999	11/09/1998	
4745281	03/17/1998	OUTGOING	RR - CAR			03/17/1998	03/17/1998	

4745279	03/16/1998	OUTGOING	NLR		03/16/1998	03/16/1998
4745280	03/16/1998	OUTGOING	RR		03/16/1998	03/16/1998
4591126	02/23/1998	INCOMING	RBA		03/16/1998	02/20/1998
4591127	02/23/1998	INCOMING	PROP ACT 5		03/17/1998	02/20/1998
4591125	12/22/1997	INCOMING	MONIT ANNL		03/16/1998	11/21/1997
4745278	10/27/1997	OUTGOING	RR - CAR		10/27/1997	10/27/1997
4591124	10/06/1997	INCOMING	PROP ACT 5		10/27/1997	10/01/1997
4745277	07/08/1997	OUTGOING	RR - CAR		07/08/1997	07/08/1997
4591123	06/12/1997	INCOMING	PROP ACT 8		07/08/1997	06/09/1997
4745276	06/06/1997	OUTGOING	NLR		06/06/1997	06/06/1997
4591122	04/28/1997	INCOMING	MPR		06/06/1997	04/22/1997
4745273	03/14/1997	OUTGOING	RR - CAR		03/14/1997	03/14/1997
4745274	03/14/1997	OUTGOING	RR - CAR		03/14/1997	03/14/1997
4745275	03/14/1997	OUTGOING	NLR		03/14/1997	03/14/1997
4591121	03/10/1997	INCOMING	OTHER		03/14/1997	03/05/1997
4591119	02/14/1997	INCOMING	PROP ACT15		03/14/1997	02/10/1997
4591120	02/14/1997	INCOMING	PROP ACT 5		03/14/1997	02/10/1997
4745270	11/13/1996	OUTGOING	RR - CAR		11/13/1996	11/13/1996
4745271	11/13/1996	OUTGOING	NLR		11/13/1996	11/13/1996
4745272	11/13/1996	OUTGOING	RR - CAR		11/13/1996	11/13/1996
4745264	11/06/1996	OUTGOING	NLR		11/06/1996	11/06/1996
4745265	11/06/1996	OUTGOING	NLR		11/06/1996	11/06/1996
4591118	10/30/1996	INCOMING	MONIT ANNL		11/13/1996	10/28/1996
4745269	10/25/1996	OUTGOING	REJ TECH		10/25/1996	10/25/1996
4591116	10/15/1996	INCOMING	PROP ACT19		11/13/1996	10/10/1996
4591117	10/15/1996	INCOMING	MPR		11/13/1996	10/10/1996
4745268	07/11/1996	OUTGOING	RCPT		07/11/1996	07/11/1996
4591114	07/08/1996	INCOMING	PROP ACT17		07/11/1996	07/01/1996
4591115	07/08/1996	INCOMING	PROP ACT12		10/25/1996	07/01/1996
4745266	02/07/1996	OUTGOING	RCPT		02/07/1996	02/07/1996
4745267	02/07/1996	OUTGOING	RCPT		02/07/1996	02/07/1996
4591111	01/29/1996	INCOMING	MES		11/06/1996	01/24/1996
4591112	01/29/1996	INCOMING	PROP ACT12		02/07/1996	01/22/1996

	01/29/1996	INCOMING	PROP ACT17		02/07/1996	01/22/1996
4591113		INCOMING	MPR		11/06/1996	01/08/1996
4591110	01/12/1996	INCOMING	NLR		01/12/1996	01/12/1996
4745240	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745243	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745244	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745245	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745246	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745259	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745260	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745261	01/12/1996	OUTGOING	NLR		01/12/1996	01/12/1996
4745262	01/12/1996	OUTGOING	REJ ADMIN		01/12/1996	01/12/1996
4745263	01/12/1996	OUTGOING	REJ ADMIN		01/12/1996	01/12/1996
4591108	01/09/1996	INCOMING	PROP ACT17		01/12/1996	12/19/1995
4591109	01/09/1996	INCOMING	PROP ACT12		01/12/1996	12/19/1995
4591107	01/08/1996	INCOMING	MONIT ANNL		01/12/1996	10/27/1995
4591106	06/21/1995	INCOMING	NTO		01/12/1996	06/21/1995
4745242	06/06/1995	OUTGOING	NLR		06/06/1995	06/06/1995
4591105	04/27/1995	INCOMING	MES		01/12/1996	04/20/1995
4745241	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745249	11/10/1994	OUTGOING	RR		11/10/1994	11/10/1994
4745250	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745251	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745252	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745253	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745254	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745255	11/10/1994	OUTGOING	NLR		11/10/1994	11/10/1994
4745256	11/10/1994	OUTGOING	RR - CAR		11/10/1994	11/10/1994
4745257	11/10/1994	OUTGOING	RR - CAR		11/10/1994	11/10/1994
4745258	11/10/1994	OUTGOING	RR		11/10/1994	11/10/1994
4591102	11/03/1994	INCOMING	PROP ACT 8		11/10/1994	10/06/1994
4591103	11/03/1994	INCOMING	PROP ACT12		11/10/1994	10/06/1994
4591104	11/03/1994	INCOMING	MONIT ANNL		11/10/1994	10/05/1994
4591101	04/13/1994	INCOMING	MES		11/10/1994	



	02/14/1994	INCOMING	MPR	11/10/1994
4591100		INCOMING	MPR	
4591099	01/13/1994	INCOMING	MES	11/10/1994
4591098	01/11/1994	INCOMING	MPR	11/10/1994
4591097	11/17/1993	INCOMING	OTHER	11/10/1994
4591096	11/16/1993	INCOMING	MPR	11/10/1994
4591095	10/19/1993	INCOMING	MONIT ANNL	11/10/1994
4591094	10/18/1993	INCOMING	GENL INFO	01/15/1999
4745247	09/27/1993	OUTGOING	PREAPP DOC	09/27/1993
4591093	09/23/1993	INCOMING	GENL INFO	01/12/1996
4591092	09/17/1993	INCOMING	GENL INFO	01/12/1996
4591091	08/31/1993	INCOMING	OTHER	01/12/1996
4591090	08/19/1993	INCOMING	OTHER	01/12/1996
4591088	07/22/1993	INCOMING	FAR	11/10/1994
4591089	07/22/1993	INCOMING	RAP INSTAL	06/06/1995
4591087	07/19/1993	INCOMING	OTHER	01/12/1996
4745218	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745219	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745220	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745221	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745222	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745223	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745224	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745225	06/03/1993	OUTGOING	NLR	06/03/1993
4745226	06/03/1993	OUTGOING	RR - RAP	06/03/1993
4745227	06/03/1993	OUTGOING	NLR	06/03/1993
4745228	06/03/1993	OUTGOING	NLR	06/03/1993
4745229	06/03/1993	OUTGOING	NLR	06/03/1993
4745230	06/03/1993	OUTGOING	NLR	06/03/1993
4745231	06/03/1993	OUTGOING	NLR	06/03/1993
4745232	06/03/1993	OUTGOING	NLR	06/03/1993
4745234	06/03/1993	OUTGOING	RR - CAR	06/03/1993
4745235	06/03/1993	OUTGOING	NLR	06/03/1993
4745236	06/03/1993	OUTGOING	RR - RAP	06/03/1993

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4745238	06/03/1993	OUTGOING	NLR		06/03/1993	06/03/1993
4745239	06/03/1993	OUTGOING	NLR		06/03/1993	06/03/1993
4591086	05/25/1993	INCOMING	OTHER		06/03/1993	
4591085	04/26/1993	INCOMING	GENL INFO		06/03/1993	
4745237	04/23/1993	OUTGOING	CLASS V		04/23/1993	04/23/1993
4591083	04/22/1993	INCOMING	OTHER		06/03/1993	
4591084	04/22/1993	INCOMING	MES		06/03/1993	
4591082	04/19/1993	INCOMING	RAP INSTAL		06/03/1993	
4745233	03/02/1993	OUTGOING	ACTN RQST		03/02/1993	03/02/1993
4591080	02/18/1993	INCOMING	CONTINUE-Y		06/03/1993	
4591081	02/18/1993	INCOMING	QUEST		06/03/1993	
4591076	01/29/1993	INCOMING	CONTINUE-Y		06/03/1993	
4591077	01/29/1993	INCOMING	CONTINUE-Y		06/03/1993	
4591078	01/29/1993	INCOMING	QUEST		06/03/1993	
4591079	01/29/1993	INCOMING	QUEST		06/03/1993	
4591075	01/22/1993	INCOMING	QTR MONIT		06/03/1993	
4591074	12/09/1992	INCOMING	GENL INFO		06/03/1993	
4591073	10/30/1992	INCOMING	QTR MONIT		06/03/1993	
4591072	10/27/1992	INCOMING	RAP		06/03/1993	
4591071	10/22/1992	INCOMING	QTR MONIT		06/03/1993	
4591070	10/12/1992	INCOMING	GENL INFO		06/03/1993	
4591069	10/07/1992	INCOMING	OTHER		06/03/1993	
4591068	09/18/1992	INCOMING	GENL INFO		06/03/1993	
4745212	08/04/1992	OUTGOING	RR		08/04/1992	08/04/1992
4745213	08/04/1992	OUTGOING	RR		08/04/1992	08/04/1992
4745214	08/04/1992	OUTGOING	RR		08/04/1992	08/04/1992
4745215	08/04/1992	OUTGOING	RR		08/04/1992	08/04/1992
4745216	07/29/1992	OUTGOING	RR		07/29/1992	07/29/1992
4745217	07/29/1992	OUTGOING	RR		07/29/1992	07/29/1992
4591067	07/28/1992	INCOMING	QTR MONIT		06/03/1993	
4591065	06/16/1992	INCOMING	COMP ASMNT		07/29/1992	
4591066	06/16/1992	INCOMING	TECH RESP		07/29/1992	
4591064	06/05/1992	INCOMING	GENL INFO		08/04/1992	

4591063	05/12/1992	INCOMING	TECH RESP		08/04/1992
4591062	04/29/1992	INCOMING	QTR MONIT		08/04/1992
4591061	04/21/1992	INCOMING	TECH RESP		08/04/1992
4745205	02/28/1992	OUTGOING	RR		02/28/1992
4745206	02/28/1992	OUTGOING	RR		02/28/1992
4745207	02/28/1992	OUTGOING	RR		02/28/1992
4745209	02/28/1992	OUTGOING	RR		02/28/1992
4745210	02/28/1992	OUTGOING	RR		02/28/1992
4745211	02/28/1992	OUTGOING	RR		02/28/1992
4591060	01/30/1992	INCOMING	QTR MONIT		02/28/1992
4591059	11/08/1991	INCOMING	QTR MONIT		02/28/1992
4591058	11/07/1991	INCOMING	GENL INFO		02/28/1992
4745208	11/05/1991	OUTGOING	WASTE CD		11/05/1991
4591057	11/01/1991	INCOMING	PHASERPT		02/28/1992
4591056	10/03/1991	INCOMING	RQT EXSTN		02/28/1992
4591055	09/16/1991	INCOMING	TECH RESP		02/28/1992
4745204	08/15/1991	OUTGOING	CAD		08/15/1991
4591054	07/11/1991	INCOMING	TECH RESP		08/15/1991

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## Central Registry

### Detail of: **Leaking Petroleum Storage Tanks Remediation ID Number 98181**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **HOUSTON LIGHTING & POWER COMPANY (CN600276653)** Since 08/25/1993 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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Legal	Description	Start Date	End Date	Type	Status	Status Date
98181	LEAKING PETROLEUM STORAGE TANK	03/08/1991	03/21/2008	CLEANUP	INACTIVE	03/21/2008

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## Central Registry

### Detail of: **Petroleum Storage Tank Registration 33347**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Registration **INACTIVE**

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

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## Central Registry

Detail of: **Petroleum Storage Tank Registration 33347**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Registration **INACTIVE**

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

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### Investigations

Investigation Date	Investigation Type
10/13/2010	Compliance Investigation
11/04/2011	Compliance Investigation

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## Central Registry

**Detail of: Petroleum Storage Tank Registration 33347**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Registration **INACTIVE**

Status:

Held by: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)**

**OWNER OPERATOR** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

## Financial Assurance

0 Insurance Or Risk Retention, expires 01/01/1901 ([More](#))

## Self-Certification Status by Compartment

**Expired: 1AA 2A** (last day of 01/2008)

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## Registered Tanks and Their Associated Systems

Table 1. Underground Storage Tank Summary

Tank	Capacity (Gallon)	Date Installed	Status	Substance Stored	Related Information
1A	10000	01/01/1978	Removed from Ground (06/05/2007)	A:Empty	Tank Details Compartment Piping Vapor Recovery



Table 2. Tank Details

Tank	Design & Materials	Corrosion Protection	Release Detection	Spill Containment and Overfill Prevention	Installation Contractor	Installer	Test Result	Related Information
1A	1: Single Wall ( Steel )	Ext Dielectric Coat/Wrap/Tape Field Install Cath Protec Composite (Steel/FRP)	A: 1: Ext Vapor/Tracer Monitoring A: 2: Ext Groundwater Monitoring A: 4: Auto Tank Gauge & Inv Cntrl	A: 1: Tight Fill Fitting 2: Fac Built Spill Cont/Bckt/Sump 3: Delivery Shutoff Valve				Tank Summary Compartment Piping Vapor Recovery

Table 3. Compartment Details

Tank Compartment	Capacity (gallons)	Principal Substance	Other Substance	Release Detection	Spill Containment and Overfill Prevention	Related Information
1A A	10000	Empty		1 : Ext Vapor/Tracer Monitoring 2 : Ext Groundwater Monitoring 3 : Auto Tank Gauge & Inv Cntrl	1 : Tight Fill Fitting 2 : Fac Built Spill Cont/Bckt/Sump 3 : Delivery Shutoff Valve	Tank Summary Tank Details Piping Vapor Recovery



Table 4. Piping Systems

Tank	Type of Piping	Piping Material	Design and External Containment	Connectors and valves	Corrosion Protection	Release Detection	Related Information
1A	Pressurized	FRP	Double Wall	1: Shear Impact Valves 2: Flex Connectors	1: FRP (Noncorrodible)	A:Ann Pipe Tightness/Electr Mon A:Auto Line Leak Detector	<a href="#">Tank Summary</a> <a href="#">Tank Details</a> <a href="#">Compartment</a> <a href="#">Vapor Recovery</a>

Table 5. Vapor Recovery Systems

Tank	Type of Stage 1	Date Installed	Type of Stage 2	Date Installed	Related Information
1A	Two Point System	06/28/1991			<a href="#">Tank Summary</a> <a href="#">Tank Details</a> <a href="#">Compartment</a> <a href="#">Piping</a>

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## Central Registry

### Detail of: **Petroleum Storage Tank Stage II**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**  
10310 KATY FWY, HOUSTON

### Related Information:

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## Central Registry

### Detail of: Stormwater Permit TXR05T311

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

Permit Status: **CANCELLED**

Held by: **BOYER INC (CN600591820)**

**OPERATOR** Since 11/24/2006

Mailing Address: 8900 FAIRBANKS N HOUSTON RD HOUSTON, TX 77064-6805

**BOYER INC (CN600591820)**

**OWNER OPERATOR** Since 10/11/2007 [View Compliance History](#)

Mailing Address: 8900 FAIRBANKS N HOUSTON RD HOUSTON, TX 77064-6805

[View Earlier Holders](#)

---

## Related Information:

[Permit Information](#)

There is no information related to this Permit in the following categories:

[Commissioners' Actions](#)

[Effective Enforcement Orders](#)

[Criminal Convictions](#)

[Proposed Enforcement Orders](#)

[Complaints](#)

[Discharges](#)

[Emergency Response Events](#)

[Emission Events](#)

[Fish Kills](#)



**Other Incidents**  
**Investigations**  
**Periodic Reports**

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### Water Quality General Permits and Registration Search

#### Summary of Authorization TXR05T311

Permit/Registration Number: TXR05T311  
 Authorization Status: TERMINATED  
 Date Coverage Began: 05/28/2006  
 Date Coverage Ended: 08/07/2007

#### Authorization Details

Site Name on Permit/Registration: BOYER  
 Authorization Type: INDUSTRIAL  
 Ms4 Operator : CITY OF HOUSTON  
 Sector : E  
 Receiving Water Body : RUMMEL CREEK

#### Permittee or Registrant Information

Permittee: NOT FOUND  
 Annual Fee Billing Address: NOT FOUND OR NOT APPLICABLE

#### Permitted Site Information

RN: RN100666924  
 RE Name: BOYER  
 Site Location: 10310 KATY FWY HOUSTON TX 77043 5105  
 County: HARRIS  
 TCEQ Region: REGION 12 - HOUSTON  
 Latitude: 29.78694  
 Longitude: -95.55222

#### Regulated Entity Site Information

RE Name: SPRING BRANCH SERVICE CENTER

**Site Location:** 10310 KATY FWY HOUSTON TX 77043 5105  
**County:** HARRIS  
**TCEQ Region:** REGION 12 - HOUSTON  
**Latitude:** 29.78694  
**Longitude:** -95.55222

#### Application History for this Authorization

Application Type	Status	Received Date	Final Action Date
NOTICE OF INTENT	APPROVED	06/02/2006	06/29/2006
NOT-RENEWAL	APPROVED	11/24/2006	05/31/2007

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## Central Registry

### Detail of: **Voluntary Cleanup Program ID Number 2100**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### Related Information:

[Correspondence Tracking](#)[ID Number Information](#)

There is no information related to this ID Number in the following categories:

[Commissioners' Actions](#)[Effective Enforcement Orders](#)[Criminal Convictions](#)[Proposed Enforcement Orders](#)[Complaints](#)[Discharges](#)[Emergency Response Events](#)[Emission Events](#)[Fish Kills](#)[Other Incidents](#)[Investigations](#)[Periodic Reports](#)

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 2100

For: [SPRING BRANCH SERVICE CENTER \(RN100666924\)](#)

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

## Correspondence Tracking

Tracking No.	Received/Sent	Direction	Type	Subject	Due Date	End Date	Document Date	Method
12219149	04/07/2008	INCOMING	RACR REV		06/06/2008	05/23/2008	04/03/2008	EMAIL
12210847	03/27/2008	INCOMING	RACR A	SITE ASS/SOIL REMED REPORT	05/26/2008	05/23/2008	03/19/2008	EMAIL
12230400	03/27/2008	INCOMING	SIGNED AFFIDAVIT		05/26/2008	03/27/2008		
12230402	03/27/2008	INCOMING	SURVEY/PLAT		05/26/2008	03/27/2008		
17347938	03/27/2008	OUTGOING	COC			03/27/2008		
12153496	01/24/2008	INCOMING	INVESTIGATION RPT REV		03/24/2008	03/24/2008	01/18/2008	
12153505	01/24/2008	INCOMING	INVESTIGATION RPT REV		03/24/2008	03/24/2008	01/22/2008	
12144196	11/15/2007	INCOMING	AGREEMENT		01/14/2008	11/15/2007		
12140321	10/19/2007	INCOMING	INVESTIGATION PLAN		12/18/2007	11/12/2007	10/16/2007	
12139479	10/04/2007	INCOMING	VCP APPLICATION		11/18/2007	11/15/2007	10/02/2007	

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## Central Registry

Detail of: **Voluntary Cleanup Program ID Number 2100**

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

Legal	Description	Start Date	End Date	Type	Status	Status Date
2100	VOLUNTARY CLEANUP	10/04/2007	03/27/2008	CLEANUP	INACTIVE	04/18/2008

Tracking No.	Type	Value	Start Date	End Date
12140424	PROJECT MANAGER	VMODAK	10/19/2007	03/27/2008
12139459	PROJECT MANAGER	DCHRISTI	10/11/2007	11/15/2007
9288444	ADMINISTRATIVE STATUS	INACTIVE	04/18/2008	
12139458	PCA NUMBER	34295	10/11/2007	
12139460	PROJECT NUMBER	342950	10/11/2007	
12139451	CASHIER RECEIVED DATE	10/02/2007	10/11/2007	
12139463	APPLICATION RECEIVED DATE	10/04/2007	10/11/2007	
9286328	APPLICANT INTEREST IN SITE	OWNER	10/11/2007	
12139461	REGION NOTIFIED	10/04/2007	10/11/2007	
12139454	FILE MEDIA	PAPER	10/11/2007	
9311549	OTHER PROGRAM	EPA	10/11/2007	

Physical	Description	Start Date	Type	Status	Status Date
SPRING BRANCH SERVICE CENTER		10/04/2007	AFFECTED PROPERTY	COMPLETED	04/18/2008

Tracking No.	Type	Value	Start Date	End Date
9290968	PROJECT PHASE	COMPLETED	04/18/2008	
12139477	CURRENT FACILITY TYPE	UTILITY	10/11/2007	
12139473	SITE SIZE	8.3 ACRES	10/11/2007	
9298327	SOILS CHEMICAL OF CONCERN CLASSIFICATION	METALS	10/11/2007	



	SOILS CHEMICAL OF CONCERN CLASSIFICATION	SVOCS	10/11/2007
9298328			
9298329	SOILS CHEMICAL OF CONCERN CLASSIFICATION	TPH	10/11/2007
9298330	SOILS CHEMICAL OF CONCERN CLASSIFICATION	VOCs	10/11/2007
9309128	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	ARSENIC	10/11/2007
9309129	SOIL INDIVIDUAL CHEMICALS REQUIRING REMEDY	NAPTHALENE	10/11/2007
9298322	GW BEARING UNIT	DEFAULT GW BEARING UNIT 1	10/11/2007
9309126	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	ARSENIC	10/11/2007
9309127	GW INDIVIDUAL CHEMICALS REQUIRING REMEDY	NAPTHALENE	10/11/2007

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## Central Registry

### Detail of: Voluntary Cleanup Program ID Number 2100

For: **SPRING BRANCH SERVICE CENTER (RN100666924)**

10310 KATY FWY, HOUSTON

ID Number Status: **INACTIVE**

Responsible Parties: **CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (CN601095797)** Since 12/02/1986 [View Compliance History](#)

Mailing Address: PO BOX 1700 HOUSTON, TX 77251-1700

### GW BEARING UNIT - DEFAULT GW BEARING UNIT 1 - 10/11/2007 - Tracking No. 9298322

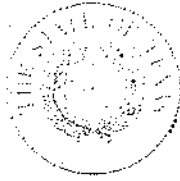
Tracking No.	Type	Value	Start Date	End Date
9298323	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	METALS	10/11/2007	
9298324	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	SVOCS	10/11/2007	
9298325	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	TPH	10/11/2007	
9298326	GROUNDWATER CHEMICALS OF CONCERN CLASSIFICATION	VOCS	10/11/2007	

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Bryan W. Shaw, Ph.D., *Chairman*  
Buddy Garcia, *Commissioner*  
Carlos Rubinstein, *Commissioner*  
Mark R. Vickery, P.G., *Executive Director*



34348 12

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

July 18, 2011

**RECEIVED**

**JUL 25 2011**

**REGION 12**

Mr. Douglas R. Harris  
Environmental Manager  
CenterPoint Energy Houston Electric, LLC  
P.O. Box 1700  
Houston, TX 77251-1700

Re: Approval of Waste Management Unit Closure/Change in Status Request, former Spring Branch Service Center, dated June 29, 2011  
NOR WMU Nos. 001, 002, 003, 004, 005, and 006  
10310 Old Katy Road, Houston, TX (Harris County);  
TCEQ SWR No. 34348; EPA ID No. TX981518566; Customer No. CN601095794;  
Regulated Entity No. RN100666924

Dear Mr. Harris:

The Texas Commission on Environmental Quality (TCEQ) has reviewed your unit closure/change in status request for Waste Management Unit (WMU) Nos. 001, 002, 003, 004, 005, and 006 associated with the above referenced Notice of Registration (NOR). According to the documentation provided, the facility generator status for the Spring Branch Service Center is currently considered a Municipal Conditionally Exempt Small Quantity Generator facility. As such, municipal generators are required to notify the TCEQ of waste management units used to manage hazardous wastes. Although, waste management units used to manage only municipal non-hazardous waste do not require closure under Chapter 335, Title 30 of the Texas Administrative Code, units used to store hazardous waste (regardless of whether the unit is listed or is required to be listed on the facility's NOR) are required to be closed in accordance with 30 TAC 335.8.

Based on our review of the NOR, WMU Nos. 001, 002, 004 and 006 are currently listed as active status units that do not manage hazardous waste (only municipal non-hazardous waste). Technically these units are not required to be reported nor listed on the above referenced NOR. As such, an administrative correction to NOR 34348 is hereby approved for the TCEQ Registration and Reporting Team to update the unit activity status of WMU Nos. 001, 002, 004, and 006 from 'Active' to 'Not Required'.

The June 29, 2011 report also provides supporting documentation supporting the closure of WMU No. 003 and 005 (drum and bin storage areas, respectively) in accordance with 30 TAC 335.8. According to the NOR, waste stream(s) managed in WMU No. 003 and 005 (drum and bin storage areas, respectively) are considered hazardous. Based on information contained in the report and other information available to staff, the TCEQ accepts the closure of WMU Nos. 003 and 005. The activity status of WMU No. 003 and 005 is hereby approved for the TCEQ Registration and Reporting Team to update the unit activity status of WMU No. 003 and 005 from 'Active' to 'Closed'. No further action is required under 30 Texas Administrative Code (TAC) §335.8 for WMU No. 003 and 005.

Mr. Douglas Harris  
Page 2  
July 18, 2011  
TCEQ SWR No. 34348

Please be aware that it is the continuing obligation of persons associated with a site to ensure that municipal hazardous waste and industrial solid waste are managed in a manner which does not cause the discharge or imminent threat of discharge of waste into or adjacent to waters in the state, a nuisance, or the endangerment of the public health and welfare as required by 30 TAC §335.4. If the activities described in the report fail to comply with these requirements, please take any necessary and authorized action to correct such conditions. A TCEQ field inspector may conduct an inspection of the site to determine compliance with the report.

A copy of this letter has been forwarded to the TCEQ Registration and Reporting Section to complete the updates to your Notice of Registration (NOR). For questions regarding the NOR, please contact the Registration and Reporting Section at (512) 239-6413.

Questions concerning this letter should be directed to me at (512) 239-2358. When responding by mail, please submit an original and one copy of all correspondence and reports to the TCEQ Remediation Division at Mail Code MC-127 with an additional copy submitted to the local TCEQ Region Office. Please note that the Remediation Division has instituted a policy of sending letters via Portable Document Format (PDF) and email when appropriate. Therefore, current email addresses and the site identification information in the reference block should be included in all future submittals.

Sincerely,



Eleanor T. Wehner, P.G.  
CA Program Technical Specialist  
Corrective Action Team 1, VCP-CA Section  
Remediation Division  
Texas Commission on Environmental Quality

ETW/jdm

cc: Ms. Nicole Bealle, Waste Program Manager, TCEQ Region 12 Office, Houston  
Mr. Edward Minter, Team Leader, TCEQ Registration and Reporting Section (MC- 129)



**Groundwater  
& Environmental Services, Inc.**

VCP 21 00

13003 Southwest Freeway • Suite 190 • Stafford, Texas 77477 • (888) 540-0804 • Fax (281) 494-0496

April 3, 2008

Ms. Vicki Modak  
TCEQ  
Environmental Cleanup  
12100 Park Circle 35  
Bldg D  
Austin, Texas 78753

**COPY**

RE: Transmittal of Recycled Soil Bills of Lading  
Former CenterPoint Energy Spring Branch Service Center  
Houston, Harris County, Texas  
VCP ID No. 2100.  
Former LPST ID No. 98181

Dear Ms. Modak:

Please find the attached Bills of Lading for the recycled soil that was excavated at the former CenterPoint Energy Spring Branch Service Center (VCP ID No. 2100). The soil excavation was documented in the report entitled "Site Assessment/Soil Remediation Summary Report" prepared by Groundwater and Environmental Services, Inc. and dated March 19, 2008. At the time of the publishing of that report, the soil had not been transported to the recycling facility. The soil was transported to HPP Recycles, Inc. from March 24 through March 27, 2008. As indicated from the attached Bills of Lading, a total of 1206 cubic yards was transported to the recycling facility.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,  
**GROUNDWATER & ENVIRONMENTAL SERVICES, INC.**

James Hodges  
Senior Project Manager

cc: ~~Waste Program Manager, TCEQ Region 12~~  
Scott Duhon, CenterPoint Energy (via email)  
Robin Franks, TGE Resources, Inc. (via email)

RECEIVED  
APR 04 2008  
REGION 12





# CITY OF HOUSTON

Fire Department

**Annise Parker**

Mayor

Terry Garrison  
Fire Chief  
600 Jefferson St., 7<sup>th</sup> floor  
Houston, Texas 77002

T. 832-394-6702  
F. 832-394-6780  
[www.houstontx.gov](http://www.houstontx.gov)

DATE: 03/06/2015

Robert J. Metzger  
Avillies Engineering Corporation  
5790 Windfern Road  
Houston, TX 77041

Re: Your Texas Public Information Act Request dated 03/03/15, requesting Hazardous Materials for Key Map 489-G, H & M

Dear Mr. Metzger,

In response to your above-referenced request, which was received by the City of Houston on 3/06/15, the custodian of records has located 3 page(s) of responsive documents. The fee for these documents is \$.79 (\$.30 for the copies, plus \$.49 for postage) and has been deducted from your account.

If you have any questions regarding this matter, please contact Fire/EMS Records at 832.394.6862.

Sincerely,

Danielle Ivy  
HFD Fire/EMS Records  
600 Jefferson, Ste. 860  
Houston, Texas 77002  
T. 832.394.6860  
[hfdemsrec@houstontx.gov](mailto:hfdemsrec@houstontx.gov)



# Hazmat Chemical Release

3/5/2015 11:00:35 AM

1 of 1

Date	Address	Mapkey	Chemical Released	Amount Released
05/17/2006	12850 Memorial Dr.	489G	(Turn around)	
01/26/2007	700 Town and Country Blvd.	489 G	Natural Gas	Undetrmond Amt
06/21/2007	289 W. BW 8	489 G	(Turn around)	
09/14/2008	346 FAWNLAKE	489 G	(Turn around)	
09/28/2009	12907 HANSEL LANE	489G	Diesel	Undetrmond Amt
01/21/2010	640 BELTWAY 8 @ DEERWOOD	489G	Diesel	30 gal



# Hazmat Chemical Release

3/5/2015 11:01:02 AM

1 of 1

Date	Address	Mapkey	Chemical Released	Amount Released
01/14/2006	12500 Perthshire	489H	(Turn around)	
01/31/2007	12550 Vindon	489H	(Turn Around)	



# Hazmat Chemical Release

3/5/2015 11:01:24 AM

1 of 1

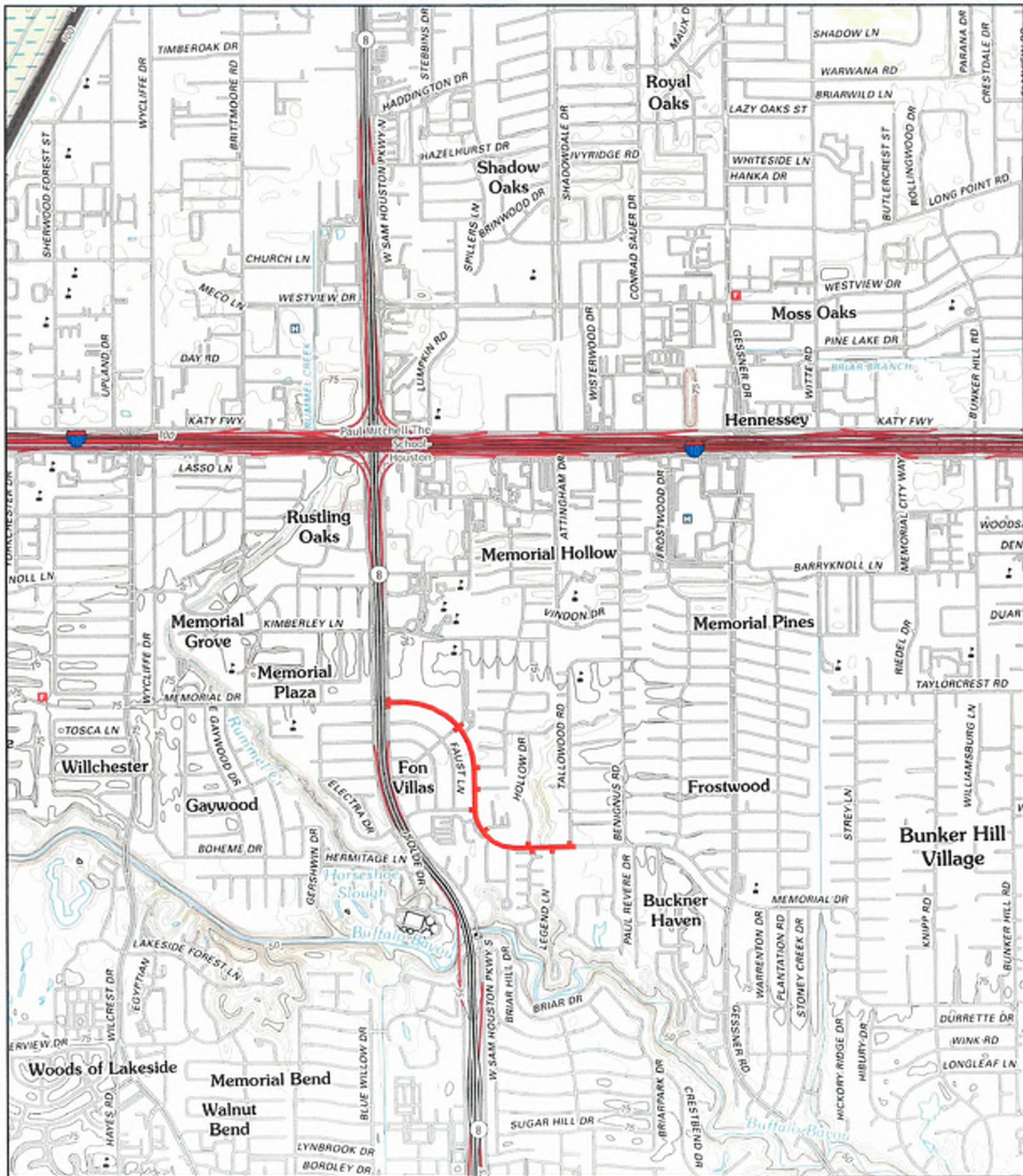
Date	Address	Mapkey	Chemical Released	Amount Released
04/22/2005	200 W. Sam Houston Pkwy. N.	489M	(Turn around)	
08/04/2007	12500 Memorial Drive	489 M	(Turn around)	
05/19/2008	12490 MEMORIAL DR	489 M	Natural Gas	Undetrmnd Amt
11/22/2008	12516 MEMORIAL	489M	Diesel	30 gal
06/08/2010	10440 Deerwood	489 M	Natural Gas	Undetrmnd Amt



**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**


**APPENDIX D**

**PHYSICAL SETTING SOURCE DOCUMENTATION**



JOB #: 103126 - 3/6/2015

**SITE: MEMORIAL DRIVE PHASE I ENVIRONMENTAL SITE ASSESSMENT**  
**QUAD: HEDWIG VILLAGE, TX**  
**DATE: 2013**  
**SCALE: 1 : 24,000**

	Subject Right-Of-Way
E102-15	

**GeoSearch**

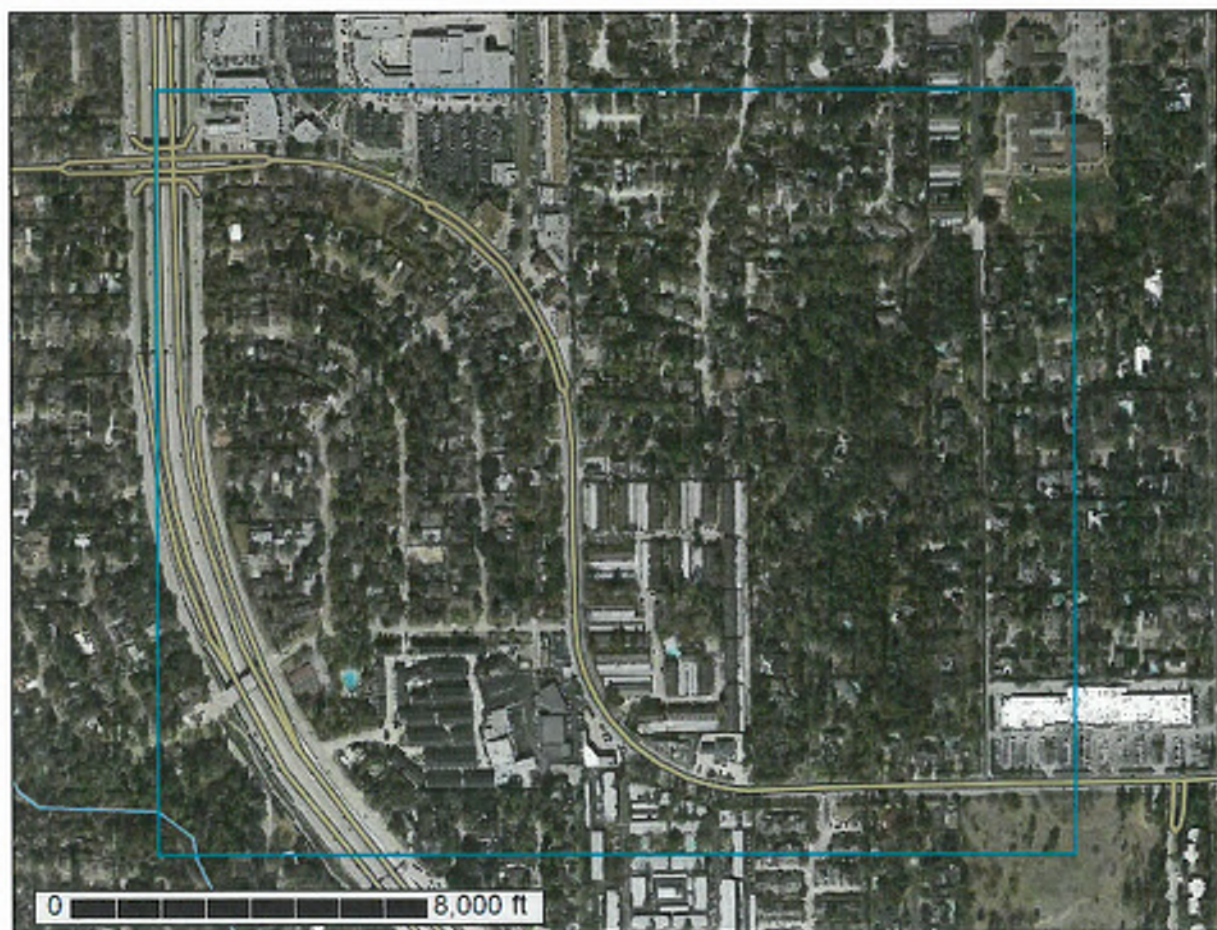




A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Harris County, Texas

## Memorial Drive



March 10, 2015



# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means



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## How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

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individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.



## Soil Map

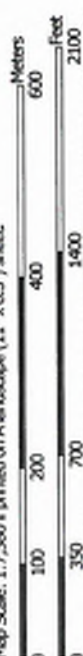
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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report  
Soil Map












































Map Scale: 1:7,500 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge bias: UTM Zone 15N WGS84



## MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 Special Point Features	 Special Line Features
 Blowout	 Water Features
 Borrow Pit	 Streams and Canals
 Clay Spot	 Transportation
 Closed Depression	 Rails
 Gravel Pit	 Interstate Highways
 Gravelly Spot	 US Routes
 Landfill	 Major Roads
 Lava Flow	 Local Roads
 Marsh or swamp	 Background
 Mine or Quarry	 Aerial Photography
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harris County, Texas  
 Survey Area Data: Version 14, Sep 30, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 26, 2011—Mar 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map-unit boundaries may be evident.

## Map Unit Legend

Harris County, Texas (TX201)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ak	Addicks-Urban land complex	5.2	2.2%
Gu	Gessner-Urban land complex	199.5	84.4%
HatA	Hatlift-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	18.8	7.9%
Mu	Verland-Urban land complex	2.9	1.2%
URLX	Urban land	10.1	4.3%
<b>Totals for Area of Interest</b>		<b>236.4</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic



## Custom Soil Resource Report

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Harris County, Texas

### Ak—Addicks-Urban land complex

#### Map Unit Setting

*National map unit symbol:* db8g  
*Elevation:* 0 to 4,000 feet  
*Mean annual precipitation:* 8 to 60 inches  
*Mean annual air temperature:* 54 to 73 degrees F  
*Frost-free period:* 180 to 310 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Addicks and similar soils:* 55 percent  
*Urban land:* 40 percent  
*Minor components:* 5 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Addicks

##### Setting

*Landform:* Flats  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Loamy fluviomarine deposits of early pleistocene age

##### Typical profile

*H1 - 0 to 11 inches:* loam  
*H2 - 11 to 49 inches:* loam  
*H3 - 49 to 78 inches:* loam

##### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Poorly drained  
*Runoff class:* Negligible  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)  
*Depth to water table:* About 12 to 21 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 35 percent  
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 4.0  
*Available water storage in profile:* High (about 12.0 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3w  
*Hydrologic Soil Group:* B/D  
*Ecological site:* Loamy prairie 44-56" pz (R150AY741TX)

## Custom Soil Resource Report

### Description of Urban Land

#### Typical profile

*H1 - 0 to 40 inches: variable*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 8s*

*Hydrologic Soil Group: D*

### Minor Components

#### Unnamed

*Percent of map unit: 5 percent*

## Gu—Gessner-Urban land complex

### Map Unit Setting

*National map unit symbol: db92*

*Elevation: 0 to 4,000 feet*

*Mean annual precipitation: 8 to 60 inches*

*Mean annual air temperature: 54 to 73 degrees F*

*Frost-free period: 180 to 310 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Gessner and similar soils: 55 percent*

*Urban land: 35 percent*

*Minor components: 10 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Gessner

#### Setting

*Landform: Depressions*

*Landform position (three-dimensional): Dip*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Parent material: Loamy fluviomarine deposits of early pleistocene age*

#### Typical profile

*H1 - 0 to 16 inches: loam*

*H2 - 16 to 80 inches: loam*

#### Properties and qualities

*Slope: 0 to 1 percent*

*Depth to restrictive feature: More than 80 inches*

*Natural drainage class: Poorly drained*

*Runoff class: Negligible*

## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* About 0 inches

*Frequency of flooding:* None

*Frequency of ponding:* Occasional

*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* High (about 10.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* 4w

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* B/D

*Ecological site:* Lowland 35-56" pz (R150AY537TX)

### Description of Urban Land

#### Typical profile

*H1 - 0 to 40 inches:* variable

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydrologic Soil Group:* D

### Minor Components

#### Unnamed

*Percent of map unit:* 10 percent

## HatA—Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded

### Map Unit Setting

*National map unit symbol:* 1vykn

*Elevation:* 20 to 150 feet

*Mean annual precipitation:* 48 to 62 inches

*Mean annual air temperature:* 67 to 69 degrees F

*Frost-free period:* 240 to 300 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Hatliff and similar soils:* 38 percent

*Pluck and similar soils:* 35 percent

*Kian and similar soils:* 24 percent

*Minor components:* 3 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*



## Custom Soil Resource Report

### Description of Hatliff

#### Setting

*Landform:* Flood plains  
*Landform position (three-dimensional):* Rise  
*Microfeatures of landform position:* Bars  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Loamy alluvium of holocene age

#### Typical profile

*A - 0 to 12 inches:* loam  
*Bw1 - 12 to 38 inches:* fine sandy loam  
*Bw2 - 38 to 62 inches:* fine sandy loam  
*Bg - 62 to 80 inches:* fine sandy loam

#### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Negligible  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* About 44 to 64 inches  
*Frequency of flooding:* Frequent  
*Frequency of ponding:* None  
*Sodium adsorption ratio, maximum in profile:* 2.0  
*Available water storage in profile:* Moderate (about 7.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2w  
*Hydrologic Soil Group:* A

### Description of Pluck

#### Setting

*Landform:* Flood plains  
*Landform position (three-dimensional):* Dip  
*Microfeatures of landform position:* Channels  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Loamy alluvium

#### Typical profile

*A - 0 to 6 inches:* fine sandy loam  
*Bg1 - 6 to 34 inches:* loam  
*Bg2 - 34 to 60 inches:* loam  
*Bg3 - 60 to 80 inches:* loam

#### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* About 3 to 6 inches

## Custom Soil Resource Report

*Frequency of flooding:* Frequent  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 0.5 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 2.0  
*Available water storage in profile:* High (about 10.5 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 5w  
*Hydrologic Soil Group:* C/D

### Description of Kian

#### Setting

*Landform:* Flood plains  
*Landform position (three-dimensional):* Dip  
*Microfeatures of landform position:* Channels  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave, linear  
*Parent material:* Loamy alluvium

#### Typical profile

*A - 0 to 5 inches:* fine sandy loam  
*Bw - 5 to 26 inches:* fine sandy loam  
*Bg1 - 26 to 55 inches:* fine sandy loam  
*Bg2 - 55 to 80 inches:* loamy fine sand

#### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* About 3 to 10 inches  
*Frequency of flooding:* Frequent  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 0.5 mmhos/cm)  
*Sodium adsorption ratio, maximum in profile:* 2.0  
*Available water storage in profile:* Moderate (about 7.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 5w  
*Hydrologic Soil Group:* D

### Minor Components

#### Simelake

*Percent of map unit:* 2 percent  
*Landform:* Flats  
*Landform position (three-dimensional):* Taif  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

#### Cowmarsh

*Percent of map unit:* 1 percent  
*Landform:* Oxbows on flood plains

## Custom Soil Resource Report

*Landform position (three-dimensional):* Dip  
*Down-slope shape:* Linear, concave  
*Across-slope shape:* Linear, concave

### **Mu—Verland-Urban land complex**

#### **Map Unit Setting**

*National map unit symbol:* db9j  
*Elevation:* 0 to 4,000 feet  
*Mean annual precipitation:* 8 to 60 inches  
*Mean annual air temperature:* 54 to 73 degrees F  
*Frost-free period:* 180 to 335 days  
*Farmland classification:* Not prime farmland

#### **Map Unit Composition**

*Verland and similar soils:* 50 percent  
*Urban land:* 35 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Verland**

##### **Setting**

*Landform:* Meander scrolls  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Loamy fluviomarine deposits of late pleistocene age

##### **Typical profile**

*H1 - 0 to 7 inches:* silty clay loam  
*H2 - 7 to 20 inches:* clay  
*H3 - 20 to 72 inches:* clay

##### **Properties and qualities**

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Somewhat poorly drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* About 6 to 18 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 3 percent  
*Available water storage in profile:* High (about 10.9 inches)

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated): 3w*  
*Land capability classification (nonirrigated): 3w*  
*Hydrologic Soil Group: D*  
*Ecological site: Blackland 24-44" pz (R150AY526TX)*

### Description of Urban Land

#### Typical profile

*H1 - 0 to 40 inches: variable*

#### Interpretive groups

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 8s*  
*Hydrologic Soil Group: D*

### Minor Components

#### Unnamed

*Percent of map unit: 15 percent*

## URLX—Urban land

### Map Unit Setting

*National map unit symbol: 2sych*  
*Elevation: 10 to 200 feet*  
*Mean annual precipitation: 48 to 62 inches*  
*Mean annual air temperature: 67 to 72 degrees F*  
*Frost-free period: 240 to 300 days*

### Map Unit Composition

*Urban land: 100 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Urban Land

#### Setting

*Down-slope shape: Linear*  
*Across-slope shape: Linear*

#### Typical profile

*M - 0 to 40 inches: variable*

#### Properties and qualities

*Slope: 0 to 3 percent*  
*Depth to restrictive feature: 0 inches to manufactured layer*  
*Runoff class: Very high*  
*Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)*



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United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

generally plane to slightly convex; and slopes range from 0 to 1 percent and average about 0.3 percent. This complex is composed of 20 to 85 percent Addicks loam, 10 to 60 percent urban land, and 5 to 20 percent other soils. Addicks soils are poorly drained, have slow surface runoff and internal drainage, moderate permeability, and high available water capacity.

Gessner-Urban Land Complex soils occur in broad nearly level areas and in depressions that vary from 15 to 180 acres in area with a few occurrences of several hundred acres. The parent material of these soils is loamy fluvio-marine deposits. Gessner soils make up approximately 55 percent of this mapping unit, Urban soils compose approximately 35 percent, and other soils make up approximately 10 percent. Down-slope and across-slope shape of the unit is concave. Gessner soils are poorly drained, and are generally saturated in winter and early spring. Surface runoff is very slow, and internal drainage is slow. Water remains in surface depressions of this soil for long periods following rain. The soils have moderate permeability and high available water capacity.

Hatliff-Pluck-Klan Complex (Hata) is a nearly level soil on floodplains. The parent material is loamy alluvium. The surface slope ranges from 0 to 1 percent. The soils are frequently flooded. The Hatliff and similar soils make up about 38 percent of the unit; Pluck and similar soils make up approximately 35 percent of the unit; Klan and similar soils, 24 percent of the unit; and other soils, 3 percent of the unit. The Hatliff soils have a linear down-slope shape and a convex across-slope shape. The soils are well drained with negligible runoff. Water storage is moderate. Pluck soils have a concave down-slope and across-slope shape. The soils are poorly drained with high runoff. Available water storage is high. Klan soils have a linear down-slope shape and concave and linear across-slope shape. The soils are poorly drained with high runoff. Available water storage is moderate.

The Verland-Urban land complex (Mu; also known as Midland Urban land complex) is present in nearly level in broad irregular areas that vary from 30 to 600 acres. Slopes range from 0 to 1 percent and average 0.5 percent. Both down-slope and across-slope shapes are linear. Approximately 50 percent of this mapping unit is composed of Verland soils, 35 percent is urban land, and 15 percent or less is composed of other soils. Limitations for development on this mapping unit are severe due to poor drainage and shrinking and swelling in underlying layers. Verland series soils are characterized by very slow surface runoff, permeability, and internal drainage and high available water capacity.

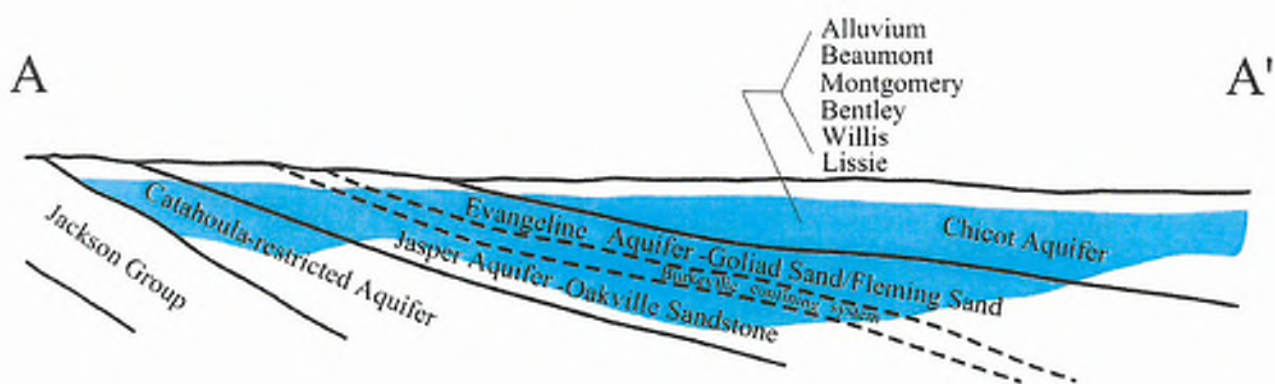
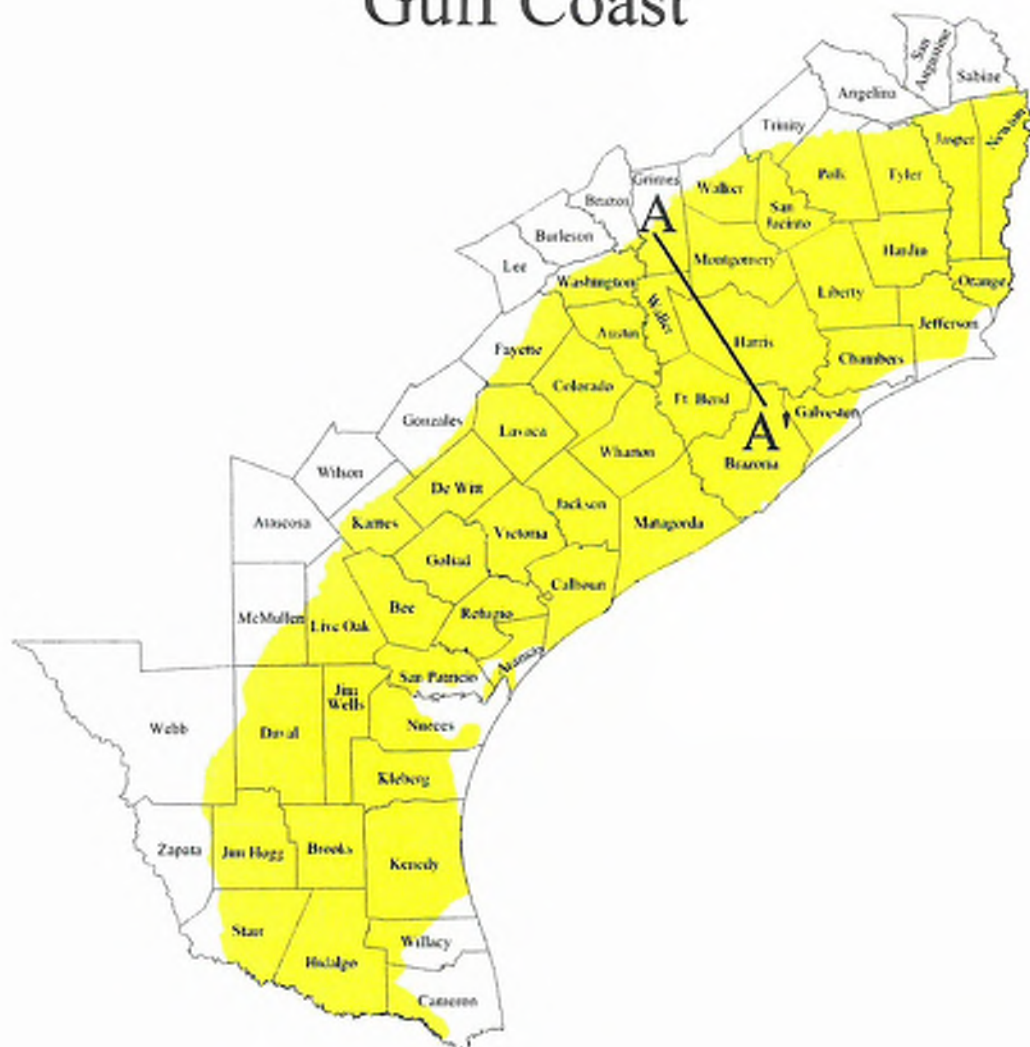
Urban land (URLX) has a slope of 0 to 3 percent and has a linear down-slope and across-slope shape. Runoff is very high and available water capacity is very low.

#### 4.4.3 *Groundwater and Floodplains*

According to the 1994 Texas Water Development Board's Major Aquifers in Texas Map, the Gulf Coast Aquifer, which includes nine geologic formations, is the underlying aquifer in the area of the Subject Property. A map and description of the Gulf Coast Aquifer (modified from Baker 1979) is attached in Appendix D. The aquifer consists of complex interbedded clays, silts, sands and gravels which are hydraulically connected. The two major aquifers in the Houston area are the Chicot and the Evangeline aquifers. These aquifers are Pliocene and Pleistocene in age and generally consist of sand layers interbedded with clays and gravels that occur near the surface and



# Gulf Coast



## Gulf Coast Aquifer

The Gulf Coast aquifer forms a wide belt along the Gulf of Mexico from Florida to Mexico. In Texas, the aquifer provides water to all or parts of 54 counties and extends from the Rio Grande northeastward to the Louisiana-Texas border. Municipal and irrigation uses account for 90 percent of the total pumpage from the aquifer. The Greater Houston metropolitan area is the largest municipal user, where well yields average about 1,600 gal/min.

The aquifer consists of complex interbedded clays, silts, sands, and gravels of Cenozoic age, which are hydrologically connected to form a large, leaky artesian aquifer system. This system comprises four major components consisting of the following generally recognized water-producing formations. The deepest is the Catahoula, which contains ground water near the outcrop in relatively restricted sand layers. Above the Catahoula is the Jasper aquifer, primarily contained within the Oakville Sandstone. The Burkeville confining layer separates the Jasper from the overlying Evangeline aquifer, which is contained within the Fleming and Goliad sands. The Chicor aquifer, or upper component of the Gulf Coast aquifer system, consists of the Lissie, Willis, Bentley, Montgomery, and Beaumont formations, and overlying alluvial deposits. Not all formations are present throughout the system, and nomenclature often differs from one end of the system to the other. Maximum total sand thickness ranges from 700 feet in the south to 1,300 feet in the northern extent.

Water quality is generally good in the shallower portion of the aquifer. Ground water containing less than 500 mg/l dissolved solids is usually encountered to a maximum depth of 3,200 feet in the aquifer from the San Antonio River Basin northeastward to Louisiana. From the San Antonio River Basin southwestward to Mexico, quality deterioration is evident in the form of increased chloride concentration and saltwater encroachment along the coast. Little of this ground water is suitable for prolonged irrigation due to either high salinity or alkalinity, or both. In several areas at or near the coast, including Galveston Island and the central and southern parts of Orange County, heavy municipal or industrial pumpage had previously caused an updip migration, or saltwater intrusion, of poor-quality water into the aquifer. Recent reductions in pumpage here have resulted in a stabilization and, in some cases, even improvement of ground-water quality.

Years of heavy pumpage for municipal and manufacturing use in portions of the aquifer have resulted in areas of significant water-level decline. Declines of 200 feet to 300 feet have been measured in some areas of eastern and southeastern Harris and northern Galveston counties. Other areas of significant water-level declines include the Kingsville area in Kleberg County and portions of Jefferson, Orange, and Wharton counties. Some of these declines have resulted in compaction of dewatered clays and significant land surface subsidence. Subsidence is generally less than 0.5 foot over most of the Texas coast, but has been as much as nine feet in Harris and surrounding counties. As a result, structural damage and flooding have occurred in many low-lying areas along Galveston Bay in Baytown, Texas City, and Houston. Conversion to surface-water use in many of the problem areas has reversed the decline trend.

### References

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- Gayton, W.E., and Associates, 1972, Ground-water conditions in Anderson, Cherokee, Freestone, and Henderson counties, Texas: TWDB Rept. 150, 80 p.
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- Muller, D.A., and Price, R.D., 1979, Ground-water availability in Texas, estimates and projections through 2030: TDWR Rept. 238, 77 p.
- Sandeen, W.M., and Wesselman, J.B., 1973, Ground-water resources of Brazoria County, Texas: TWDB Rept. 163, 205 p.
- Shafer, G.H., 1968, Ground-water resources of Nueces and San Patricio counties, Texas: TWDB Rept. 73, 137 p.
- \_\_\_\_\_, 1970, Ground-water resources of Aransas County, Texas: TWDB Rept. 124, 83 p.
- Shafer, G.H., and Baker, E.T., Jr., 1973, Ground-water resources of Kleberg, Kenedy, and southern Jim Wells counties, Texas: TWDB Rept. 173, 69 p.
- Thorkildsen, D., 1990, Evaluation of water resources of Fort Bend County, Texas: TWDB Rept. 321, 21 p.
- Thorkildsen, D., and Quincy, R., 1990, Evaluation of water resources of Orange and eastern Jefferson counties, Texas: TWDB Rept. 320, 34 p.
- Wesselman, J.B., 1967, Ground-water resources of Jasper and Newton counties, Texas: TWDB Rept. 59, 167 p.
- Wesselman, J.B., and Aronow, S., 1971, Ground-water resources of Chambers and Jefferson counties, Texas: TWDB Rept. 133, 183 p.



Phase I Environmental Site Assessment  
Memorial Drive

— Subject Right-Of-Way

E102-15

MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0645L

**FIRM**  
FLOOD INSURANCE RATE MAP  
HARRIS COUNTY,  
TEXAS  
AND INCORPORATED AREAS

PANEL 645 OF 1150

SEE MAP INDEX FOR FIRM PANEL LAYOUT

COMPANY:	NUMERICAL:	ZONEL:	REVISION:
HOUSTON CITY OF SPRING VALLEY CITY OF HOUSTON	00000	0000	0000

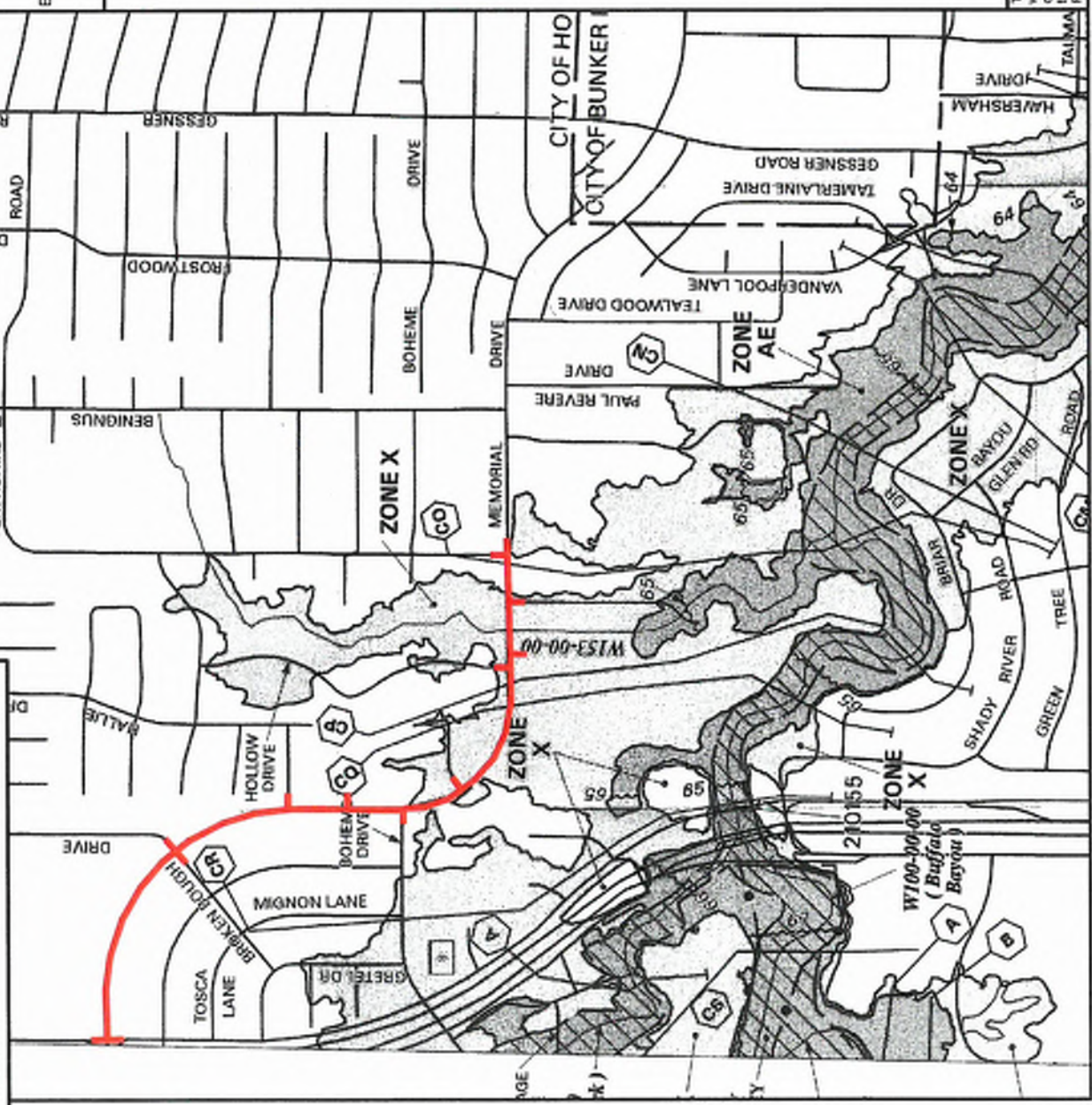
Note: To View The Map Number above please check the map sheet number and enter the Community Number above into the FEMA On-Line Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov) for the latest product information about National Flood Insurance Program flood maps. Check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

MAP NUMBER  
48201C0645L

MAP REVISED:  
JUNE 18, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using FEMA On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the life block. For the latest product information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



# LEGEND

## SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, ASS, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
- ZONE ASS** Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

## FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

## OTHER FLOOD AREAS

**ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

## OTHER AREAS

**ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.  
**ZONE D** Areas in which flood hazards are undetermined, but possible.

## COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

## OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary  
 Floodway boundary  
 Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

Base Flood Elevation line and value; elevation in feet\*

Base Flood Elevation value where uniform within zone; elevation in feet\*

\*Referenced to the North American Vertical Datum of 1988

Cross Section Line

Transect Line

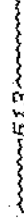
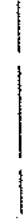
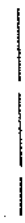
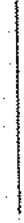
Geographic coordinates referenced to the North American Datum of 1983 (NAD83)

1000-meter Universal Transverse Mercator grid values, zone 15

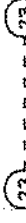
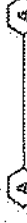
5000-foot grid ticks

Bench mark (see explanation in Notes to Users section of this FIRB panel).

River Mile



(EL. 987)



97°07'30", 32°22'30"

4276000M

600000 FT

DX5510 X

M1.5



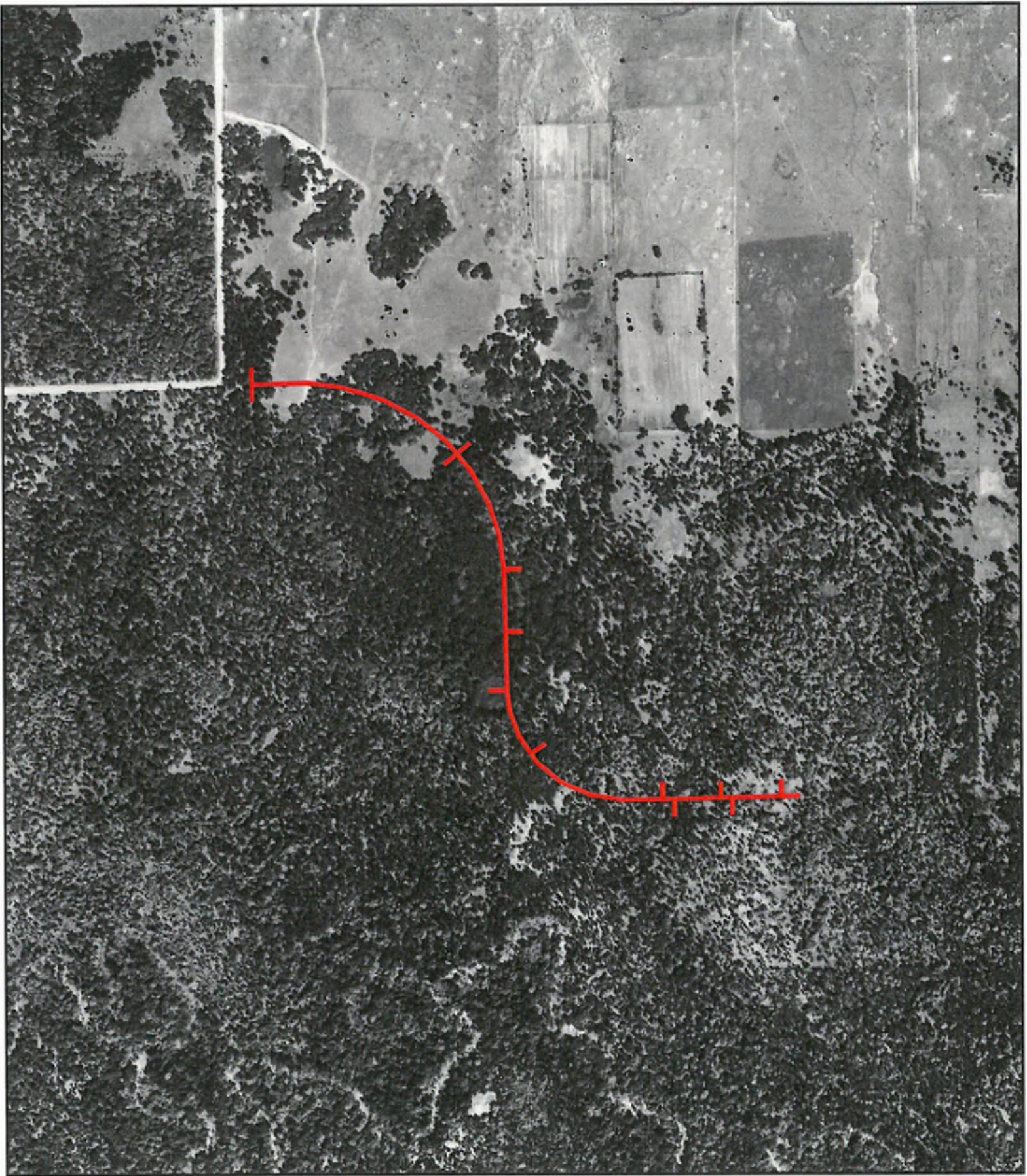


**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX E**

**HISTORICAL RESEARCH DOCUMENTATION**





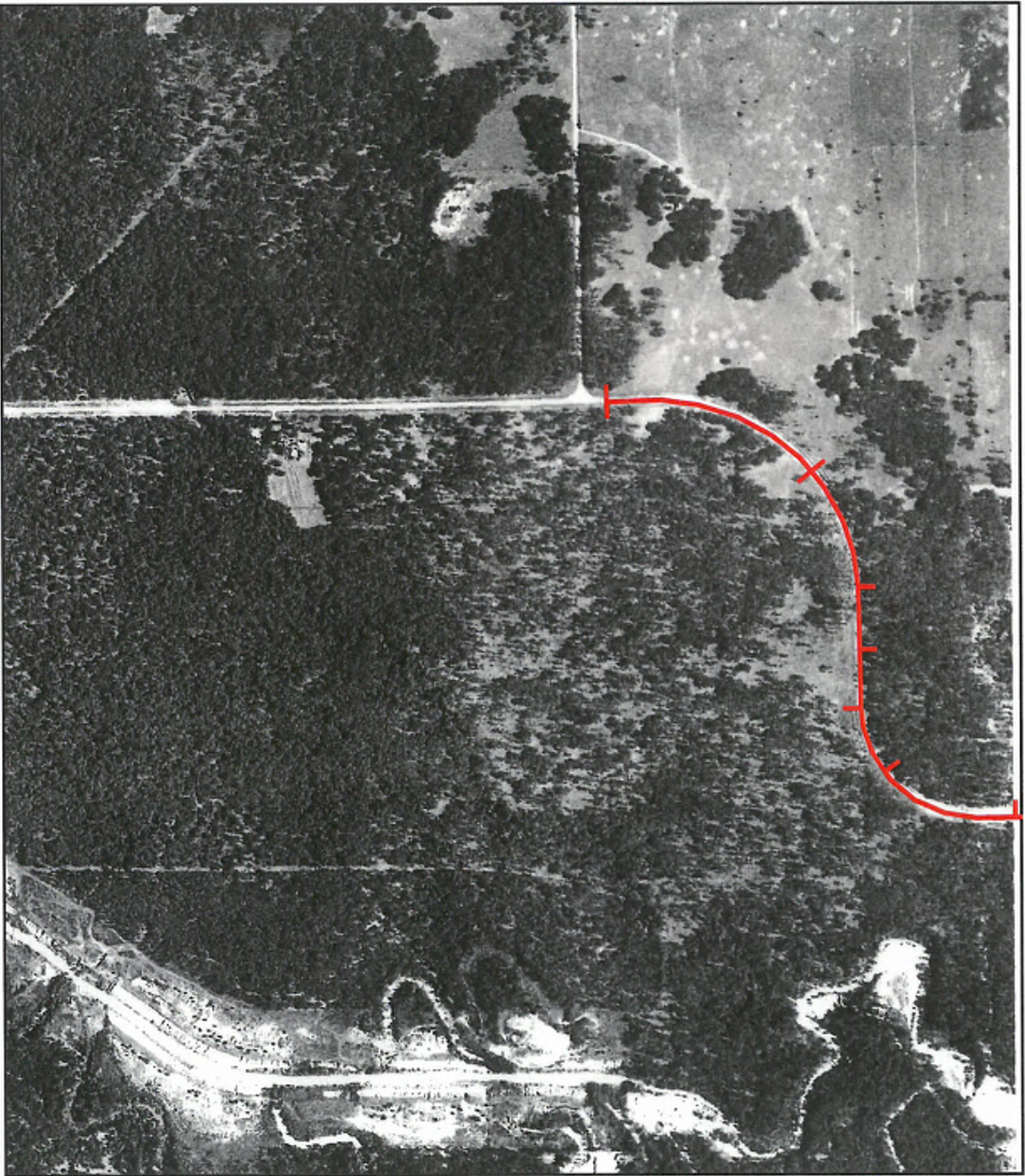
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**COUNTY:** HARRIS, TX  
**SCALE:** 1" = 700'

— Approximate Subject  
Right-Of-Way  
E102-15

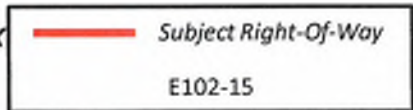
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JOB # 103134 - 3/6/2015

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**GeoSearch**





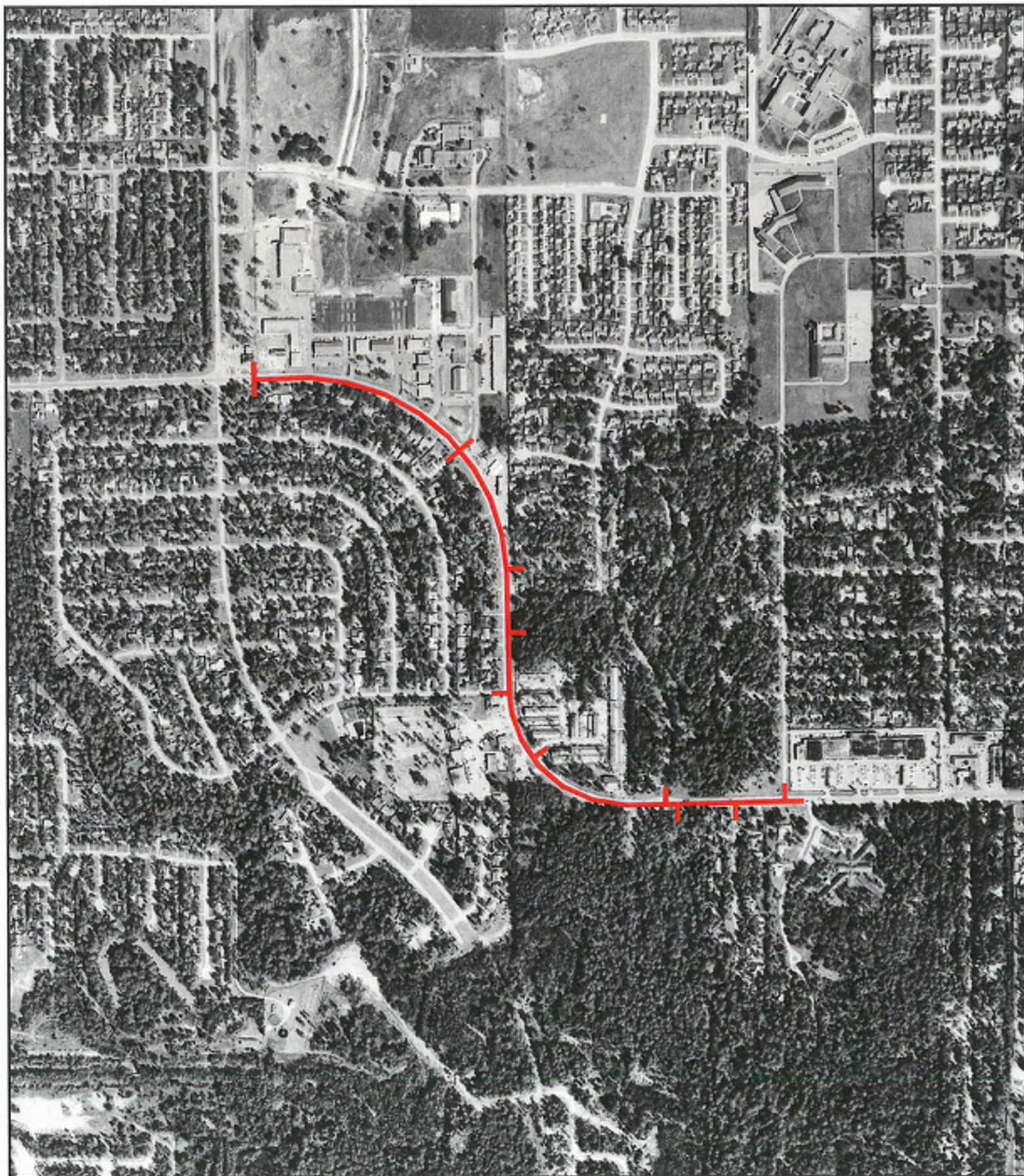
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 Subject Right-Of-Way  
E102-15

**GeoSearch**





JOB #: 100134 - 3/6/2015

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— Subject Right-Of-Way

E102-15

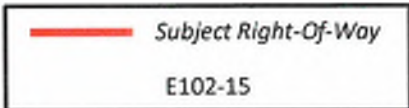
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**GeoSearch**





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 Subject Right-Of-Way  
E102-15

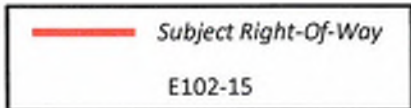
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**GeoSearch**





JOB #: 103134 - 3/8/2015

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 Subject Right-Of-Way  
E102-15

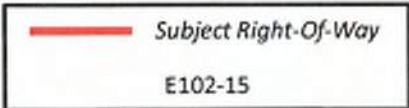
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**GeoSearch**





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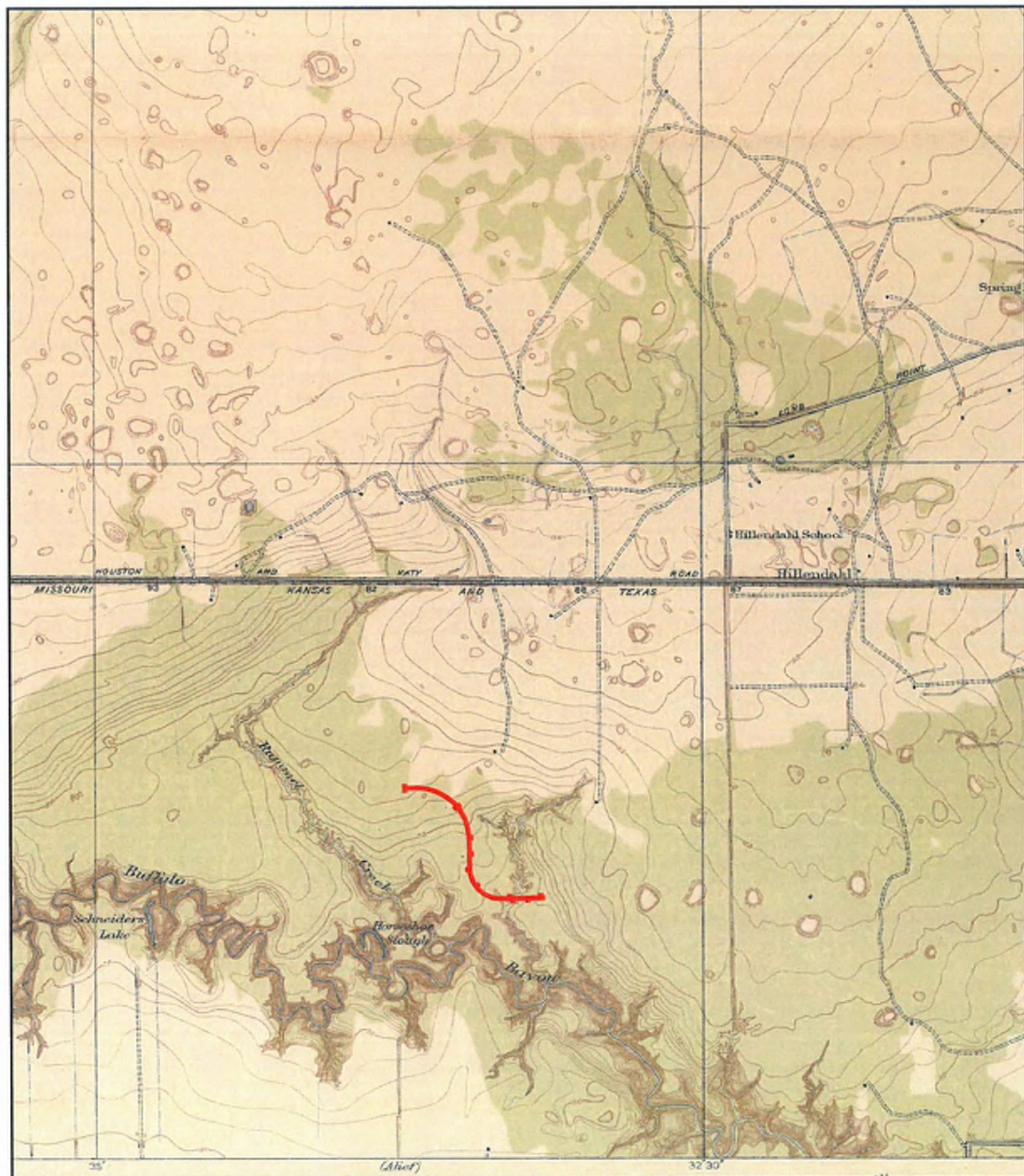
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 Subject Right-Of-Way

**GeoSearch**

E102-15





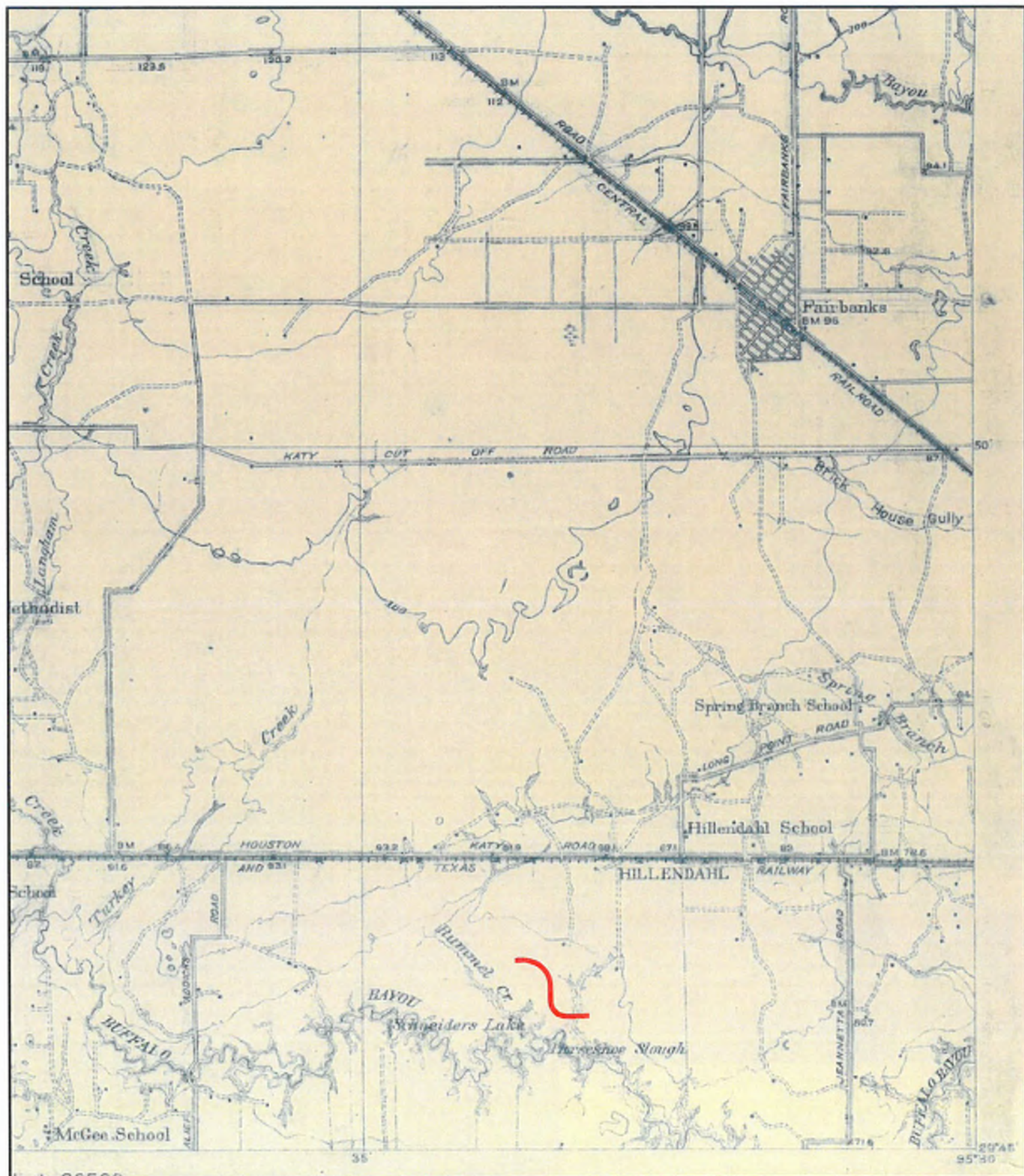
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— Approximate Subject  
Right-Of-Way  
E102-15


**GeoSearch**





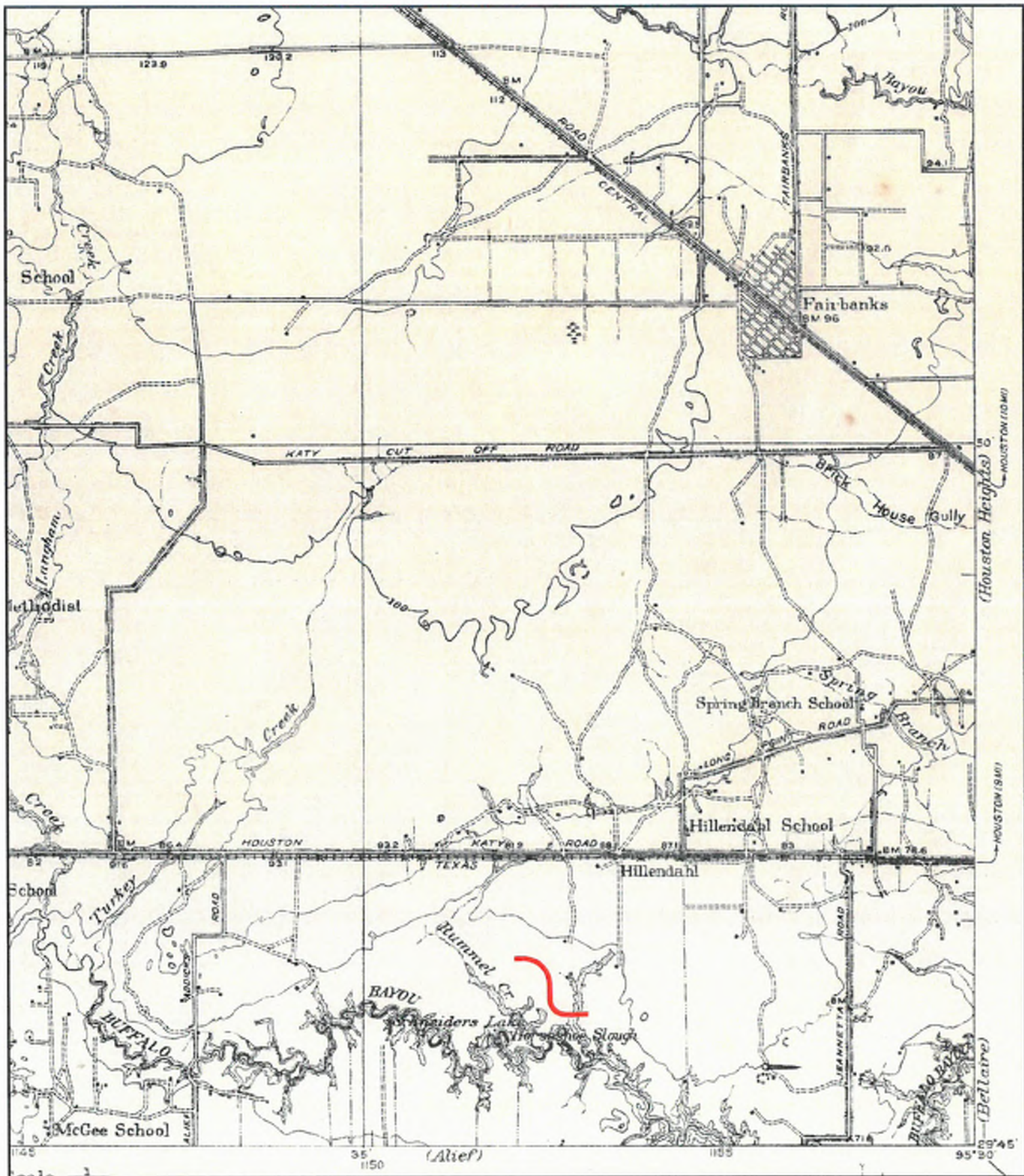
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 Approximate Subject  
 Right-Of-Way  
 E102-15


**GeoSearch**





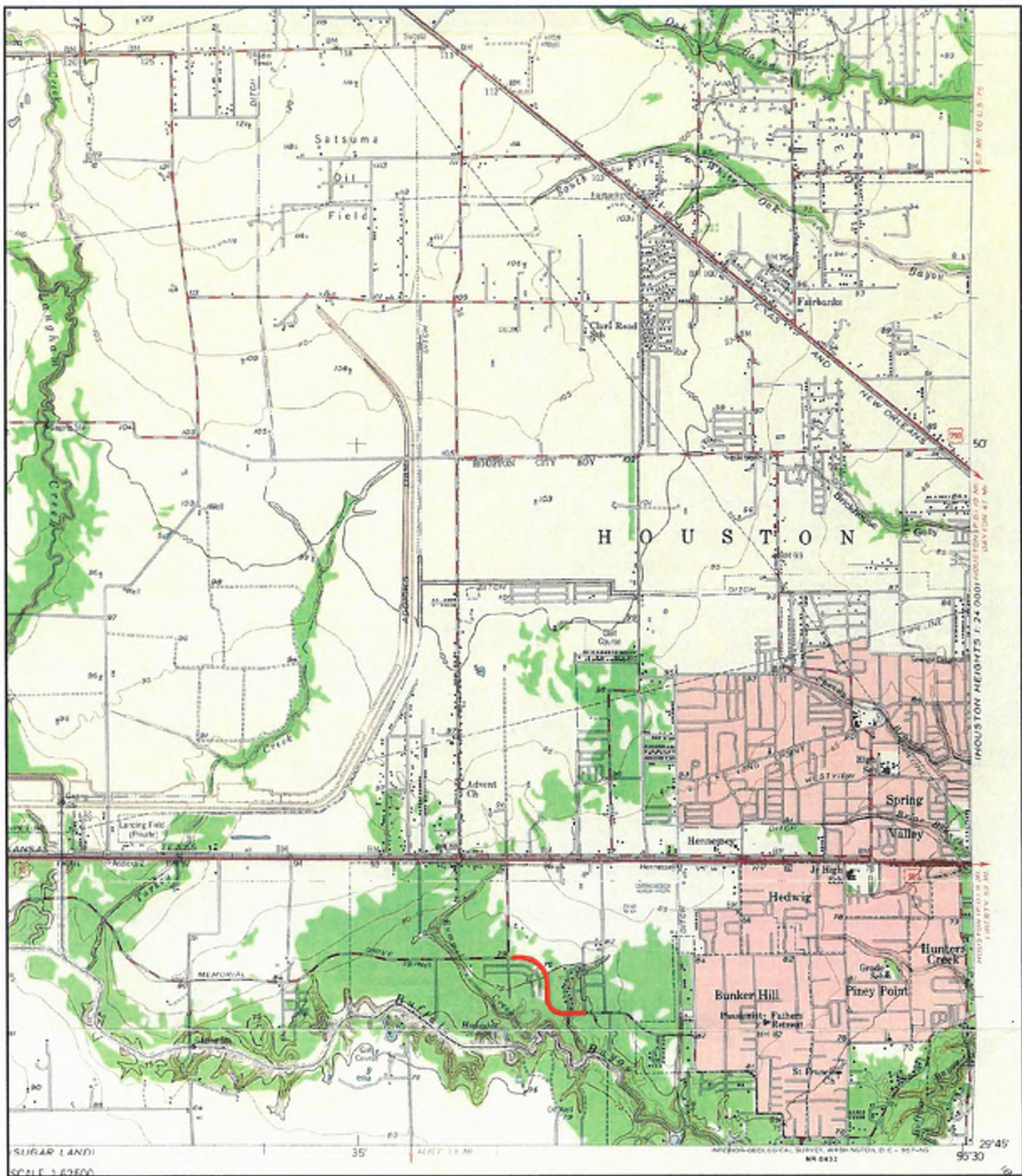
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JOB #: 103135 - 3/6/2015


 Approximate Subject  
 Right-Of-Way  
 E102-15

**GeoSearch**



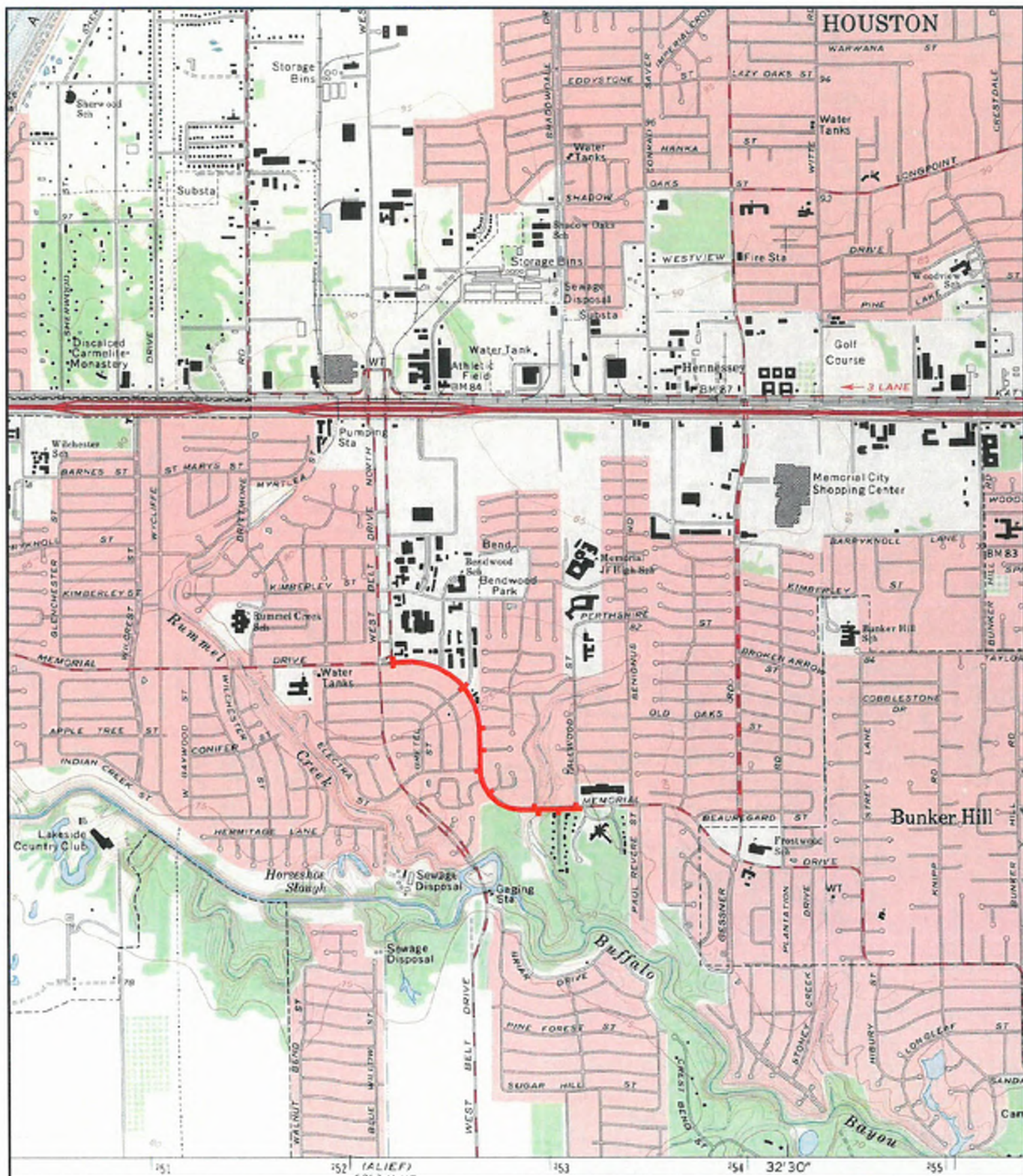


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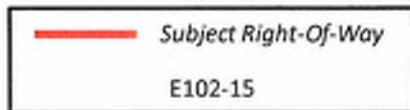
 Subject Right-Of-Way  
 E102-15

**GeoSearch**





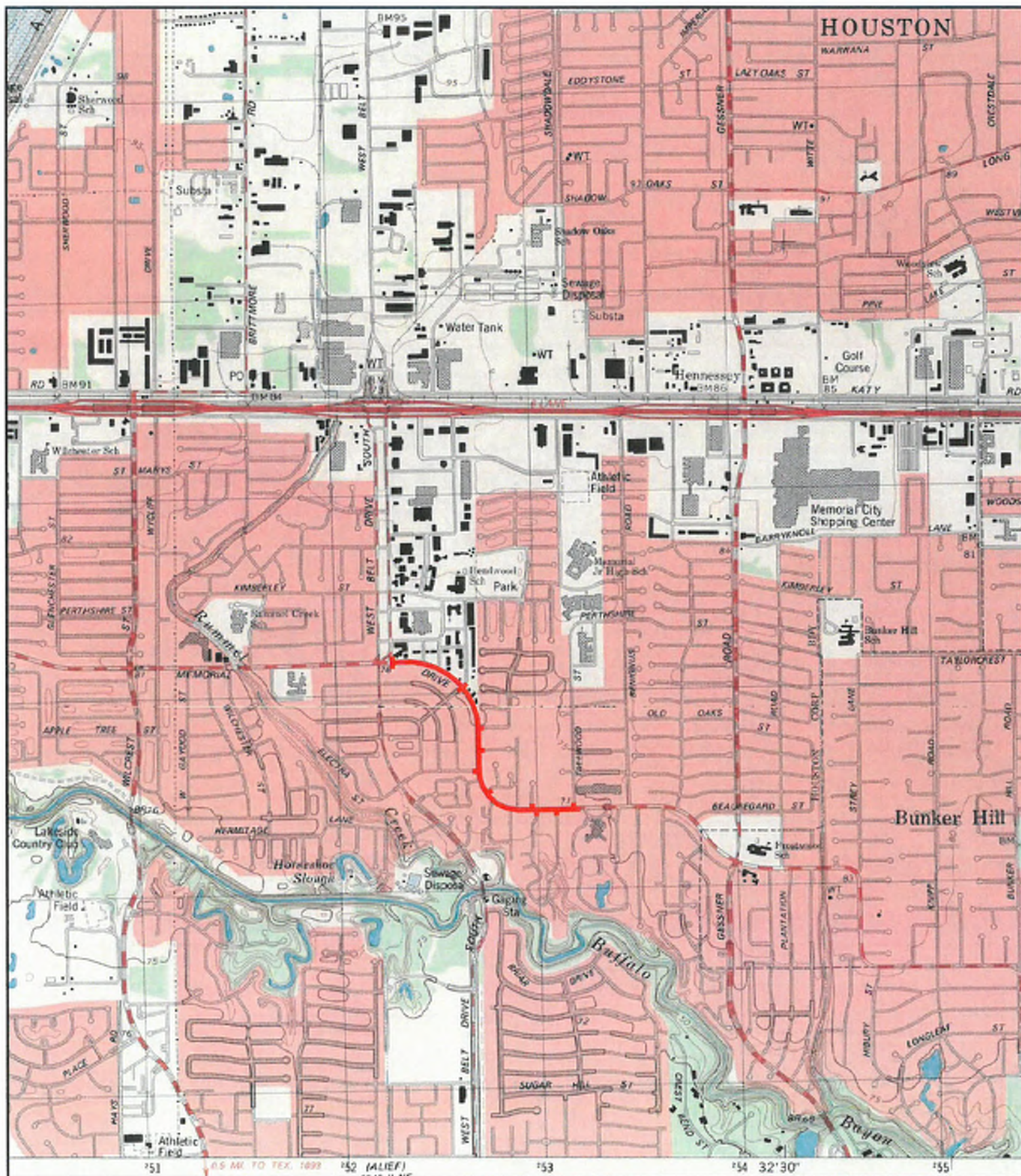
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**GeoSearch**

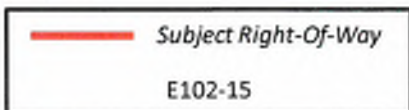
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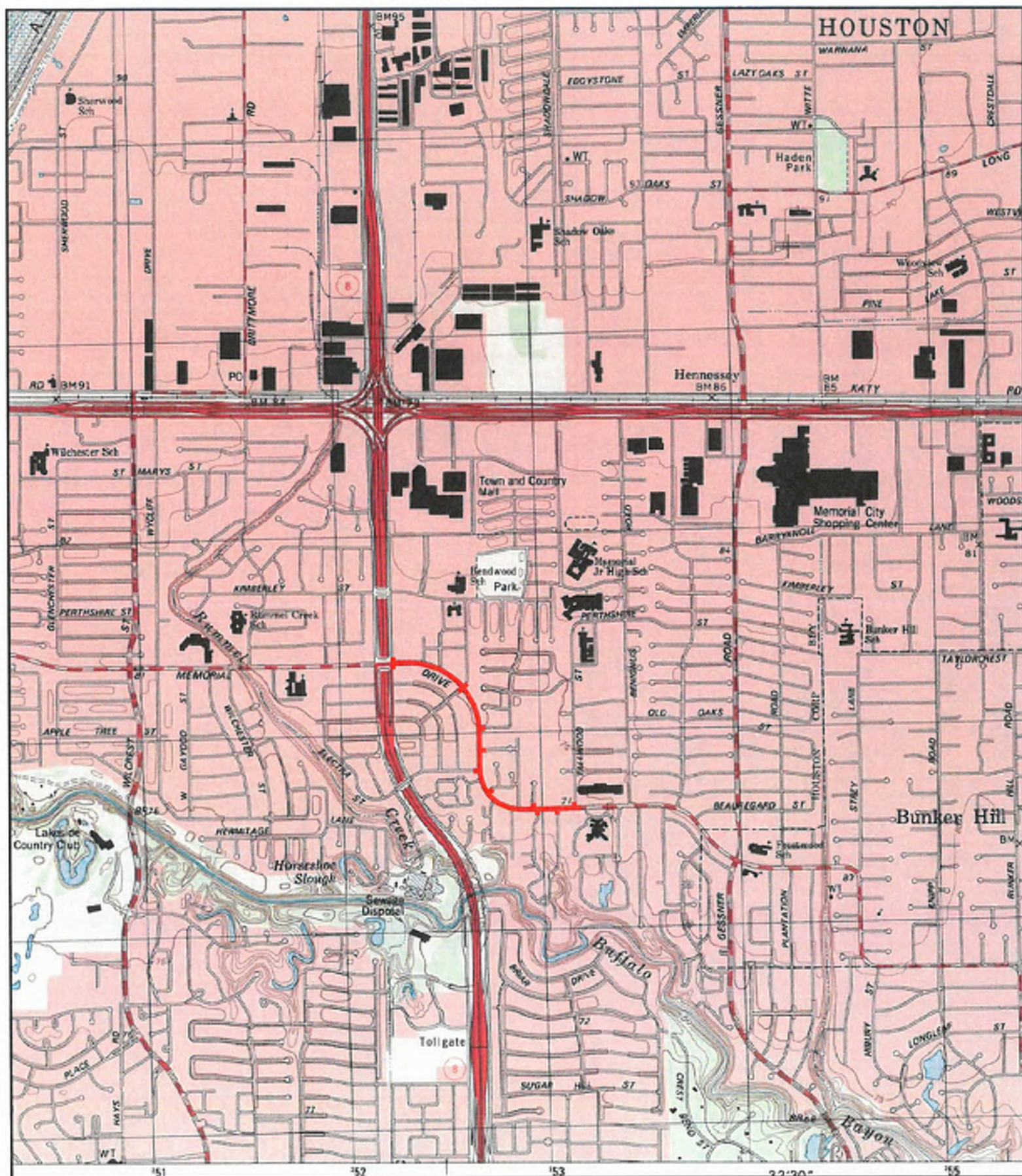
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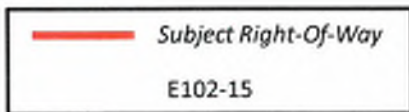
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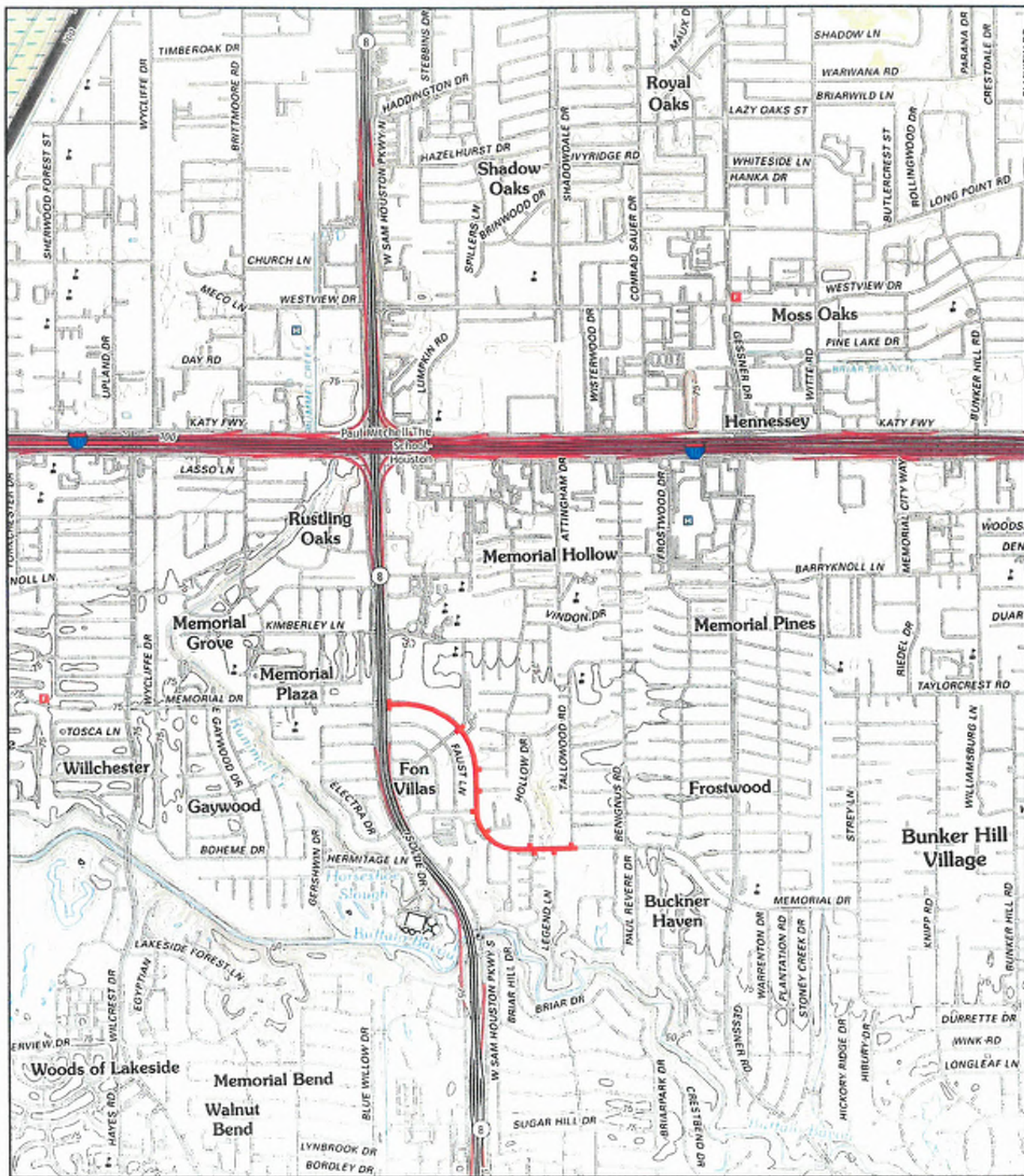
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**GeoSearch**





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**QUAD: HEDWIG VILLAGE, TX**  
**DATE: 2013**  
**SCALE: 1 : 24,000**

 Subject Right-Of-Way  
 E102-15

**GeoSearch**



**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX F:**

**HARRIS COUNTY APPRAISAL DISTRICT SEARCH RESULTS**

16

Thursday, March 05, 2015

Tax Year: 2015

HARRIS COUNTY APPRAISAL DISTRICT  
REAL PROPERTY ACCOUNT INFORMATION  
0401600000029

 Print  E-mail

[Ownership History](#) | [Fiduciary Information](#)

## Owner and Property Information

Owner Name & **WHEATLEY INVESTMENTS LTD**  
Mailing Address: **12860 MEMORIAL DR**  
**HOUSTON TX 77024-4810**

Legal **TR 29**  
Description: **ABST 3 G L BELLOWS**  
Property **12860 MEMORIAL DR**  
Address: **HOUSTON TX 77024**

State Class Code	Land Use Code	Building Class	Total Units
F1 -- Real, Commercial	8000 -- Land Neighborhood General Assignment	E	0
Land Area	Total Living Area	Net Rentable Area	Neighborhood
28,872 SF	2,212	0	9854.13
Market Area	Map Facet	Key Map®	
5017 -- Memorial	4957A	489G	

## Value Status Information

Capped Account  
Pending

Value Status  
All Values Pending

Shared CAD  
No

## Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2014 Rate	2015 Rate	Online Tax Bill
None	025	SPRING BRANCH ISD	Pending	1.394500		<a href="#">View</a>
	040	HARRIS COUNTY	Pending	0.417310		<a href="#">View</a>
	041	HARRIS CO FLOOD CNTRL	Pending	0.027360		
	042	PORT OF HOUSTON AUTHY	Pending	0.015310		
	043	HARRIS CO HOSP DIST	Pending	0.170000		
	044	HARRIS CO EDUC DEPT	Pending	0.005999		
	061	CITY OF HOUSTON	Pending	0.631080		
	269	HC MUN MGMT DIST 1	Pending	0.100000		
	977	MEMORIAL CITY	Pending			

## Valuations

	Value as of January 1, 2014		Value as of January 1, 2015	
	Market	Appraised	Market	Appraised
Land	1,154,880			
Improvement	244,670			
Total	1,399,550	1,399,550	Pending	Pending

## 5-Year Value History

## Land

## Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value
1	8000 -- Land Neighborhood General Assignment	4334	SF	28,872	1.00	1.00	1.00	Corner or Alley	1.00	Pending	Pending	Pending

Building							Building Details
Building	Year Built	Type	Style	Quality	Impr Sq Ft		
1	1995	Service Station (Self)	8419 -- Convenience Market	Good	1,300		Displayed
2	1995	Service Station (Self)	8435 -- Car Wash - Drive Thru	Average	912		<a href="#">View</a>

## Building Details (1)

Texas law prevents us from displaying residential sketches on our website.  
 You can see the sketch or get a copy at [HCAD's information center at 13013 NW Freeway.](#)

Building Data		Building Areas	
Element	Details	Description	Area
Cooling Type	Central / Forced	BASE AREA PRI	1,300
Construction Type	Fire Resistant Steel	CNPY ROOF SS GD -C	5,000
Functional Utility	Avg/Normal		
Heating Type	Hot Air	Extra Features	
Partition Type	Normal	Description	Units
Physical Condition	Avg/Normal	CANOPY ROOF SERV STN AVG	1
Plumbing Type	Adequate	Paving - Heavy Concrete	1
Sprinkler Type	None	Electronic Dispenser	1
Exterior Wall	Metal, Sandwich	Petroleum Stg Tank - F-glass -Sgl Wall -12,000 Gal	3
Economic Obsolescence	Normal		
Element	Units		
Wall Height	12		
Interior Finish Percent	100		



Ownership History: 0401600000029

**12860 MEMORIAL DR  
HOUSTON TX 77024**

Owner	Effective Date
WHEATLEY INVESTMENTS LTD	12/18/2003
CHEVRON USA INC	1/2/1988
GULF OIL CO	1/2/1984

[end of record]

[-close window-](#)



4/6 - 47

Thursday, March 05, 2015

Tax Year: 2015

HARRIS COUNTY APPRAISAL DISTRICT  
REAL PROPERTY ACCOUNT INFORMATION  
0401600000011

[Print](#) [E-mail](#)
[Ownership History](#) | [Fiduciary Information](#)

## Owner and Property Information

Owner Name & Mailing Address:	<b>BRIGGS ROBERT A JR 311 W GAYWOOD DR HOUSTON TX 77079-7228</b>	Legal Description:	<b>TR 1A ABST 3 G L BELLOWS 12699 MEMORIAL DR HOUSTON TX 77024</b>
-------------------------------	--	--------------------	--

State Class Code	Land Use Code	Building Class	Total Units			
F1 -- Real, Commercial	8000 -- Land Neighborhood General Assignment	B	0			
Land Area	Total Living Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
11,678 SF	4,036	3,876	9890.59	5017 -- Memorial	4957A	489H

## Value Status Information

Capped Account	Value Status	Shared CAD
Pending	All Values Pending	No

## Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2014 Rate	2015 Rate	Online Tax Bill
None	025	SPRING BRANCH ISD	Pending	1.394500		<a href="#">View</a>
	040	HARRIS COUNTY	Pending	0.417310		<a href="#">View</a>
	041	HARRIS CO FLOOD CNTRL	Pending	0.027360		
	042	PORT OF HOUSTON AUTHY	Pending	0.015310		
	043	HARRIS CO HOSP DIST	Pending	0.170000		
	044	HARRIS CO EDUC DEPT	Pending	0.005999		
	061	CITY OF HOUSTON	Pending	0.631080		

## Valuations

	Value as of January 1, 2014		Value as of January 1, 2015	
	Market	Appraised	Market	Appraised
Land	210,204			
Improvement	306,312			
Total	516,516	516,516	Pending	Pending

## 5-Year Value History

## Land

## Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value
1	8000 -- Land Neighborhood General Assignment	4374	SF	11,678	1.00	1.00	1.00	Corner or Alley	1.00	Pending	Pending	Pending

## Building

Building	Year Built	Type	Style	Quality	Impr	Sq Ft	Building Details
----------	------------	------	-------	---------	------	-------	------------------

1	1987	Retail Multi-Occupancy	8412 -- Neighborhood Shopping Ctr	Average	1,908	Displayed
2	1992	Retail Multi-Occupancy	8412 -- Neighborhood Shopping Ctr	Average	2,128	<a href="#">View</a>

## Building Details (1)

Texas law prevents us from displaying residential sketches on our website.  
You can see the sketch or get a copy at [HCAD's information center at 13013 NW Freeway.](#)

Building Data		Building Areas	
Element	Details	Description	Area
Cooling Type	Central / Forced	BASE AREA PRI	1,908
Construction Type	Fire Resistant Steel		
Functional Utility	Avg/Normal	Extra Features	
Heating Type	Hot Air	Description	Units
Partition Type	Normal	Paving - Asphalt & Concrete Service Stat	1
Physical Condition	Avg/Normal		
Plumbing Type	Adequate		
Sprinkler Type	None		
Exterior Wall	Brick / Stone		
Economic Obsolescence	Normal		
Element	Units		
Wall Height	12		
Store Front: Metal	1		
Interior Finish Percent	100		



Ownership History: 0401600000011

**12699 MEMORIAL DR  
HOUSTON TX 77024**

Owner	Effective Date
BRIGGS ROBERT A JR	1/2/1992
CONOCO INC	5/30/1986
CONTINENTAL OIL CO	1/2/1984

[end of record]

[-close window-](#)

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX G  
PHOTOGRAPHS**





**Photograph 1:** View to the north along West Sam Houston Parkway feeder road from its intersection with Memorial Drive. A Chevron LPST site is located to the right of photograph.



**Photograph 2:** View to the west along Memorial Drive from near its intersection with West Sam Houston Parkway. The Chevron LPST site is located to the left of the photograph.





**Photograph 3:** View to the northwest of Harris County Flood Control District Channel W153 near Tallowood Road. The railing is the northern edge of the Memorial Drive right-of-way.



**Photograph 4:** View to the north of a monitor well on the south side of Memorial Drive. The building at the top of the photograph is Chase Bank at 12802 Memorial Drive.



**ESA I Memorial Drive between West Sam Houston Parkway and Tallowood Road, E102-15**



**Photograph 5:** View to the east of a monitor well on the west side of Memorial Drive. The monitor well is across from the Bank of Texas. The building with the pink canopy is A-1 Cleaners, a VCP and LPST site.



**Photograph 6:** View to the southeast along Memorial Drive of a monitor well in front of A-1 Cleaners at 1754 Memorial Drive.



ESA I Memorial Drive between West Sam Houston Parkway and Tallowood Road, E102-15



**Photograph 7:** View of two plugged monitor wells on the southern side of Memorial Drive opposite the end of Tallowood Road. The MW Cleaners/Lantern Lane Shopping Center-Pro Cleaners, VCP and IHWCA site is located in the upper right corner of the photograph.



**Photograph 8:** View to the north along West Bough Lane from near Memorial Drive. The Bank of Texas at 12764 Memorial Drive is to the right of the photograph.





**Photograph 9:** View to the northwest of a monitor well on the West Bough Lane right-of-way. Chase Bank is in the background.



**Photograph 10:** View to the north along Hollow Drive from near Memorial Drive. .





**Photograph 11:** View to the north towards Memorial Drive of two plugged monitor wells on Legend Lane.



**Photograph 12:** View to the northeast from the intersection of Memorial Drive and the West Sam Houston Parkway feeder road of the Chevron LPST site at 12860 Memorial Drive.



ESA I Memorial Drive between West Sam Houston Parkway and Tallowood Road, E102-15



**Photograph 13:** View to the west of plugged monitor wells and recovery well at the Chevron LPST site.



**Photograph 14:** View to the east of monitor wells at the Town and Country Village Shopping Center. These wells are associated with the release of VOCs from Your Valet Cleaners at 614 West Bough Lane.





**Photograph 15:** View to the southeast of one of the five monitor wells on the Bank of Texas property at 12764 Memorial Drive. A-1 Cleaners is in the background of the photograph and Memorial Drive is to the right.



**Photograph 16:** View to the east of A-1 Cleaners VCP and LPST site at 12754 Memorial Drive.





**Photograph 17:** View to the northeast of a monitor well and remediation system at A-1 Cleaners.



**Photograph 18:** View to the north of MW Cleaners/Pro Cleaners VCP and IHWCA site at 12534 Memorial Drive.





**Photograph 19:** View to the south from Memorial Drive of the Memorial Green VCP site at 12601 Memorial Drive.



**Photograph 20:** View to the southwest of the former Conoco 43059 LPST site at 12699 Memorial Drive.





**Photograph 21:** View to the northeast of a monitor well on Broken Bough Drive. Memorial Drive is at the traffic light.



**Photograph 22:** View to the north of the Sprint PCS Tower IOP site at 608 West Bough Lane.





**Photograph 23:** View to the northeast of the former Your Valet Cleaners at 614 West Bough Lane (currently 650 West Bough Lane, Suite 100). Note the plugged monitor wells.



**Photograph 24:** View to the west-southwest of Gulf States Laundry Machinery Company at 12647 Memorial Drive. Dry cleaners were once located here. The address places this facility close to a recognized environmental condition whose exact location could not be determined (refer to Section 6.0 and Figure 5b).





**Photograph 25:** View of 55-gallon drums, various size tanks, equipment, wooden pallets and scrap metal in the concrete loading area of Gulf States Laundry Machinery Company.



**Photograph 26:** View to the east of a monitor well associated with the former Conoco LPST site. The gasoline station would have been off the upper left corner of the photograph.





**Photograph 27:** View to the northeast of a monitor well at 12810 Butterfly Lane.

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX H  
INTERVIEWS**

## Robert Metzger

---

**From:** Robert Metzger <rmetzger@avilesengineering.com>  
**Sent:** Tuesday, April 7, 2015 11:48 AM  
**To:** 'lnettles@velaw.com'  
**Subject:** request for information A-1 dry cleaner release and Town & Country historic dry cleaner release

**Importance:** High

Larry,

Thank you for speaking with me on the telephone. As discussed, please send map of monitor well locations and groundwater information for above sites.

Thank you.

*Robert J. Metzger, P.G., CAPM  
Aviles Engineering Corporation  
5790 Windfern  
Houston, TX 77041  
Office: 713-895-7645  
Fax: 713-895-7943*

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## Robert Metzger

---

**From:** Nettles, Larry <lnettles@velaw.com>  
**Sent:** Tuesday, April 7, 2015 5:10 PM  
**To:** Robert Metzger  
**Subject:** RE: request for information A-1 dry cleaner release and Town & Country historic dry cleaner release

I am not sure why you need this information but the maps I sent you show the wells that are associated with A-1 and have not been plugged. All other wells (not associated with A-1) have been plugged. There are no more Town & Country Village wells – all were plugged within the past month.

The monitor wells are completed into a groundwater zone that is 25-30 feet below ground surface. There may be shallower pockets of water in various locations, but the contaminated zone is at 25-30 feet BGS.

---

**From:** Robert Metzger [mailto:rmetzger@avilesengineering.com]  
**Sent:** Tuesday, April 07, 2015 4:10 PM  
**To:** Nettles, Larry  
**Subject:** RE: request for information A-1 dry cleaner release and Town & Country historic dry cleaner release

Larry,

Thank you for the map. It is very helpful. A few additional questions:

- Are all the wells shown associated with A-1 cleaners release or are some of them associated with the leak from the historic dry cleaners at Town and Country Village Shopping Center? If they are from two different sources would you let me know which monitor wells belongs to which release.
- When you say the groundwater is at 25 feet, is that the shallowest groundwater zone or just the one impacted? I know at some locations further east along Memorial Drive and north of Memorial Drive there are shallow water zones located around 16 feet.
- If you have a table summary of water levels measured for each of the A-1 project and the Town and Country Project monitor wells I would appreciate it if you could send them to me.

Thanks,

Robert J. Metzger, P.G., CAPM  
Aviles Engineering Corporation  
5790 Windfern  
Houston, TX 77041  
Office: 713-895-7645  
Fax: 713-895-7943

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**From:** Nettles, Larry [<mailto:lnettles@velaw.com>]

**Sent:** Tuesday, April 7, 2015 1:20 PM

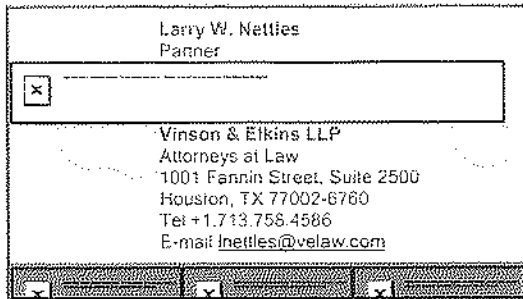
**To:** Robert Metzger

**Subject:** RE: request for information A-1 dry cleaner release and Town & Country historic dry cleaner release

Robert:

A diagram showing the groundwater monitoring wells associated with the A-1 Cleaners facility is attached. There are two maps instead of one because the wells hold two different right-of-way permits from the City of Houston. All of the wells formerly associated with the Town & Country Village site have been plugged and abandoned. The depth to groundwater is 25 feet below ground surface. Please let me know if you have any questions or need additional information.

Larry Nettles



**From:** Robert Metzger [<mailto:rmetzger@avilesengineering.com>]

**Sent:** Tuesday, April 07, 2015 11:48 AM

**To:** Nettles, Larry

**Subject:** request for information A-1 dry cleaner release and Town & Country historic dry cleaner release

**Importance:** High

Larry,

Thank you for speaking with me on the telephone. As discussed, please send map of monitor well locations and groundwater information for above sites.

Thank you.

Robert J. Metzger, P.G., CAPM  
Aviles Engineering Corporation  
5790 Windfern  
Houston, TX 77041  
Office: 713-895-7645  
Fax: 713-895-7943

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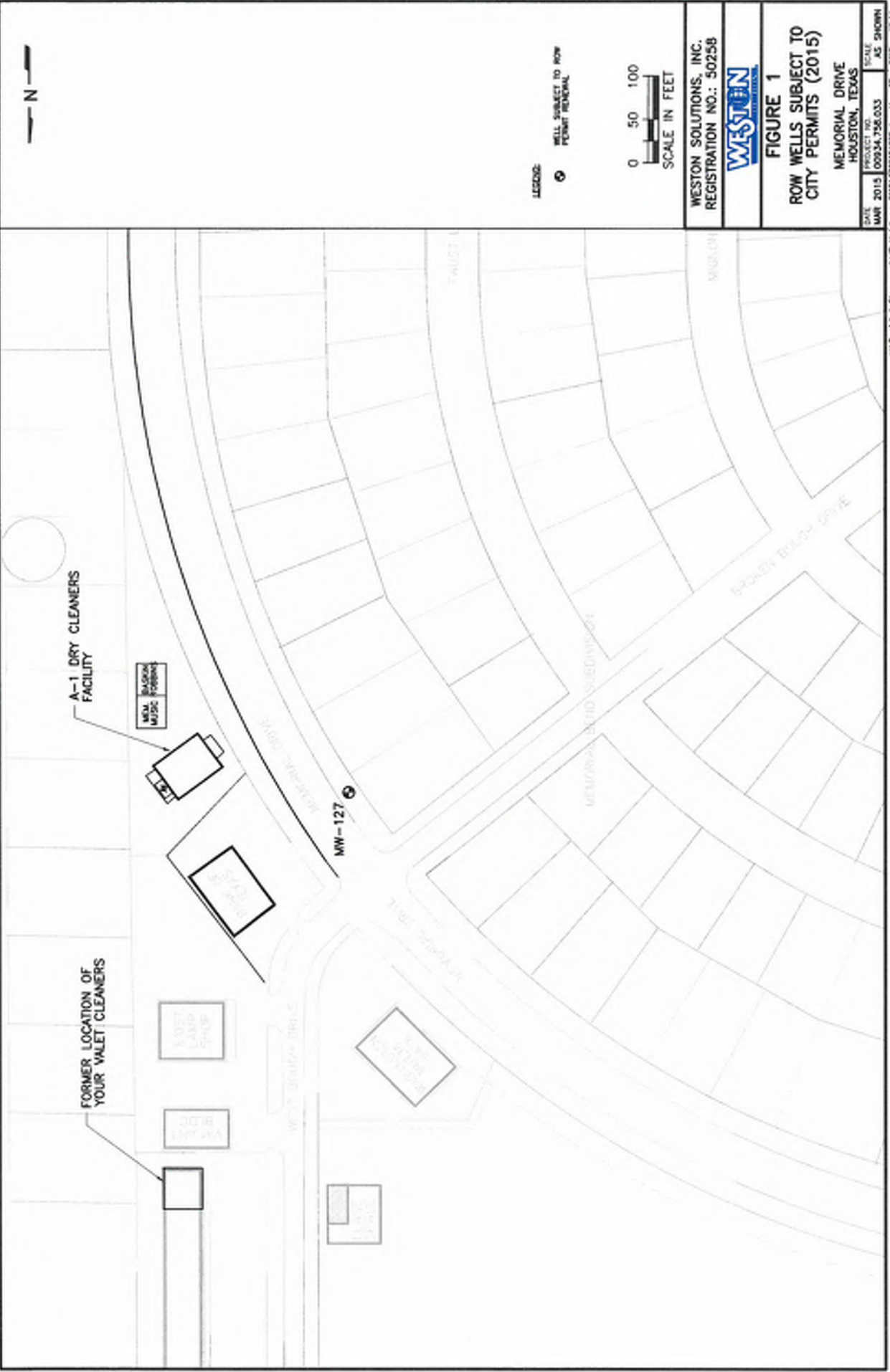
**CONFIDENTIALITY NOTICE:** The information in this email may be confidential and/or privileged. This email is intended to be reviewed by only the individual or organization named above. If you are not the intended recipient or an authorized representative of the intended recipient, you are hereby notified that any review, dissemination or copying of this email and its attachments, if any, or the information contained herein is prohibited. If you have received this email in error, please immediately notify the sender by return email and delete this email from your system.

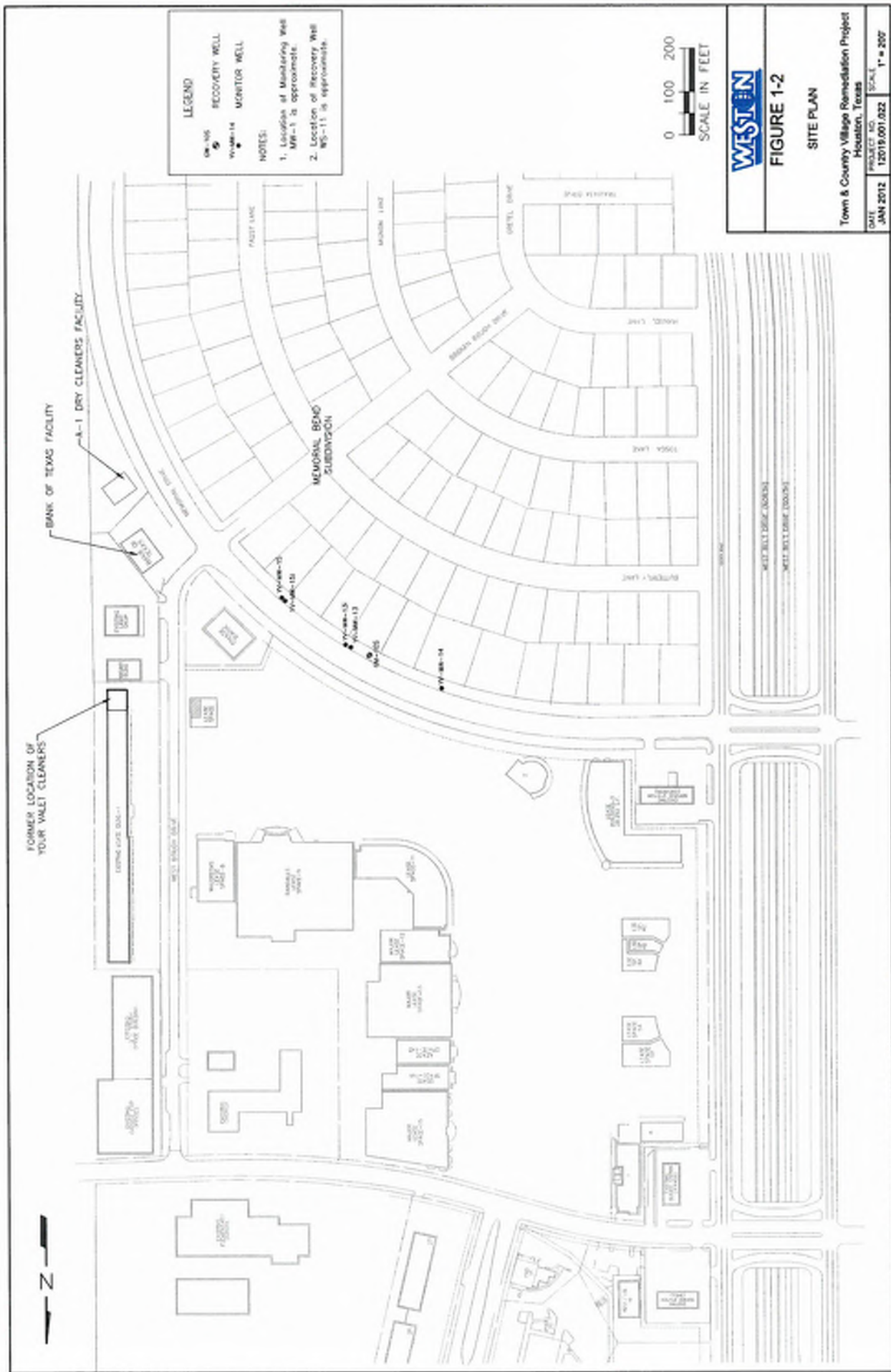
Thank You.

---









**Robert Metzger**

---

**From:** Mintz, Andrew <Andrew.Mintz@bglip.com>  
**Sent:** Tuesday, April 7, 2015 11:02 AM  
**To:** rmetzger@avilesengineering.com  
**Subject:** Direct your question

Mr. Metzger,

Your best bet would be to contact the firm's front desk at 713.223.2300. They hopefully will be able to direct your question to someone with more knowledge of your specific case. Sorry I could not be of more help.

Thanks,

Andrew Mintz | Bracewell & Giuliani LLP  
711 Louisiana Street, Suite 2300 | Houston, Texas | 77002-2770  
T: +1.713.221.1580 | F: +1.800.404.3970  
[andrew.mintz@bglip.com](mailto:andrew.mintz@bglip.com) | [www.bglip.com](http://www.bglip.com)

## **March 2011 Groundwater Monitoring Report**

---

**Lantern Lane Shopping Center  
12534 Memorial Drive  
Houston, Texas 77024**

**VCP Number 1714**

Prepared for:

**Differential Development – 1994, Ltd  
2001 Kirby Drive, Suite 1200  
Houston, Texas 77019**

**April 11, 2011**

Prepared By

---

**InControl Technologies, Inc.**

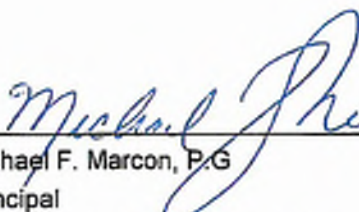
3845 FM 1960 West, Suite 195  
Houston, Texas 77068

(281) 580-8892 Fax (281) 580-8853





This Groundwater Monitoring Report has been reviewed and has been found to be in general conformance with standard industry professional practices.

  
Michael F. Marcon, P.G.  
Principal  
Professional Geoscientist 2704



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2.1 Quality Assurance/Quality Control.....	2
2.2 Groundwater Sampling Procedures .....	2
3.0 Groundwater Monitoring.....	4
3.1 Summary of Analytical Results.....	4
4.0 Conclusions and Recommendations.....	6

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Table 1	Summary of Groundwater Elevations
Table 2	Summary of Chlorinated Organic Compounds in Groundwater
Table 3	Summary of Field Parameters
Figure 1	Site Location Map
Figure 2	Proposed MSD Boundary with Groundwater Monitoring Locations
Figure 3	Groundwater Gradient Map 1 <sup>st</sup> GWBU- March 2011
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Appendix A	Field Sampling Forms
Appendix B	Laboratory Analytical Report and Data Usability Summary

## 1.0 Introduction

InControl Technologies, Inc was retained by Differential Development – 1994, Ltd. (the former property owner), to provide environmental consulting services at the Lantern Lane Shopping Center located at 12534 Memorial Drive in Houston, Harris County, Texas. The property is currently owned by amREIT Lantern Lane, LP, a Texas limited partnership. Prior to the sale of the shopping center, it was discovered that the subject property had been impacted by historical dry cleaning operations. The subject property (Site) consists of approximately 6.75-acres of land located west of downtown Houston, Harris County, Texas (**Figure 1**). The subject property is developed with a retail shopping center. The former Pro Cleaners operated a dry cleaning facility in the western portion of the Lantern Lane Shopping Center. Pro Cleaners ceased dry cleaning operations in June 2007.

On November 3, 2008, Differential submitted its MSD Application to the City of Houston. The City of Houston has assigned number 2008-012-DD to the application and has deemed the application administratively complete. The public meeting for this application was held on August 31, 2010. The public hearing for this application was held on September 16, 2010 with the City Council Committee on Development and Regulatory Affairs. The City of Houston has passed a Municipal Setting Designation Ordinance No. 2010-779 prohibiting the use of groundwater. We are continuing discussions with the municipalities and retail public utilities whose support and approval are required under the MSD Application.

The purpose of this report is to document the results of InControl Technologies' March 2011 groundwater monitoring event performed on March 21-23, 2011.

## 2.0 Sampling and Analytical Procedures

### 2.1 Quality Assurance/Quality Control

A formal Quality Assurance program was implemented for sampling activities associated with groundwater monitoring at the site. Groundwater samples are being collected in conjunction with groundwater response action activities to evaluate groundwater conditions and monitor progress of the groundwater response action. The following procedures were followed to ensure that the quality of collected data is sufficient to evaluate groundwater quality at the site:

- Dedicated sampling equipment is used for each well to reduce the possible effects of cross contamination. This practice eliminates the need for collection of equipment rinsate blanks.
- Low-flow groundwater sampling devices are used to reduce the potential for constituent loss through volatilization.
- Samples are analyzed for chlorinated organic compounds by EPA Method 8260B. Sample Quantitation Limits (except where noted) are below the Tier 1 Protective Concentration Levels (PCLs).
- Analytical data are reviewed to ensure that the samples were properly preserved and analyzed within the required holding times.
- Laboratory quality control results are reviewed to verify proper instrument calibration and the accuracy of the analytical results.

### 2.2 Groundwater Sampling Procedures

Groundwater samples were collected from the thirty-four (34) monitoring wells associated with this site (**Figure 1**) in March 2011. Prior to sampling, groundwater elevations were measured (**Table 1**). Groundwater samples were collected using low-flow purging and sampling methodology as prescribed in TCEQ guidance. Dedicated polyethylene tubing was used to extract groundwater from the mid-point of the well screen. A peristaltic pump was used to purge the groundwater at a rate less than 0.1 liters per minute. The volume of purge water was evaluated through continuous monitoring of field parameters such as pH, specific conductance, temperature, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP) which are measured inside the low-flow cell during purging and sampling.

Samples for volatiles analyses were collected directly into 40-milliliter vials and preserved with hydrochloric acid. A label that includes the sample identification number, the date and time of sample collection, the sampler's name or initials, and other pertinent information as needed was placed on each sample container. Each sample was enclosed in a zipper-type plastic bag and placed on ice in a cooler for transport to ALS Laboratory Group (ALS) in Houston, Texas. Each set of samples (i.e., each cooler) was submitted to the laboratory under standard InControl Technologies chain of custody protocol. Field sampling forms for the March 2011 sampling event are included as **Appendix A**.



Analytical method 8260B was used to analyze the groundwater samples for chlorinated organics. The target compounds for this site are perchloroethylene (PCE), trichloroethylene (TCE), vinyl chloride (VC), cis-1,2-dichloroethylene (cis-DCE), and trans-1,2-dichloroethylene (trans-DCE).

Refer to **Appendix B** for a copy of the laboratory report and Data Usability Summary (DUS). The DUS contains a review of the quality assurance/quality control parameters described above.

### 3.0 Groundwater Monitoring

Thirty-four (34) groundwater monitoring samples were collected at the site on March 21-23, 2011 using low-flow purging and sampling methods. Samples were obtained from monitoring wells 1-MW-1 through 1-MW-22 and 2-MW-1 through 1-MW-12, with the exception of 1-MW-3 and 1-MW-12, which were not able to be sampled. Purging and sampling was conducted with a peristaltic pump and dedicated tubing. Development was considered complete when field parameters of pH, SC, and temperature had stabilized, and water quality had improved. Groundwater quality parameter measurements for the March 2011 sampling events are included in **Table 2**. Well development and sampling forms are included in **Appendix A**.

Groundwater elevations were measured in all wells prior to the sampling event. The potentiometric surface maps for the March 2011 monitoring event are presented on **Figures 3** and **4**. The direction of groundwater flow in the first groundwater bearing unit has consistently remained to the southwest with a gradient of 0.006 feet/foot. The direction of groundwater flow in the second groundwater bearing unit has consistently remained to the southwest with a gradient of 0.001 feet/foot. Groundwater elevation data are summarized in **Table 1**.

Current analytical data results for the site constituents of concern are presented along with the cumulative results of the previous monitoring events in **Table 2**. Groundwater samples were analyzed for chlorinated solvents (tetrachloroethene and its daughter products) during these sampling events. **Figure 5** and **Figure 7** illustrate the distribution of COCs in the first groundwater bearing unit at the site. **Figure 6** and **Figure 8** illustrate the distribution of COCs in the second groundwater bearing unit at the site. Copies of the laboratory analytical and quality assurance reports from events completed during the current monitoring period are included in **Appendix B**.

**Table 3** summarizes the field parameters for each monitoring well. The groundwater sample results discussed herein were collected on March 21-23, 2011.

#### 3.1 Summary of Analytical Results

Thirty-four (34) groundwater monitoring wells (1-MW-1 through 1-MW-22 and 2-MW-1 through 1-MW-12, with the exception of 1-MW-3 and 1-MW-12) were sampled during the March 2011 sampling event. A summary of results is contained in **Table 2**. The following is a summary of the sampling results:

##### First Groundwater Bearing Unit

- Tetrachloroethene and its daughter products (trichloroethene, cis-1,2-dichloroethene and vinyl chloride) are the primary VOCs detected on the subject property (**Figures 5** and **7**);
- Tetrachloroethene was detected above its Tier 1 PCL of 0.005 mg/L in the groundwater samples collected from monitoring wells 1-MW-5, 1-MW-9, 1-MW-11, and 1-MW-15. The concentration of tetrachloroethene decreased in all groundwater monitoring wells except two during the March 2011 sampling event. The remaining wells reported stable concentrations within the historical range.

- Trichloroethene was detected above its Tier 1 PCL of 0.005 mg/L in the groundwater samples obtained from monitor wells 1-MW-4, 1-MW-5, 1-MW-9, and 1-MW-11.
- Cis-1,2-dichloroethene was detected above its Tier 1 PCL of 0.07 mg/L in the groundwater sample obtained from monitor well 1-MW-4. All other wells reported concentrations below the PCL.
- Trans-1,2-dichloroethene was not detected in any monitoring well above its Tier 1 PCL of 0.1 mg/L.
- Vinyl chloride was not detected above its Tier 1 PCL of 0.002 mg/L in any of the monitoring wells.

#### Second Groundwater Bearing Unit

- Tetrachloroethene and its daughter products (trichloroethene, cis-1,2-dichloroethene and vinyl chloride) are the primary VOCs detected on the subject property (**Figures 6 and 8**);
- Tetrachloroethene was detected above its Tier 1 PCL of 0.005 mg/L in the groundwater samples collected from monitoring wells 2-MW-1, 2-MW-2, 2-MW-3, 2-MW-6, 2-MW-9, 2-MW-10, and 2-MW-11. The concentration of tetrachloroethene decreased in all groundwater monitoring wells.
- Trichloroethene was detected above its Tier 1 PCL of 0.005 mg/L in the groundwater samples obtained from monitor wells 2-MW-1, 2-MW-2, 2-MW-6, and 2-MW-9.
- Cis-1,2-dichloroethene was detected above its Tier 1 PCL of 0.07 mg/L in the groundwater sample obtained from monitor well 2-MW-2. All other wells reported concentrations below the PCL.
- Trans-1,2-dichloroethene was not detected in any monitoring well above its Tier 1 PCL of 0.1 mg/L.
- Vinyl chloride was detected above its Tier 1 PCL of 0.002 mg/L in the groundwater sample obtained from monitor well 2-MW-2. All other wells reported concentrations below the PCL.

Overall decreased concentrations of all COCs were noted in the groundwater samples collected during this event. Decreasing tetrachloroethene and trichloroethene concentrations have been noted in most of the monitoring wells. The presence of both cis-1,2-dichloroethene and vinyl chloride indicates that natural processes are actively attenuating the chlorinated solvents. The fact that cis-1,2-dichloroethene and vinyl chloride are not significantly accumulating indicates that the process is continuing through ethene.

## 4.0 Conclusions and Recommendations

The groundwater monitoring data provide a basis for the following conclusions:

- The concentrations of tetrachloroethene and trichloroethene have decreased significantly within the PCLE zone.
- The potentiometric data indicate that direction of groundwater flow is to the southwest in both the first and second groundwater bearing units. This is generally consistent with the historic direction of groundwater flow.

Based on the conclusions listed above, InControl Technologies recommends annual sampling of the monitoring wells.



Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
First Groundwater Bearing Unit				
1-MW-1	98.12	7/12/2006	18.11	80.01
		10/3/2006	18.39	79.73
		4/2/2007	17.33	80.79
		3/3/2008	--	NA
		3/21/2011	17.89	80.23
1-MW-2	97.90	7/12/2006	18.28	79.62
		10/3/2006	18.56	79.34
		4/2/2007	17.60	80.30
		3/3/2008	16.70	81.20
		3/21/2011	18.00	79.90
1-MW-3	98.78	4/7/2005	16.91	81.87
		7/12/2006	18.61	80.17
		10/3/2006	18.72	80.06
		12/20/2006	18.65	80.13
		4/2/2007	17.67	81.11
		3/3/2008	16.74	82.04
		3/21/2011	--	NA
1-MW-4	98.89	4/7/2005	17.65	81.24
		7/12/2006	19.13	79.76
		10/3/2006	19.30	79.59
		12/19/2006	19.26	79.63
		4/2/2007	18.30	80.59
		3/3/2008	17.49	81.40
		3/21/2011	18.81	80.08
1-MW-5	98.93	4/7/2005	16.81	82.12
		7/12/2006	18.69	80.24
		12/20/2006	18.72	80.21
		4/2/2007	17.74	81.19
		9/18/2007	17.41	81.52
		3/3/2008	16.77	82.16
		3/21/2011	18.23	80.70
1-MW-6	97.53	4/6/2005	16.06	81.47
		7/12/2006	17.70	79.83
		10/3/2006	17.84	79.69
		12/19/2006	17.75	79.78
		4/2/2007	16.86	80.67
		3/3/2008	15.97	81.56
		3/21/2011	17.35	80.18

Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
1-MW-7	98.50	7/12/2006	--	NA
		10/3/2006	18.02	80.48
		4/2/2007	16.89	81.61
		3/3/2008	15.66	82.84
		3/21/2011	17.32	81.18
1-MW-8	98.40	4/7/2005	--	NA
		7/12/2006	18.35	80.05
		10/3/2006	17.32	81.08
		4/2/2007	16.37	82.03
		3/3/2008	15.66	82.74
1-MW-9	98.22	4/6/2005	17.44	80.78
		7/12/2006	18.86	79.36
		10/3/2006	19.05	79.17
		12/20/2006	19.83	78.39
		4/2/2007	18.07	80.15
		9/18/2007	17.22	81.00
		3/3/2008	17.39	80.83
1-MW-10	98.20	4/6/2005	17.13	81.07
		7/12/2006	18.50	79.70
		10/3/2006	18.80	79.40
		4/2/2007	17.83	80.37
		9/17/2007	17.24	80.96
		3/3/2008	17.08	81.12
		3/21/2011	18.35	79.85
1-MW-11	97.65	4/6/2005	16.61	81.04
		7/12/2006	18.00	79.65
		10/3/2006	18.30	79.35
		4/2/2007	17.25	80.40
		9/17/2007	16.34	81.31
		3/3/2008	16.54	81.11
1-MW-12	99.35	7/12/2006	18.95	80.40
		12/18/2006	18.90	80.45
		4/2/2007	17.98	81.37
		3/3/2008	--	NA
		3/21/2011	--	NA

Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
1-MW-13	98.39	7/12/2006	18.51	79.88
		10/3/2006	18.77	79.62
		4/2/2007	17.86	80.53
		9/17/2007	17.00	81.39
		3/3/2008	17.04	81.35
		3/21/2011	18.35	80.04
1-MW-14	97.67	7/12/2006	18.50	79.17
		10/3/2006	18.78	78.89
		12/19/2006	18.76	78.91
		6/21/2007	18.78	78.89
		4/2/2007	17.79	79.88
		3/3/2008	18.11	79.56
		3/21/2011	18.37	79.30
1-MW-15	96.79	7/12/2006	18.24	78.55
		10/3/2006	18.49	78.30
		12/20/2006	18.49	78.30
		6/21/2007	18.04	78.75
		4/2/2007	17.56	79.23
		9/18/2007	16.85	79.94
		3/3/2008	17.05	79.74
		3/21/2011	18.10	78.69
1-MW-16	97.03	12/20/2006	18.30	78.73
		4/2/2007	17.62	79.41
		3/3/2008	18.06	78.97
		3/21/2011	18.02	79.01
1-MW-17	98.29	9/13/2006	18.46	79.83
		4/2/2007	17.68	80.61
		3/3/2008	16.73	81.56
		3/21/2011	18.03	80.26
1-MW-18	96.59	9/13/2006	17.66	78.93
		10/3/2006	17.79	78.80
		6/21/2007	17.81	78.78
		4/2/2007	16.81	79.78
		3/3/2008	16.10	80.49
		3/21/2011	17.37	79.22
1-MW-19	96.51	9/13/2006	18.73	77.78
		10/3/2006	18.86	77.65
		12/19/2006	18.81	77.70
		4/2/2007	18.05	78.46
		9/18/2007	17.56	78.95
		3/3/2008	17.71	78.80
		3/21/2011	18.58	77.93

Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
1-MW-20	96.11	12/19/2006	18.74	77.37
		6/21/2007	17.88	78.23
		4/2/2007	18.08	78.03
		9/17/2007	17.75	78.36
		3/3/2008	17.74	78.37
		3/21/2011	18.51	77.60
1-MW-21	95.74	12/20/2007	18.79	76.95
		6/21/2007	17.70	78.04
		4/2/2007	17.91	77.83
		9/12/2007	17.29	78.45
		3/3/2008	17.54	78.20
		3/21/2011	18.53	77.21
1-MW-22	96.13	12/20/2007	18.60	77.53
		6/21/2007	17.42	78.71
		4/2/2007	17.70	78.43
		9/12/2007	16.98	79.15
		3/3/2008	17.23	78.90
		3/21/2011	18.35	77.78
<b>Second Groundwater Bearing Unit</b>				
2-MW-1	98.58	7/12/2006	28.07	70.51
		2/5/2007	26.89	71.69
		3/19/2007	26.90	71.68
		3/28/2007	26.69	71.89
		4/2/2007	26.63	71.95
		8/24/2007	25.42	73.16
		10/1/2007	25.98	72.60
		11/7/2007	26.63	71.95
		3/3/2008	25.43	73.15
		3/21/2011	26.96	71.62
2-MW-2	98.15	7/12/2006	27.88	70.27
		10/3/2006	27.79	70.36
		2/5/2007	26.90	71.25
		3/19/2007	27.34	70.81
		3/28/2007	26.62	71.53
		4/2/2007	26.46	71.69
		8/24/2007	25.32	72.83
		10/1/2007	25.81	72.34
		11/7/2007	26.44	71.71
		3/3/2008	25.34	72.81
3/21/2011	26.74	71.41		



Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
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Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
2-MW-3	96.88	3/19/2007	25.80	71.08
		3/28/2007	25.42	71.46
		4/2/2007	25.35	71.53
		8/24/2007	24.22	72.66
		10/1/2007	24.71	72.17
		11/7/2007	25.35	71.53
		3/3/2008	24.23	72.65
2-MW-4	96.27	3/19/2007	27.25	69.02
		3/28/2007	24.73	71.54
		4/2/2007	24.67	71.60
		8/24/2007	23.72	72.55
		10/1/2007	24.14	72.13
		11/7/2007	24.69	71.58
		3/3/2008	23.78	72.49
2-MW-5	98.68	3/19/2007	27.65	71.03
		3/28/2007	27.00	71.68
		4/2/2007	26.93	71.75
		8/24/2007	25.81	72.87
		10/1/2007	26.32	72.36
		11/7/2007	26.98	71.70
		3/3/2008	25.82	72.86
2-MW-6	96.01	8/24/2007	23.29	72.72
		10/1/2007	23.71	72.30
		11/7/2007	24.07	71.94
		3/3/2008	23.50	72.51
		3/21/2011	24.54	71.47
2-MW-7	95.12	10/1/2007	18.45	76.67
		11/7/2007	30.01	65.11
		3/3/2008	29.82	65.30
		3/21/2011	31.25	63.87
2-MW-8	97.62	11/7/2007	26.04	71.58
		3/3/2008	24.83	72.79
		3/21/2011	26.35	71.27

Table 1  
 Summary of Groundwater Elevations  
 Lantern Lane Shopping Center  
 12534 Memorial Drive  
 Houston, Texas  
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Monitoring Well	Top of Casing (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)
2-MW-9	96.16	3/3/2008	23.83	72.33
		3/21/2011	24.99	71.17
2-MW-10	96.19	3/3/2008	24.96	71.23
		3/21/2011	25.04	71.15
2-MW-11	96.21	3/3/2008	29.48	66.73
		3/21/2011	30.07	66.14
2-MW-12	96.09	3/3/2008	18.12	77.97
		3/21/2011	19.13	76.96

Table 2  
Summary of Chlorinated Compounds in Groundwater  
Lantern Lane Shopping Center  
Houston, Texas  
VCP No. 1714

Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1,-DCE (mg/L)
<b>Tier 1<sup>GW</sup> Critical PCL without MSD</b>		<b>0.005</b>	<b>0.005</b>	<b>0.07</b>	<b>0.1</b>	<b>0.002</b>	<b>0.007</b>
<b>Tier 1<sup>Air</sup> Critical PCL with MSD</b>		<b>330</b>	<b>160</b>	<b>16,000</b>	<b>10,000</b>	<b>3.6</b>	<b>980</b>
First Groundwater Bearing Unit							
1-MW-1	2/18/2004	<0.00043	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/4/2006	<0.0005	<b>0.00081 J</b>	<0.0005	<0.0006	<0.006	<0.006
	3/6/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/21/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-2	2/18/2004	<0.00043	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/4/2006	<b>0.00096 J</b>	<0.0007	<0.0005	<0.0006	<0.006	<0.006
	4/3/2007	<b>0.0016 J</b>	<b>0.00086 J</b>	<0.0005	<0.0006	<0.006	<b>0.00098 J</b>
	3/6/2008	<b>0.0024 J</b>	<b>0.0014 J</b>	<b>0.00061 J</b>	<0.0006	<0.0006	<b>0.0025 J</b>
	3/21/2011	<b>0.0031 J</b>	<b>0.0021 J</b>	<b>0.0023 J</b>	<0.0005	<0.0005	<b>0.0024 J</b>
1-MW-3	2/18/2004	<b>0.0037</b>	<b>0.120</b>	<b>0.059</b>	<b>0.015</b>	<0.00079	<b>0.0008 J</b>
	3/10/2004	<b>0.0029 J</b>	<b>0.110</b>	<b>0.063</b>	<b>0.021</b>	<b>0.0011 J</b>	<b>0.00089 J</b>
	4/7/2005	<0.00043	<b>0.063</b>	<b>0.044</b>	<b>0.019</b>	<0.00079	<0.00053
	4/4/2006	<b>0.0084</b>	<b>0.180</b>	<b>0.066</b>	<b>0.019</b>	<0.0006	<0.0006
	7/7/2006	<b>0.0130</b>	<b>0.150</b>	<b>0.070</b>	<b>0.020</b>	<0.0006	<0.0006
	10/4/2006	<b>0.0040 J</b>	<b>0.110</b>	<b>0.061</b>	<b>0.022</b>	<0.0006	<0.0006
	12/20/2006	<b>0.0032 J</b>	<b>0.062</b>	<b>0.043</b>	<b>0.017</b>	<0.0006	<b>0.00070 J</b>
	4/3/2007	<b>0.0023 J</b>	<b>0.060</b>	<b>0.082</b>	<b>0.036</b>	<0.0006	<b>0.00085 J</b>
	3/6/2008	<0.0005	<b>0.037</b>	<b>0.072</b>	<b>0.036</b>	<0.0006	<0.0006
1-MW-4	4/28/2004	<0.00043	<b>0.011</b>	<b>0.091</b>	<b>0.026</b>	<b>0.0039</b>	<0.00053
	4/5/2005	<b>0.00108</b>	<b>0.272</b>	<b>0.227</b>	<b>0.0381</b>	<b>0.0288</b>	ND
	4/7/2005	<b>0.0012 J</b>	<b>0.220</b>	<b>0.190</b>	<b>0.037</b>	<b>0.0110</b>	<b>0.0015 J</b>
	4/4/2006	<0.0005	<0.0007	<b>0.045</b>	<b>0.013</b>	<0.0006	<0.0006
	7/7/2006	<b>0.0025 J</b>	<b>0.0014 J</b>	<b>0.033</b>	<b>0.007</b>	<0.0006	<0.0006
	10/4/2006	<0.0005	<0.0007	<b>0.023</b>	<b>0.0046 J</b>	<0.0006	<0.0006
	12/19/2006	<0.0005	<0.0007	<b>0.020</b>	<b>0.0046</b>	<0.0006	<0.0006
	4/3/2007	<0.0005	<0.0007	<b>0.059</b>	<b>0.016</b>	<0.0006	<0.0006
	3/11/2008	<b>0.0017 J</b>	<b>0.200</b>	<b>0.110</b>	<b>0.038</b>	<b>0.0071</b>	<b>0.0067</b>
	3/23/2011	<0.0006	<b>0.015</b>	<b>0.140</b>	<b>0.039</b>	<b>0.0018 J</b>	<0.0005
1-MW-5	4/28/2004	<b>0.520</b>	<b>0.160</b>	<b>0.046</b>	<b>0.0034</b>	<0.00079	<0.00053
	4/6/2005	<b>0.610</b>	<b>0.180</b>	<b>0.050</b>	<b>0.0037</b>	ND	ND
	4/7/2005	<b>0.470</b>	<b>0.130</b>	<b>0.029</b>	<b>0.0019</b>	<0.00079	<0.00053
	4/4/2006	<b>0.230</b>	<b>0.110</b>	<b>0.021</b>	<b>0.0016 J</b>	<0.0006	<0.0006
	7/6/2006	<b>0.170</b>	<b>0.075</b>	<b>0.018</b>	<b>0.0013 J</b>	<0.0006	<0.0006
	10/4/2006	<b>0.170</b>	<b>0.100</b>	<b>0.024</b>	<b>0.0019 J</b>	<0.0006	<0.0006
	12/20/2006	<b>0.088</b>	<b>0.050</b>	<b>0.013</b>	<b>0.0014 J</b>	<0.0006	<0.0006
	4/4/2007	<b>0.230</b>	<b>0.093</b>	<b>0.022</b>	<0.0006	<0.0006	<0.0006
	9/18/2007	<b>0.061</b>	<b>0.110</b>	<b>0.034</b>	<b>0.0012 J</b>	<0.0006	<0.0006
	3/6/2008	<b>0.510</b>	<b>0.130</b>	<b>0.038</b>	<b>0.0014 J</b>	<0.0006	<0.0006
	3/21/2011	<b>0.200</b>	<b>0.094</b>	<b>0.046</b>	<b>0.0033 J</b>	<0.0005	<0.0005



Table 2  
 Summary of Chlorinated Compounds in Groundwater  
 Lantern Lane Shopping Center  
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Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1,-DCE (mg/L)
Tier 1 <sup>GW</sup> Critical PCL without MSD		0.005	0.005	0.07	0.1	0.002	0.007
Tier 1 <sup>Air</sup> Critical PCL with MSD		330	160	16,000	10,000	3.6	980
1-MW-6	4/30/2004	0.0083	2.10	ND	ND	ND	ND
	4/30/2004	0.0076	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/5/2006	ND	ND	ND	ND	ND	ND
	4/6/2006	0.0013 J	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/4/2006	0.00076 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	7/7/2006	0.0026 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	10/4/2006	0.0018 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	12/19/2006	0.00065 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/3/2007	0.0026 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/5/2008	0.0019 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
3/21/2011	0.00062 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
1-MW-7	4/30/2004	0.0010	ND	ND	ND	ND	ND
	4/30/2004	<0.00043	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/4/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/11/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/21/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-8	4/30/2004	0.0140	0.0011	ND	ND	ND	ND
	4/30/2004	0.0130	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/7/2005	0.0012 J	<0.0007	<0.00074	<0.00063	<0.00079	<0.00053
	4/4/2006	0.0010	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/4/2007	0.0024 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/5/2008	0.0015 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/21/2011	0.0010 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-9	2/25/2005	4.480	0.246	0.0645	ND	ND	ND
	2/25/2005	2.700	0.190	0.054	0.0075	<0.00079	<0.00053
	4/5/2005	2.240	0.371	0.0901	ND	ND	ND
	4/6/2005	2.700	0.310	0.065	0.0065	<0.00079	<0.00053
	4/5/2006	1.200	0.190	0.064	0.0035	<0.0006	<0.0006
	7/7/2006	1.900	0.230	0.079	0.0044 J	<0.0006	<0.0006
	10/4/2006	2.100	0.220	0.079	0.0041 J	<0.0006	<0.0006
	12/20/2006	1.300	0.160	0.048	0.0034 J	<0.0006	0.00093 J
	4/5/2007	1.900	0.230	0.069	0.0067	<0.0006	<0.0006
	9/18/2007	2.300	0.230	0.087	0.0079	<0.0006	<0.0006
	3/7/2008	1.100	0.180	0.056	0.0100	<0.0006	<0.0006
	3/23/2011	2.700	0.100	0.052	0.0021 J	<0.0005	<0.0005
	1-MW-10	2/25/2005	0.0555	0.0182	0.0445	0.0209	0.00103
2/25/2005		0.035	0.015	0.046	0.019	<0.00079	<0.00053
4/5/2005		0.00358	0.00329	0.00863	0.0015	ND	ND
4/6/2005		0.00211 J	0.0061	0.028	0.012	<0.00079	<0.00053
4/5/2006		0.0026 J	0.042	0.023	0.0064	<0.0006	<0.0006
7/28/2006		0.0033 J	0.033	0.021	0.0060	<0.0006	<0.0006
4/4/2007		0.0011 J	0.0085	0.015	0.0047 J	<0.0006	<0.0006
9/17/2007		0.0017 J	<0.0007	0.0094	0.0024 J	<0.0006	<0.0006
3/6/2008		0.0021 J	0.0042 J	0.037	0.013	<0.0006	<0.0006
3/22/2011		0.0016 J	0.0050 J	0.015	0.0050 J	<0.0005	<0.0005



Table 2  
Summary of Chlorinated Compounds in Groundwater  
Lantern Lane Shopping Center  
Houston, Texas  
VCP No. 1714

Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1,-DCE (mg/L)
Tier 1 <sup>GW</sup> Critical PCL without MSD		0.005	0.005	0.07	0.1	0.002	0.007
Tier 1 <sup>Air</sup> Critical PCL with MSD		330	160	16,000	10,000	3.6	980
1-MW-11	2/25/2005	0.528	0.060	0.0202	0.00984	ND	ND
	2/25/2005	0.340	0.049	0.017	0.0079	<0.00079	<0.00053
	4/5/2005	0.322	0.102	0.0242	0.0071	ND	ND
	4/6/2005	0.30	0.12	0.025	0.016	<0.00079	<0.00053
	4/4/2006	0.28	0.044	0.014	0.0032 J	<0.0006	<0.0006
	7/27/2006	3.50	0.24	0.11	0.006	<0.0006	<0.0006
	10/4/2006	2.30	0.16	0.095	0.0044 J	<0.0006	<0.0006
	4/5/2007	0.81	0.086	0.024	0.0028 J	<0.0006	<0.0006
	9/17/2007	0.90	0.078	0.018	0.0064	<0.0006	<0.0006
	3/5/2008	0.78	0.21	0.037	0.015	<0.0006	<0.0006
3/21/2011	0.15	0.03	0.008	0.0032 J	<0.0005	<0.0005	
1-MW-12	4/4/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	7/6/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	12/18/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/11/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
1-MW-13	7/13/2006	0.019	0.0035 J	0.0047	<0.0006	<0.0006	<0.0006
	7/27/2006	0.016	0.0023 J	0.0029 J	<0.0006	<0.0006	<0.0006
	4/4/2007	0.044	0.0085	0.016	<0.0006	<0.0006	<0.0006
	9/17/2007	0.098	0.016	0.031	<0.0006	<0.0006	0.0033 J
	3/5/2008	0.055	0.0085	0.011	<0.0006	<0.0006	0.0034 J
	3/22/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	0.0061
1-MW-14	7/13/2006	0.011	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	7/28/2006	0.012	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	12/19/2006	0.0034 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/3/2007	0.0063	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/6/2008	0.0028 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	0.0019 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-15	7/14/2006	0.082	0.0019 J	<0.0005	<0.0006	<0.0006	<0.0006
	10/5/2006	0.066	0.0013 J	<0.0005	<0.0006	<0.0006	<0.0006
	12/20/2006	0.034	0.00082 J	<0.0005	<0.0006	<0.0006	<0.0006
	4/4/2007	0.039	0.00095 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/18/2007	0.059	0.0012 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/4/2008	0.058	0.0011 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	0.029	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-16	1/20/2006	0.0016 J	<0.0007	0.00069 J	<0.0006	<0.0006	<0.0006
	4/3/2007	0.00098 J	<0.0007	0.0024 J	<0.0006	<0.0006	<0.0006
	9/18/2007	0.00065 J	<0.0007	0.024	0.0053	<0.0006	<0.0006
	3/6/2008	0.0013 J	0.0054	0.037	0.0099	<0.0006	<0.0006
	3/22/2011	0.00081 J	0.0092	0.048	0.0150	<0.0005	<0.0005
1-MW-17	9/13/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/21/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Table 2  
 Summary of Chlorinated Compounds in Groundwater  
 Lantern Lane Shopping Center  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1,-DCE (mg/L)
Tier 1 <sup>GW</sup> Critical PCL without MSD		0.005	0.005	0.07	0.1	0.002	0.007
Tier 1 <sup>AW</sup> Critical PCL with MSD		330	160	16,000	10,000	3.6	980
1-MW-18	9/13/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/2/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/4/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-19	9/13/2006	0.025	0.0025 J	<0.0005	<0.0006	<0.0006	<0.0006
	10/5/2006	0.030	0.0032 J	<0.0005	<0.0006	<0.0006	<0.0006
	12/19/2006	0.0088	0.0017 J	<0.0005	<0.0006	<0.0006	<0.0006
	4/4/2007	0.018	0.0033 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/18/2007	0.0031 J	0.00084 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/5/2008	0.0038 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	0.0029 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-20	12/19/2006	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/2/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	6/21/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	9/17/2007	0.0007 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	12/12/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1-MW-21	12/20/2006	0.012	0.002 J	0.0013 J	<0.0006	<0.0006	<0.0006
	1/9/2007	0.0028 J	0.0022 J	0.0019 J	<0.0006	<0.0006	<0.0006
	4/3/2007	0.0088	0.0023 J	0.0019 J	<0.0006	<0.0006	<0.0006
	6/21/2007	0.0015 J	0.0024 J	0.0021 J	<0.0006	<0.0006	<0.0006
	9/12/2007	0.0037 J	0.003 J	0.0028 J	<0.0006	<0.0006	<0.0006
	12/12/2007	0.0021 J	0.0034 J	0.0027 J	<0.0006	<0.0006	<0.0006
	3/11/2008	0.0022 J	0.0031 J	0.0025 J	<0.0006	<0.0006	<0.0006
	3/23/2011	<0.0006	0.0012 J	0.0013 J	<0.0005	<0.0005	<0.0005
1-MW-22	12/18/2006	0.0026 J	0.0014 J	<0.0005	<0.0006	<0.0006	<0.0006
	4/3/2007	0.0076	0.0011 J	<0.0005	<0.0006	<0.0006	<0.0006
	6/21/2007	0.0042 J	0.00087 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/12/2007	0.0023 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	12/12/2007	0.0037 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	0.003 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Table 2  
 Summary of Chlorinated Compounds in Groundwater  
 Lantern Lane Shopping Center  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1,-DCE (mg/L)
Tier 1 <sup>GW</sup> GW <sub>ing</sub> Critical PCL without MSD		0.005	0.005	0.07	0.1	0.002	0.007
Tier 1 <sup>Air</sup> GW <sub>inh-v</sub> Critical PCL with MSD		330	160	16,000	10,000	3.6	980
Second Groundwater Bearing Unit							
2-MW-1	7/12/2006	0.055	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	4/5/2007	0.064	0.0012 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/12/2007	0.056	0.0065	<0.0005	<0.0006	<0.0006	<0.0006
	3/7/2008	0.056	0.0078	<0.0005	0.00093 J	<0.0006	<0.0006
	3/21/2011	0.007	0.0150	0.012	0.0022 J	<0.0005	<0.0005
2-MW-2	7/12/2006	1.6	0.009	0.002	<0.0006	<0.0006	<0.0006
	7/27/2006	1.3	0.0085	0.0021 J	<0.0006	<0.0006	<0.0006
	4/5/2007	1.8	0.017	0.0021 J	<0.0006	<0.0006	<0.0006
	9/18/2007	1.7	0.43	0.0099	0.0035 J	<0.0006	<0.0006
	3/7/2008	1.5	0.13	0.47	0.0056	<0.0006	0.00077 J
	3/23/2011	0.25	0.45	1.30	0.0025 J	0.0027	0.0025 J
2-MW-3	3/19/2007	0.086	0.0013 J	<0.0005	<0.0006	<0.0006	<0.0006
	4/5/2007	0.083	0.0015 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/18/2007	0.081	0.0039 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/4/2008	0.087	0.0061	<0.0005	0.003 J	<0.0006	<0.0006
	3/22/2011	0.020	<0.0005	<0.0005	0.0010 J	<0.0005	<0.0005
2-MW-4	3/19/2007	0.024	0.003 J	0.00066 J	<0.0006	<0.0006	<0.0006
	4/5/2007	0.021	0.0029 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/18/2007	0.014	0.0023 J	<0.0005	<0.0006	<0.0006	<0.0006
	10/26/2007	0.015	0.0025 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/4/2008	0.016	0.0016 J	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	0.0048 J	0.0013 J	<0.0005	<0.0005	<0.0005	<0.0005
2-MW-5	3/19/2007	0.038	0.0017 J	<0.0005	<0.0006	<0.0006	<0.0006
	4/5/2007	0.033	0.0013 J	<0.0005	<0.0006	<0.0006	<0.0006
	9/18/2007	0.055	0.0034 J	0.0071	<0.0006	<0.0006	<0.0006
	3/7/2008	0.023	0.0091	0.032	<0.0006	<0.0006	<0.0006
	3/23/2011	0.0012 J	0.0045 J	0.035	<0.0005	<0.0005	<0.0005
2-MW-6	8/9/2007	0.14	0.0036 J	0.00069 J	<0.0006	<0.0006	<0.0006
	8/23/2007	0.15	0.0035 J	0.00072 J	<0.0006	<0.0006	<0.0006
	12/13/2007	0.15	0.0036 J	0.00072 J	<0.0006	<0.0006	<0.0006
	3/5/2008	0.16	0.0039 J	0.00068 J	<0.0006	<0.0006	<0.0006
	3/22/2011	0.047	0.013	<0.0005	<0.0005	<0.0005	<0.0005
2-MW-7	10/2/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	0.0042 J	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/23/2011	0.0046 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
2-MW-8	11/7/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/11/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/22/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Table 2  
 Summary of Chlorinated Compounds in Groundwater  
 Lantern Lane Shopping Center  
 Houston, Texas  
 VCP No. 1714

Monitoring Well	Sample Date	PCE (mg/L)	TCE (mg/L)	cis-1,2-DCE (mg/L)	trans-1,2-DCE (mg/L)	VC (mg/L)	1,1-DCE (mg/L)
<b>Tier 1 <sup>GW</sup>GW<sub>log</sub> Critical PCL without MSD</b>		<b>0.005</b>	<b>0.005</b>	<b>0.07</b>	<b>0.1</b>	<b>0.002</b>	<b>0.007</b>
<b>Tier 1 <sup>Air</sup>GW<sub>inh-v</sub> Critical PCL with MSD</b>		<b>330</b>	<b>160</b>	<b>16,000</b>	<b>10,000</b>	<b>3.6</b>	<b>980</b>
2-MW-9	12/13/2007	<b>0.021</b>	<b>0.0051</b>	<b>0.0011 J</b>	<0.0006	<0.0006	<0.0006
	12/21/2007	<b>0.026</b>	<b>0.0055</b>	<b>0.0014 J</b>	<0.0006	<0.0006	<0.0006
	3/12/2008	<b>0.033</b>	<b>0.0069</b>	<b>0.0011 J</b>	<0.0006	<0.0006	<0.0006
	3/22/2011	<b>0.030</b>	<b>0.0550</b>	<b>0.024</b>	<0.0005	<0.0005	<0.0005
2-MW-10	3/4/2008	<b>0.0490</b>	<b>0.0020 J</b>	<0.0005	<0.0006	<0.0006	<0.0006
	3/23/2011	<b>0.0110</b>	<b>0.0016 J</b>	<0.0005	<0.0005	<0.0005	<0.0005
2-MW-11	2/20/2008	<b>0.012</b>	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	<b>0.015</b>	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/23/2011	<b>0.012</b>	<b>0.0012 J</b>	<0.0005	<0.0005	<b>0.0014 J</b>	<0.0005
2-MW-12	2/20/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/12/2008	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
	3/23/2011	<0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<b>0.0048 J</b>
Wastewater Samples							
Sewer-1	3/16/2004	<b>0.290</b>	<b>0.0130</b>	<0.00074	<0.00063	<0.00079	<0.00053
Sewer 040606	4/6/2006	<0.0005	<b>0.020</b>	<0.0005	<0.0006	<0.0006	<0.0006
Sewer 070706	7/7/2006	<0.025	<0.035	<0.025	<0.03	<0.03	<0.03
Sewer	12/20/2006	<0.0005	<b>1.1</b>	<0.0005	<0.0006	<0.0006	<0.0006
	4/3/2007	<0.0005	<0.0007	<0.0005	<0.0006	<0.0006	<0.0006
<b>Bold</b>	values exceed the laboratory limit of quantitation.						
<b>Bold</b>	exceeds <sup>GW</sup> GW <sub>log</sub> PCL						



**LEGEND:**

- ◆ UTZ Well
- Property Boundary
- (72.51) Groundwater Elevation



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**Groundwater Gradient Map**  
**First Groundwater Bearing Unit**  
March 2011

CLIENT:	Differential Development - 1094, Ltd.	PREP:	MFM
LOCATION:	Larries Lane Shopping Center 12534 Memorial Drive, Houston, TX	CHECKED:	
DATE:	7/22/08	PROJECT NO:	457-101
CP		FIGURE:	3



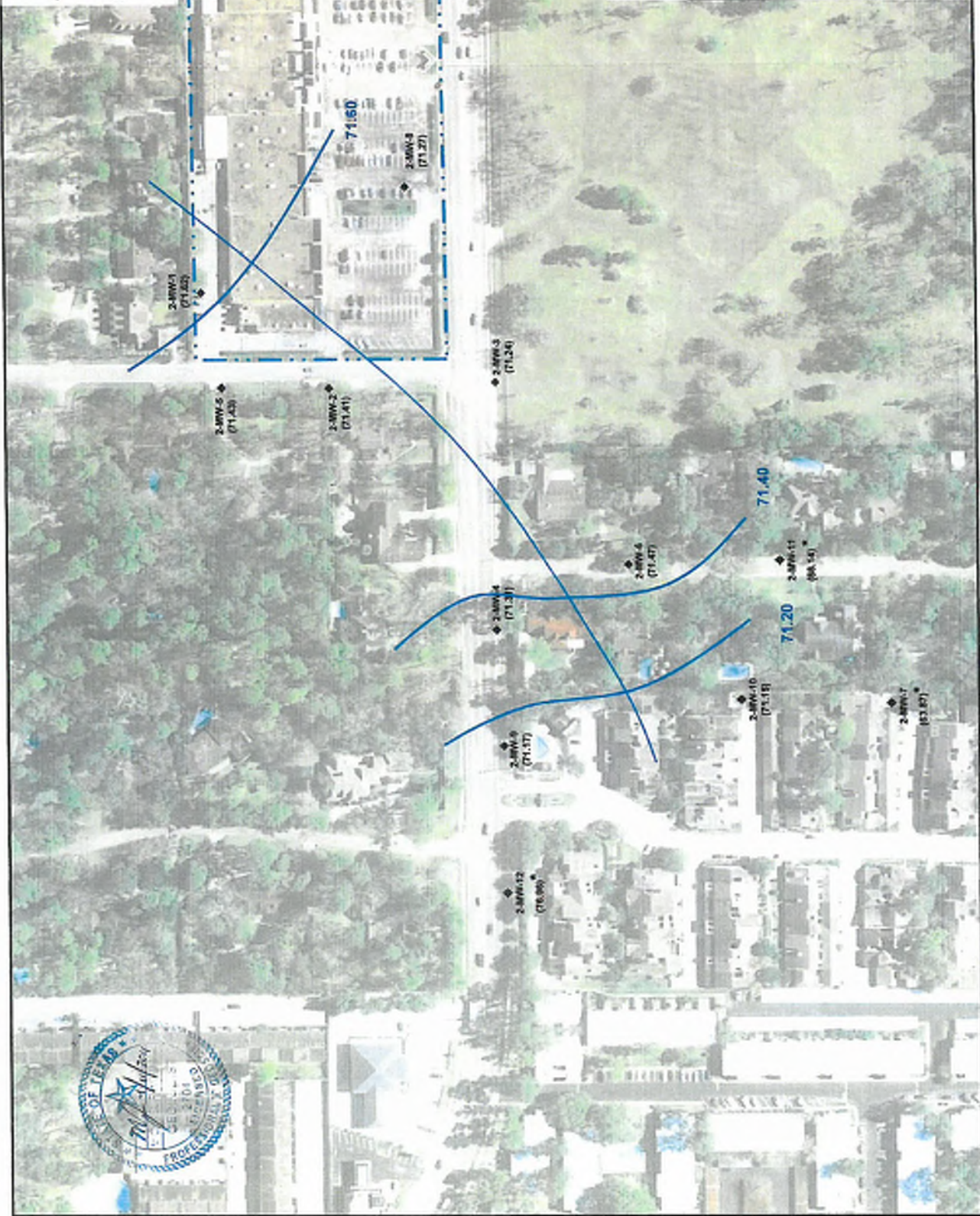
**LEGEND:**

◆ LTZ Well

— Property Boundary

(72.51) Groundwater Elevation

\* These wells were not included in the gradient



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**Groundwater Gradient Map**  
Second Groundwater Bearing Unit  
March 2011

CLIENT:	PM:
Differential Development - 1994, Ltd.	MFM
LOCATION: Larlem Lane Shopping Center 12534 Memorial Drive, Houston, TX	CREATED
DETAILED: DESIGNED: PROJECT NO:	FIGURE:
CP 7/22/08 457-101	4



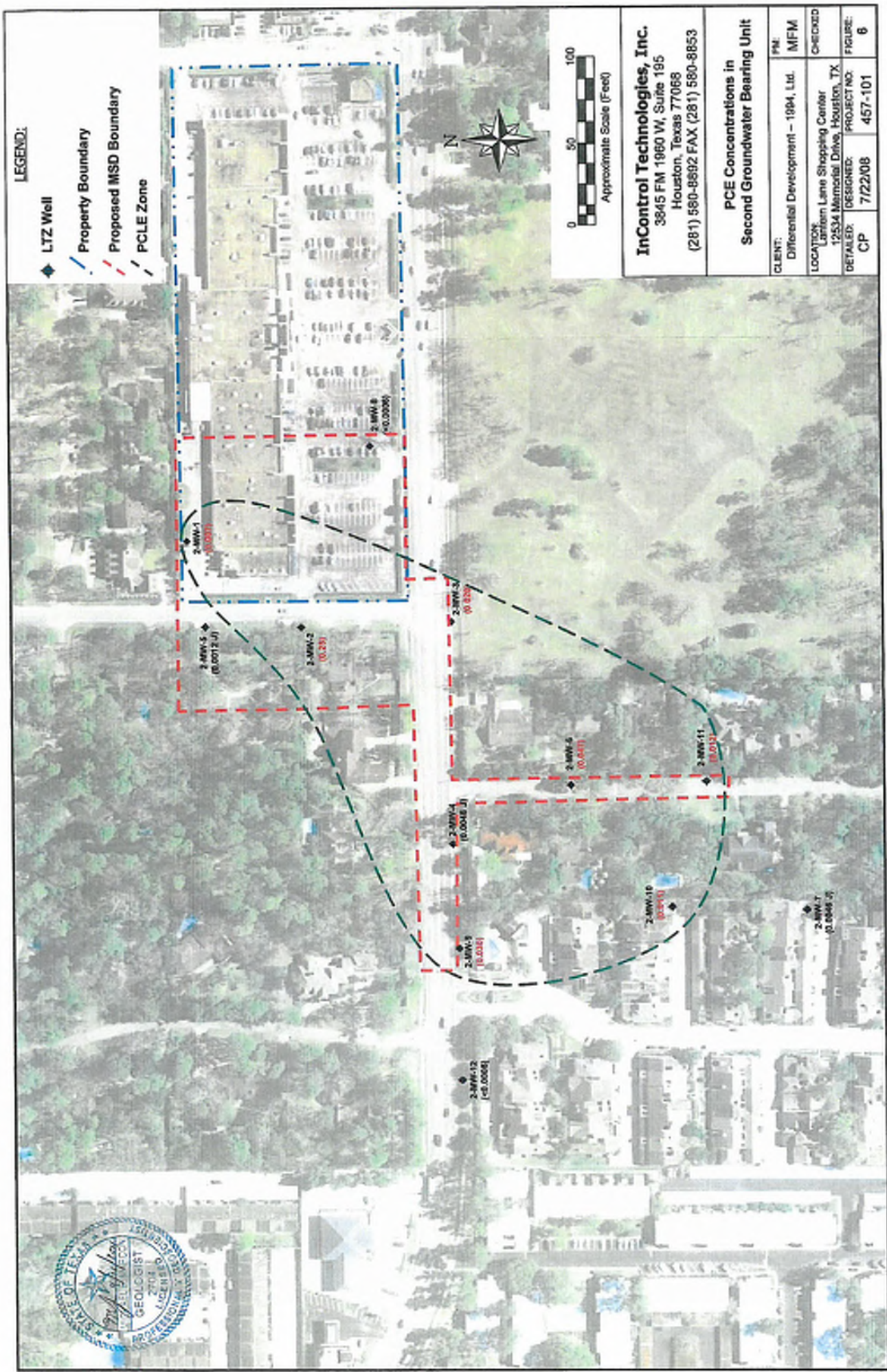
- LEGEND:**
- ◆ UTZ Well
  - Property Boundary
  - - - Proposed MSD Boundary
  - - - PCLE Zone



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<b>PCE Concentrations in First Groundwater Bearing Unit</b>	
CLIENT:	Differential Development - 1994, Ltd.
PM:	MFM
LOCATION:	Lattimer Lane Shopping Center 12534 Memorial Drive, Houston, TX
DESIGNED:	PROJECT NO:
CP	457-101
DATE:	7/22/08
CHECKED:	FIGURE:
	5





- LEGEND:**
- ◆ LTZ Well
  - Property Boundary
  - - - Proposed MSD Boundary
  - - - PCLE Zone



**InControl Technologies, Inc.**  
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<b>PCE Concentrations in Second Groundwater Bearing Unit</b>	
CLIENT:	Differential Development – 1994, Ltd.
PM:	MFM
LOCATION:	Lantern Lane Shopping Center 12534 Memorial Drive, Houston, TX
DESIGNED:	PROJECT NO.
CP	457-101
7/22/08	FIGURE:
	6





**LEGEND:**

- ◆ UTZ Well
- Property Boundary
- - - Proposed MSD Boundary
- - - PCLE Zone

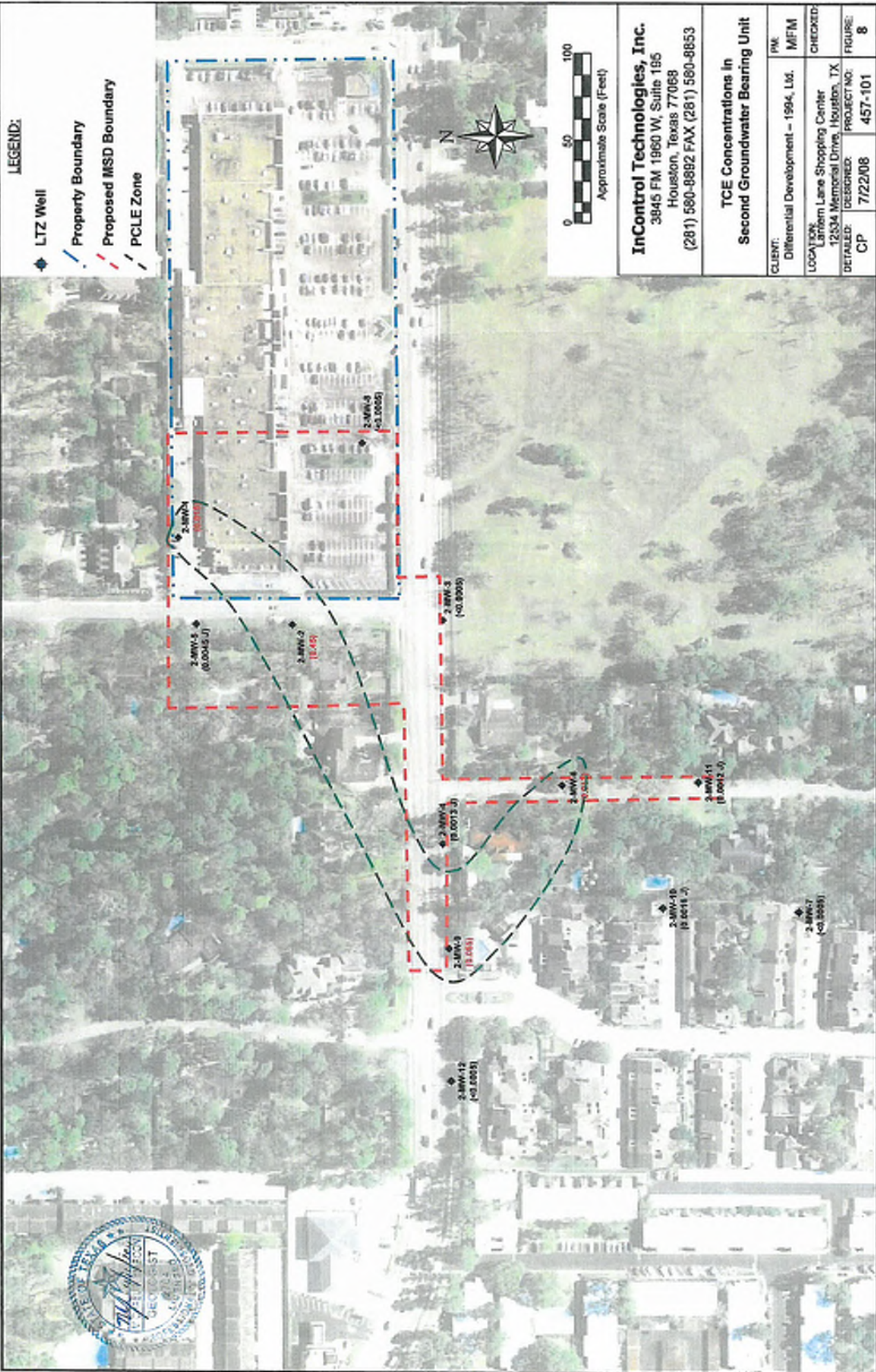


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**TCE Concentrations in  
 First Groundwater Bearing Unit**

CLIENT:	Differential Development - 1994, Ltd.	DATE:	MFM
LOCATION:	Lanham Lane Shopping Center 12334 Memorial Drive, Houston, TX	CHECKED:	
DESIGNED:	PROJECT NO: 457-101	FIGURE:	7
CP	7/22/08		







Limited Phase II Environmental Site Assessment

Local Drainage Project - 12522 Old Oaks  
 WBS No. M-000126-0063-3

TABLE 2

Summary of B-1 through B-4 Soil Sample Analyses

SOIL BORING <sup>1</sup>	Sample Interval, feet below pavement surface	CONTAMINANT CONCENTRATIONS ABOVE SAMPLE DETECTION LIMITS IN SOIL SAMPLES				
		4-Isopropyl-toluene (Cymene), mg/kg <sup>2</sup>	Methyl Ethyl Ketone (MEK), mg/kg	Toluene, mg/kg	Tetrachloroethylene, mg/kg	1,2-Dibromoethane (Ethylene Dibromide), mg/kg
B-1	1 to 2	0.117	0.025	0.003	U <sup>3</sup>	U
B-2	10 to 11	U	U	U	U	U
B-3	1 to 2	U	U	U	0.022	U
B-4	10 to 11	U	U	U	U	<b>0.003<sup>4</sup></b>
TCEQ TRRP Tier 1 Residential Soil Protective Concentration Levels (PCLs), <sup>GW</sup> Soil <sub>Ing</sub>		230	29.0	8.20	0.050	0.00021

<sup>1</sup>Refer to Boring Location Map in Figures 1 and 2

<sup>2</sup>mg/kg = milligrams per kilogram or parts per million.

<sup>3</sup>U = Undetected at Sample Detection Limit

<sup>4</sup>**Bolded concentration exceeds Residential <sup>GW</sup>Soil<sub>Ing</sub> PCL.**

**Phase I Environmental Site Assessment for TIRZ 17 Reconstruction of Memorial Drive  
Between West Sam Houston Parkway and 100 Feet East of Tallowood Road, Houston, Texas**

**APPENDIX I**

**RESUME**





## ROBERT J. METZGER, PG, CAPM

### POSITION

Senior Geologist for 13 years  
Aviles Engineering Corporation, Houston, Texas

### EDUCATION

Bowling Green State University, Bachelor of Science in Education  
- Earth and Biological Sciences

Bowling Green State University, Master of Science – Geology

### REGISTRATIONS

Texas Registered Professional Geoscientist License No. 1133

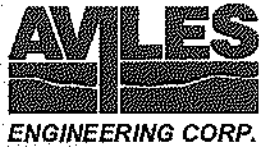
Texas Commission on Environmental Quality Corrective Action  
Project Manager No. 01418

Certified with 40-Hour OSHA Hazardous Material Health and  
Safety Training and 8-Hour Refresher

### EXPERIENCE

**Conducted Phase I and Phase II ESAs for the City of Houston  
Department of Public Works and Engineering Projects:**

- Gessner Water Main Replacement
- Water Line Replacement in Imperial Valley Area Package II
- Water Line Replacement in Antoine Forest Area
- Riverwood Estates No. 1 Lift Station and Force Main
- Harvey Wilson Drive and Armour Drive Reconstruction
- Riverwood Estates, John Alber, and Garden Oaks Phase II Areas Water Line Replacements
- Jensen Drive Pump Station Valve Box and Pipeline
- Polk Street Underpass Storm Water Inlet Replacement
- Park Row Road from State Highway 6 to Eldridge Parkway
- Heights Area Waterline Replacement
- West Little York Street Reconstruction from Deep Forest Drive to TC Jester Boulevard
- Bastrop Street Sanitary Sewer Line
- Northgate Regional Lift Station and Force Main
- Corder Subdivision Water Main Replacement
- Bennington Subdivision Water Main Replacement
- Westheimer North Water Main Replacement
- Lockwood Street Paving from Bennington Boulevard to Tidwell Road
- Huntington Water Main Replacement
- McCarty #1 Lift Station and Force Main Replacement
- Parker Road Water Main Replacement
- Kingspoint Road Sanitary Sewer Line
- Alabonson Area Water Line Replacement
- Mangum Manor Areas Water Line Replacement



**EXPERIENCE,  
continued**

**Phase II Environmental Site Assessment: Toyota Center, Houston, Texas:** Conducted comprehensive Phase II ESA of a six-block site to assess and delineate contaminated soil and groundwater prior to construction of the Toyota Center.

**Houston Airport Systems Hobby Airport Taxiway H Phase II Environmental Site Assessment:** Conducted Phase II ESA for expansion of Taxiway H at Hobby Airport, which included advancement of soil borings, installation of temporary groundwater monitoring wells and soil and groundwater sampling. Prepared Phase II ESA report.

**Environmental Assessment: Houston Police Department Firing Range at George Bush Intercontinental Airport:** Oversight of drilling soil borings and installation of monitor wells during decommissioning of firing range to determine soil and groundwater disposal options and site cleanup. Prepared and edited assessment report.

**Environmental Soil Sampling and Analysis Woodhouse Paving Phase I and II Project Areas at Port of Houston Authority:** During the Phase I Project, surface concrete was cored, a soil boring was conducted from the soil surface to 18 inches below the surface, and a soil sample was collected from each boring at 20 locations. During the Phase II Project, six soil borings were drilled to 4 feet below the ground surface (bgs), two borings were drilled to 10 feet bgs, and two borings were drilled to 30 feet bgs. One to two soil samples were collected from each boring for a total of 14 samples. Each of the soil samples collected during Phase I and Phase II was submitted to a commercial laboratory for analyses of the following potential environmental contaminants:

- Total petroleum hydrocarbons
- Total RCRA metals
- Volatile and semi volatile organic compounds
- Polychlorinated biphenyls (PCBs)
- Herbicides and Pesticides

Following analysis, a report was prepared for each project area describing the soil boring and sampling procedures, and the results of the laboratory analyses. Concentrations of contaminant in the soil samples were compared to applicable TCEQ standards.

**Response to Public Questions/Comments Regarding  
Memorial Drive Mobility & Drainage Improvements Project T-1738A**



No.	Abbreviated Questions	Response
1	Could you please tell me when are we (Memorial area residents) going to get Detention Ponds? Spring Branch has so many and we have none.	TIRZ is currently actively pursuing underground and surface detention opportunities south of IH-10.
2	Where will 10x10 culverts be placed. Will the culverts under Memorial Drive from W153 be expanded?	10-FT x 10-FT box culverts will be placed directly under the Memorial Drive pavement within the project limits. We are evaluating the W153 Memorial crossing to determine if improvements are justified and can be completed without causing adverse impacts downstream. The final preliminary engineering report will be posted on the TIRZ 17 website once approved by the City.
3	What happens to the bridge on Memorial?	We are evaluating the W153 Memorial crossing to determine if improvements are justified and can be completed without causing adverse impacts downstream. The final preliminary engineering report will be posted on the TIRZ 17 website once approved by the City.
4	Does TIRZ have in its possession any engineering study that demonstrates that Buffalo Bayou is capable of carrying more water than has been flowing into it so far during big rains? What if extra water causes flooding for folks downstream?	1. TIRZ 17 doesn't have such a report. 2. TIRZ 17 has no plans for additional runoff to W153 or Buffalo Bayou. The objective of this project was to maximize the box culverts under the roadway and construct restrictors to reduce flow to the W153 channel. HCFCD regulations require any drainage project discharging into receiving streams and bayous have no adverse impact on the system. This project will adhere to the regulatory standards.
5	What impact will your project have on the drainage situation for W153? - W153 is restricted at Memorial Drive. How will your work avoid making this situation worse than it already is?? - Where will the water captured under memorial drive go? Into W153?	TIRZ 17 has no plans for additional runoff to W153. The objective of this project was to maximize the box culverts under the roadway and construct restrictors to reduce flow to the W153 channel. HCFCD regulations require any drainage project discharging into receiving streams and bayous have no adverse impact on the system. This project will adhere to the regulatory standards. The water will be detained in the large 10-FT x 10-FT boxes under the Memorial Drive pavement.
6	Median - How will side street traffic be able to turn left onto Memorial with medians blocking the road. Drainage - Why cant they put in 5 10x10 boxes across Memorial rather than 2.	1. The median opening locations will be strategically placed throughout the corridor based on City of Houston Infrastructure Design Manual, traffic operations analysis, crash locations, geometrics and engineering judgment. The majority of the cross streets will have median openings. Traffic generated from the smaller driveways will have to drive to the adjacent median opening and make a U-turn. 2. Adding additional rows of boxes will lead to conflicts with private (AT&T and Center Point) and public (water and wastewater) utilities located throughout the corridor. The number of boxes is also impacted by traffic control phasing and construction methods.
7	Since you'll be digging up Memorial Drive at Tallowood, will the project put in a larger transit under Memorial for W-153? This is the lowest total cost option for the City as it deals with W-153	We are evaluating the W153 Memorial crossing to determine if improvements are justified and can be completed without causing adverse impacts downstream. The final preliminary engineering report will be posted on the TIRZ 17 website once approved by the City.
8	100 to 150' on side streets be modified to improve operations on Memorial. For instance right of left turn bays -West Bough -Intersections by Robert's China/ Convenience Store -Tallowood	The limits of the TIRZ improvements does not include any of the side streets.
9	Can you explain how the additional drainage will not affect W153 drainage under Memorial? You will have more water trying to get down W153 which by the limitation of no additional flow downstream of Memorial Dr means less water flow available to W153 from North of Memorial	TIRZ 17 has no plans for additional runoff to W153. We will either meet or reduce flow into W153. The objective of this project was to maximize the box culverts under the roadway and construct restrictors to reduce flow to the W153 channel. The proposed boxes will function by storing runoff currently reaching W153 and releasing it well after W153 recedes. HCFCD regulations require any drainage project discharging into receiving streams and bayous have no adverse impact on the system. This project will adhere to the regulatory standards.
10	1. I've heard nothing tonight about "safe crossings" for children and other pedestrians crossing Memorial Dr to schools north of the roadway. Unacceptable. 2. The stretch of Memorial Dr reconstruction from Kirkwood to Eldridge is being funded 80% by TXDOT and 20% by City of Houston taxpayers. the Tirz's project, estimated to cost approximately \$15 million to reconstruct Memorial Drive from Beltway 8 to Tallowood is being financed 100% by Houston taxpayer. It would appear that approximately \$12 million (80% of \$15 million) is being left on the table. Your thoughts? 3. An 18-foot curb face to curb face median/esplanade with 1-foot turning lane cuts would appear to be an acceptable configuration with less threat to future removal of esplanade to add more lanes in the future (think Gessner). 4. Why no dedicated bike lanes as with the current Memorial Drive project between Kirkwood to Eldridge... same 100' Right of Way, by the way. 5. Please consult the Energy Corridor's Mast Plan for intersections. the innovative design gives pedestrians and cyclists a "head start" ahead of vehicle traffic.	1. Adding a raised median throughout the alignment will increase vehicular and pedestrian safety. The actual pedestrian crossings located at West Bough and BW Frontage Road will have accessible ramps, pedestrian signals and audible push buttons. No mid-block crossings between West Bough and the eastern limits are proposed at this time. 2. TIRZ 17 is perpetually seeking to leverage funding through project cost sharing. Presently TIRZ 17 is investigating other fund leveraging opportunities including Federal grants. 3. Reducing median width to 18-FT leads to the following safety issues: - Passenger cars having difficulties making U-turns in a single maneuver. This will lead to vehicles stopping & reversing in the travel lane to be able to make the U-turn which is not safe. - Passenger cars waiting in the median opening will protrude into adjacent traffic lane (Typical length of a standard passenger car is 19-FT, pickup trucks tend to be longer). 4. It's safer to have a shared used path because you are separating vehicular traffic from bike traffic. In addition, the City had indicated that they do not want on-street dedicated bike lanes. 5. Will do. Thank you for your suggestion.
11	1. Can Councilman Pennington explain what was done from Kirkwood to Eldridge there are no esplanades or turn lanes. 2. Is there a phase 2 or 3 to this proposed project? 3. Why did the Barryknoll work take more than a year and then part had to be redone? 4. How about a show of hands on the three alternatives.	1. CM Pennington's office to address. This TIRZ 17 portion of Memorial Drive is from BW 8 Frontage road to Tallowood. 2. To minimize traffic impacts, the project will be constructed in multiple phases. The phases will be determined during detail design. 3. Barryknoll Lane Construction project encountered several delays outside the purview of anyone representing the TIRZ. These delays were primarily due to the contractor having to demobilize in association with AT&T's conflict. 4. The recommended alternative is to improve the roadway to a curb and gutter concrete section with 24-FT wide raised medians to improve safety, mobility and access management along the project corridor.
12	1. Please consider a 18' to 20' median with trees between peds & sidewalks on both sides. 2. Please put the extra feet from a smaller median into separated ped and bikeway. 3. Consider either box detention under wider sidewalk or using permeable sidewalks with open bottomed detention system.	1 & 2. Reducing median width to 18-FT leads to the following safety issues: - Passenger cars having difficulties making U-turns in a single maneuver. This will lead to vehicles stopping & reversing in the travel lane to be able to make the U-turn which is not safe. - Passenger cars waiting in the median opening will protrude into adjacent traffic lane (Typical length of a standard passenger car is 19-FT, pickup trucks tend to be longer). Wider sidewalks will be placed on both sides of the roadway to promote a pedestrian friendly environment. Trees and landscaping amenities design will commence during the detail design phase of the project. 3. We will evaluate during the preliminary engineering phase.

**Response to Public Questions/Comments Regarding  
Memorial Drive Mobility & Drainage Improvements Project T-1738A**



No.	Abbreviated Questions	Response
13	Will you listen to CM Pennington's suggestion no to expand Memorial Drive beyond existing 4 lanes. Will you follow TIRZ 18 plan to limit to 4 lanes with few left hand turn lanes TIRZ 18 should be an example to TIRZ 17 as to how to respect the residents and to work with them. Please understand that families live in the Memorial neighborhoods for the #1 school district #2 established residential amenities #3 safety. Nobody move to Memorial for the commercial offices and shops-Nobody. Please refrain from expanding Memorial Drive into the yards and demolishing private fences of residents AS TO BOX CULVERTS, expensive maintenance is required. You say you do not maintain. Who then?	<p>The project objectives are as follows:</p> <p><b>1. Improve Safety &amp; Mobility</b></p> <ul style="list-style-type: none"> <li>-The roadway will be improved to a curb and gutter concrete section with 24-FT wide raised medians to improve safety, mobility and access management along the project corridor.</li> <li>-The roadway will also be reconstructed to meet current roadway geometric requirements.</li> <li>- Left-turn bays will be added at median openings for safe queuing</li> <li>- Traffic signals at BW 8 Frontage Road and West Bough Lane will be upgraded to meet current City of Houston standards</li> <li>- The 4-lane roadway configuration will not change. We do not plan to add any additional through lanes.</li> <li>- No right-of-way acquisition will be needed except for a single 20'x20' corner clip at the Memorial Drive and West Bough intersection to accommodate traffic signal equipment and ADA pedestrian ramps.</li> </ul> <p><b>2. Improve Drainage</b></p> <ul style="list-style-type: none"> <li>- The installation of dual 10-FT x 10-FT reinforced concrete box storm sewers will reduce overland flows to neighboring areas.</li> <li>- Provide net detention of +10-acre feet (3.3 million gallons)</li> <li>- Reduce area flooding</li> <li>- City will maintain the boxes, we are going through the City process for approval. We have met with the Drainage and Maintenance groups at the City and they are fully aware of the project.</li> </ul> <p><b>3. Improve Quality of Life</b></p> <ul style="list-style-type: none"> <li>- Pedestrian-friendly environment</li> <li>- Continuous, wider sidewalks</li> <li>- Multi-use/shared-use paths</li> <li>- Landscaping/trees within median</li> <li>- Pedestrian lighting</li> </ul>
14	Why put bicyclists in with pedestrians? Why not make median 8' - 10', reduce sidewalk width and have two separate 5' bike lanes at edge of road on both sides of Memorial?	<p>Reducing median width to 8-10-FT leads to the following safety issues:</p> <ul style="list-style-type: none"> <li>- Passenger cars having difficulties making U-turns in a single maneuver. This will lead to vehicles stopping &amp; reversing in the travel lane to be able to make the U-turn which is not safe.</li> <li>- Passenger cars waiting in the median opening will protrude into adjacent traffic lane (Typical width of a standard passenger car is 19-FT, pickup trucks tend to be longer).</li> </ul> <p>It's safer to have a shared used path because you are separating vehicular traffic from bike traffic. In addition, the City has indicated that they do not want on-street dedicated bike lanes.</p>
15	We think project should extend to Gessner.	<p>Extension beyond the existing project limits requires action from the City of Houston. Extension to Gessner also requires coordination with the City of Bunker Hill as the portion of Memorial west of Gessner is within the City of Bunker Hill City Limits.</p>
16	Wouldn't it make sense to extend the Memorial Drive Project - street and drainage - past Tallowood to Gessner?	<p>Extension beyond the existing project limits requires action from the City of Houston. Extension to Gessner also requires coordination with the City of Bunker Hill as the portion of memorial west of Gessner is within the City of Bunker Hill City Limits.</p>
17	How is drainage under Memorial of 153 being addressed? How is our quality of life being addressed when you are using our property + house as a holding pond?	<p>We are evaluating the W153 Memorial crossing to determine if improvements are justified and can be completed without causing adverse impacts downstream. The final preliminary engineering report will be posted on the TIRZ 17 website once approved by the City.</p>
18	Why are there no extra lanes planned?	<p>The traffic counts do not warrant additional lanes. In addition, the City identifies Memorial Drive as a roadway that has sufficient width and does not need to be widened in the Marjor Thoroughfare and Freeway Plan (MTRFP).</p>
19	Does the City plan to take any property for eminent domain. If so - where? I live on corner of Tallowood & Memorial	<p>No right-of-way acquisition will be needed except for a single 20'x20' corner clip at the Memorial Drive and West Bough intersection to accommodate traffic signal equipment and handicap ramps</p>
20	Why did the TIRZ stop where it did? Why not go to Gessner or even further? To W-151?	<p>The project terminates at the existing TIRZ boundary limits. Extension beyond the existing project limits requires action from the City of Houston. Extension to Gessner also requires coordination with the City of Bunker Hill as the portion of memorial west of Gessner is within the City of Bunker Hill Limits.</p>
21	If you go down to an 18 ft median would you be able to add dedicated bike lanes?	<p>Reducing median width to 18-FT leads to the following safety issues:</p> <ul style="list-style-type: none"> <li>- Passenger cars having difficulties making U-turns in a single maneuver. This will lead to vehicles stopping &amp; reversing in the travel lane to be able to make the U-turn which is not safe.</li> <li>- Passenger cars waiting in the median opening will protrude into adjacent traffic lane (Typical width of a standard passenger car is 19-FT, pickup trucks tend to be longer).</li> </ul> <p>In addition, the City has indicated that they do not want on-street dedicated bike lanes</p>
22	Why does Gessner need to be a major thoroughfare? Isn't this what Beltway 8 is for?	<p>The classification of Gessner as a Major Thoroughfare is not a function of TIRZ 17. The City of Houston determines the thoroughfare classification. The City uses several factors to classify streets into categories: length of road, existing and projected traffic volume, character of adjacent properties and possibility of expansion.</p>
23	Are the box culverts closed end at W153? i.e., no water can go into W153?	<p>Memorial Drive storm sewers discharge into W153 under the current conditions. The proposed storm sewer trunklines will discharge into W153 through restrictors that limit the flow to match or be below the existing flow rate.</p>
24	I'm concerned that the water run off will cause flooding near Gessner and Briar Forest.	<p>The proposed Memorial Drive improvements will remove runoff from the surface and store it in large underground storage boxes. The project will have no adverse impact on Gessner and Briar Forest.</p>
25	What retention currently exists South of Memorial City within TIRZ17? Any? Could a block of older housing be purchase and underground detention be put in and either a park or new buildings be put in the same area?	<p>TIRZ is actively pursuing underground and surface detention opportunities south of IH-10.</p>



**Response to Public Questions/Comments Regarding  
Memorial Drive Mobility & Drainage Improvements Project T-1738A**



No.	Abbreviated Questions	Response
25	<p>1. Memorial Drive between Gessner and the Beltway at times is a race track filled with speeders. What provisions are going to be made to make this very safe?</p> <p>2. The Memorial Green Project will collect water from the 15 acres and bring it to the NorthWest corner of the property. It then will go into an open ditch along Memorial and move West to ditch 153 which is a bottleneck. What are you going to do about this transition?</p>	<p>1. The roadway will be improved to a curb and gutter concrete section with 24-FT wide raised medians to improve safety, mobility and access management along the project corridor. The roadway will also be reconstructed to meet current roadway geometric requirements. Left-turn bays will be added at median openings for safe queuing.</p> <p>2. TIRZ 17 does not regulate, review or permit development plans. We are not involved in Memorial Green. Our project limits end at Tallowood, where we are transitioning to the existing roadway configuration of 4-lanes with a continuous left turn lane and tying into the existing drainage system.</p>
26	<p>ALT 1=Most desirable ALT 2= Too narrow median - not to Spec. 6' sidewalks unnecessary ALT 3=??</p>	<p><u>Alternate 1</u> - Improving roadway to a curb and gutter concrete section with 30-FT wide raised medians. This alternate was not selected because it will impact a lot of properties that are currently encroaching into City's right-of-way.</p> <p><u>Alternate 2</u> - Improving roadway to a curb and gutter concrete section with 24-FT wide raised medians. This alternate was the recommended one because it will mitigate impacts to properties that are currently encroaching into City's right-of-way. It will also increase safety and mobility throughout the corridor. Having raised medians with trees/landscaping also provides the quality of life component of the project.</p> <p><u>Alternate 3</u> - Improving roadway to a curb and gutter concrete section with a middle continuous two way left turn lane. This alternate was not recommended because the middle lane creates conflicts and is not as safe as alternate 2. It also lacks the quality of life component.</p>
27	<p>Will (or can) a traffic signal be added at Boheme at Memorial Drive? Boheme is a major cut-through street connecting Memorial Drive and Beltway 8. Traffic flow is significant.</p>	<p>Based on peak hour volumes, a traffic signal is not warranted at this intersection. However, the proposed median opening will allow for safer turning movements.</p>
28	<p>Do you plan to close Beltway 8 trunkline that drains run-off from Beltway 8/ I-10 south to Buffalo Bayou? Do you plan to redirect the entire trunkline east to W-153 via box culverts under Memorial Drive.</p>	<p>No, we will not impact or modify the BW 8 trunkline. A portion of the existing Memorial Drive project corridor drains to the BW 8 trunkline. We will maintain the same flow rate to the BW8 trunkline with the proposed project. We will install 2-10-FT x 10-FT boxes under memorial without connecting them to the BW 8 trunkline. The proposed boxes will carry no flow from the BW 8 trunkline to W153.</p>
29	<p>Make median openings along Legend Lane so traffic doesn't have to make a U-turn at Somerset Place.</p>	<p>The median opening locations will be strategically placed throughout the corridor based on City of Houston Infrastructure Design Manual, traffic operations analysis, crash locations, geometrics and engineering judgment. The majority of the cross streets will have median opening.</p> <p>We are currently in the preliminary engineering phase and evaluating the locations of the median openings.</p>
30	<p>Suggest having an 11' lane and either as 12' outside or 13' outside lane so total paved width is 23 or 24 feet.</p>	<p>The latest City of Houston's Infrastructure Design Manual requires all lanes to be 11 feet wide.</p>
31	<p>Requesting Left Turn Bays at Memorial Drive and Legend Lane and object to any plan that puts additional drainage into W-153.</p>	<p>We are evaluating this as part of the preliminary engineering process.</p>
32	<p>1. Space, trees, and plantings between the roadway and the sidewalk maximized. 2. Suggest an 8' shared use path EB and WB. 3. Median width should be a compromise of 20 feet. 4. Are 11' lanes including / excluding the usable gutter pan in the outside lane.</p>	<p>1. Landscaping amenities will be designed during the detail design phase.</p> <p>2. The final configuration of the shared used path is being evaluated during the preliminary engineering phase.</p> <p>3. Reducing median width to 20-FT leads to the following safety issues: - Passenger cars having difficulties making U-turns in a single maneuver. This will lead to vehicles stopping &amp; reversing in the travel lane to be able to make the U-turn which is not safe. - Passenger cars waiting in the median opening will protrude into adjacent traffic lane (Typical length of a standard passenger car is 19-FT, pickup trucks tend to be even longer). 4. 11-Ft lanes are from face of curb to middle of lane line or stripe</p>
33	<p>Suggests improvement to Buffalo Bayou to deal with flooding.</p>	<p>HCFCD has jurisdiction on Buffalo Bayou.</p>
34	<p>1. How will you provide replacement drainage. 2. The 100' ROW will require tree removal.</p>	<p>1. The existing drainage infrastructure along Memorial Drive will be replaced with large concrete box trunklines to improve the risk of flooding in the area.</p> <p>2. To comply with City Ordinance, an Urban Forester will inventory and evaluate all the trees within the corridor and develop tree protection plans to minimize impacts to trees.</p>
35	<p>Right-of-way width is 90-ft not 100-ft</p>	<p>The City MTFP does show Memorial Drive, from Bunkerhill City Limits to West Belt as a 90-foot right-of-way (ROW) section.</p> <p>For our project limits, our Surveyor, Kuo &amp; Associates, developed the existing ROW lines at 100 feet width, per iron rods found out in the field. In addition, the HCAD maps show a varying width ROW (103'-106'). In summary, we must proceed with the 100-foot wide ROW based on ACTUAL iron rods found out in the field by our Registered Professional Land Surveyor (RPLS).</p>
36	<p>Do you plan to close the TxDot Beltway 8 trunkline that drains storm water run-off from Beltway 8/ Interstate 10 south to Buffalo Bayou? Do you plan to redirect this entire TxDot Beltway 8 trunkline east to W-153 via box culverts under Memorial Drive? I need an explanation</p>	<p>We are not changing any of the existing drainage patterns along Memorial Drive. What currently drains to the west towards BW 8 Frontage road will continue to do so in the proposed conditions and what currently drains to the east towards W153 will also continue to do so.</p> <p>Our recommendation is to maintain flow rates from Memorial to the existing storm sewer trunk line beneath Beltway 8. That is to say that some flow from Memorial is currently draining to the Beltway 8 trunk line and that same flow rate will be maintained in the proposed conditions. The Beltway 8 system will not be rerouted and no additional water from the Beltway 8 system will be conveyed to W153.</p> <p>Large trunk lines are proposed as part of the Memorial Drive improvements.</p> <p>These large storm sewer boxes will provide relief for W153 by storing water that currently reaches W153 and allowing it to be discharged through a restrictor after W153 has lowered. The large boxes will not be connected to the Beltway 8 trunk line therefore no flow from the Beltway 8 system will be conveyed to W153.</p>