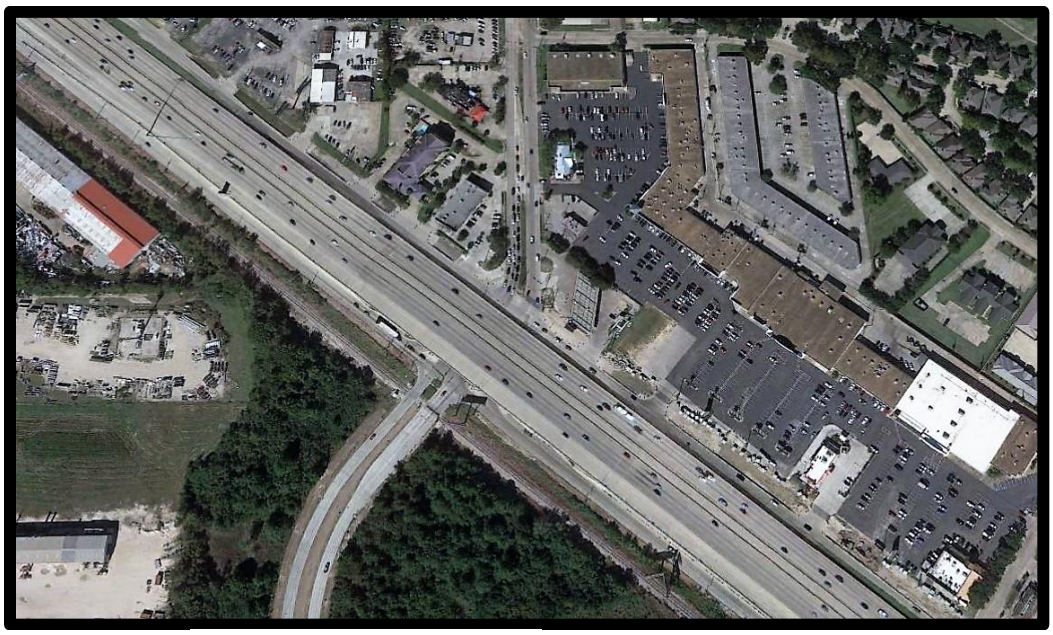
TRAFFIC ENGINEERING STUDY
Red Light Running Camera Evaluation Analysis
EB & WB US 290 Service Roads at Jones Road
Jersey Village, Texas



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I. INTRODUCTION

PURPOSE

This traffic study is intended for the evaluation of potential safety deficiencies and installation of red light running counter-measures for the intersections of the eastbound and westbound US 290 Service Roads at Jones road, in the City of Jersey Village, Texas. There are 3 approaches that are being considered, SB Jones Road and EB and WB US 290 Service Roads; as depicted in Figure 1. The traffic engineering analysis consists of traffic data collection, qualitative assessment of the conditions, crash analysis, evaluation of signal operations and visibility, and evaluation of signal clearance intervals. Based on the analysis performed in this study, a series of effective counter-measures will be evaluated and recommended.

REQUIREMENTS

Texas Transportation Code Title 7 (Vehicles and Traffic) Subtitle I (Enforcement of Traffic Laws) Chapter 707 (Photographic Traffic Signal Enforcement System Section 707.003 (Installation and Operation of Photographic Traffic Signal Enforcement System), requires that the local authority shall conduct a traffic engineering study of the approach to determine whether, in addition to or as an alternative to the system, a design change to the approach or a change in the signalization of the intersection is likely to reduce the number of red light violations at the intersection.

Section 707.003, further requires that the intersection approach must be selected for the installation of a photographic traffic signal enforcement system based on traffic volume, the history of accidents at the approach, the number or frequency of red light violations at the intersection, and similar traffic engineering and safety criteria, without regard to the ethnic or socioeconomic characteristics of the area in which the approach is located.

In addition to the requirements of Section 707.003, the traffic study evaluated and documented the criteria outlined in the Texas Department of Transportation (TxDOT) Form 2296-RLC "Evaluation of the Need for Red Light Running Camera Engineering Analysis".

The United States Department of Transportation Federal Highway Administration (FHWA) developed an *Engineering Countermeasures to Reduce Red-Light Running Intersection Safety Brief (FHWA-SA-10-005)* that defines red-light running and provides potential engineering countermeasures to reducing red-light running. Some of the engineering countermeasures listed in the brief include:

- Improving Signal Visibility and Conspicuity,
- Increasing the Likelihood for stopping,
- Removing reasons for intentional violations and
- Eliminating the need to stop.

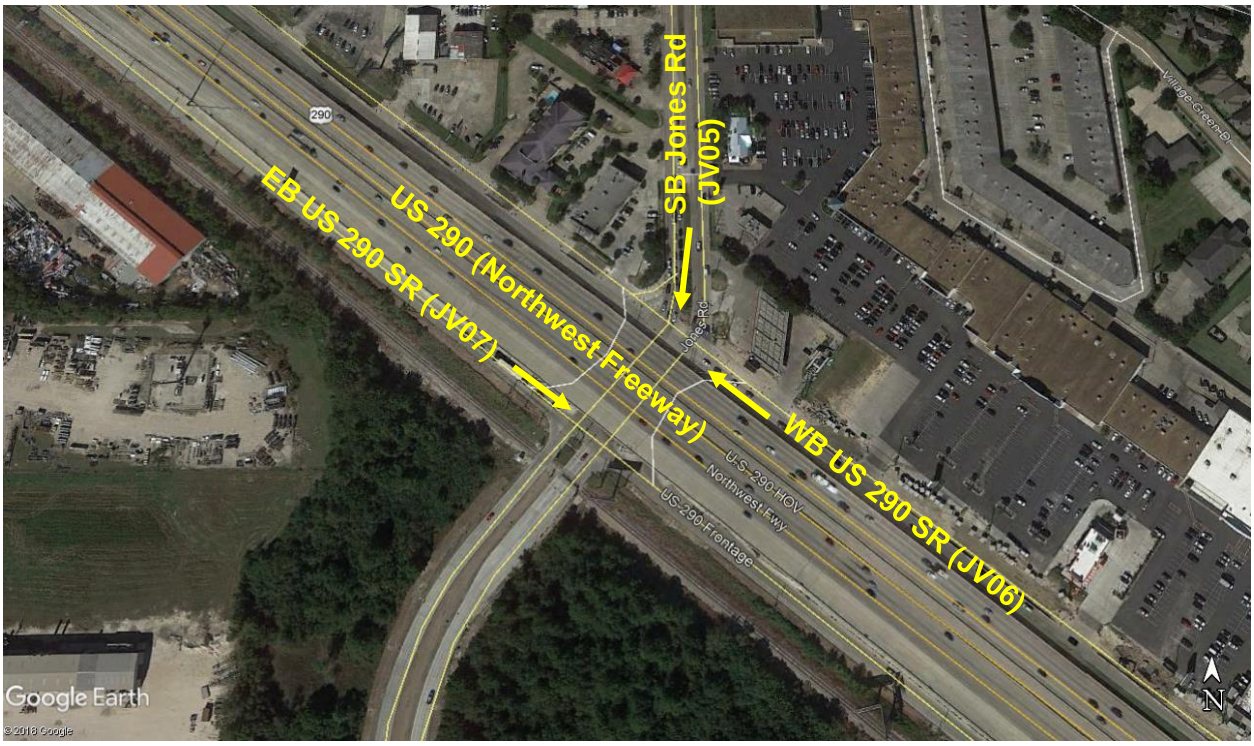


Figure 1. Intersection Location Map

II. INTERSECTION CONDITION ASSESSMENT

This section includes an assessment of the intersection operation and current field conditions as reviewed by a qualified Texas registered professional traffic engineer.

As shown on Figure 1, Jones Road passes under US 290 (also known as Northwest Freeway) mainline; and intersects the EB & WB US 290 Service Roads at grade on north & south side of the freeway main line. Both EB & WB US 290 Service Road signals are operated with a single controller as shown on the signal schematic on Figure 2, provided by TxDOT.

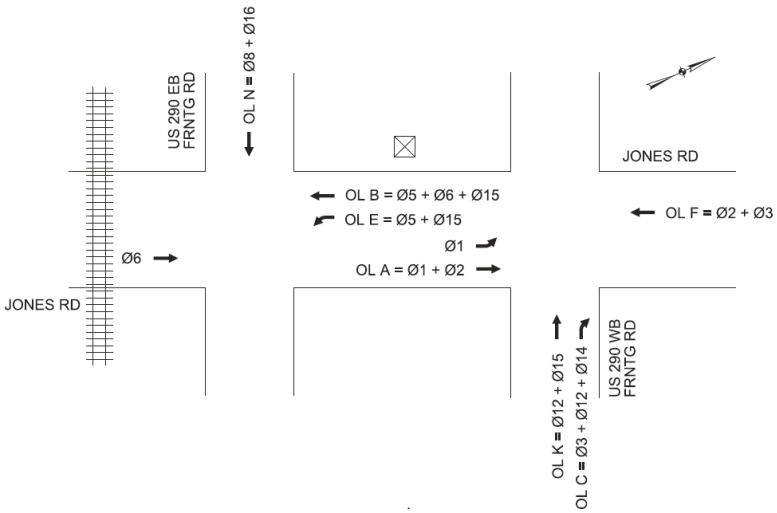


Figure 2. Traffic Signal Phasing

It should be noted that the westbound US 290 Service Road at Jones Road has been under construction since mid-2017. Until recent months in 2018, lane closures on the WB approach have been in effect, impacting the intersection operation on the north side of the freeway. The eastbound approach on US 290 Service Road and Jones Road have been relatively un-effected. Therefore, the study will utilize pre-construction crash data and traffic volumes collected after substantial completion of the construction, with no lane closures, for accuracy.

Section below is a summary of the intersection assessment including signal visibility, pavement condition, vehicle detection system, and signal operations.

WB US 290 Service Road Approach

The WB approach consists of 3 lanes (1 shared through & left, 1 through, 1 right turn) with curb and sidewalk as shown in Figure 2.

Figure 3. WB US 290 Service Road Approach

Signal Visibility – Signal heads are visible from 1000'+ which is more than the MUTCD requirement of 390', as shown on Table 4D-2 below for posted speed of 40 mph. The signal heads are not currently at the final position due to on-going construction, the visibility is not affected and expected to improve after completion. A "signal ahead" sign is not present on this approach and is not needed. The temporary traffic signal heads are horizontal-mounted and include "tunnel visors" and "backplates" for maximum visibility. The proposed signals will also have "tunnel visors" and "backplates" as shown on the signal plans.

Table 4D-2. Minimum Sight Distance for Signal Visibility

85th-Percentile Speed	Minimum Sight Distance
20 mph	175 feet
25 mph	215 feet
30 mph	270 feet
35 mph	325 feet
40 mph	390 feet
45 mph	460 feet
50 mph	540 feet
55 mph	625 feet
60 mph	715 feet

Note: Distances in this table are derived from stopping sight distance plus an assumed queue length for shorter cycle lengths (60 to 75 seconds).

Table 1. 2009 MUTCD Table 4D-2

Pavement Conditions - A visual inspection of the pavement condition at the intersection showed no signs of significant wearing or cracking that could inhibit a driver's ability to stop while approaching the intersection. Due to construction, the required pavement marking (i.e. stop bar, lane lines, arrows, crosswalks) are worn or are partially missing. The proposed traffic signal plans indicate installation of all required markings per MUTCD requirements (see Appendix E for signal plans). Signing is adequate and in conformance with MUTCD.

Vehicle Detectors – three (3) sets Loop sensors are installed in the pavement on this approach. 6’ x 20’ presence sensors are installed at the stop bar in all lanes, 6’ x 6’ advance pulse sensors are installed at approximately 110’ and 240’ from the stop, in all lanes. Pedestrian signal heads are installed and will be improved as a part of the signal reconstruction.

Signal Operation – Arrival at the signal is random due to substantial separation distance from the previous signal at FM 529. Significant queuing was observed at signal during the mid-day field visit. Some of the queues are attributed to the ongoing construction off the roadway, but signal operation can be improved by optimizing the signal timings. The signal phasing and operation is not a contributing factor to red light running.

SB Jones Road Approach

The southbound Jones Road approach is a curbed 3-lane divided with sidewalks and posted speed of 35 mph. There is a "jog" in alignment of the road, approaching the signal, creating a visibility issue for unfamiliar driver. The approach is characterized by frequent driveways and mature trees planted on shoulder side, as depicted on Figure 4.

Figure 4. SB Jones Road Approach

Signal Visibility – As shown in Figure 5 below, the "jog" in Jones Road approach to the signal creates a visibility issue for southbound traffic. Although the required minimum 325' distance at 35 mph is met, the visibility can become an issue from the outside lane and for unfamiliar drivers. A "signal ahead" is not installed on this approach and is recommended on both shoulder and median in advance of the signal to warn drivers of the presence of the signal. Frequent tree trimming is required to ensure continued compliance with the visibility distance requirements from all lanes.

Figure 5. SB Jones Road Alignment

Pavement Conditions - A visual inspection of the pavement condition at the intersection showed no signs of significant wearing or cracking that could inhibit a driver's ability to stop while approaching the intersection. All required pavement marking (i.e. stop bar, lane lines, arrows, crosswalks) are present but worn-out. Upon completion of the construction, all pavement markings should be updated to ensure full visibility. Signing is adequate and in conformance with MUTCD.

Vehicle Detectors – 6' x 20' vehicle loop sensors in presence mode are installed in all lanes and are functioning.

Signal Operation – Arrival at the signal is random. The signal phasing and operation is not a contributing factor to red light running. Optimization of the signal timings will improve the operation.

EB US 290 Service Road Approach

The EB approach is consists of 2 lanes (1 shared through & left, 1 shared through & right) with curbs as shown in Figure 6, and no sidewalks on the south side.

Figure 6. EB US 290 Service Road Approach

Signal Visibility – Signal heads are visible from 1000'+ which is more than the MUTCD requirement of 390', as shown on Table 4D-2 below for posted speed of 40 mph. The traffic signal heads are horizontal-mounted and include "tunnel visors" and "backplates" for maximum visibility. A signal ahead sign is installed in advance of the intersection.

Figure 7. EB US 290 Service Road

Pavement Conditions - A visual inspection of the pavement condition at the intersection showed no signs of significant wearing or cracking that could inhibit a driver's ability to stop while approaching the intersection. The pavement marking (i.e. stop bar, lane lines, arrows, crosswalks) are worn-out and should be refreshed at the conclusion of the construction project. Signing is adequate and in conformance with MUTCD.

Vehicle Detectors – Three (3) sets Loop sensors are installed in the pavement on this approach. 6' x 20' presence sensors are installed at the stop bar in all lanes, and 2 sets of 6' x 6' advance pulse sensors are installed at approximately 110' and at approximately 240' from stop bar. Pedestrian signal heads are installed for all permitted crossings.

Signal Operation – Arrival is generally random due to a mile distance from the previous signal at West Road. The signal phasing and operation is not a contributing factor to red light running. Observed traveling speeds appear to be higher than the posted limits, thus, addition of a speed limit sign may help in settling the traffic on EB US 290 Service Road.

III. TRAFFIC VOLUMES

24-hour, hourly directional traffic volume data were collected on Tuesday, October 2, 2018. Figures 8-10 depict the daily flow variation and hourly volumes of the intersection approaches. Copies of the actual volume data are provided in the Appendix C of this report. As depicted, data indicates a distinct high morning peak in the EB US 290 Service Road and SB Jones Road, between the hours of 7:00 to 8:00 AM. The afternoon high peak occurs between 4:00 to 5:00 PM on WB US 290 Service Road and NB Senate Avenue. The afternoon peak hour is the heaviest hourly volume.

The southbound Jones Road approach experiences high congestion during morning peak hours, as indicated on Figure 10. This is partially due to high concentration of retail and fast-food activity at and around this intersection.

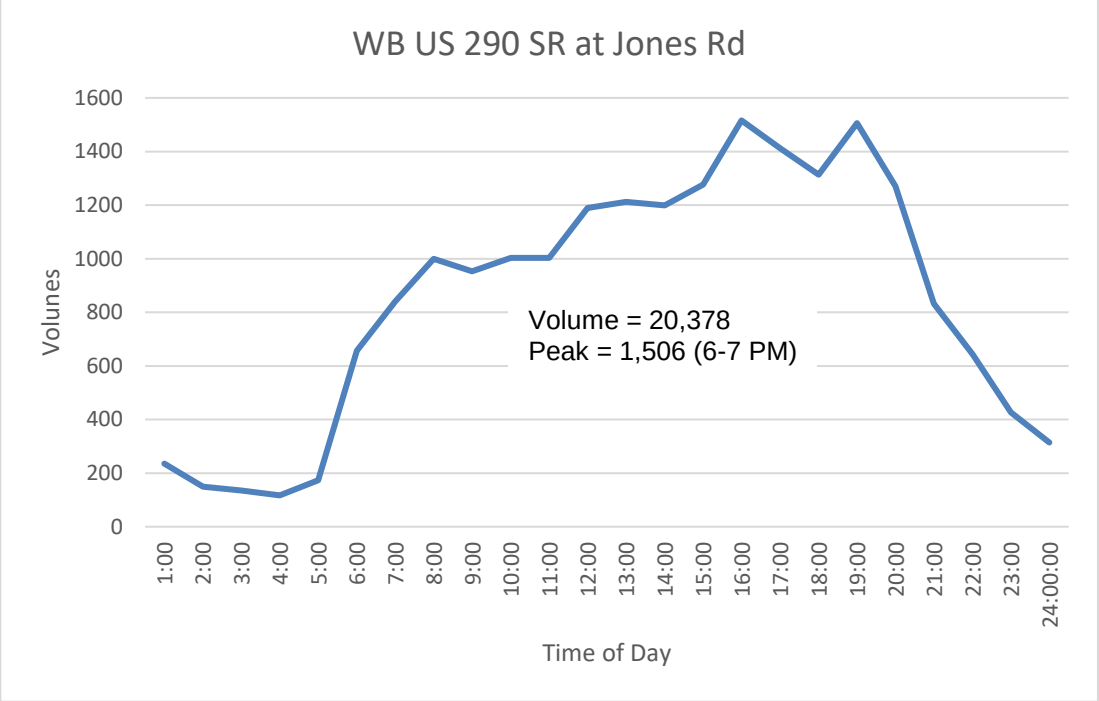


Figure 8. WB US 290 Service Road Daily Traffic Flow

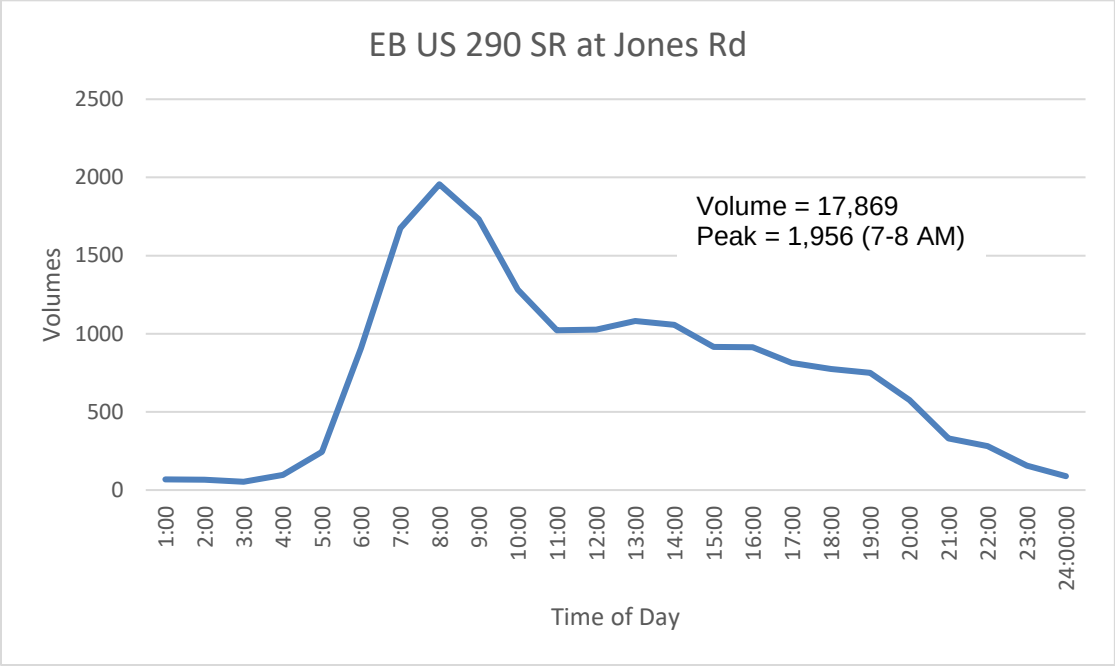


Figure 9. EB US 290 SR Traffic Flow

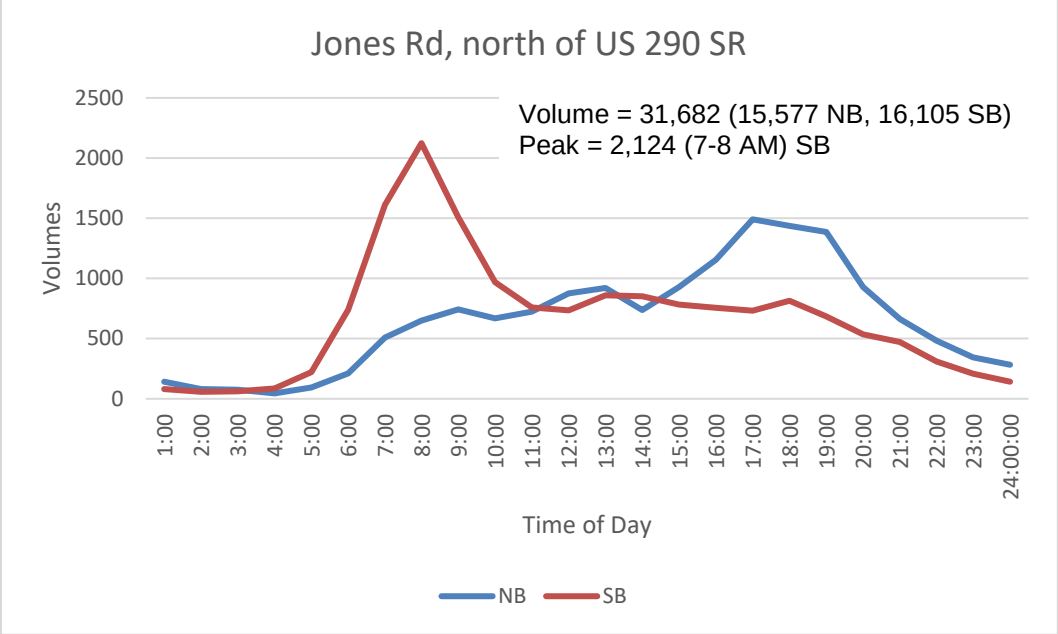


Figure 10. Jones Road, North of US 290, Daily Traffic Flow

IV. CRASH ANALYSIS

City of Jersey Village Police Department (JVPD) complied and provided detailed crash histories for the period January 1, 2016 through July 2018 for the intersection approaches by type and severity. Table 2, 3 & 4, contains summaries of the crash data. Detail summaries provided by JVPD are provided in the Appendix B of this report.

2016 CRASH HISTORY									
INTERSECTION APPROACHES	TOTAL INT. CRASHES	ANGLE CRASHES	REAREND CRASHES	OTHER	RLR RELATED CRASHES	RLR INJ. CRASHES	NON RLR INJ. Crashes	RLR FATAL CRASHES	NON RLR FATAL CRASHES
SB JONES Rd @ WB US 290 SR	9	3	6	0	0	0	1	0	0
WB US 290 SR @ JONES RD	33	22	11	0	2	3	4	0	0
EB US 290 SR @ JONES RD	12	4	8	0	1	0	3	0	0
Totals =	54	29	25	0	3	3	8	0	0

Table 2. 2016 Crash Summary

2017 CRASH HISTORY									
INTERSECTION APPROACH	TOTAL INT. CRASHES	ANGLE CRASHES	REAREND CRASHES	OTHER	RLR RELATED CRASHES	RLR INJ CRASHES	NON RLR INJ CRASHES	RLR FATAL CRASHES	NON RLR FATAL CRASHES
SB JONES @ WB US 290 SR	6	3	3	0	0	0	1	0	0
WB US 290 SR @ JONES RD	8	6	2	0	1	0	0	0	0
EB US 290 SR @ JONES RD	10	6	4	0	1	0	1	0	0
TOTALS =	24	15	9	0	2	0	2	0	0

Table 3. 2017 Crash Summary

2018 CRASH HISTORY (THROUGH JULY 2018)									
INTERSECTION APPROACH	TOTAL INT. CRASHES	ANGLE CRASHES	REAREND CRASHES	OTHER CRASHES	RLR RELATED CRASHES	RLR INJ CRASHES	NON RLR INJ. CRASHES	RLR FATAL CRASHES	NON RLR FATAL CRASHES
SB JONES RD @ WB US 290 SR	8	5	2	0	0	0	1	0	0
WB US 290 SR @ JONES RD	7	4	3	0	0	0	0	0	0
EB US 290 SR @ JONES RD	7	4	3	0	2	2	0	0	0
TOTALS=	22	13	8	0	2	2	1	0	0

Table 4. 2018 Crash Summary (through July 2018)

It should be noted that the westbound US 290 Service Road at Jones Road has been under construction during 2017 and until recently in 2018. The construction included lane closures on the WB approach, and affecting the intersection operation on the north side of the freeway. The eastbound approach and Jones Road have been relatively un-affected. Therefore, crash data for the westbound US 290 Service Road approach have been clearly affected for 2017 and 2018, as can be seen from the crash data tables. 2016 data show a more accurate depiction of the crash patterns without construction interference. It is expected that the crash rates will stabilize and rise for the westbound direction after the completion of the project.

The analysis of the data suggests a pattern of “right-angle” type crashes at the intersection with relatively high incidents of running red light (RLC) type crashes. Westbound US 290 Service Road approach has the highest number of crashes. As “right-angle” crash type is typically susceptible to correction by installation of red light running counter-measures, all 3 approaches are expected to be good candidates for consideration.

V. ENFORCEMENT DATA

City of Jersey Village provided records of enforcement activities for the most recent 18-month period (January 1, 2017 through August 20, 2018). Records indicate that a total of 5,671 citations were issued for the 3-mile section of EB & WB US 290 Service Road, from Hilcrest Road to N Eldridge Parkway.

For the intersection of EB & WB US 290 Service Road at Jones Road, total of 1374 citations were issues, 349 in eastbound direction and 1025 in the westbound direction. A total includes 8 “red light running” citations were issued, 1 in the eastbound direction and 7 in the westbound direction. Some of the reasons for citations included the following:

- Speeding
- Unsafe lane change
- Turn from improper lane

VI. SIGNAL CLEARANCE INTERVALS

Traffic existing signal timing data was provided by TXDOT and is shown in Table 3. Appendix D contains the full timing data document for the intersection.

PHASES	1	2	3	4	5	6	7	8
Minimum Green	10	12	5	5	5	12	0	7
Passage	1.2	1.2	2.0	1.2	1.2	2.0	0.0	2.0
Maximum 1	12	15	20	5	15	35	0	30
Maximum 2	30	15	70	30	45	20	0	25
Yellow Change	3.5	4.0	4.5	3.0	3.5	4.0	3.0	3.5
Red Clearance	1.0	1.0	1.5	0.0	1.0	1.0	0.0	1.0

PHASES	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	2	0	5	7	2
Passage	0.0	0.0	0.0	0.0	0.0	1.1	3.5	0.0
Maximum 1	0	0	0	3	0	65	75	3
Maximum 2	0	0	0	3	0	30	35	3
Yellow Change	3.0	3.0	3.0	4.5	3.0	3.5	3.5	4.5
Red Clearance	0.0	0.0	0.0	1.5	0.0	1.0	1.0	1.5

Table 3. Existing Signal Timing (Provided by TXDOT)

The calculated yellow and all-red clearance intervals were determined using formulas provided by the *ITE Traffic Engineering Handbook (5th Edition)*. The Yellow Change Interval time + Red Clearance Interval time includes a reaction time, a deceleration element, and an intersection clearing time, using the following equations:

$$Y = t + \frac{1.47v}{2(a + Gg)} \qquad R = \frac{W + L}{1.47v}$$

Where: Y= yellow change interval (sec)
R= all-red interval (sec)
t= perception-reaction time (1 sec)
v= approach speed (ft/sec)
a= deceleration rate (10 ft/sec^2)
g=acceleration rate in response to the onset of a yellow indication. (ft/sec^2)
G= approach grade, with uphill positive and downhill negative (percent grade / 100)
W= width of intersection from near curb line to far curb line (ft)
L=length of vehicle (20 ft)

The calculated yellow and all-red intervals are provided in Table 4. It should be noted that for positive approach grades, 0% slope was assumed for the calculations.

Approach	Approach Grade %	Approach Speed MPH	W (Distance), Ft	Calculated Yellow Interval (Sec)	All-Red Interval (Sec)
SB Jones Rd	0%	35	60	3.6	1.6
EB US 290 Service Rd	0%	40	112	4.0	2.3
WB US 290 Service Rd	0%	40	114	4.0	2.3

Table 4. Calculated Yellow & All-Red Intervals

Approach	Yellow Interval (Sec)		All-Red Interval (Sec)	
	Existing	Calculated	Existing	Calculated
SB Jones Rd	4.0	3.6	1.0	1.6
EB US 290 Service Rd	4.5	4.0	1.5	2.3
WB US 290 Service Rd	4.5	4.0	1.5	2.3

Table 5. Yellow & All-Red Interval Comparison

Overall, the existing yellow intervals are higher and more conservative than the calculated values and shall remain in effect. The existing all-red intervals are not consistent with the calculated values and require adjustment as shown in last column of Table 5. It is recommended that the all-red interval be increased to 1.6 seconds for the SB Jones Road, and 2.3 seconds for the EB & WB US 290 Service Roads.

VII. TXDOT ENGINEERING ANALYSIS EVALUATION FORM

The Texas Department of Transportation (TxDOT) has developed an engineering analysis form titled “Evaluation of the Need for Red Light Running Camera Engineering Analysis” which is also referred to as Form 2296-RLC. The evaluation analysis worksheets, included in Appendix A, include sections for information on intersection and signal data, signal timing and traffic data, crash and enforcement data, and other supporting information.

VIII. POTENTIAL ENGINEERING COUNTERMEASURES

As discussed previously, the Texas Transportation Code Title 7 (Vehicles and Traffic) Subtitle I (Enforcement of Traffic Laws) Chapter 707 (Photographic Traffic Signal Enforcement System Section 707.003 (Installation and Operation of Photographic Traffic Signal Enforcement System), requires that the local authority shall conduct a traffic engineering study of the approach to determine whether, in addition to or as an alternative to the system, a design change to the approach or a change in the signalization of the intersection id likely to reduce the number of red light violations at the intersection.

Based on the criteria provided in the Institute of Transportation Engineers (ITE) and the Federal Highway Administration (FHWA) publication titled *Making Intersections Safer: A Toolbox of Engineering Countermeasures to Reduce Red-Light Running: An Informational Report.* Some of the engineering countermeasures, Table 6 below summarizes the countermeasures that can be considered under each of the countermeasure groupings identified above. These engineering countermeasures are based on a driver characteristic called the “unintentional violator.” This type of driver may be incapable of stopping or may be inattentive while approaching the intersection due to poor judgement by the driver or in the design or operation of the intersection. A second type of driver characteristic is the “intentional violator” who, based on his/her judgement, knows they may violate the signal yet proceeds through the intersection anyway. This type of driver is most affected by enforcement countermeasures, while unintentional red-light runners are most affected by engineering countermeasures.

Improvement category	Intersection Approaches		
	SB Jones Rd	EB US 290 SR	WB US 290 SR
Improve Signal Visibility/Conspicuity			
Signal for Each Approach Through Lane	Existing OK	Existing OK	Existing OK
Install Backplates	Existing OK	Existing OK	Existing OK
Modify Placement of Signal Heads	Add Warning	Existing OK	Existing OK
Increase Size of Signal Displays	Existing OK	Existing OK	Existing OK
Install Programmable Signal/ Visors or Louvers	Existing/Visors	Existing/Visors	Existing/Visors
Install LED Signal Lenses	Not Recommended	Not Recommended	Not Recommended
Increase the Likelihood for Stopping			
Install Signal Ahead Signs	Install Multiple New	Existing at 1000'	Existing at 1000'
Install Transverse Rumble Strips	Not Recommended	Not Recommended	Not Recommended
Install Activated Advance Warning Flashers	Not Recommended	Not Recommended	Not Recommended
Improve Pavement Surface Condition	Not Recommended	Not Recommended	Not Recommended
Remove Reasons for Intentional Violations			
Adjust Yellow Change Interval	Existing OK	Existing OK	Existing OK
Provide or Adjust All-Red Clearance Interval	Adjust to 1.6 sec.	Adjust to 2.3 sec.	Adjust to 2.3 sec.
Adjust Signal Cycle Length	Evaluate	Evaluate	Evaluate
Provide Dilemma Zone Protection	Not Required	Existing OK	Existing OK
Eliminate the Need to Stop			
Coordinate Signal Operation	Existing OK	Existing OK	Existing OK
Remove Unwarranted Signals	N/A	N/A	N/A
Construct a Roundabout	Not Recommended	Not Recommended	Not Recommended

Source: USDOT Federal Highway Administration

Table 6. Summary of Countermeasures for Reducing Red-Light Running

IX. CONCLUSIONS & RECOMMENDATIONS

The analysis determined a high concentration of “right-angle” type crashes for US 290 Service Road approaches with Jones Road, on both sides of the Northwest Freeway. The “right-angle” crash type at signalized intersections are generally attributed to failure to obey the traffic control device, either intentionally or un-intentionally. Due to recent construction activities, the most recent 18-month data do not reflect the most accurate depiction of the crash history at the intersection. Reliance on pre-construction crash data (2016) can be substantially revealing. The enforcement data provided by JVPD illustrates that although there has been a high level of enforcement, a persistent violation pattern remains. Implementation of a red-light-running cameras has been shown to significantly reduce the “right-angle” crash frequency at major intersections, specifically through the enforcement of “intentional violators”. Other red-light running counter-measures, designed to improve the conspicuity of the traffic signal, can also be considered to reduce the unintentional violations.

In conclusion, installation of red light running enforcement cameras on southbound Jones Road and eastbound & westbound US 290 Service Road approaches, will reduce the violation incidents and therefore improving the overall safety of the intersection. Other potentially effective red light running countermeasure listed on Table 6, will also further enhance the safety by curtailing violations. A summary of recommended improvements is provided below:

SB Jones Road

- Install 2 “signal ahead” signs, one on shoulder and another in the median, in approach to the signal.
- Frequently trim trees on the shoulder near the signal.
- Increase all-red interval to 1.6 seconds.
- Install a red light running camera.

EB US 290 Service Road

- Increase all-red interval to 2.3 seconds.
- Install a red light running enforcement camera.

WB US 290 Service Road

- Increase all-red interval to 2.3 seconds.
- Install a red light running enforcement camera.

APPENDIX INDEX

Appendix A **TxDOT Engineering Analysis Worksheet (Form 2296RLC)**

Appendix C **Crash Data**

Appendix C **Traffic Volumes**

Appendix D **Traffic Signal Timing Sheets**

Appendix E **TxDOT Traffic Signal Plans**

APPENDIX A
TxDOT ENGINEERING ANALYSIS WORKSHEET
(Form 2296RLC)

Evaluation of the Need for Red Light Running Cameras Engineering Analysis

City: Jersey Village County: Harris

Intersection: EB & WB US 290 Service Roads at Jones Road
Note - WB US 290 SR at Jones Road is in final stages of completion.

A. Intersection and Signal Data

1. Signal Visibility
   a. Minimum Sight Distance to Signal

Approach	Grade	Speed Limit (MPH)	Measured (ft.)	Required (ft.)*
SB Jones Rd	0%	35	350	325
WB US 290 SR	0%	40	1000+	390
EB US 290 SR	0%	40	1000+	390

- See TMUTCD Table 4D-2 for minimum sight distance requirements

   b. Are "SIGNAL AHEAD" warning signs present? ☒ Yes ☐ No
   Yes- on EB US 290SR & SB Senate Ave
   No – WB US 290SR & SB Jones Rd
   c. Are "SIGNAL AHEAD" warning signs needed? ☒ Yes ☐ No
   Needed only on SB Jones Rd
   d. Are other warning signs present in the vicinity of the intersection?
   ☐ Yes ☒ No

   Explain: _____.

   e. Information on Signal Heads Temporary signals for WB US 290 SR due to construction

Approach	Lens Size	Lens Type (LED or Bulb)	Back Plates (Y or N)	Retroreflective Border (Y or N)
SB Jones Rd	12"	Bulb	Y	N
WB US 290 SR	12"	Bulb	Y	N
EB US 290 SR	12"	Bulb	Y	N

2. Pavement and Marking Data
   a. Are stop bars in "good" condition? ☒ Yes ☐ No
   Explain: The stop bars are visible but need refreshed due to construction

   b. Are lanes "clearly" visible? ☒ Yes ☐ No
   Explain:
   c. Are crosswalks "clearly" marked? ☒ Yes ☒ No
   Explain: crosswalks are worn due to construction

   d. What is the pavement condition (ruts, potholes, cracking, etc.)?
   ☒ Good Explain:
   ☐ Fair Explain:
   ☐ Poor Explain:

e. Do pavement surface treatments exist (rumble strips, texturing, pavers, etc.)?

☐ Yes Explain:

☒ No

3. Provide diagram of intersection including: pavement markings, width of lanes and medians,

NORTH

See Signal Plans in Appendix E

location of signal heads and signs, locations of loops/detectors, and grades.

See signal plans provided by TxDOT in Appendix E

B. Signal Timing and Traffic Data

1. Clearance Intervals

Approach	Posted Speed Limit	Grade	Width of Intersection	Yellow Interval		All Red Interval	
				Existing	Calculated*	Existing	Calculated*
SB Jones Rd	35	0%	60’	3.6	3.6	1.1	1.6
WB US 290 SR	40	0%	112’	4.5	4.0	1.5	2.3
EB US 290 SR	40	0%	114’	4.5	4.0	1.5	2.3

- Reference ITE for calculation of clearance intervals

2. Include existing controller settings for each phase and each time-of-day. Information should include applicable settings such as minimum green, max 1 & 2, passage, minimum gap/ext., protected-permissive, lead-lag, yellow and all red, walk and ped clearance time, recall settings, offsets, cycle length, etc. Include analysis of peak hour conditions and a determination of whether signal timings are contributing to red-light running problems. See controller timings provided by TxDOT in Appendix D

   a. Does signal timing or phasing factor in as a possible contributor to red light running at this intersection?

   ☐ Yes Explain:
   ☒ No

   b. List comments or recommendations on potential signal timing or phasing changes:
   No phasing changes are recommended. Increase All-Red interval from as shown.

3. Vehicle Detection Data

Approach	Detection Type (loop, video, etc.)	Detector Location (measured from stop bar)
SB Jones Rd	Loop	2 sets of 6’ x 20’ at stop bar
WB US 290 SR	Loop	6’ x 20’ at stop bar, 6’x6’ loops at 110’ & 240’
EB US 290 SR	Loop	6’ x 20’ at stop bar, 6’x6’ loops at 110’ & 240’

4. Traffic Volume Data

Approach	Daily Volumes		Peak Hour Volumes	
	Total	Heavy Vehicles	Total	Heavy Vehicles
SB Jones Rd	16,105	-	2124	-
WB US 290 SR	20,378	-	1506	-
EB US 290 SR	17,869	-	1956	-

C. Crash and Enforcement Data

1. 18 Months of "Before" Crash Data

Approach	Collision Type	Total	Number of Injury Crashes	Number of Fatal Crashes	Crashes Associated with Red Light Running
SB Jones Rd	Rear End	6	0	0	0
	Angle	3	1	0	0
	Head-on	0	0	0	0
	Pedestrian	0	0	0	0
	Pedal cyclist	0	0	0	0
	Other	0	0	0	0
	Total	9	0	0	0
WB US 290 SR	Rear End	11	1	0	0
	Angle	22	3	0	2
	Head-on	0	0	0	0
	Pedestrian	0	0	0	0
	Pedal cyclist	0	0	0	0
	Other	0	0	0	0
	Total	33	3	0	2
EB US 290 SR	Rear End	8	0	0	0
	Angle	4	3	0	1
	Head-on	0	0	0	0
	Pedestrian	0	0	0	0
	Pedal cyclist	0	0	0	0
	Other	0	0	0	0
	Total	12	3	0	1
	Rear End	0	0	0	0
	Angle	0	0	0	0
	Head-on	0	0	0	0
	Pedestrian	0	0	0	0
	Pedal cyclist	0	0	0	0
	Other	0	0	0	0
	Total	0	0	0	0

Due to construction activities in 2017 & early 2018, 18-month most recent crash data are not used for analysis. 2016 crash data reflects the most recent un-affected crash data to be used for analysis.

2. Violation Rate

a. Number of red light running citations per year issued by law enforcement Number: 1374 Citations on US 290 SR (349 EB & 1025 WB) including 8 citations for running red light(1 EB & 7 WB)
Year: Jan. 1, 2017 – Aug. 20, 2018

b. Observed Violations: None Observed Date:
Time Period:

Approach	Traffic Volume	Number of Violations

3. Enforcement and Operational Issues

a. Describe the difficulty experienced by law enforcement officers in patrol cars or on foot in apprehending violators. Law enforcement resources are limited. This is a high congestion during morning and afternoon peak periods. Speed are also higher than posted. Enforcement level has been high with 1374 citations issued in 18-month period, but, red light running remains a concern with high level of "right-angle" crash types.

b. Describe the ability of law enforcement officers to apprehend violators safely within a reasonable distance from the violation. Law enforcement resources are limited for consistent enforcement. This is a congested area during AM & PM peak periods. Long enforcement activities affects the congestion level and impacts freeway ramp operation.

c. Are pedestrians at risk due to violations? ☐ Yes ☒ No
Explain:

Number of pedestrians per hour: None Observed
Pedestrian crosswalk provided? ☒ Yes ☐ No

d. Have there been any changes to the operations of the intersection (signal timing, restriping, increased enforcement, etc.) with the past three years. Yes. TxDOT is currently completing intersection improvements at the intersections on north side of the freeway.

D. Other Supporting Information:

See traffic study for more details.

APPENDIX B

CRASH DATA

2017 RLC YEAR TOTAL'S	Total Int. CRASHES	RLC RELATED CRASHES	RLC INJ CRASHES	RL RELATED INJ	NON RLR CRASHES	NON RLC REL.INJ CRASHES	NON RLC REL. INJ.	RLR FATAL CRASHES	RLC REL. FATALITIES	NON RLR FATAL CRA	NON RLR FATALITES
JV01 SB SENATE @ WBSR	1	0	0	0	1	0	0	0	0	0	0
JV02 NB Senate @ EBSR	9	3	1	1	6	1	1	0	0	0	0
JV03 EBSR @ SENATE	6	0	1	2	6	0	0	0	0	0	0
JV04 WBSR @ SENATE	5	1	0	0	4	0	0	0	0	0	0
JV05 SB JONES @ WBSR	6	0	0	0	6	1	1	0	0	0	0
JV06 WBSR @ JONES	8	1	0	0	7	0	0	0	0	0	0
JV07 EBSR @ JONES	10	1	0	0	9	1	1	0	0	0	0
JV08 EBSR @ FM 529	3	3	1	1	0	0	0	0	0	0	0
JV09 WBSR @ FM 529	5	0	1	1	5	0	0	0	0	0	0
JV13 WBSR @ WEST RD	14	7	2	3	7	0	0	0	0	0	0
JV18 NB FM 529 @ EBSR	9	1	0	0	8	1	1	0	0	0	0
	76	17	6	8	59	4	4	0	0	0	0

Source: JVPD

2018 RLC YEAR TOTAL'S	Total Int. CRASHES	RLC RELATED CRASHES	RLC INJ CRASHES	RL RELATED INJ	NON RLR CRASHES	NON RLC REL.INJ CRA.	NON RLC REL. INJ.	RLR FATAL CRASHES	RLC FATAL CRASHES	NON RLR FATALITIES	NON RLR FATALITES
JV01 SB SENATE @ WBSR	0	0	0	0	0	0	0	0	0	0	0
JV02 NBSenate @ EBSR	5	1	1	2	4	0	0	0	0	0	0
JV03 EBSR @ SENATE	3	0	0	0	3	1	1	0	0	0	0
JV04 WBSR @ SENATE	5	1	1	2	4	0	0	0	0	0	0
JV05 SB JONES @ WBSR	8	0	0	0	8	1	1	0	0	0	0
JV06 WBSR @ JONES	7	0	0	0	7	0	0	0	0	0	0
JV07 EBSR @ JONES	7	2	2	3	5	0	0	0	0	0	0
JV08 EBSR @ FM 529	4	1	1	1	3	1	2	0	0	0	0
JV09 WBSR @ FM 529	4	0	0	0	4	0	0	0	0	0	0
JV13 WBSR @ WEST RD	8	5	2	5	3	1	1	0	0	0	0
JV18 NB FM 529 @ EBSR	2	0	0	0	1	0	0	0	0	0	0
	53	10	7	13	42	4	5	0	0	0	0

Source: JVPD

2017 RLC YEAR TOTAL'S	Total Int. CRASHES	RLC RELATED CRASHES	RLC INJ CRASHES	RL RELATED INJ	NON RLR CRASHES	NON RLC REL.INJ CRASHES	NON RLC REL. INJ.	RLR FATAL CRASHES	RLC REL. FATALITIES	NON RLR FATAL CRA	NON RLR FATALITES
JV01 SB SENATE @ WBSR	1	0	0	0	1	0	0	0	0	0	0
JV02 NB Senate @ EBSR	9	3	1	1	6	1	1	0	0	0	0
JV03 EBSR @ SENATE	6	0	1	2	6	0	0	0	0	0	0
JV04 WBSR @ SENATE	5	1	0	0	4	0	0	0	0	0	0
JV05 SB JONES @ WBSR	6	0	0	0	6	1	1	0	0	0	0
JV06 WBSR @ JONES	8	1	0	0	7	0	0	0	0	0	0
JV07 EBSR @ JONES	10	1	0	0	9	1	1	0	0	0	0
JV08 EBSR @ FM 529	3	3	1	1	0	0	0	0	0	0	0
JV09 WBSR @ FM 529	5	0	1	1	5	0	0	0	0	0	0
JV13 WBSR @ WEST RD	14	7	2	3	7	0	0	0	0	0	0
JV18 NB FM 529 @ EBSR	9	1	0	0	8	1	1	0	0	0	0
	76	17	6	8	59	4	4	0	0	0	0

Source: JVPD

APPENDIX C

TRAFFIC VOLUMES

** PDF file created with demo version of the ComponentOne VSPDF8 control. **

GRAM Traffic Counting, Inc
1506 Festival
Houston, Texas 77062
888-316-6141

Site Code: 4
Station ID: 1615
US 290 frontage east of Jones Road
Jersey Village, Texas
Latitude: 0' 0.0000 Undefined

Start Time	02-Oct-18 Tue	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon
12:00		73	297		
12:15		59	311		
12:30		53	287		
12:45		50	317	235	1212
01:00		34	306		
01:15		35	323		
01:30		38	310		
01:45		42	260	149	1199
02:00		35	289		
02:15		36	284		
02:30		40	279		
02:45		24	425	135	1277
03:00		18	393		
03:15		33	366		
03:30		36	358		
03:45		30	399	117	1516
04:00		25	350		
04:15		35	354		
04:30		50	352		
04:45		63	357	173	1413
05:00		65	377		
05:15		122	287		
05:30		180	336		
05:45		290	314	657	1314
06:00		175	338		
06:15		208	362		
06:30		232	379		
06:45		226	427	841	1506
07:00		207	441		
07:15		244	303		
07:30		272	275		
07:45		277	251	1000	1270
08:00		237	226		
08:15		234	208		
08:30		239	201		
08:45		243	197	953	832
09:00		237	179		
09:15		233	166		
09:30		263	179		
09:45		270	120	1003	644
10:00		234	118		
10:15		255	108		
10:30		244	117		
10:45		270	83	1003	426
11:00		271	87		
11:15		283	89		
11:30		318	77		
11:45		317	61	1189	314
Total		7455	12923		
Percent		36.6%	63.4%		
Grand Total		7455	12923		
Percent		36.6%	63.4%		
ADT		ADT 19,067		AADT 19,067	

GRAM Traffic Counting, Inc
1506 Festival Houston, Texas 77062
832-752-3303 or 888-315-6141

Site Code: 3 SB
Station ID: 1606
Jones Rd north of WB US 290 Service Rd
Jersey Village, Texas
Latitude: 0' 0.0000 Undefined

Start Time	29-Aug-18 Wed	SB Morning	SB Afternoon	Hour Totals Morning	Hour Totals Afternoon
12:00		15	193		
12:15		25	227		
12:30		13	235		
12:45		29	206	82	861
01:00		17	209		
01:15		13	234		
01:30		13	208		
01:45		15	201	58	852
02:00		14	192		
02:15		14	208		
02:30		14	210		
02:45		21	173	63	783
03:00		15	179		
03:15		23	209		
03:30		29	190		
03:45		20	177	87	755
04:00		20	168		
04:15		43	203		
04:30		69	199		
04:45		90	161	222	731
05:00		110	198		
05:15		146	202		
05:30		193	209		
05:45		290	205	739	814
06:00		294	194		
06:15		372	171		
06:30		411	163		
06:45		536	155	1613	683
07:00		540	154		
07:15		531	127		
07:30		503	136		
07:45		550	119	2124	536
08:00		478	141		
08:15		372	109		
08:30		332	136		
08:45		327	85	1509	471
09:00		259	90		
09:15		259	75		
09:30		244	76		
09:45		208	68	970	309
10:00		174	61		
10:15		212	63		
10:30		203	46		
10:45		170	38	759	208
11:00		173	33		
11:15		153	34		
11:30		204	40		
11:45		204	35	734	142
Total		8960	7145		
Percent		55.6%	44.4%		
Grand Total		8960	7145		
Percent		55.6%	44.4%		
ADT		ADT 16,105		AADT 16,105	

GRAM Traffic Counting, Inc
1506 Festival Houston, Texas 77062
832-752-3303 or 888-315-6141

Site Code: 3 NB
Station ID: 1606
Jones Rd north of WB US 290 Service Rd
Jersey Village, Texas
Latitude: 0' 0.0000 Undefined

Start Time	29-Aug-18 Wed	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon
12:00		44	276		
12:15		43	229		
12:30		25	210		
12:45		31	207	143	922
01:00		22	174		
01:15		25	186		
01:30		15	190		
01:45		18	188	80	738
02:00		20	236		
02:15		20	186		
02:30		18	246		
02:45		17	260	75	928
03:00		14	239		
03:15		18	305		
03:30		4	324		
03:45		9	287	45	1155
04:00		14	347		
04:15		20	399		
04:30		27	362		
04:45		32	383	93	1491
05:00		36	356		
05:15		40	377		
05:30		62	337		
05:45		73	368	211	1438
06:00		86	332		
06:15		111	361		
06:30		157	343		
06:45		154	349	508	1385
07:00		129	283		
07:15		165	227		
07:30		170	213		
07:45		187	207	651	930
08:00		181	183		
08:15		174	176		
08:30		201	164		
08:45		186	139	742	662
09:00		171	110		
09:15		123	138		
09:30		190	132		
09:45		185	103	669	483
10:00		181	112		
10:15		178	80		
10:30		178	83		
10:45		187	70	724	345
11:00		217	91		
11:15		204	70		
11:30		224	70		
11:45		230	53	875	284
Total		4816	10761		
Percent		30.9%	69.1%		
Grand Total		4816	10761		
Percent		30.9%	69.1%		
ADT		ADT 15,577		AADT 15,577	

** PDF file created with demo version of the ComponentOne VSPDF8 control. **

GRAM Traffic Counting, Inc
1506 Festival
Houston, Texas 77062
888-316-6141

Site Code: 2 EB
Station ID: 1609
US 290 Service Rd east of West road
Jersey Village, Texas
Latitude: 0' 0.0000 Undefined

Start Time	02-Oct-18 Tue	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon
12:00		21	270		
12:15		26	284		
12:30		10	254		
12:45		11	274	68	1082
01:00		19	276		
01:15		15	259		
01:30		20	273		
01:45		12	248	66	1056
02:00		19	232		
02:15		10	252		
02:30		11	232		
02:45		13	199	53	915
03:00		20	235		
03:15		29	262		
03:30		26	228		
03:45		21	188	96	913
04:00		23	255		
04:15		52	173		
04:30		81	190		
04:45		89	196	245	814
05:00		128	182		
05:15		168	212		
05:30		277	210		
05:45		335	171	908	775
06:00		327	190		
06:15		401	175		
06:30		452	192		
06:45		495	192	1675	749
07:00		483	189		
07:15		470	150		
07:30		507	127		
07:45		496	110	1956	576
08:00		486	80		
08:15		447	91		
08:30		401	81		
08:45		399	78	1733	330
09:00		387	104		
09:15		339	74		
09:30		289	42		
09:45		267	62	1282	282
10:00		248	56		
10:15		255	37		
10:30		256	33		
10:45		263	31	1022	157
11:00		258	33		
11:15		283	28		
11:30		259	17		
11:45		227	11	1027	89
Total		10131	7738		
Percent		56.7%	43.3%		
Grand Total		10131	7738		
Percent		56.7%	43.3%		
ADT		ADT 17,869		AADT 17,869	

APPENDIX D

SIGNAL TIMING DATA

Installed: 03/06/2018

Access Data

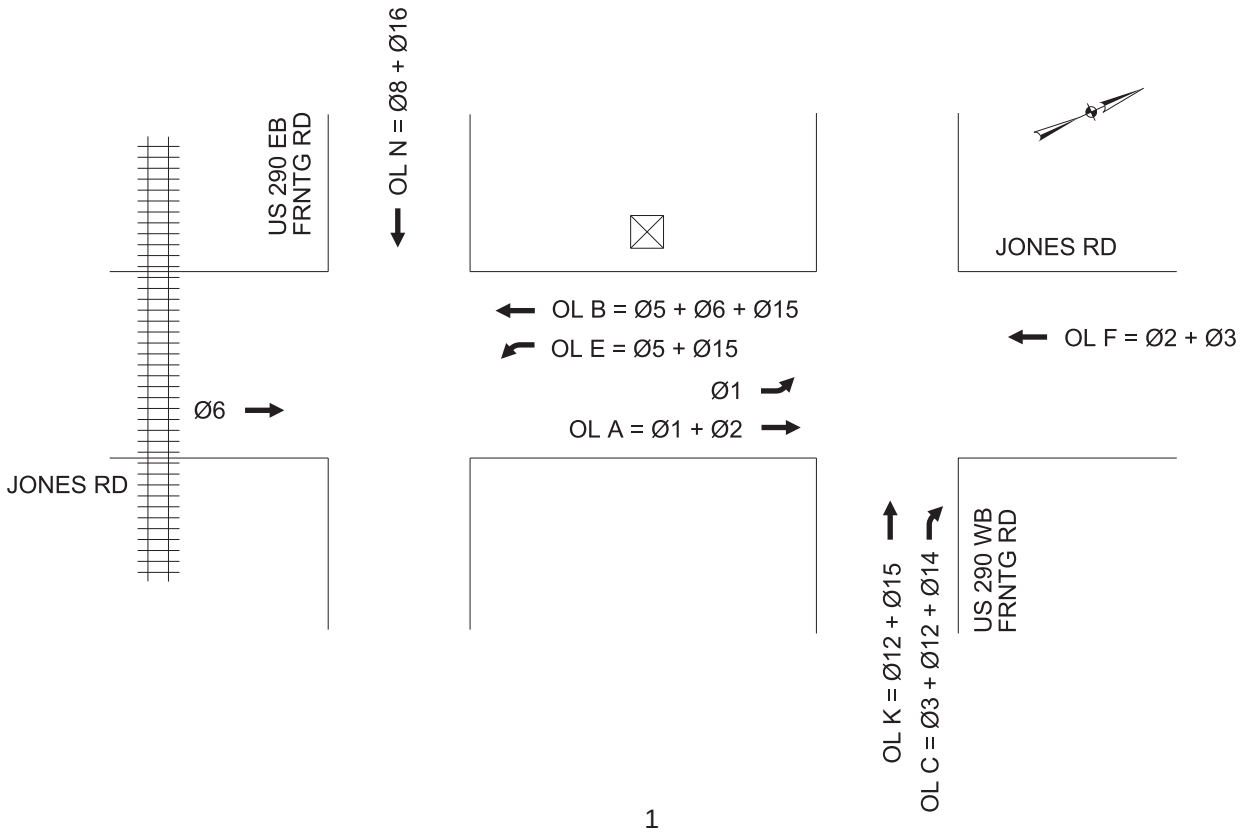
Date:
11/5/2014

Time:
8:09

Intersection Name:	US 290 at Jones (Const.)
Source:	Database

	Level 1	Level 2
Security Code:	9999	

	Baud Rate	Data Bits	Parity
Printer Port 2	0-1200	0-Eight	0
Com Port 2	0-1200		
Com Port 3	5-19200		



Phase Vehicle Timing Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

PHASES	1	2	3	4	5	6	7	8
Minimum Green	10	12	5	5	5	12	0	7
Passage	1.2	1.2	2.0	1.2	1.2	2.0	0.0	2.0
Maximum 1	12	15	20	5	15	35	0	30
Maximum 2	30	15	70	30	45	20	0	25
Yellow Change	3.5	4.0	4.5	3.0	3.5	4.0	3.0	3.5
Red Clearance	1.0	1.0	1.5	0.0	1.0	1.0	0.0	1.0

PHASES	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	2	0	5	7	2
Passage	0.0	0.0	0.0	0.0	0.0	1.1	3.5	0.0
Maximum 1	0	0	0	3	0	65	75	3
Maximum 2	0	0	0	3	0	30	35	3
Yellow Change	3.0	3.0	3.0	4.5	3.0	3.5	3.5	4.5
Red Clearance	0.0	0.0	0.0	1.5	0.0	1.0	1.0	1.5

Phase Pedestrian Timing Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

PHASES	1	2	3	4	5	6	7	8
Walk	0	5	0	5	0	5	0	5
Pedestrian Clear	0	7	0	12	0	6	0	12
Flashing Walk	0	0	0	0	0	0	0	0
Eextended Ped Cear	0	0	0	0	0	0	0	0
Act Rest in Walk	0	0	0	0	0	0	0	0

PHASES	9	10	11	12	13	14	15	16
Walk	0	0	0	0	0	0	0	0
Pedestrian Clear	0	0	0	0	0	0	0	0
Flashing Walk	0	0	0	0	0	0	0	0
Eextended Ped Cear	0	0	0	0	0	0	0	0
Act Rest in Walk	0	0	0	0	0	0	0	0

Phase General Control Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

PHASES	1	2	3	4	5	6
Initial	1-Inactive	1-Inactive	4-Green	1-Inactive	4-Green	1-Inactive
Non-Actuated Respons	0-none	0-none	0-none	0-none	0-none	0-none
Vehicle Recall	2-Min	2-Min	2-Min	0-None	2-Min	2-Min
Ped Recall	0-None	0-None	0-None	0-None	0-None	0-None
Recall DDelay	0	0	0	0	0	0

PHASES	7	8	9	10	11	12
Initial	0-None	1-Inactive	0-None	0-None	0-None	1-Inactive
Non-Actuated Respons	0-none	0-none	0-none	0-none	0-none	0-none
Vehicle Recall	0-None	2-Min	0-None	0-None	0-None	2-Min
Ped Recall	0-None	0-None	0-None	0-None	0-None	0-None
Recall DDelay	0	0	0	0	0	0

PHASES	13	14	15	16
Initial	0-None	1-Inactive	1-Inactive	1-Inactive
Non-Actuated Respons	0-none	0-none	0-none	0-none
Vehicle Recall	0-None	2-Min	2-Min	2-Min
Ped Recall	0-None	0-None	0-None	0-None
Recall DDelay	0	0	0	0

Phase Miscellanenous Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

PHASES	1	2	3	4	5	6	7	8
Non-Locking Memory	0	0	0	1	0	0	0	0
Dual Entry	0	0	0	0	0	0	0	0
Last Car Passage	0	0	0	0	0	0	0	0
Conditional Service	0	0	0	0	0	0	0	0
No Simultaneous Gap Out	0	0	0	0	0	0	0	0

PHASES	9	10	11	12	13	14	15	16
Non-Locking Memory	0	0	0	0	0	0	0	0
Dual Entry	0	0	0	0	0	0	0	0
Last Car Passage	0	0	0	0	0	0	0	0
Conditional Service	0	0	0	0	0	0	0	0
No Simultaneous Gap Out	0	0	0	0	0	0	0	0

Phase Vehicle Detector Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

DETECTOR	1	2	3	4	5	6	7	8
Assigned Phase	1	15	2	15	5	6	4	0
Operation Mode	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh
Switch PHase	0	0	0	0	0	0	0	0
Extend	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay	0	0	0	0	0	0	0	0

DETECTOR	9	10	11	12	13	14	15	16
Assigned Phase	0	0	6	0	3	8	0	0
Operation Mode	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh	0-Veh
Switch PHase	0	0	0	0	0	0	0	0
Extend	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Delay	0	0	0	0	0	0	0	0

Phase Pestrian Detector Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

DETECTOR	1	2	3	4	5	6	7	8
Assigned Phase	1	2	3	4	5	6	7	8
Operation Mode	1-Ped	1-Ped	1-Ped	1-Ped	1-Ped	1-Ped	1-Ped	1-Ped
Switch PHase	0	0	0	0	0	0	0	0
Extend	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay	0	0	0	0	0	0	0	0

Unit General Control Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

Startup Time	5
Startup State	0-Flash
Red Revert	4.0
Auto Pedestrian Clear	0
Stop Time Reset	0
Alternate Sequence	0

RING	1	2	3	4
Input Response	Ring 1	Ring 2	None	None
Output Selection	Ring 1	Ring 2	None	None

I/O Modes	Input	Output
"ABC" Connector	0	0
"D" Connector	0	0

Unit Overlap Data

Intersection Name: US 290 at Jones (Const.) Date: 1/26/2018

Source: Database Time: 12:40:08PM

PHASE	1	2	3	5	6	8	12	14	15	16
Overlap A	1	1	0	0	0	0	0	0	0	0
Overlap B	0	0	0	1	1	0	0	0	1	0
Overlap C	0	0	1	0	0	0	1	1	0	0
Overlap E	0	0	0	1	0	0	0	0	1	0
Overlap F	0	1	1	0	0	0	0	0	0	0
Overlap K	0	0	0	0	0	0	1	0	1	0
Overlap N	0	0	0	0	0	1	0	0	0	1

Codes: 0=NO 1=YES Phase is included in overla

OVERLAP	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
TRL GRN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
YEL/10	40	40	40	40	40	40	40	40	40	40	45	40	40	45	40	40
RED/10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
-GRN/YEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+GRN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Unit Ring Data

Intersection Name US 290 at Jones (Const.) **Date** 11/5/2014

Source Database **Time** 9:05:57AM

			Concurrent Phases															
Phase	**Ring**	**Next**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**1**	**12**	**1**	**1**	**1**	**16**
1	1	2	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
2	1	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
3	1	4	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
4	1	14	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
5	2	15	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
6	2	8	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
7	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
8	2	16	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
12	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
14	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
15	2	6	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0
16	2	5	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Unit Port 1 Data

Intersection Name	US 290 at Jones (Const.)	**Date**	11/5/2014
Source	Database	**Time**	9:05:59AM

Description	Device Present	Msg40 Frame Enabled
0-T&F BIU #1 TS2	1	0
1-T&F BIU #2 TS2	1	0
2-T&F BIU #3 TS2	0	0
3-T&F BIU #4 TS2	0	0
4-T&F BIU #5 TS2 Reserved	0	0
5-T&F BIU #6 TS2 Reserved	0	0
6-T&F BIU #7 TS2 Mfg Use	0	0
7-T&F BIU #8 TS2 Mfg Use	0	0
8-DET BIU #1 TS2	1	0
9-DET BIU #2 TS2	0	0
10-DET BIU #3 TS2	0	0
11-DET BIU #4 TS2	0	0
12-DET BIU #5 Reserved	0	0
13-DET BIU #6 Reserved	0	0
14-DET BIU #7 Mfg Use	0	0
15-DET BIU #8 Mfg Use	0	0
16-Malfunction unit	1	0
17-Diagnostic (Msg 30)	0	0
18-Controller Unit	1	0
19-Undefined	0	0

Unit Channel Output Data

Intersection Name	US 290 at Jones (Const.)	**Date**	11/5/2014
Source	Database	**Time**	9:06:06AM

Channel	Control	Hardware Pin
1-Phase 1 Vehicle	1-Veh Phase 1	1-Phase 1 RYG
2-Phase 2 Vehicle	38-Overlap F	2-Phase 2 RYG
3-Phase 3 Vehicle	3-Veh Phase 3	3-Phase 3 RYG
4-Phase 4 Vehicle	43-Overlap K	4-Phase4 RYG
5-Phase 5 Vehicle	37-Overlap E	5-Phase 5 RYG
6-Phase 6 Vehicle	6-Veh Phase 6	6-Phase 6 RYG
7-Phase 7 Vehicle	7-Veh Phase 7	7-Phase 7 RYG
8-Phase 8 Vehicle	46-Overlap N	8-Phase 8 RYG
9-Phase 9 Vehicle	33-Overlap A	10-Phase 2 DPW
10-Phase 10 Vehicle	34-Overlap B	12-Phase 4 DPW
11-Phase 11 Vehicle	35-Overlap C	14-Phase 6 DPW
12-Phase 12 Vehicle	36-Overlap D	16-Phase 8 DPW

Unit Channel Output Data

Intersection Name	US 290 at Jones (Const.)	**Date**	11/5/2014
Source	Database	**Time**	9:06:06AM

Channel	Control	Hardware Pin
13-Overlap A Vehicle	18-Ped Phase 2	17-Overlap A RYG
14-Overlap B Vehicle	20-Ped Phase 4	18-Overlap B RYG
15-Overlap C Vehicle	22-Ped Phase 6	19-Overlap C RYG
16-Overlap D Vehicle	24-Ped Phase 8	20-Overlap D RYG
17-Phase 1 Ped	17-Ped Phase 1	9-Phase 1 DPW
18-Phase 3 Ped	19-Ped Phase 3	11-Phase 3 DPW
19-Phase 5 Ped	21-Ped Phase 5	13-Phase 5 DPW
20-Phase 7 Ped	23-Ped Phase 7	15-Phase 7 DPW
21-Overlap E Vehicle	0-None	0-None
22-Overlap F Vehicle	0-None	0-None
23-Overlap G Vehicle	0-None	0-None
24-Overlap H Vehicle	0-None	0-None

Coordination Mode Data

Date 1/26/2018 Time 12:40:30

Intersection Name	US 290 at Jones (Const.)
Source	Database
Operation Mode	0-Free
Mode (Normal)	2-Perm Yld
Maximum	0-Inhibit
Correction	4-Short Way 2
Offset Mode	0-Beg Green
Force Mode	0-Plan
Max Dwell Time	0
Yield Period	0
Manual Controls: Dial	1
Split	1
Offset	1

Local TBC DST and Equate Data

Date: 1/26/2018 Time: 12:40:08PM

Intersection Name: US 290 at Jones (Const.)

Source: Database

	Month	Week
DST Begin	3	2
DST End	11	1

	Hour	Minute
Cycle Zero Reference time	24	0

	Equates						
Source	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

Local TBC Traffic Data

Intersection Name: US 290 at Jones (Const.) Date: 1/26/2018

Source: Database Time: 12:40:08PM

	PRGM	Time	PATTERN		PHASE FUNCTION															
IT	Day	HH:MM	D/S/O	FLASH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	2	00:01	0/0/4																	
2	2	06:00	0/0/0		X	X	X	X	X	X	X	X						X		
3	2	09:30	0/0/0																	
4	2	16:30	0/0/0																X	
5	2	18:30	0/0/0																	

Local TBC Phase Function Data

Intersection Name: US 290 at Jones (Const.) Date: 1/26/2018

Source: Database Time: 12:40:08PM

TIMEBASE PHASE FUNCTION NAME

FUNCTION NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	(Code:0-OFF & 1-ON)
Phase 1 Max2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phase 2 Max2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phase 3 Max2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phase 4 Max2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Phase 5 Max2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
Phase 6 Max2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Phase 7 Max2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Phase 8 Max2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	

Note: The above section will be blank if no "Phase Functions" are programmed in this section

PHASES 9 THRU 16 MAX #2

FUNCTION NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	(Code:0-OFF & 1-ON)
Phase 14 Max2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Phase 15 Max2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	

Note: The above section will be blank if no "Phase Functions" are programmed in this section

PHASES 1 THRU 8 PHASE OMIT

FUNCTION NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	(Code:0-OFF & 1-ON)

Note: The above section will be blank if no "Phase Functions" are programmed in this section

PHASES 9 THRU 16 PHASE OMIT

FUNCTION NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	(Code: 0-OFF & 1-ON)

Note: The above section will be blank if no "Phase Functions" are programmed in this section

PHASES 1 THRU 8 PED OMIT

FUNCTION NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	(Code: 0-OFF & 1-ON)

Note: The above section will be blank if no "Phase Functions" are programmed in this section

Local TBC Special Function Data

Intersection Name: US 290 at Jones (Const.) Date: 1/26/2018

Source: Database Time: 12:40:08PM

FUNCTION NAME	1	2	3	4	5	6	7	8
Special Function 1	1	0	0	0	0	0	0	0
Special Function 2	0	1	0	0	0	0	0	0
Special Function 3	0	0	1	0	0	0	0	0
Special Function 4	0	0	0	1	0	0	0	0
Special Function 5	0	0	0	0	1	0	0	0
Special Function 6	0	0	0	0	0	1	0	0
Special Function 7	0	0	0	0	0	0	1	0
Special Function 8	0	0	0	0	0	0	0	1
Passage 3 & Max 3	0	0	0	0	0	0	0	0
Passage 4 & Max 4	0	0	0	0	0	0	0	0
Passage 5 & Max 5	0	0	0	0	0	0	0	0
Dynamic Max 3	0	0	0	0	0	0	0	0
Dynamic Max 4	0	0	0	0	0	0	0	0
Dynamic Max 5	0	0	0	0	0	0	0	0
Disable Protective Perm Omits	0	0	0	0	0	0	0	0
Phase 2 Sign Control	0	0	0	0	0	0	0	0
Phase 4 Sign Control	0	0	0	0	0	0	0	0
Phase 6 Sign Control	0	0	0	0	0	0	0	0
Phase 8 Sign Control	0	0	0	0	0	0	0	0
Texas Diamond 4 Phase	0	0	0	0	0	0	0	0
Texas Diamond 3 Phase	0	0	0	0	0	0	0	0
Texas Diamond Seperate	0	0	0	0	0	0	0	0
Queue 1/Level 1 control	0	0	0	0	0	0	0	0
Queue 1/Level 2 control	0	0	0	0	0	0	0	0
Queue 2/Level 1 control	0	0	0	0	0	0	0	0
Queue 2/Level 2 control	0	0	0	0	0	0	0	0
Alt Sequence 8-15 Flash Green Phas	0	0	0	0	0	0	0	0
Alt Sequence 8-15 Flash Red Phase	0	0	0	0	0	0	0	0
Reserved 01	0	0	0	0	0	0	0	0
Coord Adaptive Split	0	0	0	0	0	0	0	0
SPC 1-8 as Phs Func 1-8	0	0	0	0	0	0	0	0
SPC 1-8 as Phs Func 9-16	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0

(Code: 0-NO & 1-YES

C.90.1

Preempt General Data

Date 11/5/2014 **Time** 9:08:03AM

Intersection Name US 290 at Jones (Const.)

Source Database

	Ring1	Ring2	Ring3	Ring4
Min Green/Walk Time	4	4	4	4

FlashOverPreempts	1
Preempt1OverPreempt2	1
Preempt2OverPreempt3	1
Preempt3OverPreempt4	1
Preempt4OverPreempt5	1
Preempt5OverPreempt6	1

Preempt Pre 1 Time Data

Date 11/5/2014 **Time** 9:08:03AM

Intersection Name US 290 at Jones (Const.)

Source Database

NonLock	1	**SelPedClear**	9
Link	0	**SelRedClear**	2.0
Delay	1	**SelYelChange**	4.5
Extend	0	**TrackGreen**	53
Duration	10	**TrackPedClear**	12
MaxCall	0	**TrackRedClear**	2.0
LockOut	0	**TrackYelChange**	4.5
		DwellGreen	10
		ReturnPedClear	12
		ReturnRedClear	2.0
		ReturnYelChange	4.5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ExitPhase	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ExitCalls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Preempt Load 1 Switch Data

Date 11/5/2014 **Time** 9:08:03AM

Intersection Name US 290 at Jones (Const.)

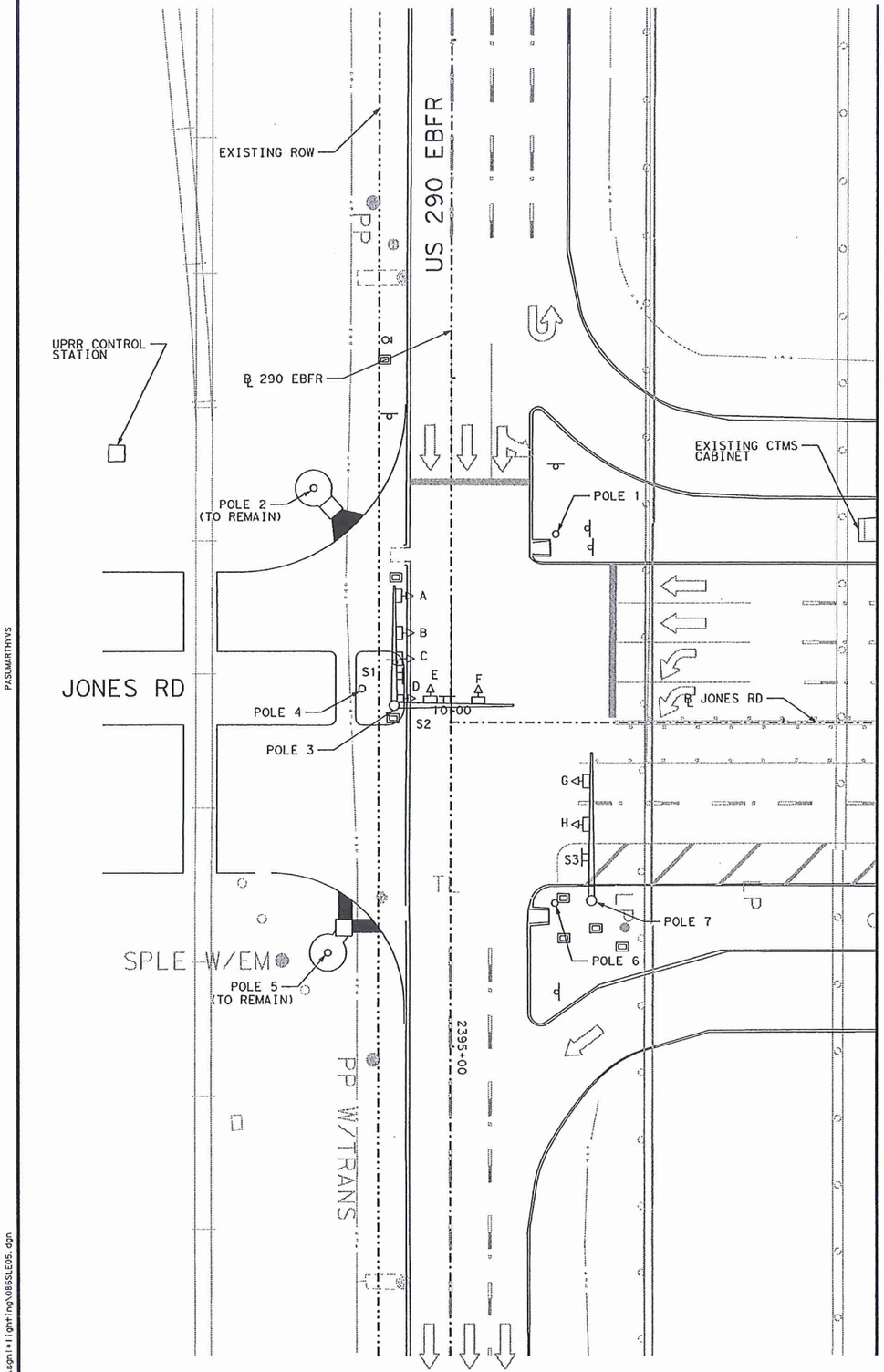
Source Database

	1	2	3	4	5	6	7	8
Veh Track Status	1-Green	0-Red	0-Red	0-Red	0-Red	1-Green	0-Red	0-Red
Veh Dwell Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Veh Cycle Status	1-Actuated	0-No	0-No	1-Actuated	0-No	0-No	0-No	1-Actuated
Ped Track Status	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk
Ped Dwell Status	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk
Ped Cycle Status	0-No	0-No	0-No	0-No	0-No	0-No	0-No	0-No
Overlap Track Status	1-Green	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Overlap Dwell Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Overlap Cycle Status	1-Actuated	0-No	1-Actuated	0-No	1-Actuated	0-No	0-No	0-No

	9	10	11	12	13	14	15	16
Veh Track Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Veh Dwell Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Veh Cycle Status	0-No	0-No	0-No	0-No	0-No	1-Actuated	1-Actuated	0-No
Ped Track Status	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk
Ped Dwell Status	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk	0-Dont Walk
Ped Cycle Status	0-No	0-No	0-No	0-No	0-No	0-No	0-No	0-No
Overlap Track Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Overlap Dwell Status	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red	0-Red
Overlap Cycle Status	0-No	0-No	1-Actuated	0-No	0-No	1-Actuated	0-No	0-No

APPENDIX E

SIGNAL PLANS



PASUMARTHYS

11/12/2012 1:01:58 PM
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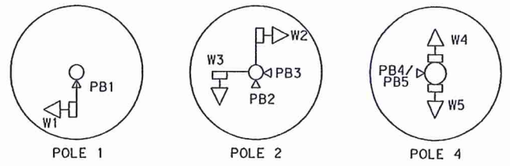
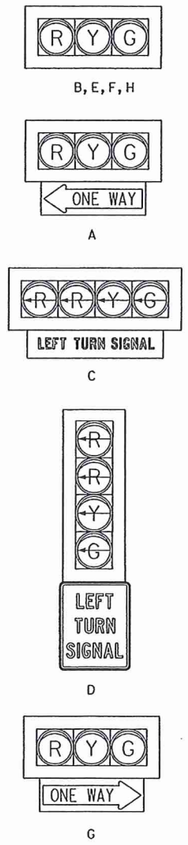
EXISTING PEDESTRIAN DETAILS:



LEGEND:

- EXISTING CONTROLLER WITH CABINET
- EXISTING CONDUIT
- EXISTING BORE CONDUIT
- EXISTING GROUND BOX TYPE D WITH APRON
- EXISTING GROUND BOX TYPE 2 WITH APRON
- EXISTING HORIZONTAL TRAFFIC SIGNAL HEAD
- EXISTING VERTICAL TRAFFIC SIGNAL HEAD
- EXISTING PEDESTRIAN SIGNAL HEAD
- EXISTING VIVDS DETECTOR
- EXISTING MAST ARM AND POLE
- EXISTING STRAIN POLE
- EXISTING PEDESTAL POLE
- EXISTING ELECTRICAL SERVICE
- EXISTING LUMINAIRE WITH 10' ARM
- EXISTING SMALL SIGN
- EXISTING PEDESTRIAN PUSH BUTTON
- EXISTING GROUND MOUNTED SIGN

EXISTING SIGNALS TO BE REMOVED



EXISTING MAST ARM MOUNTED SIGNS TO BE REMOVED

S1, S3 — US 290

S2 — Jones Rd

EXISTING PED SIGNS TO BE REMOVED

EXISTING PED SIGNALS TO BE REMOVED

12" PEDESTRIAN SIGNAL HEADS (W1 THRU W8)

NOTES:

1. PAVEMENT STRIPING IS SHOWN FOR REFERENCE ONLY.
2. POLES 1, 3, 4, 6, 7 TO BE REMOVED AFTER THE TEMPORARY SIGNAL IS OPERATIONAL. POLES 2 AND 5 TO REMAIN.
3. MAINTAIN THE EXISTING SIGNAL INSTALLATION UNTIL THE TEMPORARY SIGNAL INSTALLATION IS OPERATIONAL.

The seal appearing on this document was authorized by PRAVEEN PASUMARTHY, P.E. 100502 on NOV. 15, 2012

CDM SMITH
Firm Registration # F-3043

REV. NO.	DATE	DESCRIPTION	BY

CDM Smith
FIRM REGISTRATION NO: F-3043

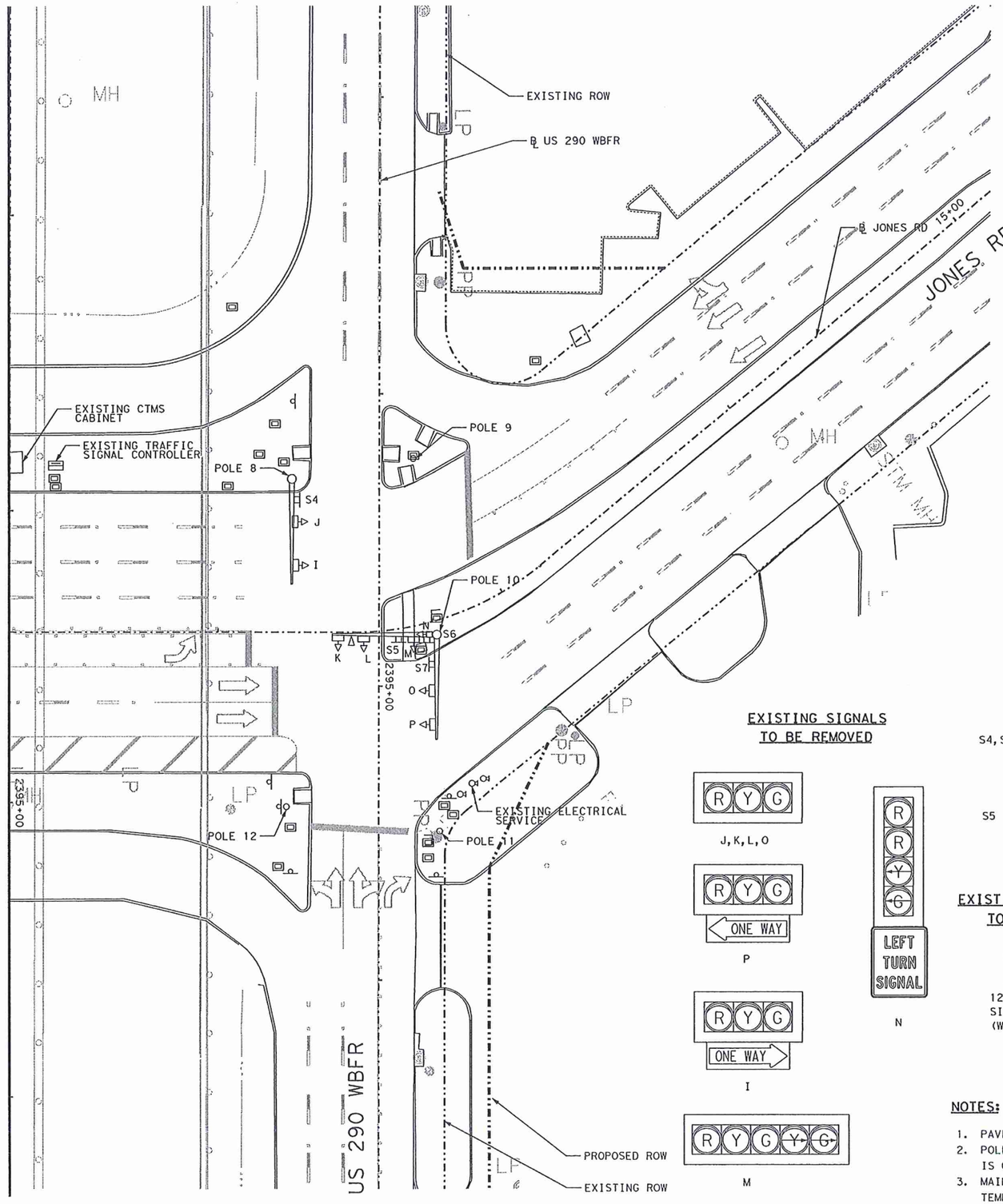
© 2012 Texas Department of Transportation

US 290
EXISTING TRAFFIC SIGNAL LAYOUT US 290 AT JONES RD

SHEET 1 OF 2

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1067

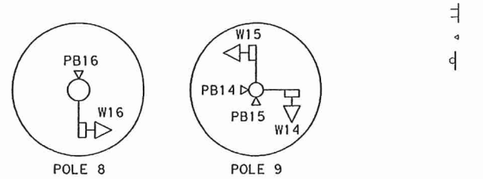
0865LE05.dgn



LEGEND:

- EXISTING CONTROLLER WITH CABINET
- EXISTING CONDUIT
- EXISTING BORE CONDUIT
- EXISTING GROUND BOX TYPE D WITH APRON
- EXISTING GROUND BOX TYPE 2 WITH APRON
- EXISTING HORIZONTAL TRAFFIC SIGNAL HEAD
- EXISTING VERTICAL TRAFFIC SIGNAL HEAD
- EXISTING PEDESTRIAN SIGNAL HEAD
- EXISTING VIVDS DETECTOR
- EXISTING MAST ARM AND POLE
- EXISTING STRAIN POLE
- EXISTING PEDESTAL POLE
- EXISTING ELECTRICAL SERVICE
- EXISTING LUMINAIRE WITH 10' ARM
- EXISTING SMALL SIGN
- EXISTING PEDESTRIAN PUSH BUTTON
- EXISTING GROUND MOUNTED SIGN

EXISTING PEDESTRIAN DETAILS:



EXISTING SIGNALS TO BE REMOVED

EXISTING MAST ARM MOUNTED SIGNS TO BE REMOVED

S4, S7 — US 290

S5 — Jones Rd

S6 — ONLY

30" X 30"
R3-8R

EXISTING PED SIGNALS TO BE REMOVED

12" PEDESTRIAN SIGNAL HEADS (W9 THRU W16)

EXISTING PED SIGNS TO BE REMOVED

PUSH BUTTON FOR

R10-4b(R) PB10, PB14

R10-4b(L) PB9, PB11, PB15, PB16

R10-4b PB12/PB13

NOTES:

1. PAVEMENT STRIPING IS SHOWN FOR REFERENCE ONLY.
2. POLES 8, 9, 10, 11, 12 TO BE REMOVED AFTER THE TEMPORARY SIGNAL IS OPERATIONAL.
3. MAINTAIN THE EXISTING SIGNAL INSTALLATION UNTIL THE TEMPORARY SIGNAL INSTALLATION IS OPERATIONAL.

0 10 20 40

STATE OF TEXAS
PRAVEEN PASUMARTHY
100502
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by PRAVEEN PASUMARTHY, P.E. 100502 on NOV. 15, 2012

CDM SMITH
Firm Registration # F-3043

REV. NO.	DATE	DESCRIPTION	BY

CDM Smith
FIRM REGISTRATION NO: F-3043

Texas Department of Transportation
© 2012

US 290
EXISTING TRAFFIC SIGNAL LAYOUT US290 AT JONES RD

SHEET 2 OF 2

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1068

PASUMARTHYVS
11/12/2012 1:01:59 PM
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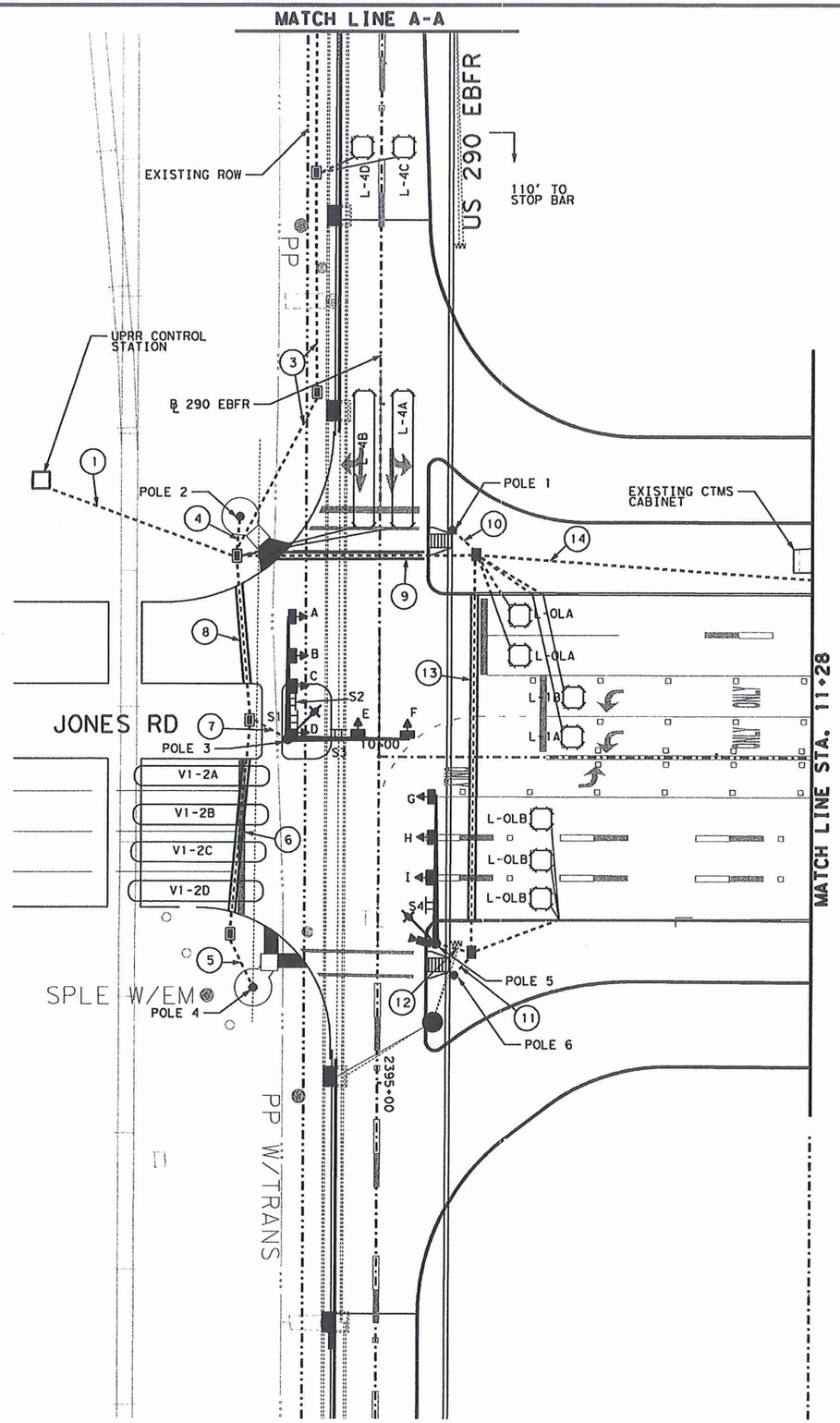
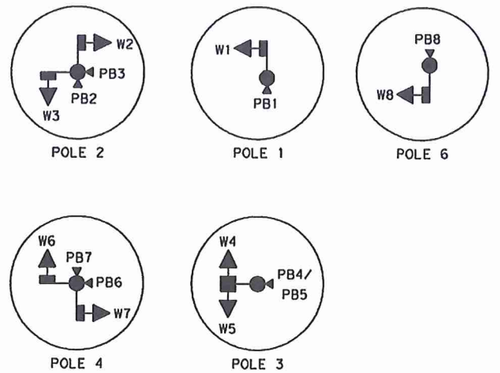
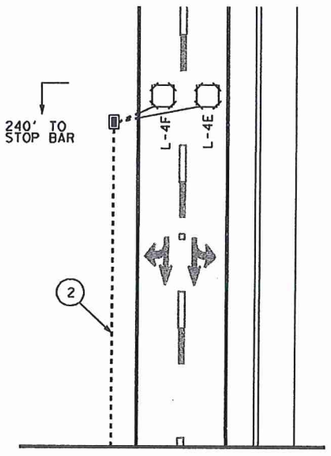
086SLE06.dgn





LEGEND:

- CONTROLLER WITH CABINET
- CONDUIT
- BORE CONDUIT
- BRIDGE MOUNTED CONDUIT
- GROUND BOX TYPE D WITH APRON
- GROUND BOX TYPE 2 WITH APRON
- HORIZONTAL TRAFFIC SIGNAL HEAD
- VERTICAL TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- VIVDS DETECTOR
- MAST ARM AND POLE
- PEDESTAL POLE
- L - LOOP DETECTOR
- ELECTRICAL SERVICE
- LUMINAIRE WITH 8' ARM
- SMALL SIGN
- PEDESTRIAN PUSH BUTTON
- PROPOSED VIVDS DETECTION ZONE
- (XX) PROPOSED RUN NUMBER
- TEMPORARY WOOD POLE
- CONSTRUCTION ZONE
- TEMPORARY POLE MOUNTED SOLID STATE CONTROLLER
- GROUND BOX TYPE D WITHOUT APRON
- PERMANENT CONSTRUCTION THIS PHASE
- FAST TRACK PAVEMENT THIS PHASE
- TEMP CONSTRUCTION THIS PHASE



MATCH LINE A-A

NOTES:

1. INSTALL POLES 1, 3, 5, 6 AS SHOWN.
2. USE EXISTING PEDESTAL POLES 2 AND 4.
3. INSTALL SIGNAL HEADS AT A MINIMUM OF 18 FT-6 IN ABOVE THE ROADWAY.
4. PROVIDE ELECTRICAL SERVICE METER AND DISCONNECT AS SHOWN.
5. PAVEMENT STRIPING IS SHOWN FOR REFERENCE ONLY.
6. FOR SIGN, SIGNAL, CONDUIT AND CABLE SCHEDULE PLEASE REFER TO SHEETS 1071.
7. FOLLOW ADDITIONAL NOTES AS IDENTIFIED ON SHEET 1051.
8. USE EXISTING TRAFFIC SIGNAL CONTROLLER FOR THE PROPOSED SIGNAL.

DESIGN SPEED LIMIT ON US 290 = 40 MPH
DESIGN SPEED LIMIT ON JONES RD = 35 MPH

1 Revised 02/19/2013

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CDM SMITH
Firm Registration # F-3043

REV. NO.	DATE	DESCRIPTION	BY

CDM Smith
FIRM REGISTRATION NO: F-3043

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US 290
PROPOSED TRAFFIC SIGNAL LAYOUT US 290 AT JONES RD

SHEET 1 OF 2

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1069

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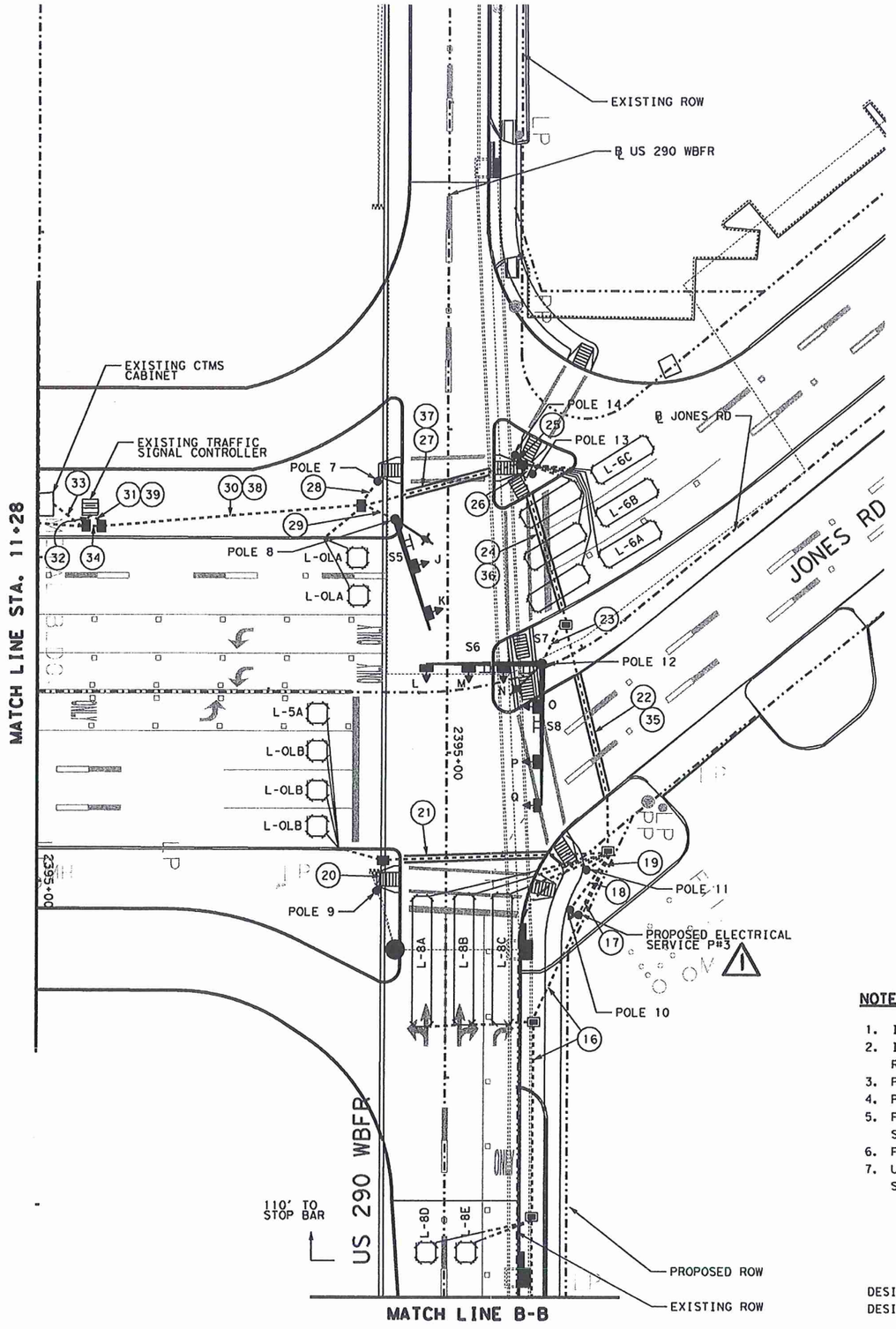

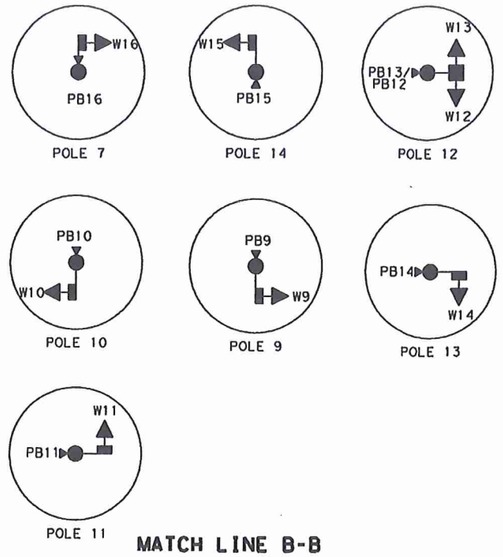

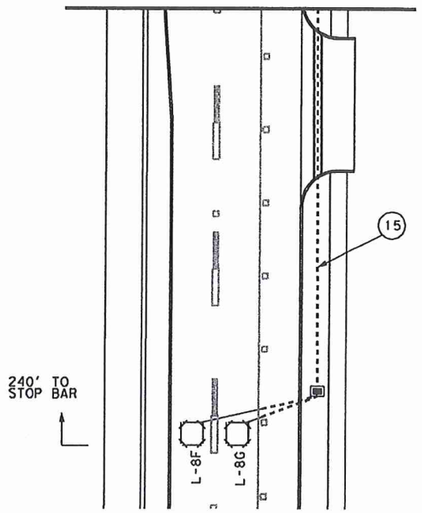

LEGEND:

- CONTROLLER WITH CABINET
- CONDUIT
- BORE CONDUIT
- BRIDGE MOUNTED CONDUIT
- GROUND BOX TYPE D WITH APRON
- GROUND BOX TYPE 2 WITH APRON
- HORIZONTAL TRAFFIC SIGNAL HEAD
- VERTICAL TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- VIVDS DETECTOR
- MAST ARM AND POLE
- PEDESTAL POLE
- L - LOOP DETECTOR
- ELECTRICAL SERVICE
- LUMINAIRE WITH 8' ARM
- SMALL SIGN
- PEDESTRIAN PUSH BUTTON
- PROPOSED VIVDS DETECTION ZONE
- XX PROPOSED RUN NUMBER
- TEMPORARY WOOD POLE
- CONSTRUCTION ZONE
- TEMPORARY POLE MOUNTED SOLID STATE CONTROLLER
- GROUND BOX TYPE D WITHOUT APRON
- PERMANENT CONSTRUCTION THIS PHASE
- FAST TRACK PAVEMENT THIS PHASE
- TEMP CONSTRUCTION THIS PHASE

NOTES:

1. INSTALL POLES 7, 8, 9, 10, 11, 12, 13, 14 AS SHOWN.
2. INSTALL SIGNAL HEADS AT A MINIMUM OF 18 FT-6 IN ABOVE THE ROADWAY.
3. PROVIDE ELECTRICAL SERVICE METER AND DISCONNECT AS SHOWN.
4. PAVEMENT STRIPING IS SHOWN FOR REFERENCE ONLY.
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DESIGN SPEED LIMIT ON US 290 = 40 MPH
DESIGN SPEED LIMIT ON JONES RD = 35 MPH

0 10 20 40

⚠ Revised 02/19/2013

STATE OF TEXAS
PRAVEEN PASUMARTHY
100502
LICENSED PROFESSIONAL ENGINEER

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CDM SMITH
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FIRM REGISTRATION NO: F-3043

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US 290
PROPOSED TRAFFIC SIGNAL LAYOUT US 290 AT JONES RD

SHEET 2 OF 2

DSN:	FED.RD. DIV.NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1070

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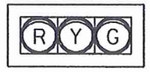
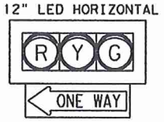
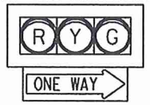
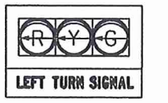
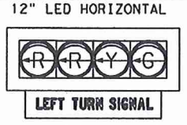
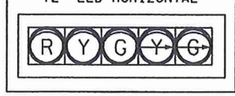
PROPOSED SIGNAL HEAD SCHEDULE

SIGNAL HEAD	DESIGNATION
12" LED HORIZONTAL 	B, E, F, H, I, J, L, M, P
12" LED HORIZONTAL 	A, Q
12" LED HORIZONTAL 	G, K
12" LED HORIZONTAL 	C
12" LED HORIZONTAL 	O
12" LED VERTICAL	D
12" LED HORIZONTAL 	N

PEDESTRIAN SIGNAL/SIGN SCHEDULE

PROPOSED SIGNAL/SIGN	DESIGNATION
COUNTDOWN TYPE	W1-16
R10-3e (R)	PB2, PB6, PB8, PB10, PB14
R10-3e (L)	PB1, PB3, PB7, PB9, PB11, PB15, PB 16
R10-3e	PB4/PB5, PB12/PB13

PROPOSED STREET NAME SIGN SCHEDULE

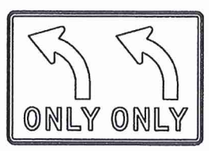
S1, S4
S5, S8

US 290 ℄42"E;
1.5" Radius, 0.5" Border, White on Green;
℄US 290E ClearviewHwy-2-W;

S3, S6

Jones Rd ℄54"E;
1.5" Radius, 0.5" Border, White on Green;
℄Jones RdE ClearviewHwy-2-W;

PROPOSED STANDARD SIGNS



S2

S7
30" X 30"
R3-8R

ELECTRICAL SCHEDULE

ITEM	RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
POWER	1/C # 4 XHHW																			2																2	2	2	2	2
GROUND	1/C # 4 BARE COPPER																			1																1	1	1	1	1
	1/C # 6 BARE COPPER	1			1	1	1	1	1	1	1	1	1	1	2			1	1		1	1	1	1	1	1	1	1	1	2	1	2		1						
LUMINAIRE	4/C # 12 TRAY CABLE							1	1	1			1	1	2					4			4	1	3			3		1	2				2						
SIGNAL CABLE	2/C # 12 TY A (PED. PUSH BUTTON)				2	2	2	1	3	5	1	1		1	7			1	1		1	1	3	1	4	1	1	6	1		7	6	7							
	4/C # 12 TY A (PED. SIGNAL HEAD)				2	2	2	2	4	6	1	1		1	8			1	1		1	1	3	2	5	1	1	7	1		8	7	8							
	7/C # 12 TY A (TRF. SIGNAL HEAD)							4	4	4			1	1	5									4	4			4		1	5	5	5							
VIVDS	COAXIAL CABLE (RG -59)												1	1	1																	1							
	3/C # 16 POWER												1	1	1																	1							
LOOP DETECTOR	2/C # 14 TY C		2	4					6				3	13	2	4					4	11		11			14			16	13	13							
RAIL ROAD	4/C # 12 TY A (PREEMPTION CABLE)	1							1					1																		1							
CONDUIT	2" RMC				1	1					1	1	1					1	1	1	1					1	1		1				1						
	3" RMC							1																1						1										
	4" RMC																																							
	2" PVC SCH 80	1	1	1												1	1																	1				1	1
	3" PVC SCH 80														1															1		1						
	4" PVC SCH 80														1															1	1	1						
	2" PVC SCH 80 (BORE)																																							
	3" PVC SCH 80 (BORE)						1		1				1								1	1													1	1	1			
	4" PVC SCH 80 (BORE)									1															1			1												

ELECTRICAL SERVICE DATA

SERVICE ID	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTOR NO./SIZE	SAFETY SWITCH (AMPS)	MAIN DISCONNECT (POLE/AMP)	TWO POLE CONTACTOR (AMPS)	LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH (POLE/AMPS)	KVA LOAD
P#3	TY D (120/240) 070 (NS) SS (E) SP (O)	1 1/4	2/#4	N/A	2P/70	30	100	T.S.	1P/50	<7.1
								Lighting	2 - 2P/15	

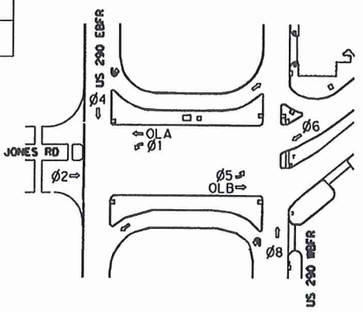
VEHICLE DETECTION CHART

TYPE	DESIGNATION	PHASE	SIZE	DIRECTION
LOOP	L-1A,L-1B	1	6'X6'	SBL
VIDEO	V-2A,V-2B,V-2C,V-2D	2	6'X40'	NBT
LOOP	L-4A,L-4B	4	6'X40'	EBT
LOOP	L-4C,L-4D,L-4E,L-4F	4	6'X6'	EBT
LOOP	L-5A	5	6'X6'	NBL
LOOP	L-6A,L-6B,L-6C	6	6'X20'	SBT
LOOP	L-8A,L-8B,L-8C	8	6'X40'	WBT
LOOP	L-8D,L-8E,L-8F,L-8G	8	6'X6'	WBT
LOOP	L-OLA	OLA	6'X6'	SBT
LOOP	L-OLB	OLB	6'X6'	NBT

POLE SCHEDULE

POLE NUMBER	POLE LENGTH	MAST ARM LENGTH	LOCATION	FOUNDATION DETAILS
1	10'		STA. 10+21.3, 66.52 LT	
2	10'		STA. 9+58.5', 70.30 LT	
3	30'	36' AND 36'	STA. 9+72.9', 5.05 LT	TYPE 36-B; 15'
4	10'		STA. 9+63.1', 69.81 RT	
5	30'	44'	STA. 10+17.0', 55.47 RT	TYPE 36-B; 15'
6	10'		STA. 10+22.5', 64.84 RT	
7	10'		STA. 12+33.6', 65.39 LT	
8	30'	36'	STA. 12+39.0', 53.69 LT	TYPE 36-A; 13'
9	10'		STA. 12+33.8', 61.13 RT	
10	10'		STA. 12+74.7', 73.40 RT	
11	10'		STA. 12+79.3', 63.20 RT	
12	30'	44' AND 36'	STA. 12+86.3', 1.37 LT	TYPE 42-A; 17'
13	10'		STA. 13+22.2', 52.97 LT	
14	10'		STA. 13+21.6', 60.76 LT	
PROPOSED ELECTRICAL SERVICE			STA. 12+75.5', 75.81 RT	

PHASING ASSIGNMENTS



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CDM SMITH
Firm Registration # F-3043

REV. NO.	DATE	DESCRIPTION	BY

CDM Smith
FIRM REGISTRATION NO: F-3043

Texas Department of Transportation

US 290
LEGEND FOR
PROPOSED TRAFFIC SIGNAL
LAYOUT US 290 AT JONES RD

SHEET 1 OF 1

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1071

Revised 02/19/2013

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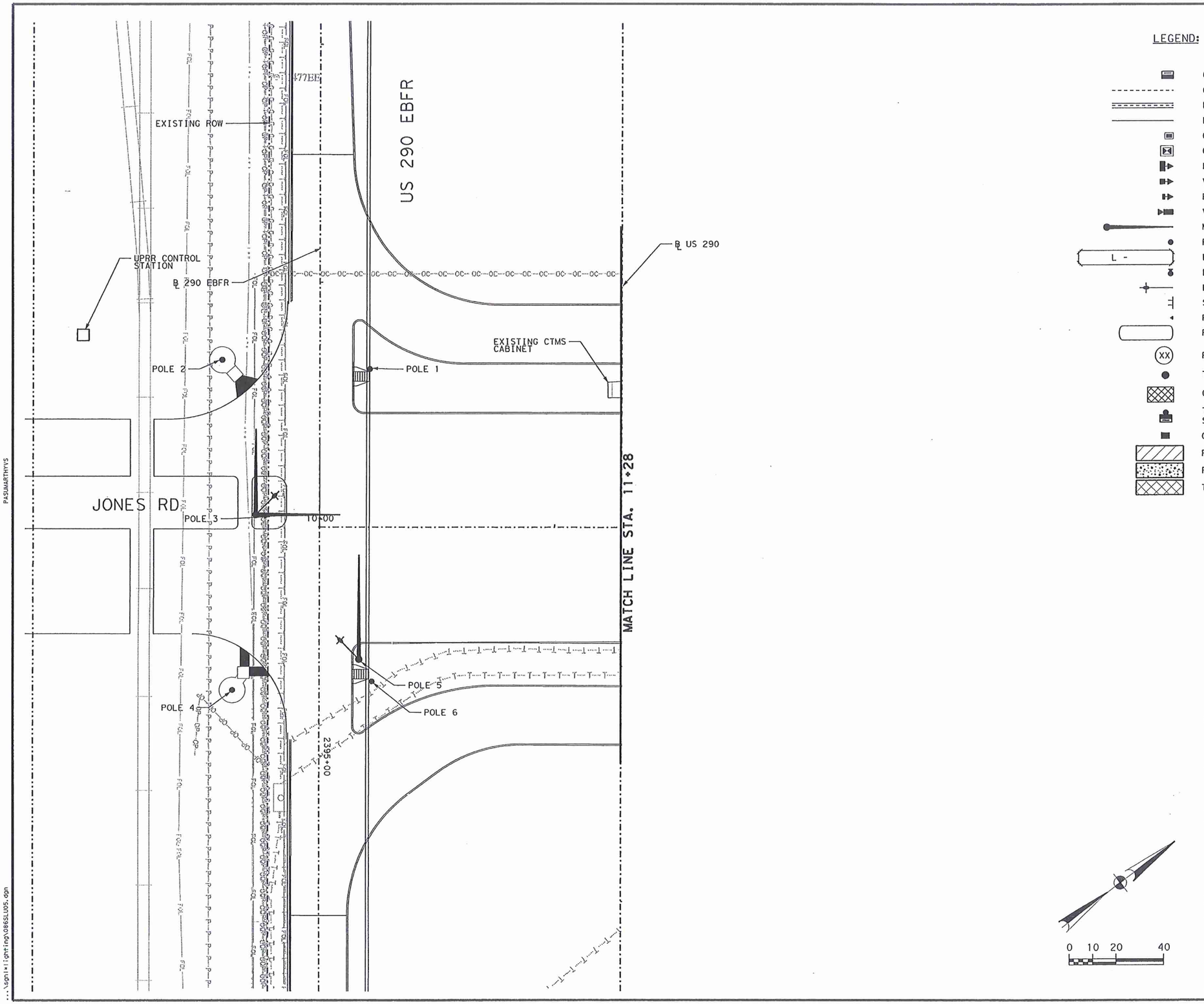

LEGEND:

- CONTROLLER WITH CABINET
- CONDUIT
- BORE CONDUIT
- BRIDGE MOUNTED CONDUIT
- GROUND BOX TYPE D WITH APRON
- GROUND BOX TYPE 2 WITH APRON
- HORIZONTAL TRAFFIC SIGNAL HEAD
- VERTICAL TRAFFIC SIGNAL HEAD
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- MAST ARM AND POLE
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STATE OF TEXAS
PRAVEEN PASUMARTHY
100502
LICENSED
PROFESSIONAL ENGINEER

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CDM SMITH
Firm Registration # F-3043

REV. NO.	DATE	DESCRIPTION	BY

CDM Smith
FIRM REGISTRATION NO: F-3043

Texas Department of Transportation
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US 290
TRAFFIC SIGNAL UTILITY
LAYOUT US 290 AT JONES RD

SHEET 1 OF 2

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1072

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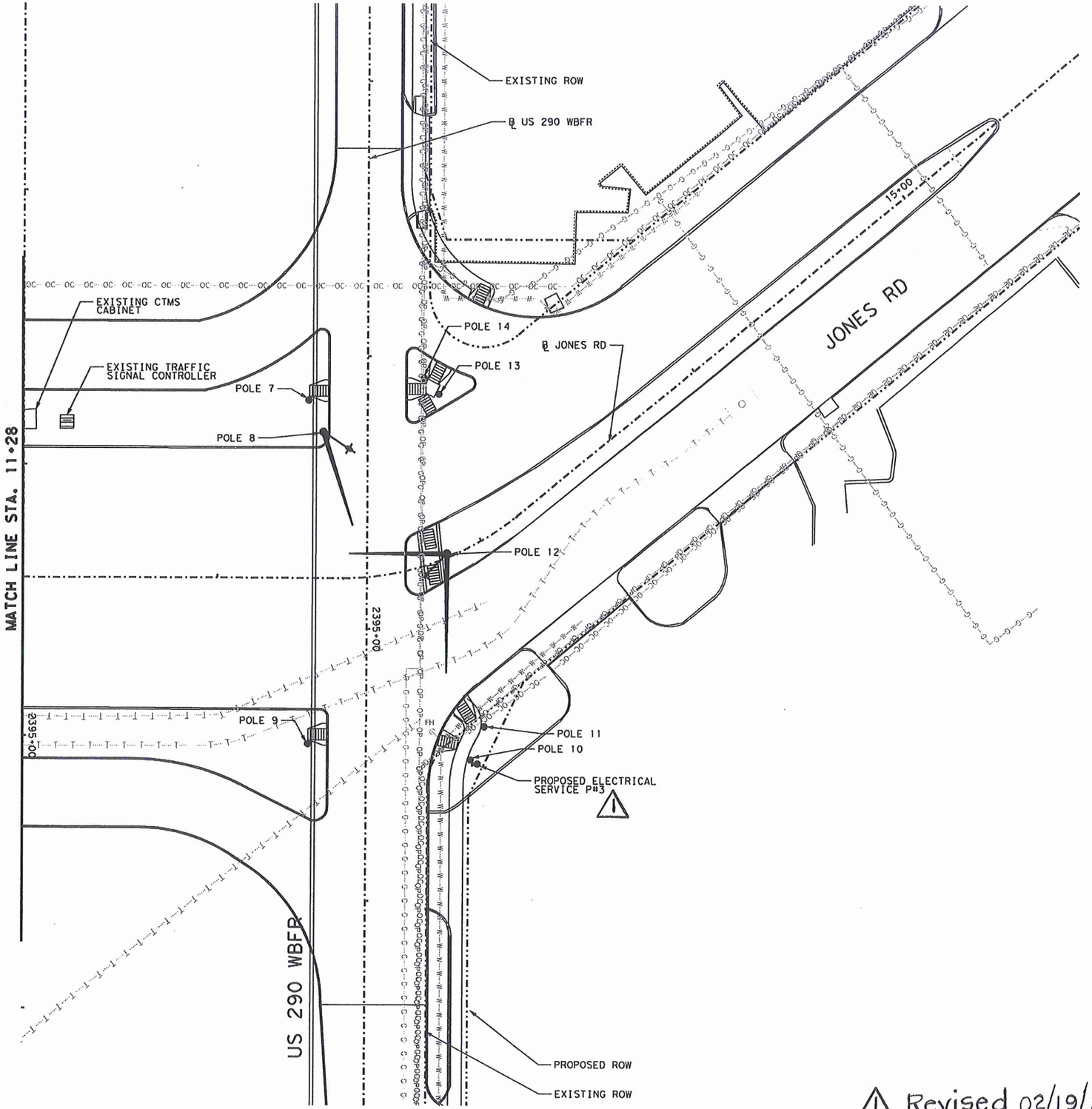

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STATE OF TEXAS
PRAVEEN PASUMARTHY
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US 290
TRAFFIC SIGNAL UTILITY LAYOUT US 290 AT JONES RD

SHEET 2 OF 2

DSN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CK:	6	TEXAS				US 290
DRN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK:	HOU	HARRIS	0050	08	086	1073

Revised 02/19/2013

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