



THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

August 20, 2020

PROJECT NAME: Santa Fe Various Street Improvements

SOLICITATION NO: B201032

RE: ADDENDUM #1

To All Prospective Bidders:

The following information is being provided to aid in preparation of your bid submittal(s):

Question #1: Bid item 3 on both base bid sections and both alternate sections does not specify how thick of a section we are to install. Please provide the required thickness.

Response: If there is adequate room to proof roll and compact subgrade then the top 6 inches of the subgrade will be chemically treated with lime. If there isn't adequate room for proof rolling and compaction then contractor to excavate until firm subgrade is exposed and replace with either chemically treated base material or black base. Bid item No. 4A, and 5A have be added to the Bid Proposal to account for additional excavation and base material if necessary. See Addendum 1 Drawings Sheet 3.

Question #2: Bid item 4 on the base bid Ave T section and the alternate bid Ave L section do not specify how thick of a section we are to install. Please provide the required thickness

Response: The required thickness of Chemically Treat Base Material is 10", as shown on Plan Sheets Page 21-25 and 33-35 and within the Geotechnical Report page 5-6.

Question #3: Bid item 4 for the base bid Ave Q and alternate bid Ave Q show to use a type A base material. This material is much more expensive than a type D material. Can we use a type D material instead of the type A.

Response: Page 8, Note 1 of the Civil sheets specify Type A or D is acceptable. Bid item has been revised to show both materials.

Question #4: Will it be acceptable to mill the asphalt and base together? Or will the County only accept the 2" asphalt millings without any base?

Response: Mill asphalt separately from base material. City of Santa Fe will only accept asphalt millings.

Question #5: Please specify in the bid item description what "Chemically Treated" method is intended to be used. Also, please add separate pay items for the lime, fly ash, cement, etc. to be delivered and spread.

Response: Reference General Construction Notes, Material Requirements Note 1-5 on Plan Sheet 3. Bid item No. 4 is complete in place, no separate pay. Bid items have been revised to add bid item for lime in conjunction with bid item No.3, "Chemically Treated Stabilized Subgrade".

Question #6: The bid items for Avenue Q (base bid and alternate) call for using Type A limestone base, but the plans show using 10" black base. Which is correct?

Response: 10" Crushed Limestone Base Course is the correct item for Avenue Q work. See Addendum 1 Drawings Sheets 26-32.

Question #7: Please specify depths on all bid items - removals, stabilized subgrade, chemically treated base material, etc.

Response: Thickness of removals varies due to existing in field conditions. Reference Boring log in Geotechnical Report. Price will be based on square yardage.

Question #8: Please confirm contract time. Under "Contract Award", 90 Calendar Days is stated, however each set of bid items (per street) gives 4 months of Barricades, Signs, and Traffic Control.

Response: Bid items for Traffic Control have been revised to 3 months

Question #9: We are provided three separate traffic control/detour plans (one for each street) in the plans. Will the contractor be allowed to set up multiple detours at the same time?

Response: Per Paving Construction Notes on Sheet 3, Contractor to phase construction one street at a time.

Question #10: Can a separate bid item be added for lime and fly ash? Per ton?

Response: Yes, Bid items have been revised to add bid item for lime in conjunction with bid item No.3, "Chemically Treated Stabilized Subgrade". No separate pay for lime for bid item No.4

Question #11: Can the base be milled with the surface course?

Response: No, mill asphalt separately from base material. City of Santa Fe will only accept asphalt millings.

Question #12: Can the entire roadway width be milled at once?

Response: If alternate egress/ingress routes for residents can be maintained during construction than entire roadway width can be milled.

Question #13: How are driveways handled? What is the limit of work on driveways?

Response: Driveways are not being replaced, feather asphalt towards existing driveway. See Addendum 1 Drawings Sheets 7-9.

Question #14: What is the thickness for treating the subgrade on this project? This is not explained in the plans or specifications. The Geotechnical Report did not show the stabilization of the existing subgrade.

Response: See response to Question No.1

Question #15: Can you include a unit price pay item with the tonnage for lime and an additional pay item for the tonnage of fly ash? Also, please state the pounds of lime per S.Y. and the pounds of fly-ash per S.Y. which will be required in both the Subgrade stabilization and the Base Material stabilization.

Response: See response to Question No. 5. 7% lime by dry weight should be used for estimating and planning. The percentages are given as application by dry weight and are typically equivalent to about 35 pounds of lime per square yard per 6-inch depth.

Question #16: Please confirm that only the milled asphalt is to be delivered to your location at 11702 11th Street in Santa Fe, Texas? Does the removed base material and subgrade excavation become the property of the contractor?

Response: Mill asphalt separately from base material. City of Santa Fe will only accept asphalt millings. Per Site Clearing Note 30 on Plan Sheet 3, all excess spoils to be hauled off site at contractor's expense.

Question #17: Can you provide the form which asked for the corporation ownership which certifies and includes the names and social security numbers of each person with at least 25% ownership of the company? Will the social security numbers be secured and not available to the general public?

Response: The specified provision does not request a form. The respondent should submit the names within their document and label them as confidential. The social security numbers will be secured and not made available to the public. By submission of its bid, the following applies:

"Pursuant to Title 5, Section 231.006 of the Texas Family Code, as applicable, Bidder certifies that it, including all of its principals, is/are current in child support payments and that it is eligible to receive payments from State funds under a contract for property, materials, or services. Bidder acknowledges and agrees that if it is awarded this contract, then the ensuing agreement may be terminated, and payment withheld if this certification is inaccurate.

Finally, by the submission of its bid, the Bidder certifies that it has included the names and social security numbers of each person with at least 25% ownership interest in Bidder within its response to the Invitation to Bid and that all such persons are current in child support payments."

Question #18: Can you address the sequencing of the work for the 2” HMAC paving in regard to this project? We are requesting that the HMAC paving all be done at the same time so that the HMAC surface will be acceptable to Galveston County when the project has been completed.

Response: If alternate egress/ingress routes for residents can be maintained during construction than entire roadway width can be overlaid at once.

Question #19: What are all the road widths after all the base work is finished on each street? Is the proposed width greater than the existing width?

Response: Per Plan Sheets 7-9 existing width remains.

Question #20: Please explain what will be required for the contractor to install on driveways and side streets, how far back on driveways and side streets are we required to overlay?

Response: Driveways and side streets are not being overlaid.

Question #21: Please confirm that the last date for asking questions is August 17, 2020 at 5:00P.M.

Response: Correct.

Question #22: What are you requiring to be done where there are mailboxes in the way since there is no pay item, can you have an item for new mailboxes?

Response: Per Plan Sheet 3, General Construction Notes, Contractor shall restore all existing facilities to equal or better conditions pre-construction. No separate pay.

Question #23: Are there any utilities, water lines and services, gas lines and services, phone lines, and fiber optic lines in the subgrade?

Response: Per Civil Sheet 3, General Construction Notes, Contractor shall be responsible for contacting Texas One Call prior to commencing work and responsible for any damage to any existing utility/appurtenances.

Question #24: Can you add an item for temporary driveways? How are the driveways being handled during construction (Especially during subgrade stabilization there is a 12” height differential)?

Response: Contractor to maintain egress/ingress access to driveways during construction, means and method will be approved by construction engineer.

Question #25: When you are performing the work in areas where you have only milling and asphalt overlay what happens if weak base areas are encountered?

Response: If contractor encounters the above scenario they can do a combination of bid items 2 and 4 or Items 2 and 5. This will be determined by In-Field geotechnical inspector and handled per their recommendations.

Question #26: In the base bid for Avenue "Q", Segment 1, the plans call for new 10" Black Base everywhere, yet the bit items for that area do not have any Black Base. There is only an item for flexible base and no base stabilization. Is this segment 1 to be constructed with raw unstabilized base? The geotechnical report talks about Type A & D but the proposal is only Type A.

Response: Avenue Q is to be constructed on Crushed Limestone Base course meeting Material Requirements on Plan Sheet 3 on top of chemically treated subgrade. See Addendum 1 Drawings Sheets 26-32.

Question #27: There needs to be a bid item added for prime coat oil by the gallon on top of surface and the base course that must be applied prior to the HMAC overlay work.

Response: No separate pay for prime coat per TxDOT Specification item 340.

Question #28: There is no bid item for shouldering up or embankment, can bid items be added for this work which will be required?

Response: No new embankment.

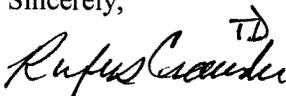
As a reminder, all questions regarding this bid must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,



Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

BID PROPOSAL - BASE BID ITEMS

SANTA FE VARIOUS STREET IMPROVEMENTS

BASE BID-SITE PREPARATION

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	636	Project Identification Sign	EA	1	_____ DOLLARS AND _____ CENTS		
2	500	Mobilization	LS	1	_____ DOLLARS AND _____ CENTS		

TOTAL BASE BID SITE PREPARATION ITEMS							
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BASE BID-PAVING ITEMS - AVENUE T

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	14,096	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	6,743	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	5,528	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Stabilization (7% Dry Weight)	TON	97	_____ DOLLARS AND _____ CENTS		
4	247	Chemically Treated Base Material (Complete in Place)	SY	2,430	_____ DOLLARS AND _____ CENTS		
4A	105	Removing Subgrade (6" Depth Min)	SY	1,215	_____ DOLLARS AND _____ CENTS		
5	340	HMAC Black Base Course- 10" Depth (Complete in Place)	SY	3,098	_____ DOLLARS AND _____ CENTS		
5A	340	HMAC Black Base Course- 16" Depth (Complete in Place)	SY	1,215	_____ DOLLARS AND _____ CENTS		
6	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,532	_____ DOLLARS AND _____ CENTS		
7	666	Replace Existing Traffic Striping	LS	1	_____ DOLLARS AND _____ CENTS		
8	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		

TOTAL BASE BID PAVING ITEMS - AVENUE T							
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BASE BID-PAVING ITEMS - AVENUE Q SEGMENT 1 (4TH ST. TO 4-1/2 ST.)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	9,980	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	11,095	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	11,095	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Stabilization (7% Dry Weight)	TON	194	_____ DOLLARS AND _____ CENTS		
4	247	Crushed Limestone Base Course (Type A or Type D.)- 10" Thick	SY	11,095	_____ DOLLARS AND _____ CENTS		
5	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,085	_____ DOLLARS AND _____ CENTS		
6	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		

TOTAL BASE BID PAVING ITEMS - AVENUE Q SEGMENT 1 (4TH ST. TO 4-1/2 ST.)							
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BID PROPOSAL - ALTERNATE BID ITEMS

ALTERNATE BID-PAVING ITEMS - AVENUE Q SEGMENT 2 (REMAINING Q SEC.)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	10,626	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	11,829	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	11,829	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Stabilization (7% Dry Weight)	TON	207	_____ DOLLARS AND _____ CENTS		
4	247	Crushed Limestone Base Course (Type A or Type D,- 10" Thick	SY	11,829	_____ DOLLARS AND _____ CENTS		
5	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,155	_____ DOLLARS AND _____ CENTS		
6	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		

TOTAL ALTERNATE BID PAVING ITEMS - AVENUE Q SEGMENT 2 (REMAINING Q SEC.)

ALTERNATE BID-PAVING ITEMS - AVENUE L

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	6,936	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	4,707	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	3,660	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Stabilization (7% Dry Weight)	TON	64	_____ DOLLARS AND _____ CENTS		
4	247	Chemically Treated Base Material (Complete in Place)	SY	2,095	_____ DOLLARS AND _____ CENTS		
4A	105	Removing Subgrade (6" Depth Min)	SY	1,047	_____ DOLLARS AND _____ CENTS		
5	340	HMAC Black Base Course- 10" Depth (Complete in Place)	SY	1,565	_____ DOLLARS AND _____ CENTS		
5A	340	HMAC Black Base Course- 16" Depth (Complete in Place)	SY	1,047	_____ DOLLARS AND _____ CENTS		
6	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	754	_____ DOLLARS AND _____ CENTS		
7	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		

TOTAL ALTERNATE BID PAVING ITEMS - AVENUE L

BID PROPOSAL

SANTA FE VARIOUS STREET IMPROVEMENTS

BASE BID SUMMARY

TOTAL BASE BID SITE PREPARATION ITEMS _____

TOTAL BASE BID PAVING ITEMS - AVENUE T _____

TOTAL BASE BID PAVING ITEMS - AVENUE Q SEGMENT 1
(4TH ST. TO 4-1/2 ST.) _____

TOTAL BASE BID PRICE : _____

ALTERNATE BID SUMMARY

TOTAL ALTERNATE BID PAVING ITEMS - AVENUE Q
SEGMENT 2 (REMAINING Q SEC.) _____

TOTAL ALTERNATE BID PAVING ITEMS - AVENUE L _____

TOTAL ALTERNATE BID PRICE : _____

BID SUMMARY

TOTAL BASE BID PRICE _____

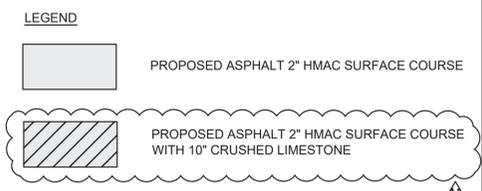
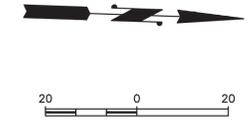
TOTAL ALTERNATE BID PRICE _____

TOTAL BASE BID + TOTAL ALTERNATE BID: _____

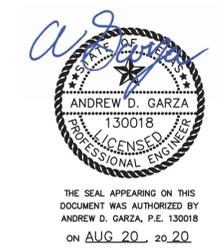
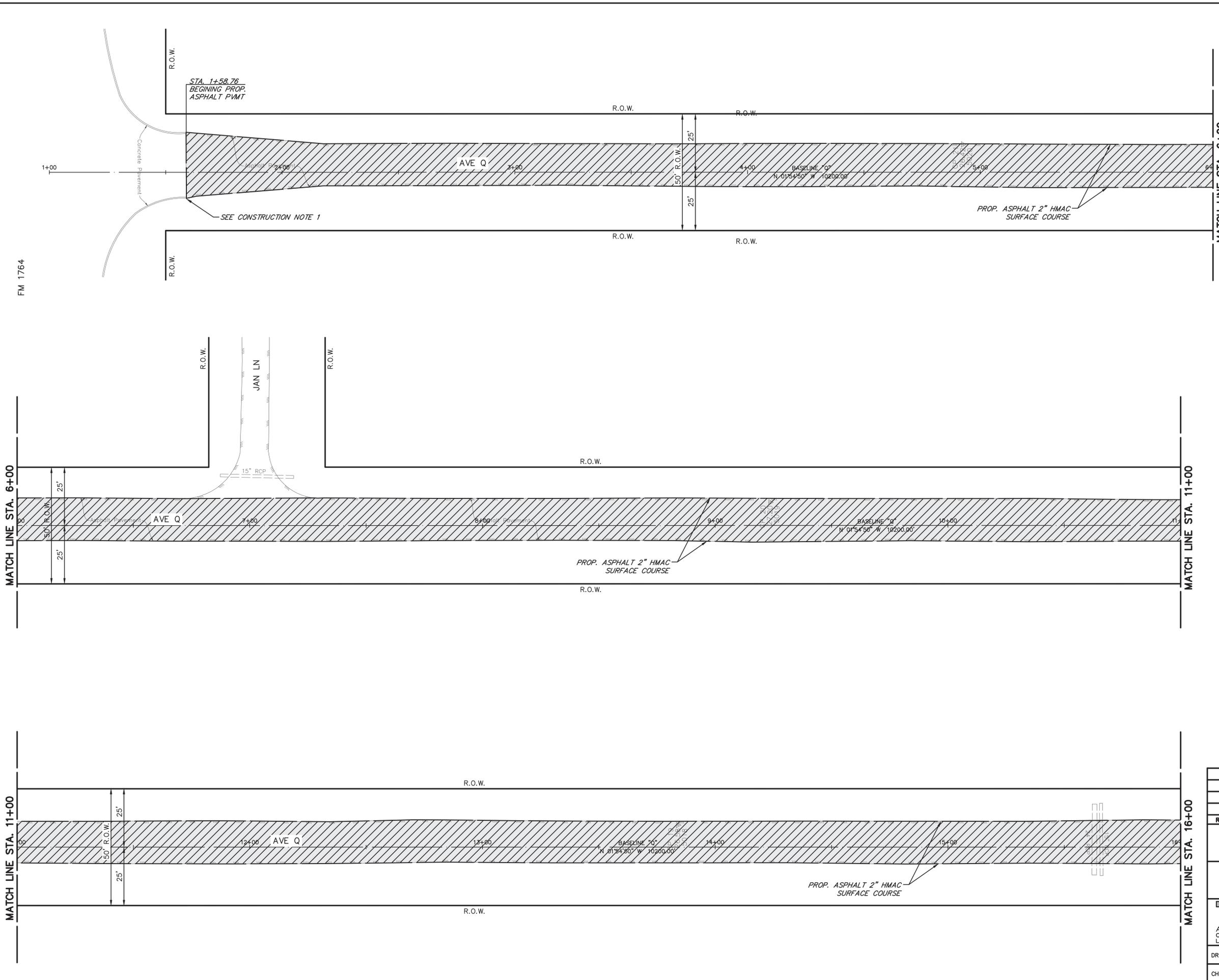
For a bid to be considered responsive all sections must be completed.

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BENCHMARK
 ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.

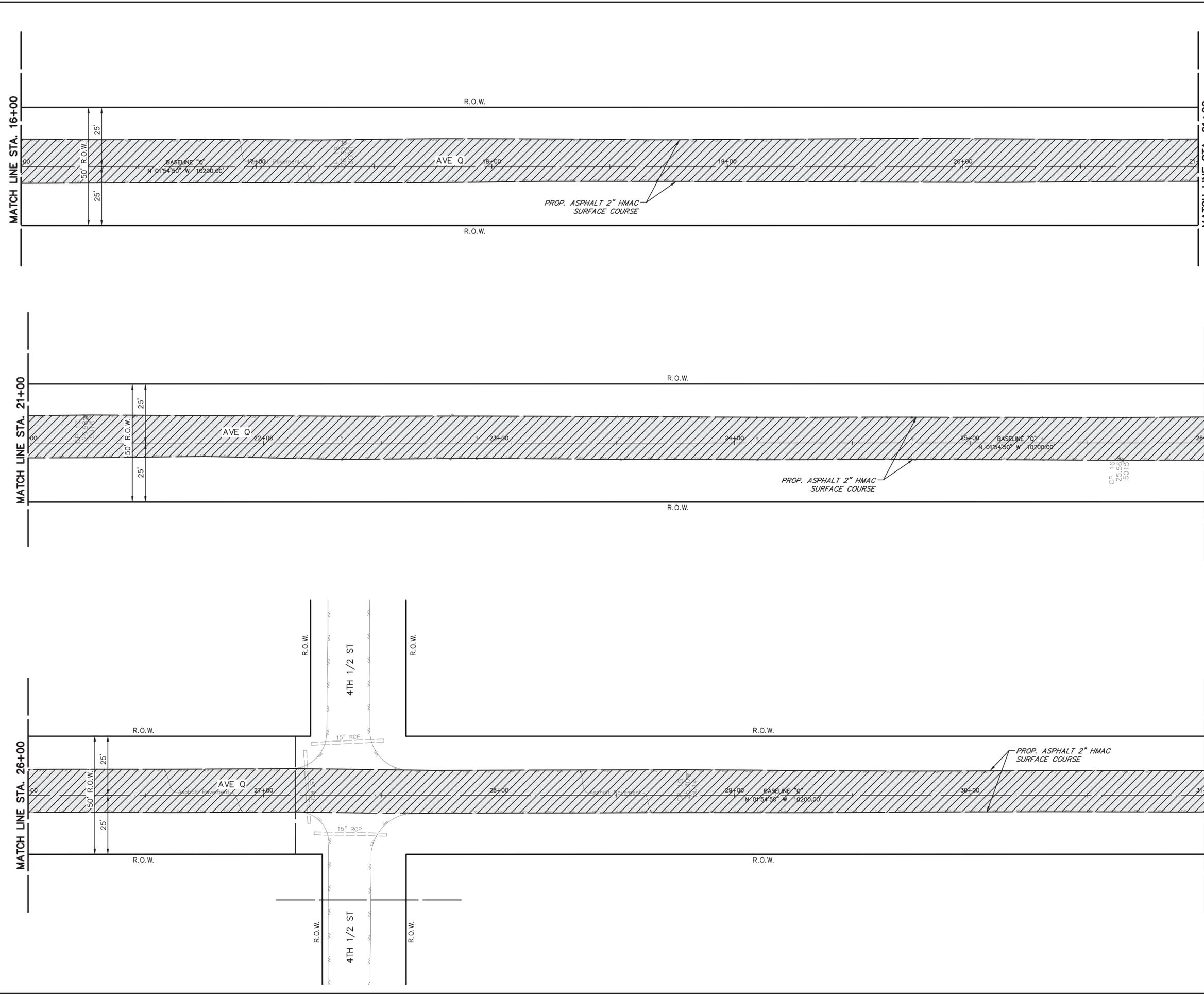


- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
- CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.



REV. NO.	DESCRIPTION	DATE	APP.
ADDENDUM NO.1		08/20/20	
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE Q PLAN STA. 1+00 TO STA. 16+00			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: AUG 2020	SHEET 26	

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BENCHMARK

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LEGEND

- PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" CRUSHED LIMESTONE
- PROPOSED ASPHALT 2" HMA SURFACE COURSE

GENERAL NOTES:

1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
3. REFERENCE TYPICAL SECTION ON PAGE 8.

CONSTRUCTION NOTE:

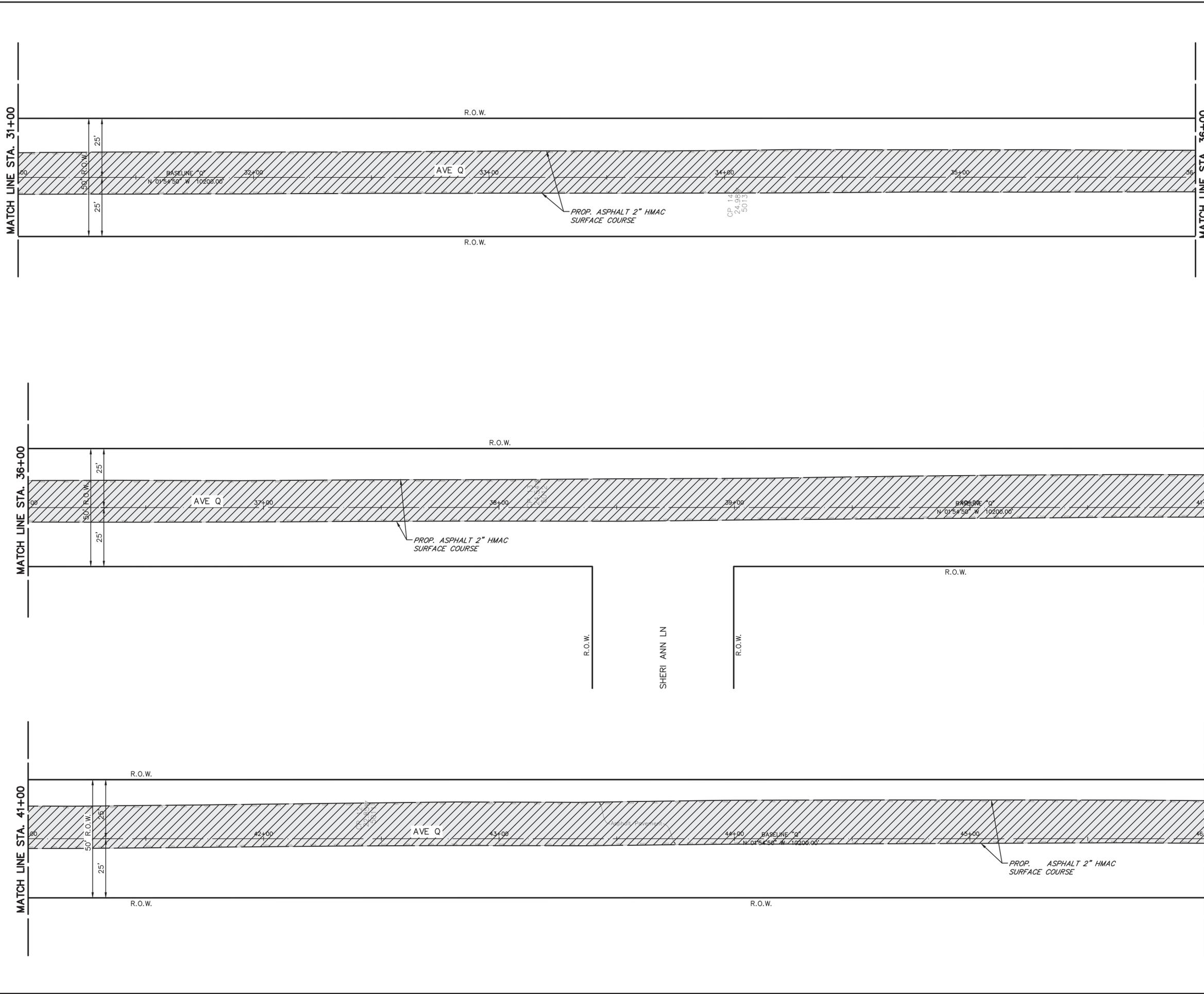
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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON AUG. 20, 2020.

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DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: AUG 2020	SHEET 27	

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LEGEND

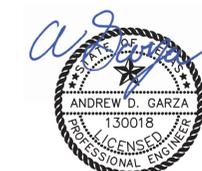
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CRUSHED LIMESTONE

GENERAL NOTES:

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CONSTRUCTION NOTE:

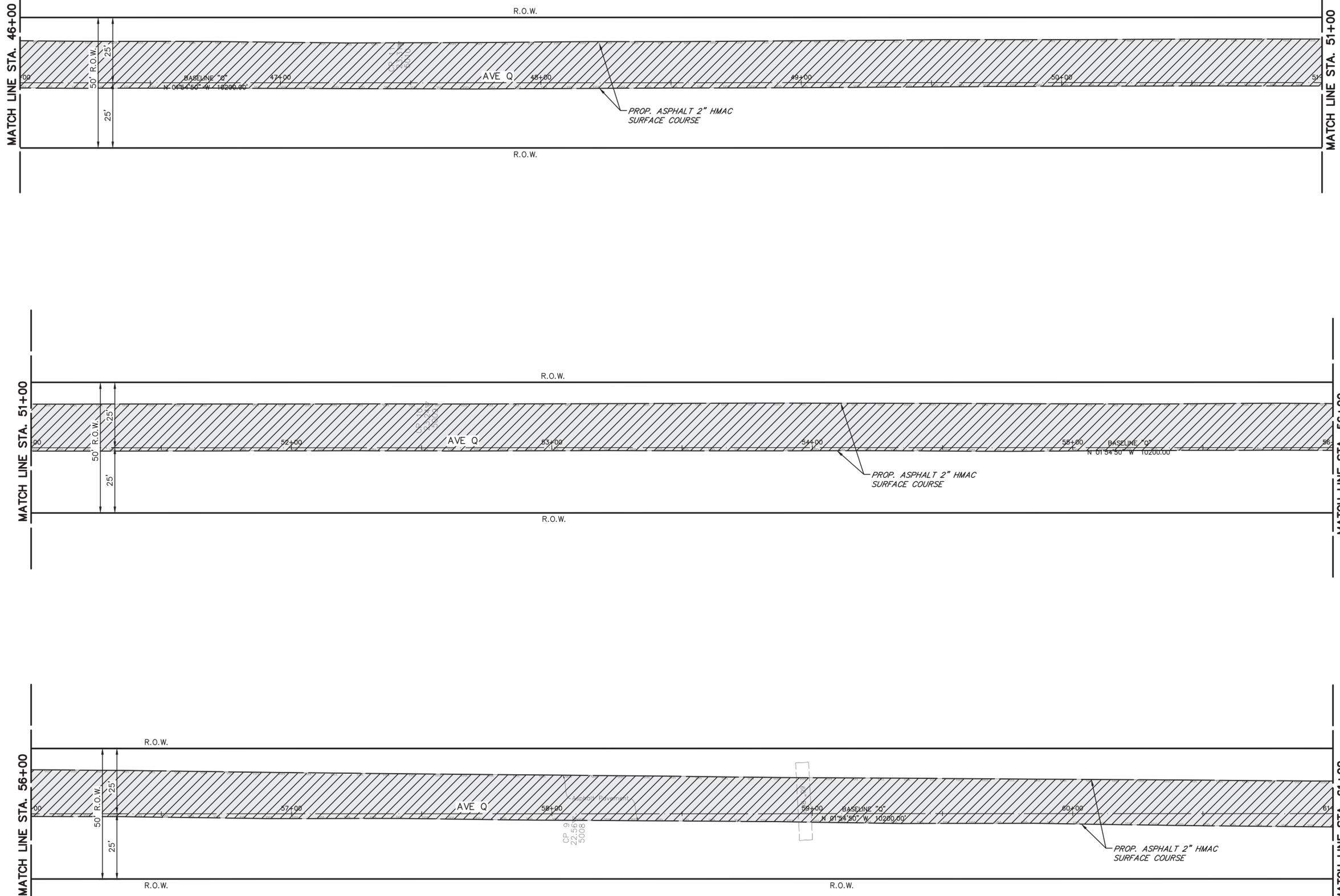
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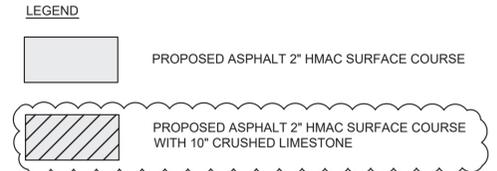
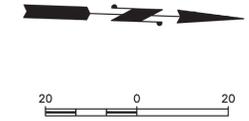
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DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: AUG 2020	SHEET 28	

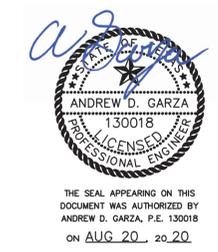
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BENCHMARK
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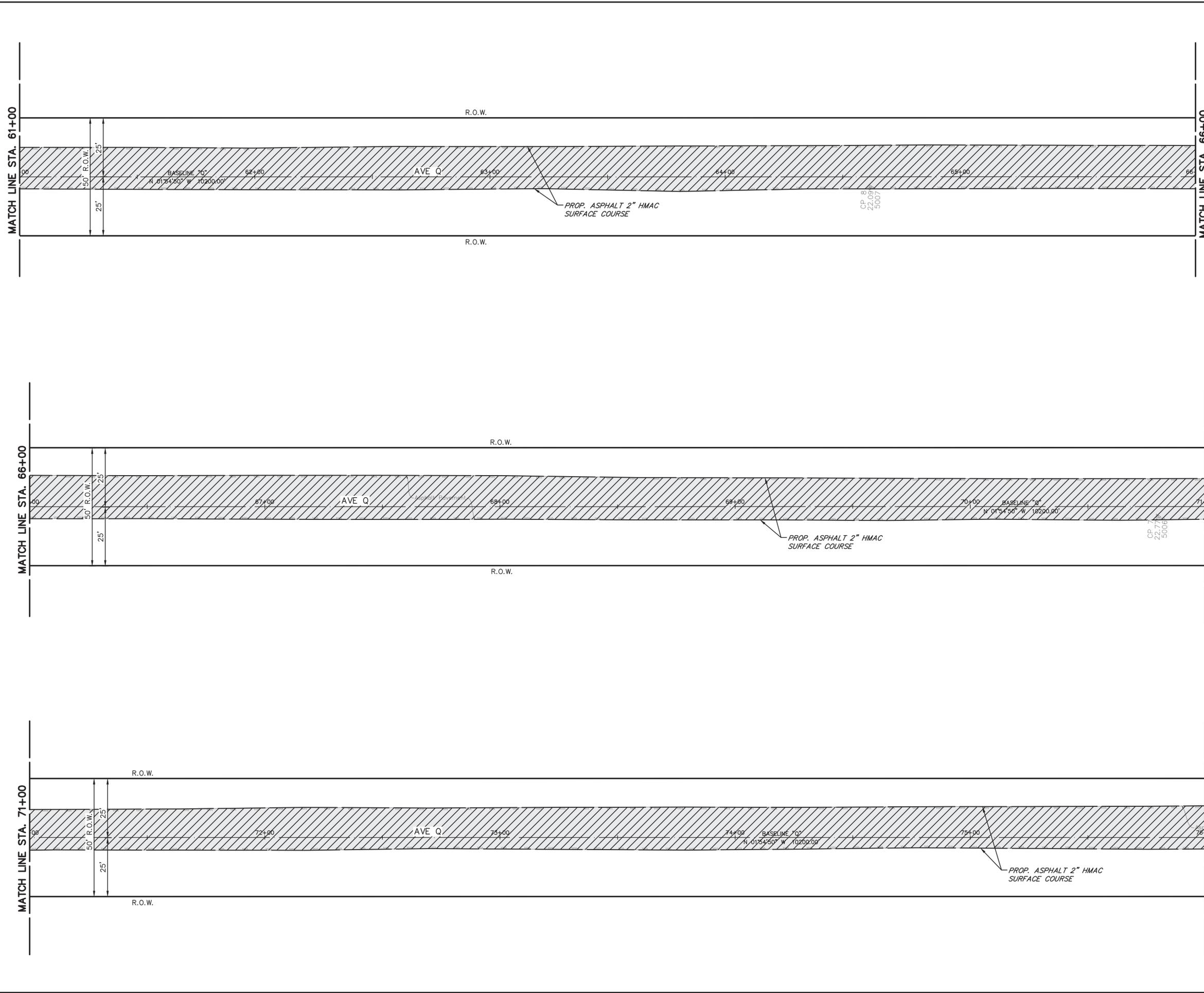


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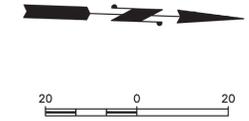


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ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



LEGEND

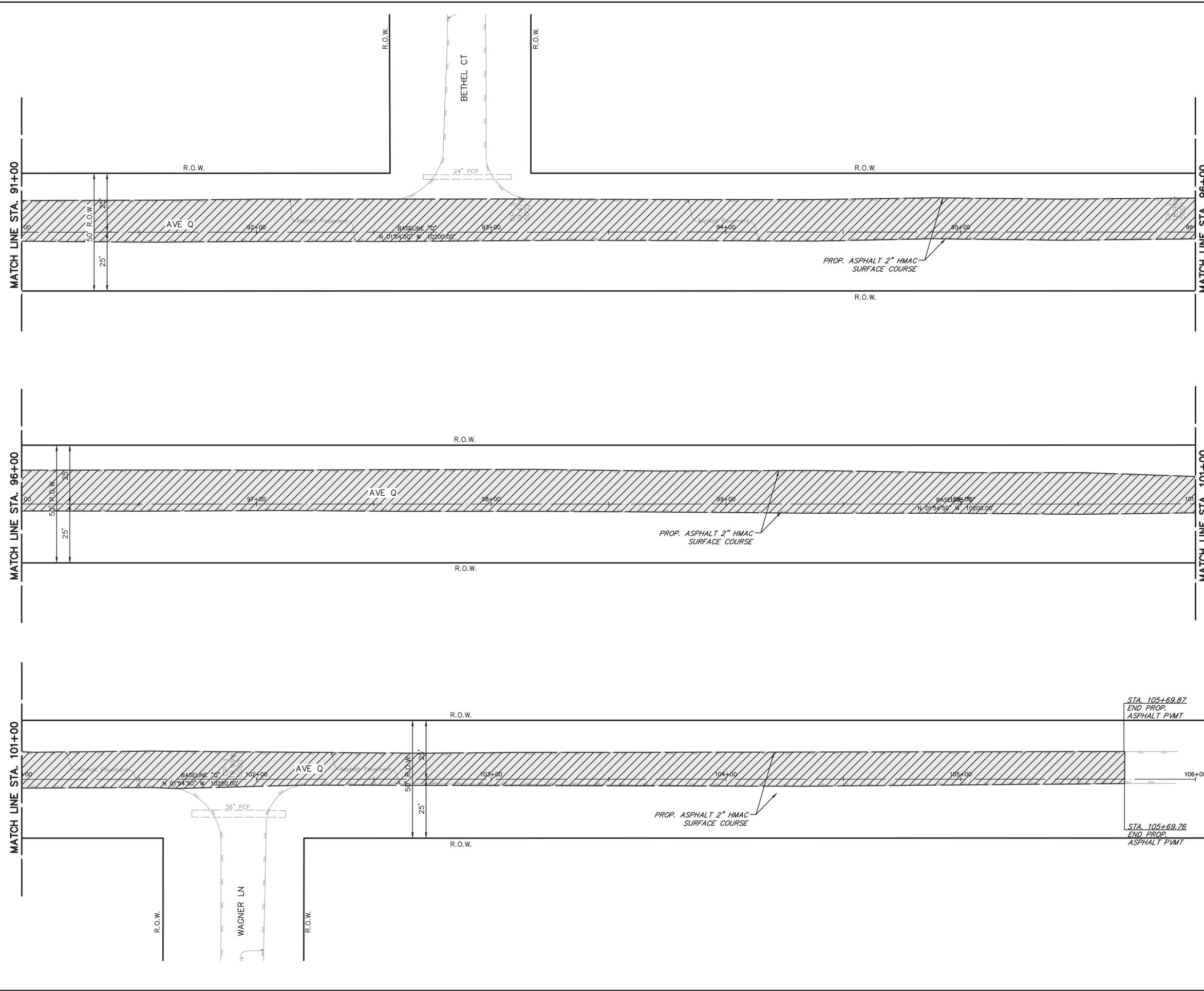
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CRUSHED LIMESTONE

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
- CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.

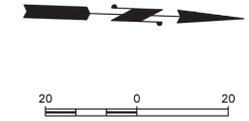
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON AUG. 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
ADDENDUM NO.1		08/20/20	
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE Q PLAN			
STA. 61+00 TO STA. 76+00			
TERRA ASSOCIATES, INC.		1445 N. LOOP WEST - SUITE 450	
CONSULTING ENGINEERS		HOUSTON, TEXAS 77008	
LANDSCAPE ARCHITECTS		713-993-0333	
DRAWN BY: TD		SCALE: 1" = 20'	PROJECT No. 0600-1902
CHECKED BY: ADG		DATE: AUG 2020	CONTRACT: 1
			SHEET 30

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\32 AVENUE Q PLAN STA. 91+00 TO END.dwg Aug 19, 2020-1:36pm Terra Associates Inc., Ricardo Bello



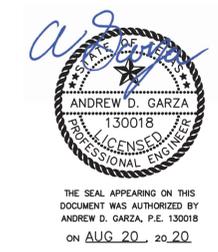
BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



LEGEND

- [Hatched Box] PROPOSED ASPHALT 2" HMAC SURFACE COURSE
- [Hatched Box with Cloud Border] PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CRUSHED LIMESTONE

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
- CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.



REV. NO.	DESCRIPTION	DATE	APP.
ADDENDUM NO.1		08/20/20	
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE Q PLAN STA. 91+00 TO END			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: AUG 2020	SHEET 32	



THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

August 24, 2020

PROJECT NAME: Santa Fe Various Street Improvements

SOLICITATION NO: B201032

RE: ADDENDUM #2

To All Prospective Bidders:

URGENT: *Due to the impending weather conditions of tropical storms Marco and Laura, the following information is being provided to aid in preparation of your bid submittal(s):*

The following information is being provided to aid in preparation of your bid submittal(s):

OPENING DATE:

Bid #B201032, Santa Fe Various Street Improvements scheduled to be opened on Thursday, August 27, 2020 at 2:00 P.M has been re-scheduled.

The new deadline for submitting a bid is as follows:

Date: Thursday, September 10, 2020

Time: 2:15 P.M.

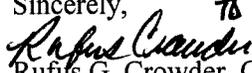
As a reminder, all questions regarding this bid must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550

E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely, ^{TS}

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County



THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550

September 1, 2020

PROJECT NAME: Santa Fe Various Street Improvements

SOLICITATION NO: ITB #B201032

Re: ADDENDUM #3

To All Prospective Bidders:

The following clarification of the prior response information is being provided to aid in preparation of your bid submittal(s):

Question #10: Can a separate bid item be added for lime and fly ash? Per ton?

Response: Yes, Bid items have been revised to add bid item for lime in conjunction with bid item No.3, "Chemically Treated Stabilized Subgrade". No separate pay for lime for bid item No.4

Follow up inquiry to question #10:

A.) The second sentence in your response to question #10 is not clear. The geotechnical report states on page 10 that the existing base stabilization recommendation of "about 2 percent lime and 8 percent fly ash by dry weight be used for estimating and planning".

You may find that you need to deviate from these percentages depending on the existing base course material that is encountered. This is even more likely if Type D Base is encountered. We made the suggestion for the lime material and fly ash material for base stabilization to have separate pay items to allow the County to manage any changes cost effectively when they occur on the job during construction. The geotechnical report did not give any unit weights for the existing base material(s) in order to calculate the tonnages of the stabilization agents.

- B.) Your original answer now implies that only lime will be used to stabilize the existing base material. Are we still using both lime and fly ash to stabilize the existing base material? You may also wish to add an item for cement since lime is ineffective in stabilizing crushed concrete base that may be encountered.**

Follow Up Response:

- A.) Per notes on Plan Sheet 3, where weak base areas are detected during proof rolling, as well as zones of fill containing organic matter and/or debris, 10" minimum of materials should be removed to expose firm subgrade and replaced with Bid Item No. 4 ,5, or 5A. For bidding purposes contractor to estimate 66 lbs/sy of fly-ash and 16 lbs/sy of lime for chemically treated base material.
- B.) Where base material has failed the geotechnical representative will either have the contractor discard it, chemically treat and replace it, or use black base.

Question #27: There needs to be a bid item added for prime coat oil by the gallon on top of surface and the base course that must be applied prior to the HMAC overlay work.

Response: No separate pay for prime coat per TxDOT Specification item 340.

Follow up inquiry to question #27:

There seems to be a disconnect in the answer given for question #27. The Tx DOT specification item 340 says that tack coat is incidental and 340 says it is applied at an application rate between 0.04 to 0.10 gallons per square yard. The question was about Prime Coat which is definitely needed on top of the Tx DOT item 247 base material and under good construction practice it is normally to be applied at a rate of 0.25 to 0.30 gallons per square yard and is paid under Tx DOT item 310 to get bonding to the Base Course. This is in addition to the tack coat. There is no prime coat need on top of the Black Base but it is needed on item 247 base. It is important that all bidders know that this is required for construction. Can you add a pay item for this Prime Coat or at least state the application rate to be used on top of the item 247 base course. Please clarify this.

Follow up response: Prime coat has been added to bid proposal. See updated bid proposal.

As a reminder, all questions regarding this bid must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this bid, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

A handwritten signature in black ink that reads "Rufus Crowder". The signature is written in a cursive style with a small flourish above the "d" in "Crowder".

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

Governing Specifications and Special Provisions

All Specifications and Special Provisions applicable to this Project are identified as follows:

Standard Specifications:

"Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges" as adopted by the Texas Department of Transportation, November 1, 2014.

GENERAL: The above listed specification items are those under which payment is to be made. These, together with such other pertinent items, if any as may be referred to in the above listed specification items, and including the special provisions listed above, constitute the complete specifications for this project. No separate payment will be made for any item that is not specifically set further in the bid sheets and all costs therefore shall be included in the prices named in the bid sheets for the various appurtenant items of work.

Technical Specifications Table of Contents

Item	TXDOT Specification
1	Abbreviations and Definitions
2	Instructions to Bidders
3	Award and Execution of Contract
4	Scope of Work
5	Control of the Work
6	Control of Materials
7	Legal Relations and Responsibilities
8	Prosecution and Progress
9	Measurement and Payment
105	Removing Treated and Untreated Base and Asphalt Pavement
247	Flexible Base
265	Fly Ash or Lime-Fly Ash Treatment (Road-Mixed)
300	Asphalts, Oils, and Emulsions
309(SS)	Milling Existing Pavement
310	Prime Coat
340	Dense-Graded Hot-Mix Asphalt (Small Quantity)
500	Mobilization
502	Barricades, Signs, and Traffic Handling
636	Signs
666	Retroreflectorized Pavement Markings

BID PROPOSAL - BASE BID ITEMS

SANTA FE VARIOUS STREET IMPROVEMENTS

BASE BID-SITE PREPARATION

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	636	Project Identification Sign	EA	1	_____		
					DOLLARS AND _____ CENTS		
2	500	Mobilization	LS	1	_____		
					DOLLARS AND _____ CENTS		
TOTAL BASE BID SITE PREPARATION ITEMS							

BASE BID-PAVING ITEMS - AVENUE T

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	14,096	_____		
					DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	6,743	_____		
					DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	5,528	_____		
					DOLLARS AND _____ CENTS		
3A	260	Lime for Subgrade Stabilization (7% Dry Weight)	TON	97	_____		
					DOLLARS AND _____ CENTS		
4	247	10" Chemically Treated Base Material, with Lime, Fly-Ash, & Manipulation (Complete in Place)	SY	2,430	_____		
					DOLLARS AND _____ CENTS		
4A	105	Removing Subgrade (6" Depth Min)	SY	1,215	_____		
					DOLLARS AND _____ CENTS		
5	340	HMAC Black Base Course- 10" Depth (Complete in Place)	SY	3,098	_____		
					DOLLARS AND _____ CENTS		
5A	340	HMAC Black Base Course- 16" Depth (Complete in Place)	SY	1,215	_____		
					DOLLARS AND _____ CENTS		
6	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,532	_____		
					DOLLARS AND _____ CENTS		
6A	310	Prime Coat Applied at (0.30 gal/sy) (Complete in Place)	GAL	2,935	_____		
					DOLLARS AND _____ CENTS		
7	666	Replace Existing Traffic Striping	LS	1	_____		
					DOLLARS AND _____ CENTS		
8	502	Barricades, Signs, and Traffic Handling	MO	3	_____		
					DOLLARS AND _____ CENTS		
TOTAL BASE BID PAVING ITEMS - AVENUE T							

BASE BID-PAVING ITEMS - AVENUE Q SEGMENT 1 (4TH ST. TO 4-1/2 ST.)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	9,980	_____		
					DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	11,095	_____		
					DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	11,095	_____		
					DOLLARS AND _____ CENTS		
3A	260	Lime for Subgrade Stabilization (7% Dry Weight)	TON	194	_____		
					DOLLARS AND _____ CENTS		
4	247	10" Thick Crushed Limestone Base Course (Type A or Type D.)- with Lime, Fly-Ash, & Manipulation (Complete in Place)	SY	11,095	_____		
					DOLLARS AND _____ CENTS		
5	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,085	_____		
					DOLLARS AND _____ CENTS		
5A	310	Prime Coat Applied at (0.30 gal/sy) (Complete in Place)	GAL	2,994	_____		
					DOLLARS AND _____ CENTS		
6	502	Barricades, Signs, and Traffic Handling	MO	3	_____		
					DOLLARS AND _____ CENTS		
TOTAL BASE BID PAVING ITEMS - AVENUE Q SEGMENT 1 (4TH ST. TO 4-1/2 ST.)							

BID PROPOSAL - ALTERNATE BID ITEMS

ALTERNATE BID-PAVING ITEMS - AVENUE Q SEGMENT 2 (REMAINING Q SEC.)

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	10,626	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	11,829	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	11,829	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Subgrade Stabilization (7% Dry Weight)	TON	207	_____ DOLLARS AND _____ CENTS		
4	247	10" Thick Crushed Limestone Base Course (Type A or Type D.)- with Lime, Fly-Ash, & Manipulation (Complete in Place)	SY	11,829	_____ DOLLARS AND _____ CENTS		
5	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	1,155	_____ DOLLARS AND _____ CENTS		
5A	310	Prime Coat Applied at (0.30 gal/sy) (Complete in Place)	GAL	3,188	_____ DOLLARS AND _____ CENTS		
6	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		
TOTAL ALTERNATE BID PAVING ITEMS - AVENUE Q SEGMENT 2 (REMAINING Q SEC.)							

ALTERNATE BID-PAVING ITEMS - AVENUE L

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	QUAN.	UNIT PRICE IN WORDS	UNIT PRICE	TOTAL PRICE
1	309 (SS)	2" Milling Existing Asphalt Surface Course	SY	6,936	_____ DOLLARS AND _____ CENTS		
2	105	Removing 10" Treated and Untreated Base Course	SY	4,707	_____ DOLLARS AND _____ CENTS		
3	260	Chemically Treated Stabilized Subgrade Manipulation, 6" Depth (Complete in Place)	SY	3,660	_____ DOLLARS AND _____ CENTS		
3A	260	Lime for Subgrade Stabilization (7% Dry Weight)	TON	64	_____ DOLLARS AND _____ CENTS		
4	247	10" Chemically Treated Base Material, with Lime, Fly-Ash, & Manipulation (Complete in Place)	SY	2,095	_____ DOLLARS AND _____ CENTS		
4A	105	Removing Subgrade (6" Depth Min)	SY	1,047	_____ DOLLARS AND _____ CENTS		
5	340	HMAC Black Base Course- 10" Depth (Complete in Place)	SY	1,565	_____ DOLLARS AND _____ CENTS		
5A	340	HMAC Black Base Course- 16" Depth (Complete in Place)	SY	1,047	_____ DOLLARS AND _____ CENTS		
6	340	2" H.M.A.C. Surface Course (TY.D.) (Complete in Place)	TON	754	_____ DOLLARS AND _____ CENTS		
6A	310	Prime Coat Applied at (0.30 gal/sy) (Complete in Place)	GAL	1,297	_____ DOLLARS AND _____ CENTS		
7	502	Barricades, Signs, and Traffic Handling	MO	3	_____ DOLLARS AND _____ CENTS		
TOTAL ALTERNATE BID PAVING ITEMS - AVENUE L							

BID PROPOSAL

SANTA FE VARIOUS STREET IMPROVEMENTS

BASE BID SUMMARY

TOTAL BASE BID SITE PREPARATION ITEMS	_____
TOTAL BASE BID PAVING ITEMS - AVENUE T	_____
TOTAL BASE BID PAVING ITEMS - AVENUE Q SEGMENT 1 (4TH ST. TO 4-1/2 ST.)	_____
TOTAL BASE BID PRICE :	_____

ALTERNATE BID SUMMARY

TOTAL ALTERNATE BID PAVING ITEMS - AVENUE Q SEGMENT 2 (REMAINING Q SEC.)	_____
TOTAL ALTERNATE BID PAVING ITEMS - AVENUE L	_____
TOTAL ALTERNATE BID PRICE :	_____

BID SUMMARY

TOTAL BASE BID PRICE	_____
TOTAL ALTERNATE BID PRICE	_____
TOTAL BASE BID + TOTAL ALTERNATE BID:	_____

For a bid to be considered responsive all sections must be completed.

COUNTY OF GALVESTON ENGINEERING DEPARTMENT

SANTA FE
VARIOUS STREET IMPROVEMENTS

GALVESTON COUNTY, TEXAS

DARRELL APFFEL

COMMISSIONER

PRECINCT 1

JOE GIUSTI

COMMISSIONER

PRECINCT 2

MARK HENRY

COUNTY JUDGE

STEPHEN D. HOLMES

COMMISSIONER

PRECINCT 3

KEN CLARK

COMMISSIONER

PRECINCT 4

MICHAEL C. SHANNON, P.E.

COUNTY ENGINEER



JULY 2020
PRECINCT # 2
COUNTY OF GALVESTON, TEXAS



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

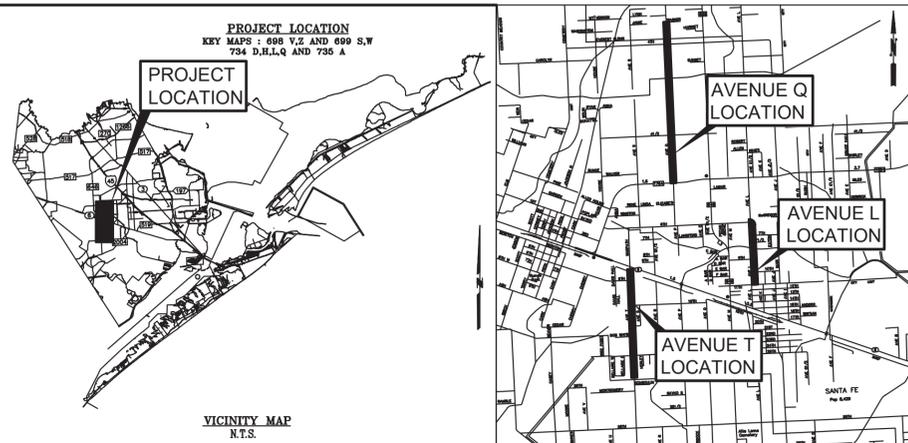
TERRA ASSOCIATES, INC.
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-003832

APPROVED BY:

MICHAEL SHANNON, PE
COUNTY ENGINEER

DATE _____

TAI PROJECT No. 0600-1902
MAY, 2020



F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\02 INDEX SHEET.dwg Jul 02, 2020-1:11pm Terra Associates Inc., Ricardo Bello

SHEET NO. GENERAL

- 01 COVER SHEET
- 02 INDEX SHEET
- 03 GENERAL CONSTRUCTION NOTES
- 04 AVENUE T OVERALL LAYOUT
- 05 AVENUE Q OVERALL LAYOUT
- 06 AVENUE L OVERALL LAYOUT
- 07 AVENUE T TYPICAL SECTION
- 08 AVENUE Q TYPICAL SECTION
- 09 AVENUE L TYPICAL SECTION

SURVEY

- 10 - 11 SURVEY CONTROL MAP AVE T
- 12 - 14 SURVEY CONTROL MAP AVE Q
- 15 SURVEY CONTROL MAP AVE L
- 16 - 20 SURVEY CONTROL SWINGTIES

ROADWAY DETAILS

- 21 AVENUE T PLAN STA. 1+00 TO STA. 16+00
- 22 AVENUE T PLAN STA. 16+00 TO STA. 31+00
- 23 AVENUE T PLAN STA. 31+00 TO STA. 46+00
- 24 AVENUE T PLAN STA. 46+00 TO STA. 61+00
- 25 AVENUE T PLAN STA. 61+00 TO END
- 26 AVENUE Q PLAN STA. 1+00 TO STA. 16+00
- 27 AVENUE Q PLAN STA. 16+00 TO STA. 31+00
- 28 AVENUE Q PLAN STA. 31+00 TO STA. 46+00
- 29 AVENUE Q PLAN STA. 46+00 TO STA. 61+00
- 30 AVENUE Q PLAN STA. 61+00 TO STA. 76+00
- 31 AVENUE Q PLAN STA. 76+00 TO STA. 91+00
- 32 AVENUE Q PLAN STA. 91+00 TO END
- 33 AVENUE L PLAN STA. 1+00 TO STA. 16+00
- 34 AVENUE L PLAN STA. 16+00 TO STA. 31+00
- 35 AVENUE L PLAN STA. 31+00 TO END

TRAFFIC CONTROL PLAN

- 36 TRAFFIC CONTROL PLAN ROADWAY OVERLAY TYPICAL
- 37 AVENUE T - DETOUR PLAN
- 38 AVENUE Q - DETOUR PLAN
- 39 AVENUE L - DETOUR PLAN
- 40 TRAFFIC CONTROL PLAN TYPICAL 3-WAY INTERSECTION 1-3
- 41 TRAFFIC CONTROL PLAN TYPICAL 4-WAY INTERSECTION 1-4
- 42 TRAFFIC CONTROL PLAN TYPICAL 1-LANE 2-WAY CLOSURE

STANDARD DETAILS

- 43 PAVING CONSTRUCTION DETAILS
- 44 DRIVEWAY CONSTRUCTION DETAILS
- 45 RAILROAD PAVEMENT MARKING DETAILS
- 46 PROJECT SIGN



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
INDEX SHEET			
TERRA		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333	
ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: NONE	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET	02

F:\Clients\0600-Galveston County\Drawings\03 GENERAL CONSTRUCTION NOTES.dwg Jul 23, 2020 - 3:37pm Terra Associates Inc., Ricardo Ballo

GENERAL CONSTRUCTION NOTES

1. ALL UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY IN THE FIELD THE EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 1-800-545-6005 OR 811 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.
2. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF SANTA FE /GALVESTON COUNTY, AT NO COST TO THE CITY OF SANTA FE OR GALVESTON COUNTY.
3. CONTRACTOR SHALL NOTIFY THE OFFICE OF CITY ENGINEER, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING AT 409-925-8933 FOR ANY CITY REQUIRED INSPECTIONS AT LEAST 48 HOURS PRIOR TO COMMENCING WORK.
4. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF CONSTRUCTION. ANY CONFLICT OR DISCREPANCY DISCOVERED MUST IMMEDIATELY BE BROUGHT TO THE ENGINEER'S ATTENTION.
5. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE DRAINAGE INCLUDES SURFACE AND GROUND WATER. ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE FINAL DRAFT OF STORM WATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES ALL IN COMPLIANCE WITH THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) REQUIREMENTS.
6. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
7. THE CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
8. IF THE CONSTRUCTION DOES NOT BEGIN WITHIN A YEAR AFTER THE PLANS HAVE BEEN SIGNED, NEW SIGNATURES MUST BE OBTAINED AND LETTERS OF AVAILABILITY MUST BE UPDATED.
9. CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE FACILITIES TO DIRECT SURFACE DRAINAGE AWAY FROM TRENCHES AND TOWARDS OFF SITE DRAINAGE FACILITIES. PREVENT WATER FROM PONDING ON SITE AND DO NOT BLOCK DRAINAGE FROM OR DIRECT EXCESS DRAINAGE ON TO ADJACENT PROPERTY.
10. EXISTING PAVEMENTS, CURBS, SIDEWALKS, AND DRIVEWAYS WITHIN PUBLIC RIGHTS-OF-WAY WHICH HAVE BEEN DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO THE STANDARDS OF THE APPROPRIATE REGULATORY AGENCY.
11. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAW CONCERNING TRENCHING AND SHORING.
12. ALL MATERIALS FOR PROPOSED CONSTRUCTION OR REPAIR OF EXISTING FACILITIES SHALL BE NEW PRODUCTS DIRECT FROM THE FACTORY AND FREE FROM DEFECTS.
13. **WASTE MATERIALS INCLUDING PAVEMENT REMOVED DURING CONSTRUCTION, WASTE PIPING AND SUPPLIES, CONSTRUCTION DEBRIS AND EXCESS EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF PROPERLY BY THE CONTRACTOR, UNLESS NOTED OTHERWISE ON PLANS.**
14. CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO STARTING CONSTRUCTION.
15. CONTRACTOR SHALL GIVE NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, AND PERSONS IN CHARGE OF PUBLIC AND PRIVATE UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO STARTING WORK, INCLUDING BUT NOT LIMITED TO PIPELINE COMPANIES, MUD ENGINEER, MUD OPERATOR, DRY UTILITY COMPANIES, OR CITY ENGINEER.
16. ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
17. SURFACE RESTORATION: AT THE END OF ALL CONSTRUCTION PROJECTS, THE CONTRACTOR SHALL RESTORE THE EXISTING FACILITIES AND ALL SPOIL MATERIAL, VEGETATION & DEBRIS SHALL BE HAULED AND DISPOSED OF OFF SITE, I.E., THE PROPERTY, SHALL BE MADE EQUAL TO OR BETTER THAN EXISTING SITE CONDITION PRIOR TO CONSTRUCTION.
18. CONTRACTOR SHALL HYDROMULCH SEED ANY DISTURBED AREA DURING CONSTRUCTION AT NO COST TO CITY OR COUNTY.
19. GUIDELINES SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAG MEN, SIGNING, STRIPING AND WARNING DEVICES, ETC., DURING CONSTRUCTION - BOTH DAY AND NIGHT. IF EXISTING TRAFFIC SIGNALS OR ANY OTHER TRAFFIC DEVICES ARE AFFECTED BY CONSTRUCTION, CONTRACTOR IS TO PROVIDE ALTERNATE TRAFFIC CONTROL DEVICES IMMEDIATELY SO THAT TRAFFIC IS NOT INTERRUPTED.
20. THE WORK AREA SHALL BE BARRICADED AND ILLUMINATED DURING DARKNESS AND PERIODS OF INACTIVITY, WHEN IN AN AREA OF DIRECT PUBLIC ACCESS.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STORAGE OF MATERIAL AND EQUIPMENT IN A SAFE AND WORKMANLIKE MANNER TO PREVENT INJURIES, DURING AND AFTER WORKING HOURS UNTIL PROJECT COMPLETION. THERE SHALL BE NO PAYMENT MADE TO CONTRACTOR FOR STORED MATERIAL.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHIPPING OF ALL MATERIALS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO EXAMINE SUCH MATERIAL AT THE POINT OF DELIVERY AND TO REJECT ALL DEFECTIVE MATERIAL. THE DEFECTIVE MATERIAL MUST

BE REPLACED WITH SOUND MATERIAL.

23. CONTRACTOR SHALL NOT PERFORM ANY WORK WITHIN AREA DELINEATED AS WETLANDS UNTIL ALL NECESSARY PERMITS ARE APPROVED.
24. TREE AND PLANT PROTECTION - CONTRACTOR IS TO PRESERVE AND PROTECT EXISTING TREES AND PLANTS FROM FOLIAGE, BRANCH, TRUNK AND/OR ROOT DAMAGE THAT COULD RESULT FROM CONSTRUCTION OPERATIONS.
25. CONTRACTOR SHALL ADJUST ALL EXISTING MANHOLES, VALVE, METER BOXES, INLETS, ETC. TO PROPOSED TOP OF PAVEMENT OR FINISHED GRADE. IF MANHOLE IS IN ROW FG, ADJUST TO NG. IF OUTSIDE ROW, ADJUST MH TO FG + 3". NO SEPARATE PAY FOR ADJUSTING EXISTING FACILITIES.

SITE CLEARING AND GRADING CONSTRUCTION NOTES

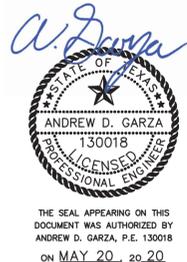
26. ALL CONSTRUCTION TO BE DONE IN CONFORMANCE WITH REQUIREMENTS OF GEOTECHNICAL ENGINEERING REPORTS PREPARED BY TERRACON CONSULTANTS, INC., TERRACON PROJECT NO. 91195042, DATED NOVEMBER 13, 2019, AND ANY ADDENDUMS THEREAFTER.
27. SPECIAL CARE SHOULD BE TAKEN DURING DEMOLITION AND REMOVAL OF EXISTING PAVING AND BASE COURSE TO MINIMIZE DISTURBANCE OF THE SUBGRADE.
28. PAVING SUBGRADE PREPARATIONS TO BE IN CONFORMANCE WITH THE SOILS REPORT, PROJECT SPECIFICATIONS, AND DETAILS IN PLANS. MOST STRINGENT GOVERNS.
29. CONTRACTOR TO PROVIDE TEMPORARY MEASURES TO CONTROL STORM WATER RUN-OFF DURING CONSTRUCTION AS REQUIRED TO MINIMIZE EROSION AND TO MEET TPDES REQUIREMENTS.
30. EXCESS SPOILS SHALL BE HAULED OFF SITE AT CONTRACTOR'S EXPENSE.
31. THE ON-SITE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE WILL MONITOR THE CONSTRUCTION OPERATION AFTER MILLING TO, IDENTIFY EXISTING CONDITIONS, AND MAKE RECOMMENDATIONS CONCERNING SELECTION AND PLACEMENT OF SOILS.

PAVING CONSTRUCTION NOTES

1. GENERAL CONSTRUCTION NOTES APPLY TO PAVEMENT CONSTRUCTION.
2. PAVING MATERIALS AND PROCEDURES SHALL BE IN CONFORMANCE WITH THE SOILS REPORTS, PROJECT SPECIFICATIONS, AND DETAILS IN PLANS. MOST STRINGENT GOVERNS.
3. ALL ROAD WIDTHS, CURB RADII, AND CURVE ALIGNMENT SHOWN INDICATE FACE OF CURB. T.C. INDICATES TOP OF CURB ELEVATION.
4. SUBGRADE SHALL BE PREPARED IN CONFORMANCE WITH SOILS REPORT.
5. ALL FINISHED GRADES SHALL VARY UNIFORMLY BETWEEN FINISHED ELEVATIONS AND CONTRACTOR SHALL ENSURE THAT POSITIVE DRAINAGE IS ESTABLISHED ACROSS THE SITE UPON COMPLETION OF THE PROJECT.
6. GUIDELINES SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE OBSERVED.
7. **CONTRACTOR TO PRIORITIZE AVE T, THEN PROCEED TO AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q. AVENUE L WILL BE THE LAST STREET TO BE REPAIRED WITH REMAINING PROJECT BUDGET. CONTRACTOR TO BEGIN AVENUE L REPAIR AT STATION 1+57.09 AND WORK TOWARDS END OF PROPOSED ASPHALT PAVEMENT REPAIR.**

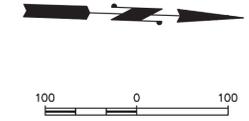
GEOTECHNICAL NOTES:

1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF THE NEW HMAC SURFACE COURSE AS INDICATED WITHIN THE PLAN SET. ONCE MILLING IS COMPLETED, THE EXPOSED SURFACE SHOULD BE CAREFULLY PROOF ROLLED WITH A 20-TON PNEUMATIC ROLLER OR EQUIVALENT EQUIPMENT. SPECIAL CARE SHOULD BE EXERCISED WHEN PROOF ROLLING AREAS CONTAINING FILL SOILS IN AN ATTEMPT TO OBSERVE SOFT/WEAK ZONES WITHIN THE FILL SOILS. WEAK AREAS DETECTED DURING PROOF ROLLING AS WELL AS ZONES OF FILL CONTAINING ORGANIC MATTER AND/OR DEBRIS, SHOULD BE REMOVED TO EXPOSE FIRM SUBGRADE AND REPLACED WITH EITHER CHEMICALLY TREATED BASE MATERIAL OR HMAC BASE COURSE (BLACK BASE) MEETING THE SPECIFICATIONS PROVIDED IN MATERIAL REQUIREMENTS. THE REMOVAL OF THE EXISTING PAVEMENT AND SUBGRADE SHOULD EXTEND AT LEAST 2 FEET HORIZONTALLY BEYOND THE LIMITS OF THE WEAK AREAS. SUBSEQUENT TO PROOF ROLLING AND PRIOR TO PLACEMENT OF THE CHEMICALLY TREATED BASE LAYER OR BLACK BASE, IT MUST BE ENSURED THAT THE EXPOSED SUBGRADE HAS A COMPACTION OF AT LEAST 95 PERCENT OF THE STANDARD EFFORT (ASTM D698) MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT.
 2. IN AREAS REQUIRING BASE REPAIR, THE EXISTING PAVEMENT AND SUBGRADE SHOULD BE OVER EXCAVATED TO A SUFFICIENT DEPTH TO ACCOMMODATE 2 INCHES OF ASPHALTIC CONCRETE SURFACE COURSE OVER 10 INCHES OF BLACK BASE. THE REMOVAL OF THE EXISTING PAVEMENT AND SUBGRADE SHOULD EXTEND AT LEAST 2 FEET HORIZONTALLY BEYOND THE LIMITS OF THE DISTRESS AND EXPOSE FIRM SUBGRADE. THE EXPOSED SUBGRADE SHOULD THEN BE PROOF ROLLED AS DESCRIBED PREVIOUSLY AND COMPACTED TO AT LEAST 95 PERCENT OF THE STANDARD EFFORT (ASTM D698) MAXIMUM DRY DENSITY AT A MOISTURE CONTENT WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT, PRIOR TO PLACEMENT OF THE BLACK BASE AND HMAC SURFACE COURSE.
 3. PROOF ROLLING SHOULD BE PERFORMED UNDER THE DIRECT OBSERVATION OF THE GEOTECHNICAL ENGINEER OR HIS/HER REPRESENTATIVE.
 4. PROPER SITE DRAINAGE SHOULD BE MAINTAINED DURING CONSTRUCTION SO THAT PONDING OF SURFACE RUNOFF DOES NOT OCCUR AND CAUSE CONSTRUCTION DELAYS AND/OR INHIBIT SITE ACCESS.
- MATERIAL REQUIREMENTS:**
1. HMAC SURFACE COURSE - THE ASPHALTIC CONCRETE SURFACE COURSE SHOULD BE PLANT MIXED, HOT LAID TYPE D (FINE GRADED SURFACE COURSE) MEETING THE REQUIREMENTS IN TXDOT 2014 STANDARD SPECIFICATION ITEM 340. SPECIFIC CRITERIA FOR THE JOB SPECIFICATIONS SHOULD INCLUDE COMPACTION TO WITHIN AN AIR VOID RANGE OF 5 TO 9 PERCENT CALCULATED USING THE MAXIMUM THEORETICAL SPECIFIC GRAVITY OF THE MIX MEASURED BY TXDOT TEX-227-F. THE ASPHALT CEMENT CONTENT BY PERCENT OF TOTAL MIXTURE WEIGHT SHOULD BE WITHIN ± 0.5 PERCENT ASPHALT CEMENT FROM THE JOB MIX DESIGN.
 2. HMAC BASE COURSE (BLACK BASE) - THE BLACK BASE SHOULD BE PLANT MIXED, HOT LAID TYPE A (COARSE BASE) OR TYPE B (FINE BASE) MEETING THE REQUIREMENTS IN TXDOT 2014 STANDARD SPECIFICATIONS ITEM 340. SPECIFIC CRITERIA FOR THE JOB SPECIFICATIONS SHOULD INCLUDE COMPACTION TO WITHIN AN AIR VOID RANGE OF 5 TO 9 PERCENT CALCULATED USING THE MAXIMUM THEORETICAL SPECIFIC GRAVITY OF THE MIX MEASURED BY TXDOT TEX-227-F. THE ASPHALT CEMENT CONTENT BY PERCENT OF TOTAL MIXTURE WEIGHT SHOULD BE WITHIN ± 0.5 PERCENT ASPHALT CEMENT FROM THE JOB MIX DESIGN.
 3. CHEMICALLY TREATED BASE MATERIAL - BASE MATERIAL SHOULD BE COMPOSED OF CRUSHED LIMESTONE OR CRUSHED CONCRETE MEETING THE REQUIREMENTS OF TXDOT 2014 STANDARD SPECIFICATIONS ITEM 247, TYPE A OR D, GRADE 1-2. THE BASE MATERIAL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT OF THE MODIFIED EFFORT (ASTM D1557) MAXIMUM DRY DENSITY AT MOISTURE CONTENT WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT. THE MAXIMUM ALLOWED PLASTICITY INDEX (PI) OF A GRADE 1-2 BASE MATERIAL IS 12.
 4. CHEMICALLY TREATED EXISTING MILLED PAVEMENT MATERIAL - THE EXISTING MILLED PAVEMENT MATERIAL SHOULD BE TREATED WITH LIME-FLYASH IN ACCORDANCE WITH TXDOT 2014 STANDARD SPECIFICATIONS ITEM 265. 2 PERCENT LIME AND 8 PERCENT FLYASH BY DRY WEIGHT BE USED FOR ESTIMATING AND PLANNING. THE PERCENTAGES ARE GIVEN AS APPLICATION BY DRY WEIGHT OF SOIL. LIME-FLYASH IS ALSO AVAILABLE PRE-MIXED, TYPICALLY IN PERCENTAGES OF 20 TO 30 PERCENT LIME AND 70 TO 80 PERCENT FLYASH, AND MAY BE USED IF PREFERRED.
 5. FOR AVENUE Q ONLY, IN LIEU OF BLACK BASE CRUSHED LIMESTONE MEETING THE REQUIREMENTS OF TXDOT 2014 STANDARD SPECIFICATIONS ITEM 247, TYPE A OR D, GRADE 1-2 SHALL BE USED.

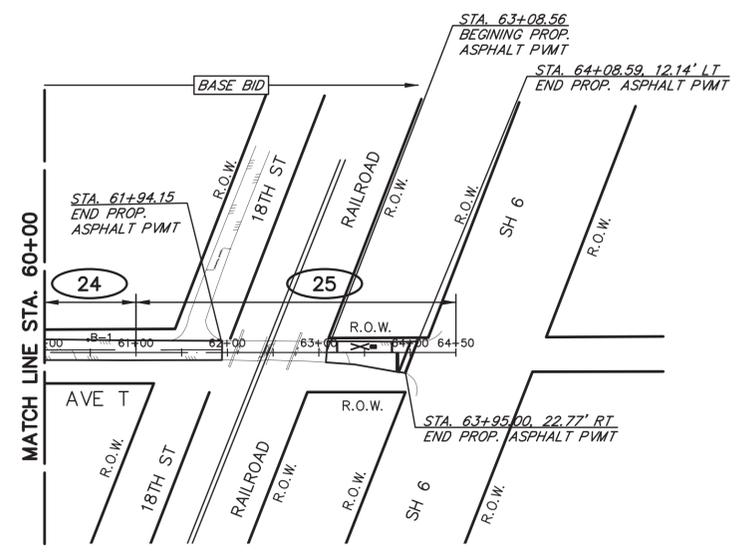
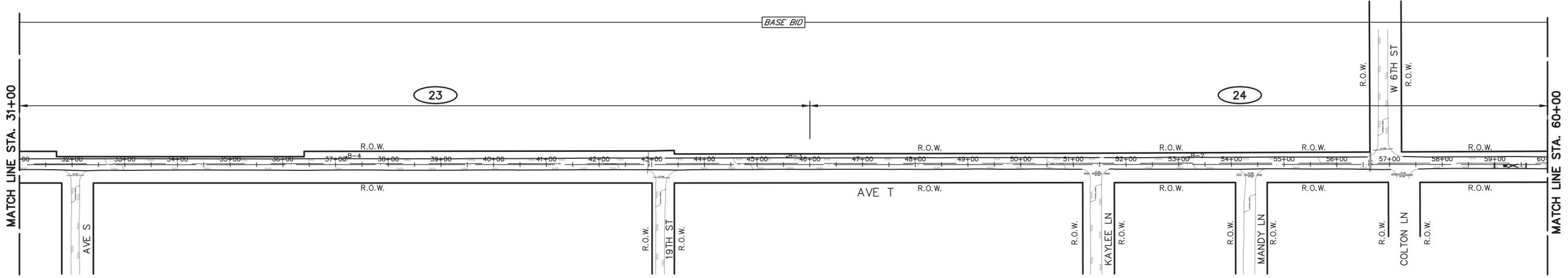
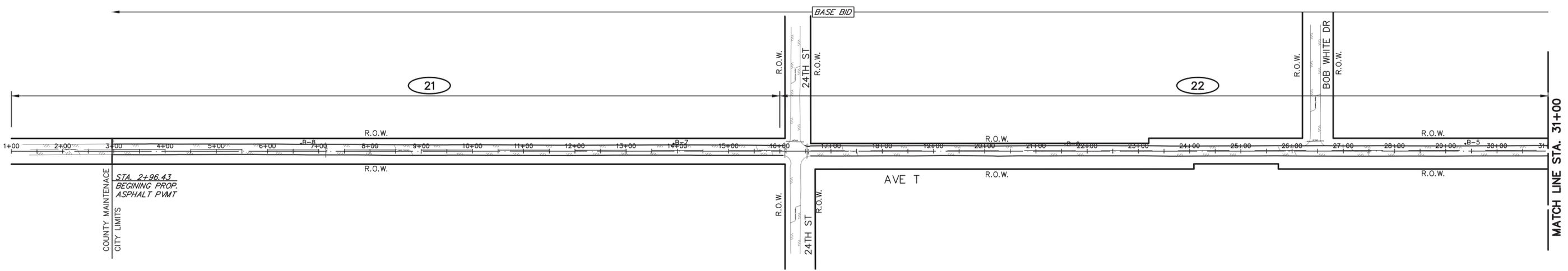


REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
GENERAL CONSTRUCTION NOTES			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET	03

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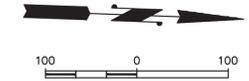
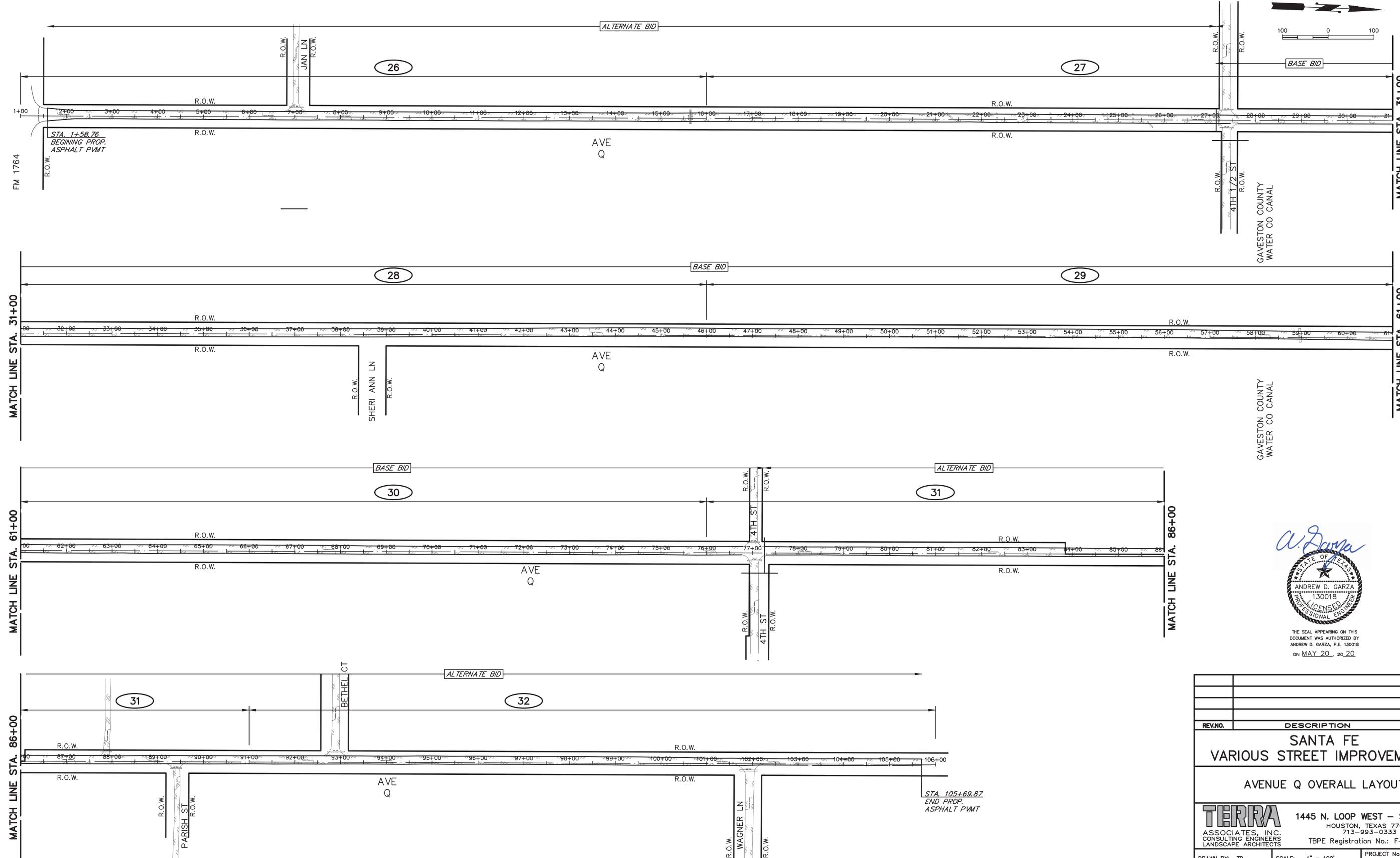
A. D. Garza

 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE T OVERALL LAYOUT			
TERRA		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333	
ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 100'	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 04	

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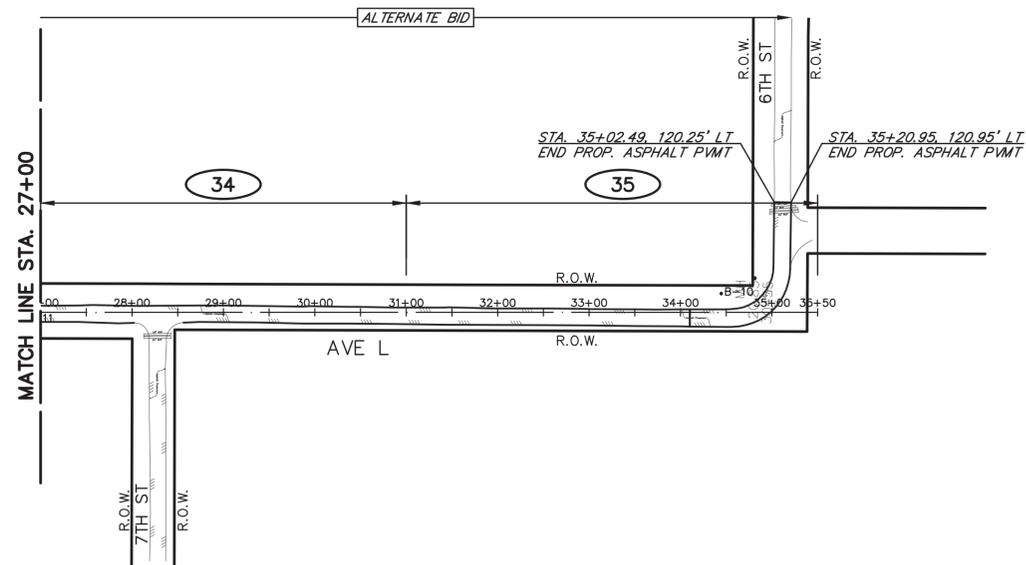
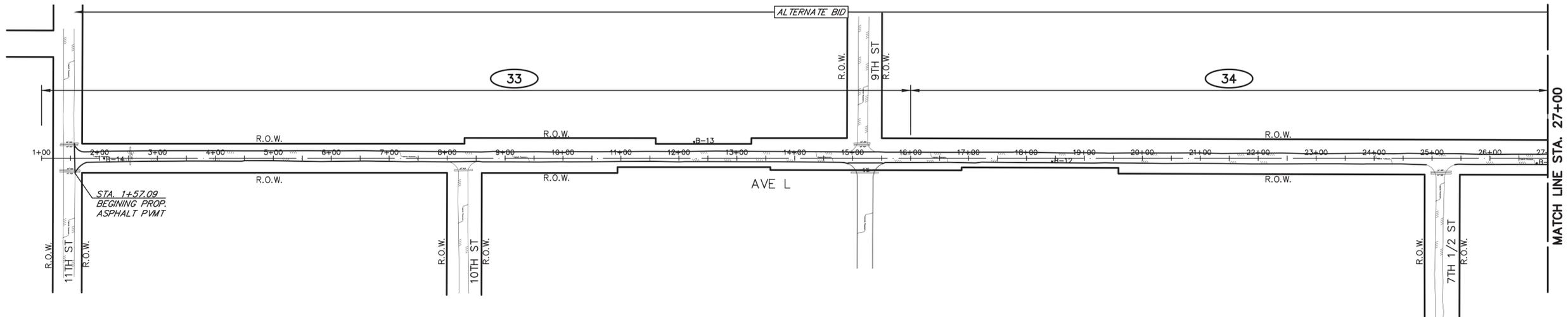
A. D. Garza
 STATE OF TEXAS
 ANDREW D. GARZA
 130018
 LICENSED PROFESSIONAL ENGINEER
 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE Q OVERALL LAYOUT			
TERRA		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333	
ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		TBPE Registration No.: F-003832	
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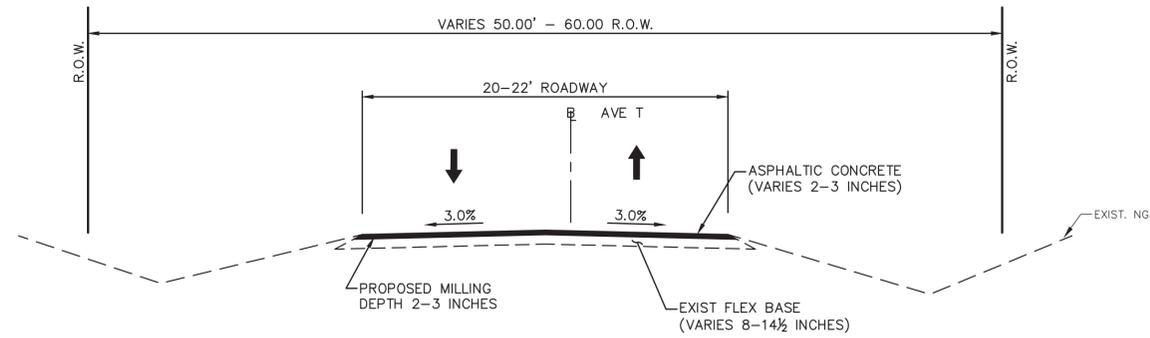
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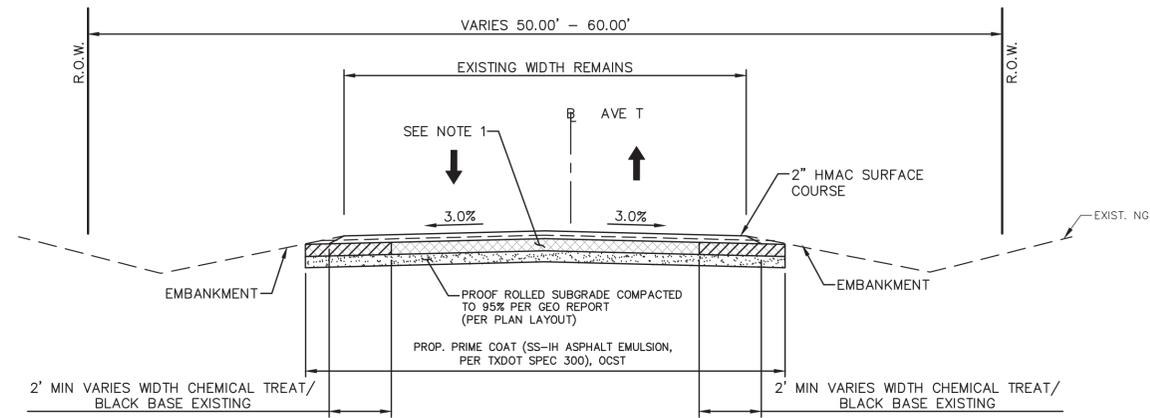
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

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AVENUE L OVERALL LAYOUT			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 100'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 06	

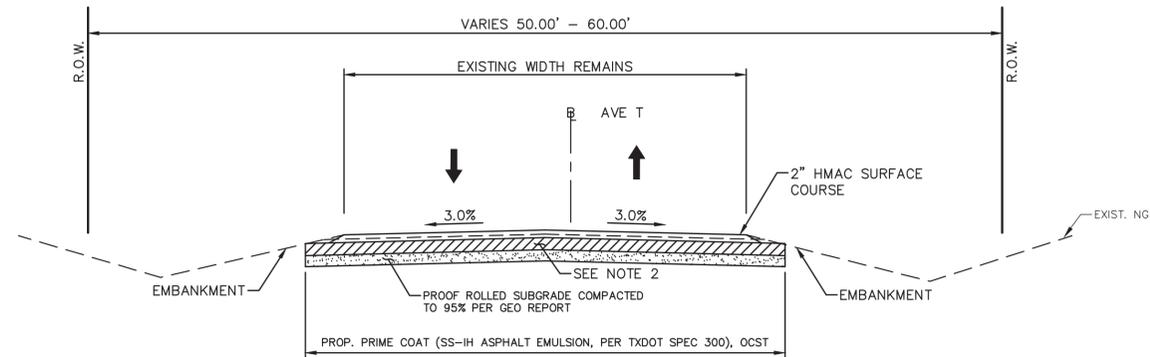
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AVENUE T
EXIST. TYPICAL SECTION
 (REFER TO LAYOUT SHEETS FOR STATIONS)



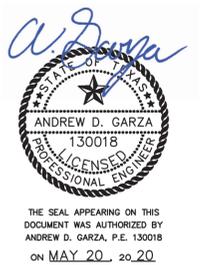
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 (REFER TO LAYOUT SHEETS FOR STATIONS)



AVENUE T
FULL BASE REPAIR TYPICAL SECTION
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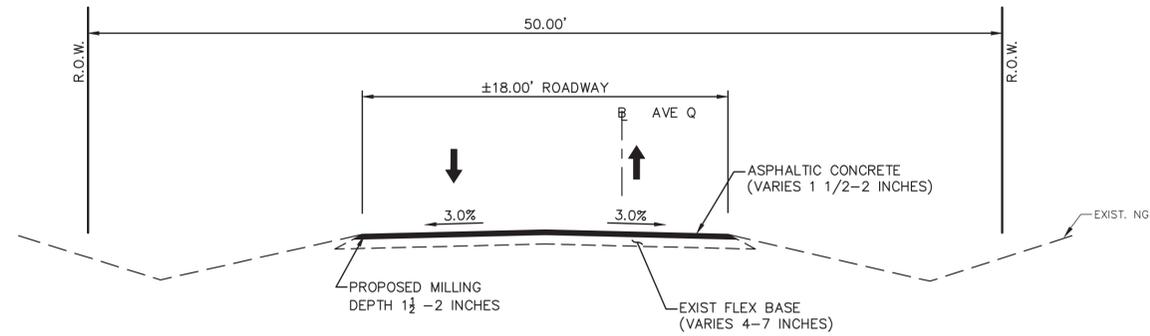
NOTES:

- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF THE NEW HMAC SURFACE COURSE. ONCE MILLING IS COMPLETED, THE EXPOSED SURFACE SHOULD BE CAREFULLY PROOFROLLED. AS DIRECTED BY ONSITE GEOTECH IN FIELD WEAK AREAS DETECTED DURING PROOFROLLING, AS WELL AS ZONES OF FILL CONTAINING ORGANIC MATTER AND/OR DEBRIS, SHALL BE REMOVED TO EXPOSE FIRM SUBGRADE AND BASE SHALL BE REPLACED WITH EITHER CHEMICALLY TREATED BASE MATERIAL OR HMAC BASE COURSE (BLACK BASE), AS DIRECTED BY GEOTECH, MEETING THE SPECIFICATIONS, AND GEOTECHNICAL REPORT.
- IN AREAS REQUIRING BASE REPAIR, THE EXISTING PAVEMENT AND SUBGRADE SHOULD BE OVEREXCAVATED TO A SUFFICIENT DEPTH TO ACCOMMODATE 2 INCHES OF ASPHALTIC CONCRETE SURFACE COURSE OVER 10 INCHES OF BLACK BASE. THE REMOVAL OF THE EXISTING PAVEMENT AND SUBGRADE SHOULD EXTEND AT LEAST 2 FEET HORIZONTALLY BEYOND THE LIMITS OF THE DISTRESS AND EXPOSE FIRM SUBGRADE, PER GEOTECHNICAL REPORT.
- CONTRACTOR TO DELIVER MILLINGS TO 11702 11TH STREET, SANTA FE, TX.
- CONTRACTOR TO MATCH ELEVATIONS ALONG ALL SIDE STREETS/ DRIVEWAYS WHERE RESURFACING OCCURS.



REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE T TYPICAL SECTION			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 07	

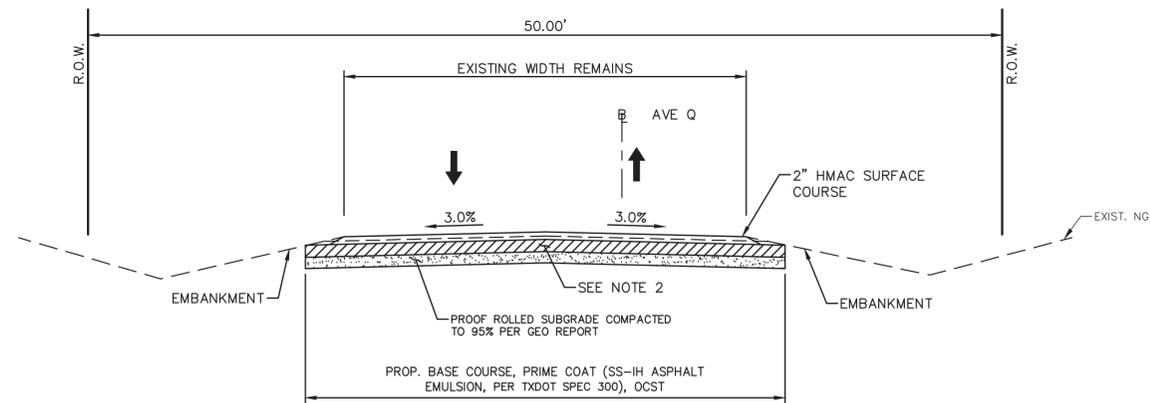
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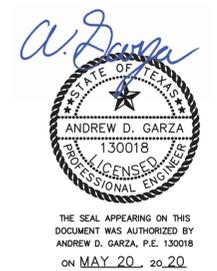
AVENUE Q
EXIST. TYPICAL SECTION
 (REFER TO LAYOUT SHEETS FOR STATIONS)

NOTES:

1. NOT USED.
2. THE EXISTING PAVEMENT AND SUBGRADE SHOULD BE OVEREXCAVATED TO A SUFFICIENT DEPTH TO ACCOMMODATE 2 INCHES OF ASPHALTIC CONCRETE SURFACE COURSE OVER 10 INCHES OF CRUSHED LIMESTONE MEETING THE REQUIREMENTS OF TXDOT 2014 STANDARD SPECIFICATIONS ITEM 247, TYPE A OR D, GRADE 1-2. THE REMOVAL OF THE EXISTING PAVEMENT AND SUBGRADE SHOULD EXTEND AT LEAST 2 FEET HORIZONTALLY BEYOND THE LIMITS OF THE DISTRESS AND EXPOSE FIRM SUBGRADE, PER GEOTECHNICAL REPORT.
3. CONTRACTOR TO DELIVER MILLINGS TO 11702 11TH STREET, SANTA FE, TX.
4. CONTRACTOR TO MATCH ELEVATIONS ALONG ALL SIDE STREETS/ DRIVEWAYS WHERE RESURFACING OCCURS.

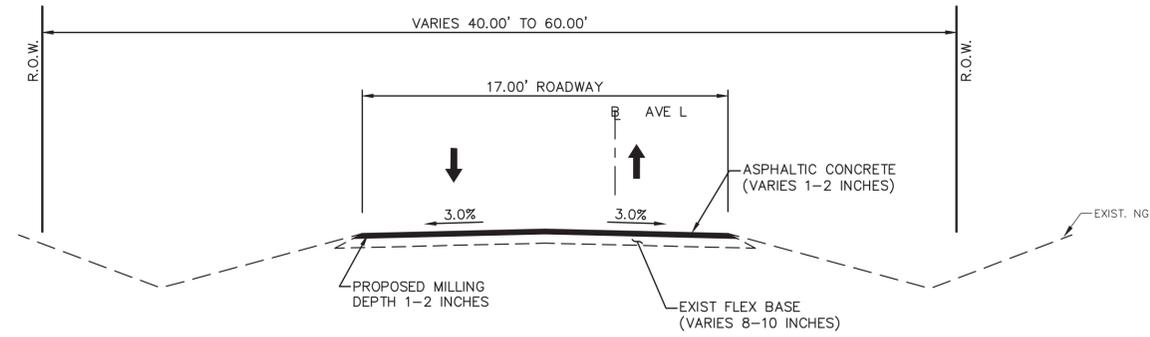


AVENUE Q
FULL BASE REPAIR TYPICAL SECTION
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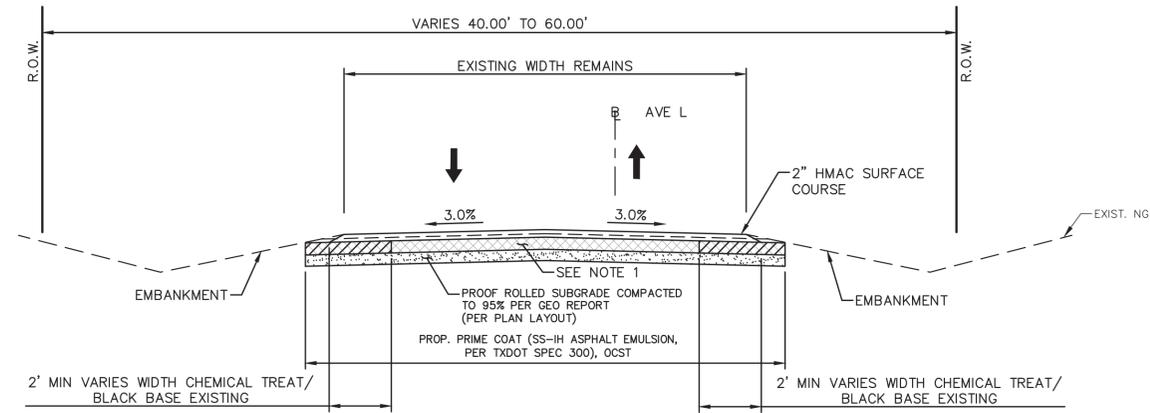


REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE Q TYPICAL SECTION			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
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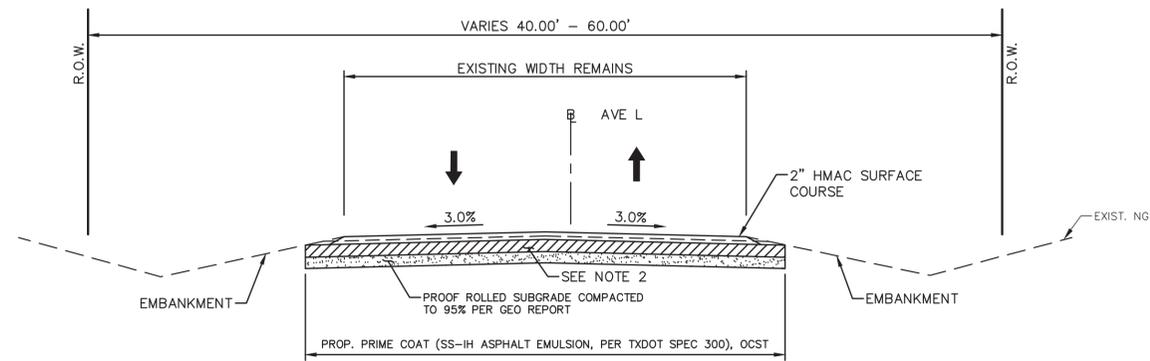
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AVENUE L
EXIST. TYPICAL SECTION
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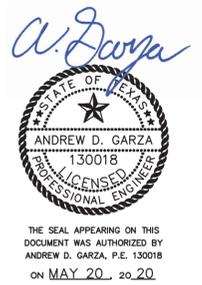
AVENUE L
PARTIAL BASE REPAIR TYPICAL SECTION
(REFER TO LAYOUT SHEETS FOR STATIONS)



AVENUE L
FULL BASE REPAIR TYPICAL SECTION
(REFER TO LAYOUT SHEETS FOR STATIONS)

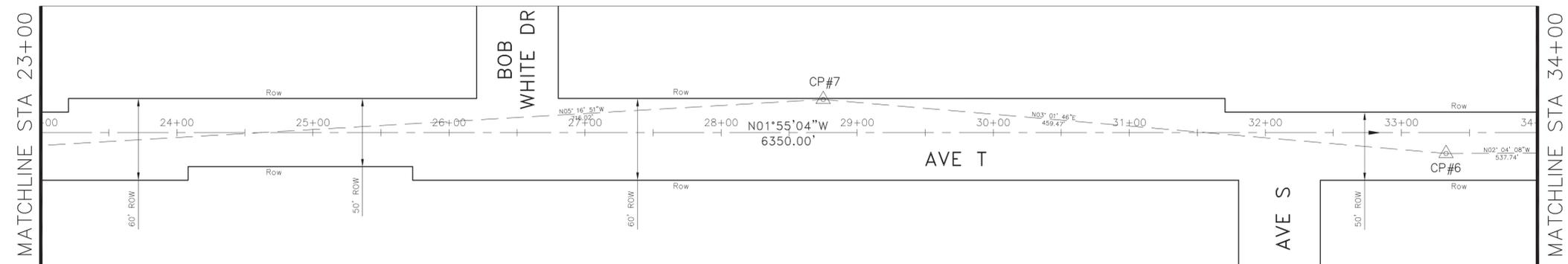
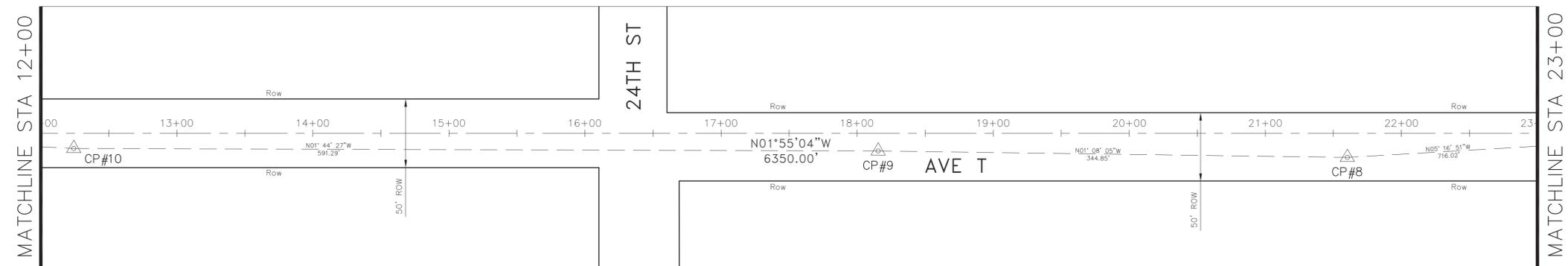
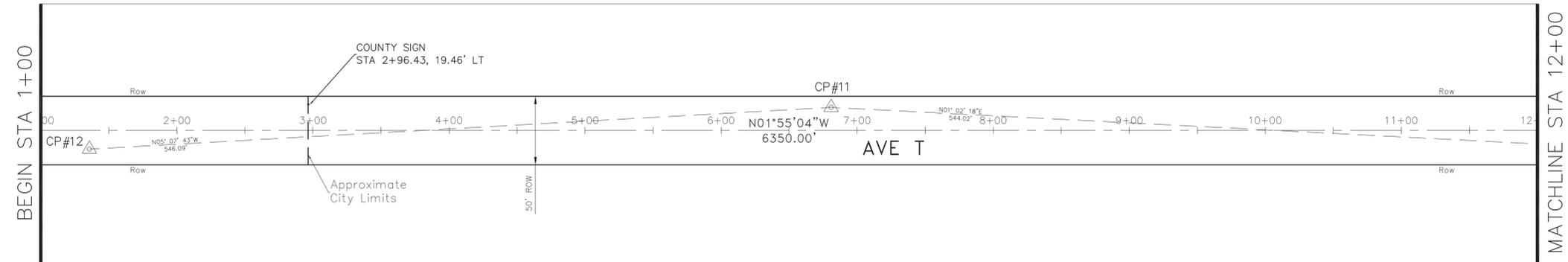
NOTES:

- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF THE NEW HMAC SURFACE COURSE. ONCE MILLING IS COMPLETED, THE EXPOSED SURFACE SHOULD BE CAREFULLY PROOFROLLED. AS DIRECTED BY ONSITE GEOTECH IN FIELD WEAK AREAS DETECTED DURING PROOFROLLING, AS WELL AS ZONES OF FILL CONTAINING ORGANIC MATTER AND/OR DEBRIS, SHALL BE REMOVED TO EXPOSE FIRM SUBGRADE AND BASE SHALL BE REPLACED WITH EITHER CHEMICALLY TREATED BASE MATERIAL OR HMAC BASE COURSE (BLACK BASE), AS DIRECTED BY GEOTECH, MEETING THE SPECIFICATIONS, AND GEOTECHNICAL REPORT.
- IN AREAS REQUIRING BASE REPAIR, THE EXISTING PAVEMENT AND SUBGRADE SHOULD BE OVEREXCAVATED TO A SUFFICIENT DEPTH TO ACCOMMODATE 2 INCHES OF ASPHALTIC CONCRETE SURFACE COURSE OVER 10 INCHES OF BLACK BASE. THE REMOVAL OF THE EXISTING PAVEMENT AND SUBGRADE SHOULD EXTEND AT LEAST 2 FEET HORIZONTALLY BEYOND THE LIMITS OF THE DISTRESS AND EXPOSE FIRM SUBGRADE, PER GEOTECHNICAL REPORT.
- CONTRACTOR TO DELIVER MILLINGS TO 11702 11TH STREET, SANTA FE, TX.
- CONTRACTOR TO MATCH ELEVATIONS ALONG ALL SIDE STREETS/ DRIVEWAYS WHERE RESURFACING OCCURS.



REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE L TYPICAL SECTION			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 09	

P:\Cadd\2019\190333 - Terra Assoc - Santa Fe Road Repair, Gal Cty Pct.2\CAD_DWG\Survey_Control_Drawings\Survey_Control_Map.dwg Jun 10, 2020-12:19pm Terra Associates Inc., Bill Reimer



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

ALL DISTANCES ARE SURFACE VALUES.

RIGHT OF WAY (ROW) IS APPROXIMATE.

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.

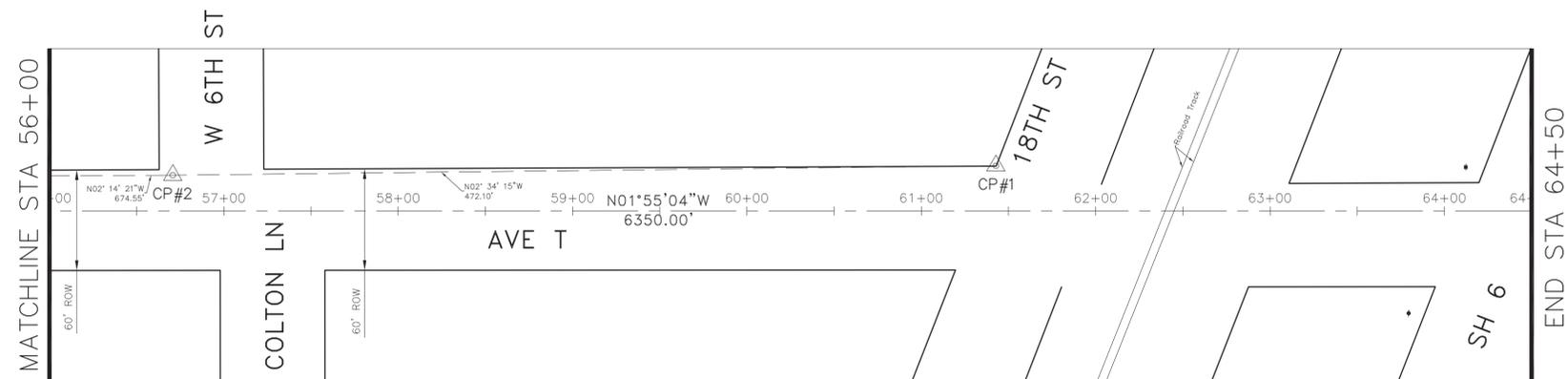
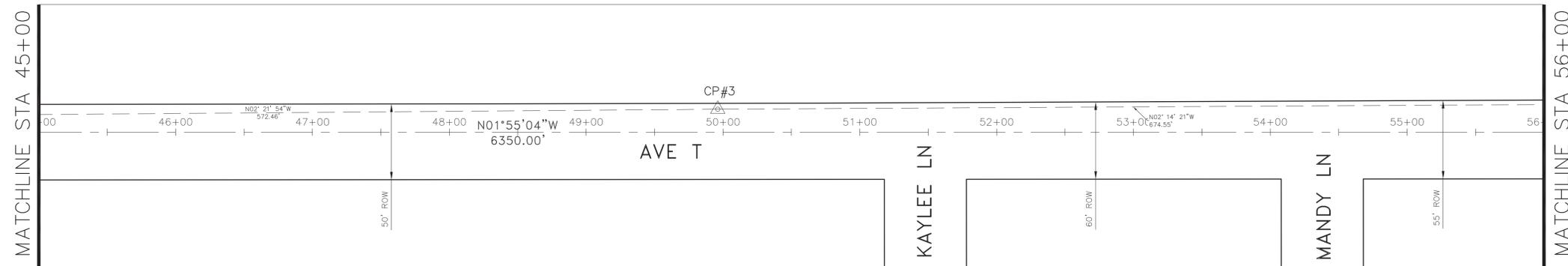
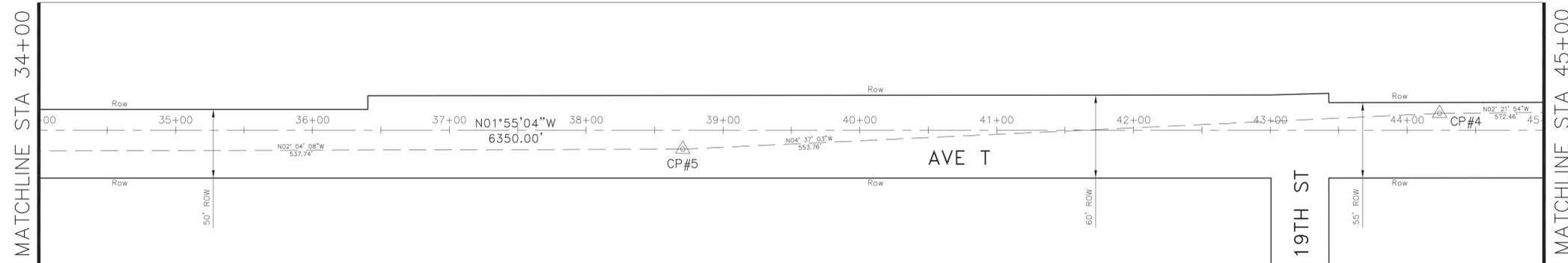


REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL MAP
AVE T
FROM STA 1+00 TO STA 34+00 (SHEET 1 OF 11)**

	AMANI ENGINEERING, INC.	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBP REG. NO. F-4528 TBP REG. NO. 1028200
	DRAWN BY: TD	SCALE: 1"=100'
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 10



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

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RIGHT OF WAY (ROW) IS APPROXIMATE.

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.

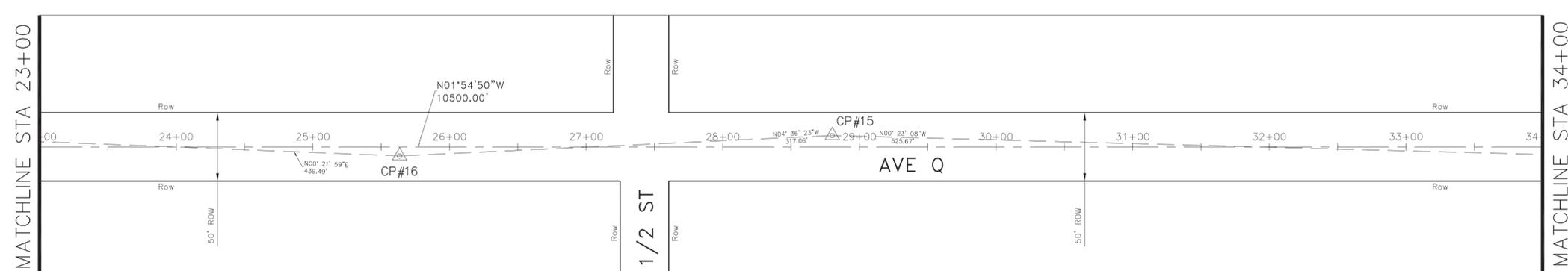
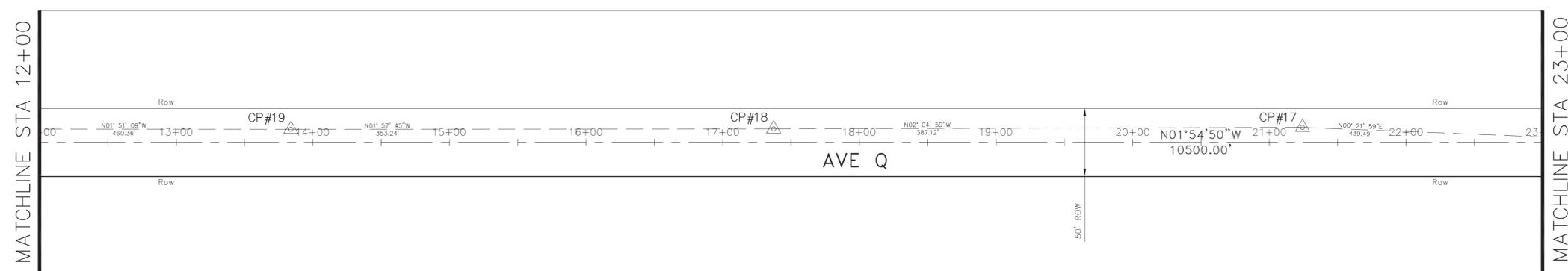
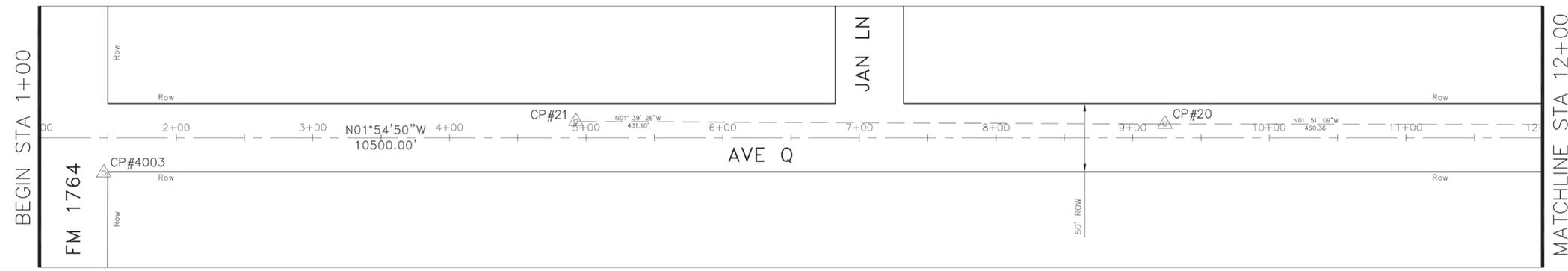


REV.NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL MAP
AVE T
FROM STA 34+00 TO STA 64+50 (SHEET 2 OF 11)**

	AMANI ENGINEERING, INC.	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200
	DRAWN BY: TD	SCALE: 1"=100'
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 11



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

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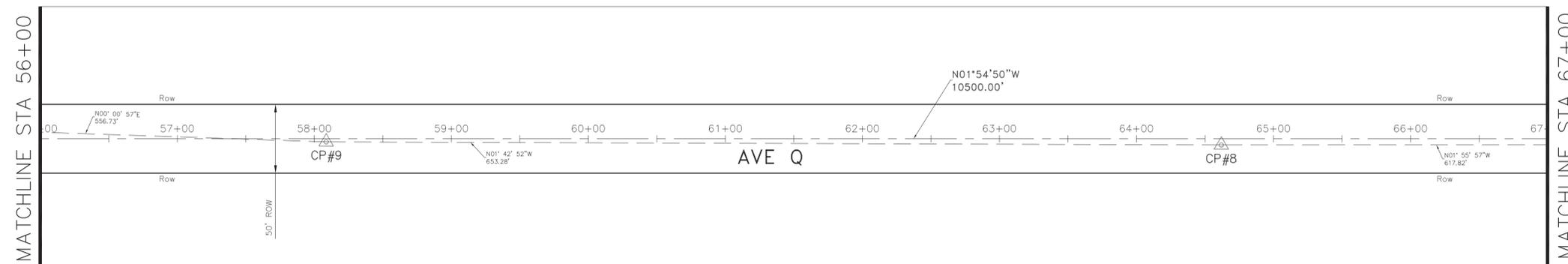
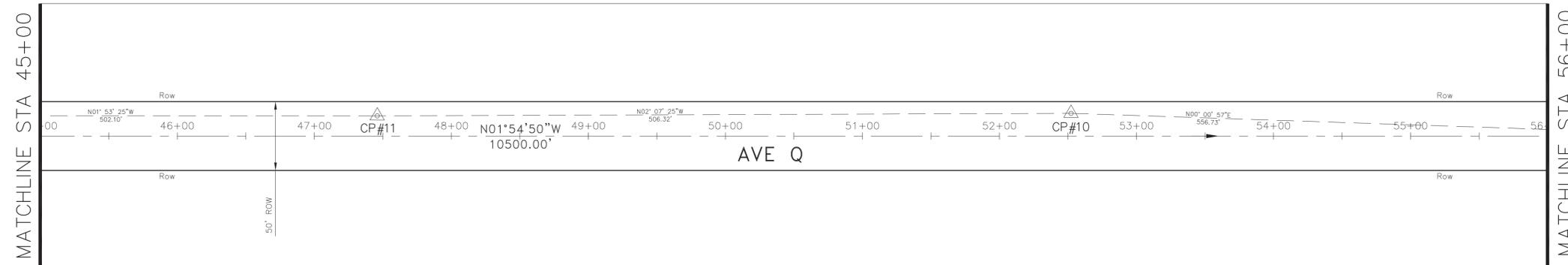
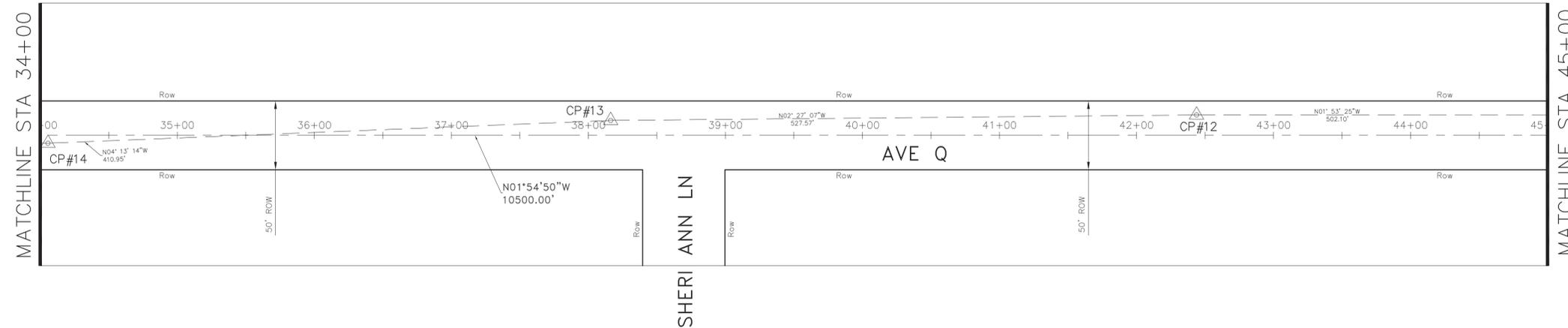


REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

SANTA FE
VARIOUS STREET IMPROVEMENTS

SURVEY CONTROL MAP
AVE Q
FROM STA 1+00 TO STA 34+00 (SHEET 3 OF 11)

	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200
	DRAWN BY: TD SCALE: 1"=100' PROJECT No. 0600-1902 CHECKED BY: ADG DATE: DECEMBER 2019 CONTRACT: 1 SHEET 12



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

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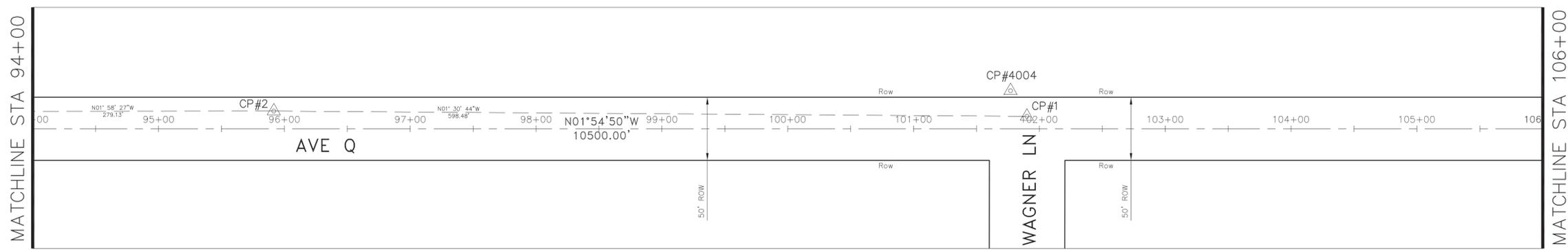
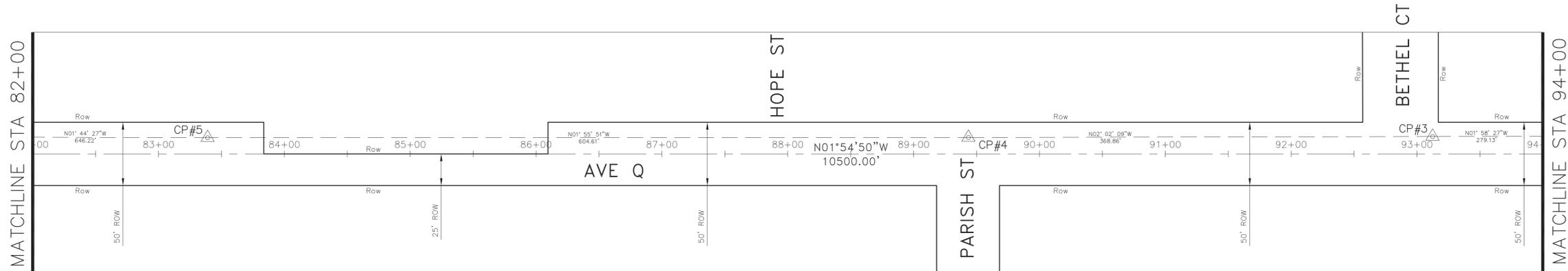
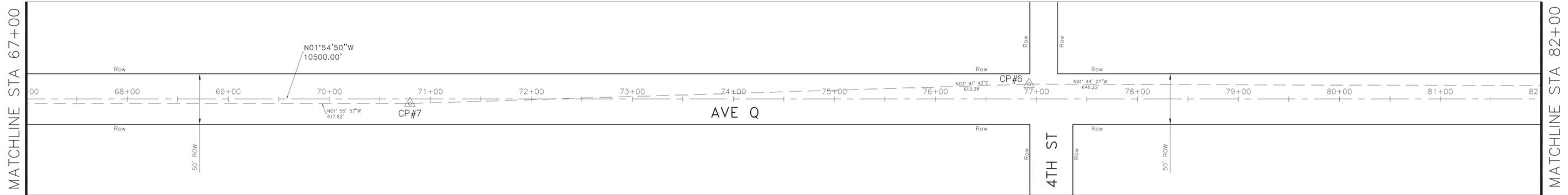
REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

SANTA FE
VARIOUS STREET IMPROVEMENTS

SURVEY CONTROL MAP
AVE Q
FROM STA 34+00 TO STA 67+00 (SHEET 4 OF 11)

AMANI ENGINEERING, INC.
8303 SOUTHWEST FREEWAY
SUITE 600
HOUSTON, TEXAS 77074
TEL: (713) 270-5700
TBPE REG. NO. F-4528
TBPELS REG. NO. 1028200

DRAWN BY: TD	SCALE: 1"=100'	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 13



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

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REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

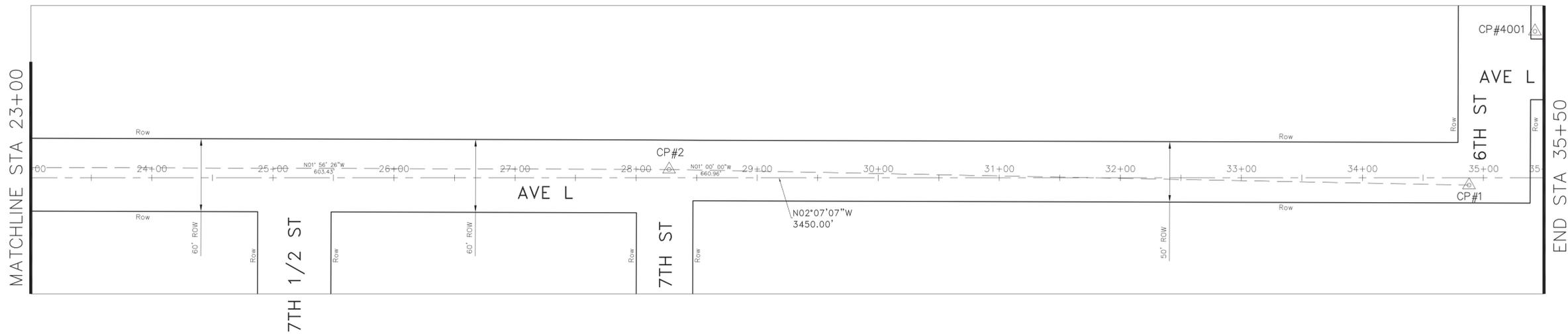
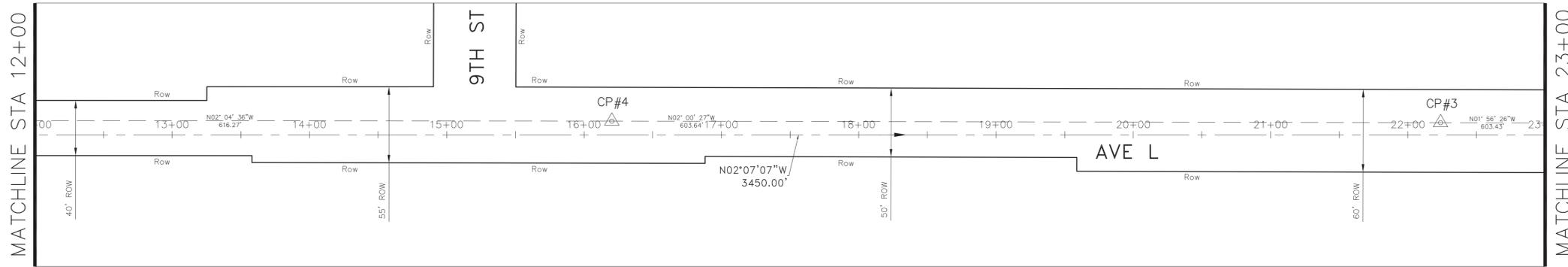
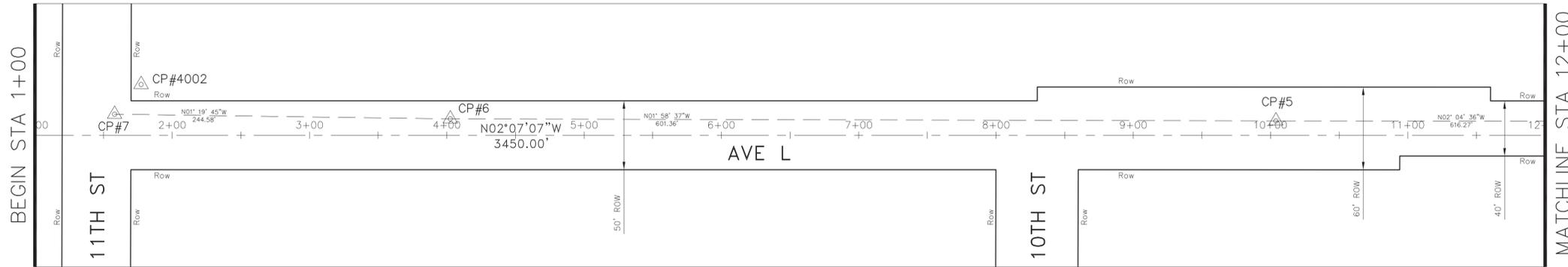
**SANTA FE
VARIOUS STREET IMPROVEMENTS**

SURVEY CONTROL MAP
AVE Q
FROM STA 67+00 TO STA 106+00 (SHEET 5 OF 11)

<p>AMANI ENGINEERING, INC.</p>	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200
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DRAWN BY: TD	SCALE: 1"=100'	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 14

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NOTES:

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REV. NO.	DESCRIPTION	DATE	APP.
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1	COMMENT REVISIONS	02/18/20	WR

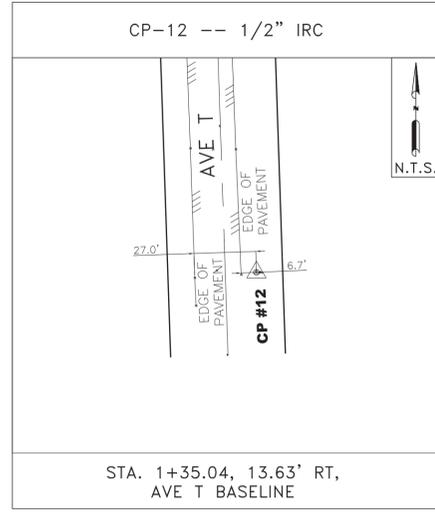
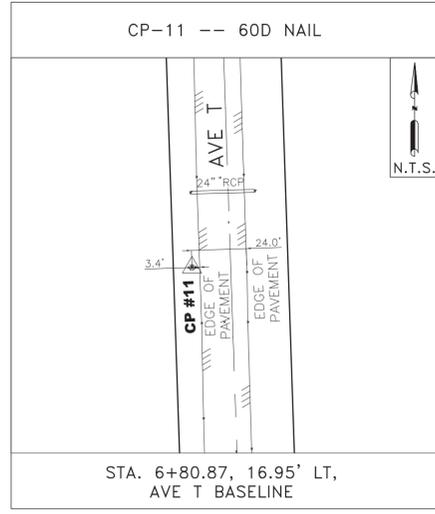
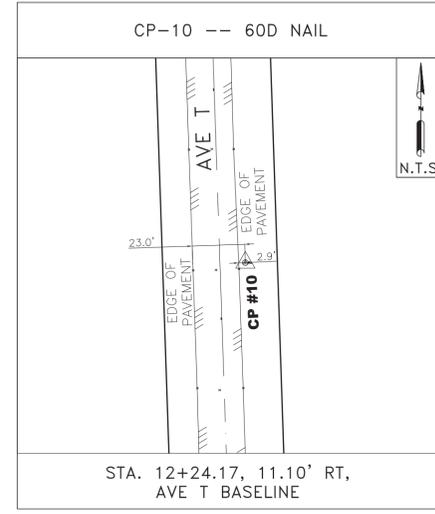
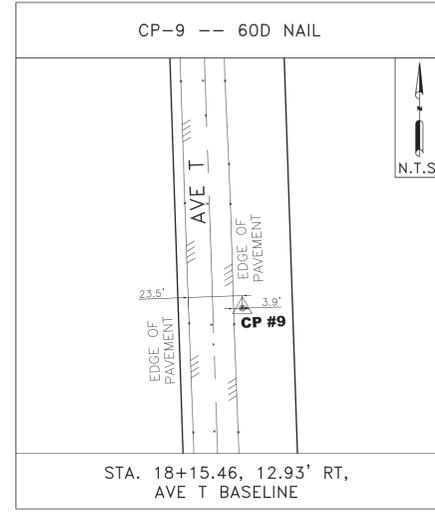
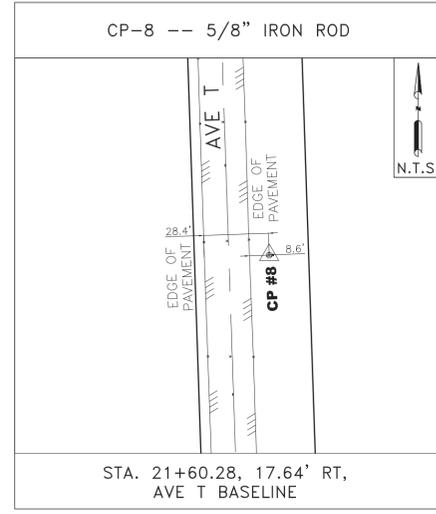
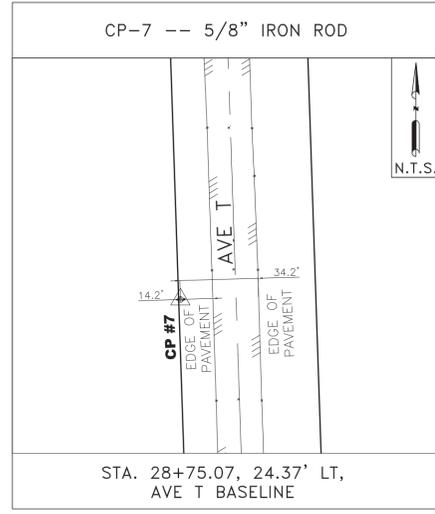
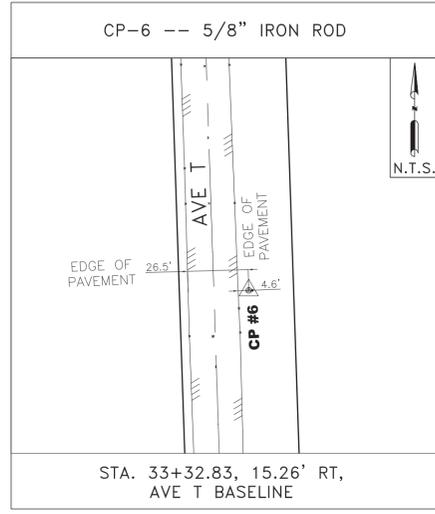
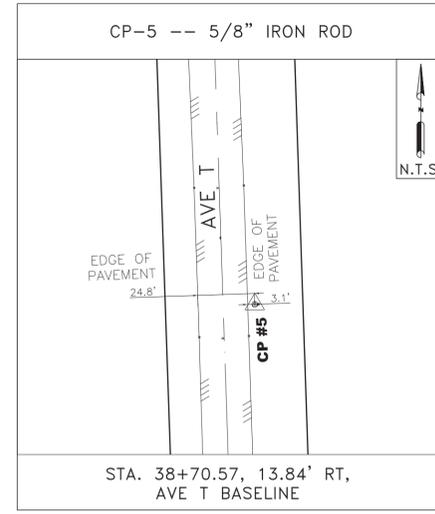
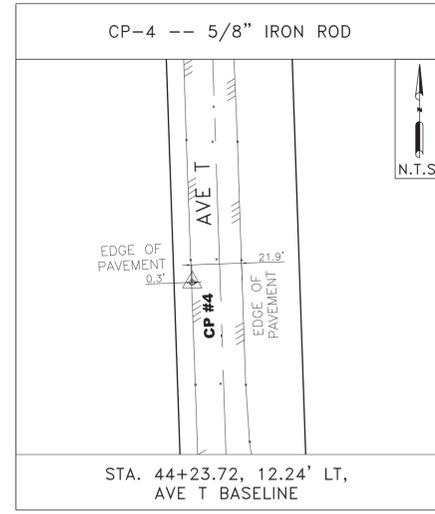
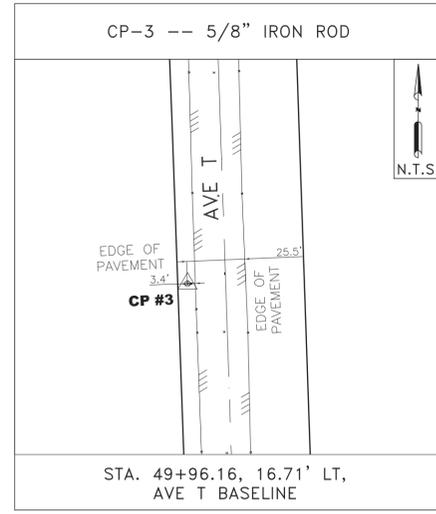
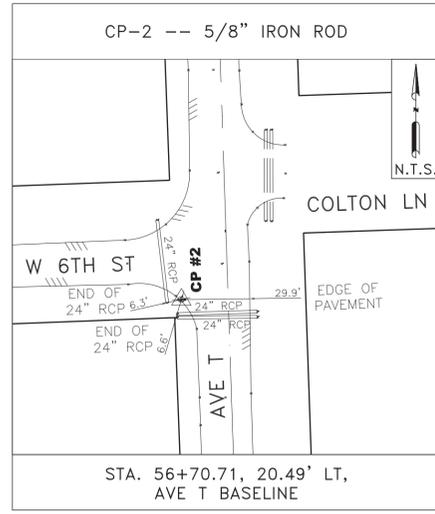
**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL MAP
AVE L
FROM STA 1+00 TO STA 35+50 (SHEET 6 OF 11)**

AMANI ENGINEERING, INC.
8303 SOUTHWEST FREEWAY
SUITE 600
HOUSTON, TEXAS 77074
TEL: (713) 270-5700
TBPE REG. NO. F-4528
TBPELS REG. NO. 1028200

DRAWN BY: TD	SCALE: 1"=100'	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 15

P:\Cadd\2019\19033 - Terra Assoc - Santa Fe Road Repair, Gal City Pct.2\CAD_DWG\Survey_Control Drawings\SWINGTIES.dwg Jun 10, 2020-3:47pm Terra Associates Inc., Bill Reimer



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

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RIGHT OF WAY (ROW) IS APPROXIMATE.

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



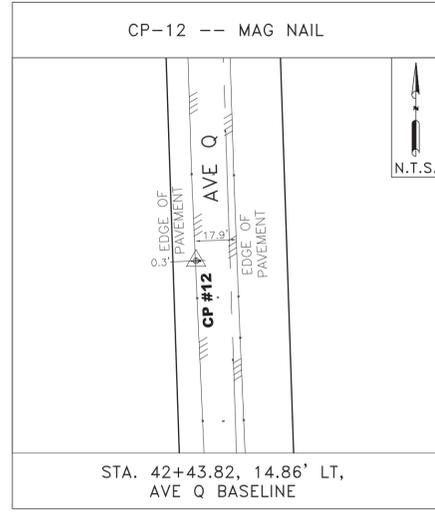
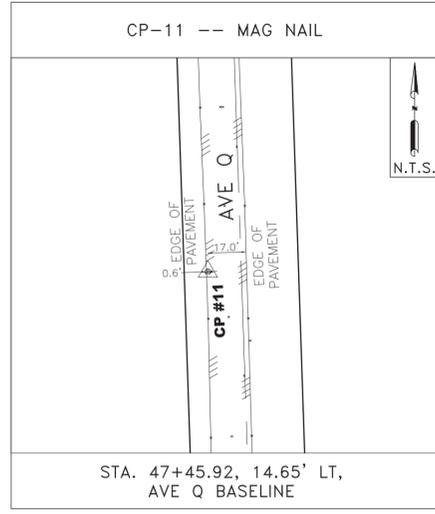
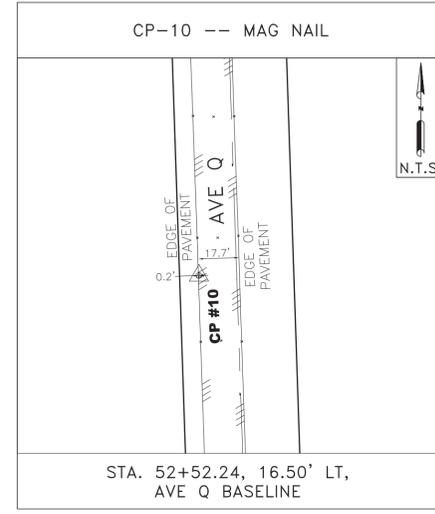
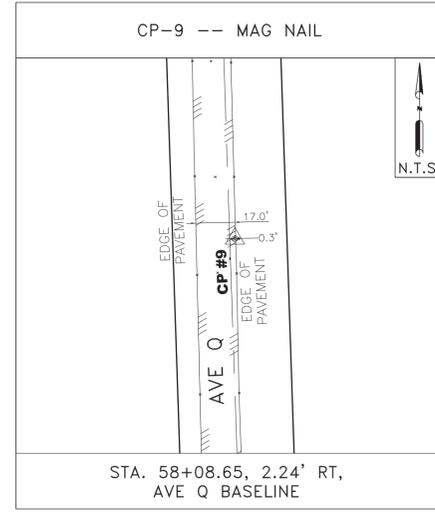
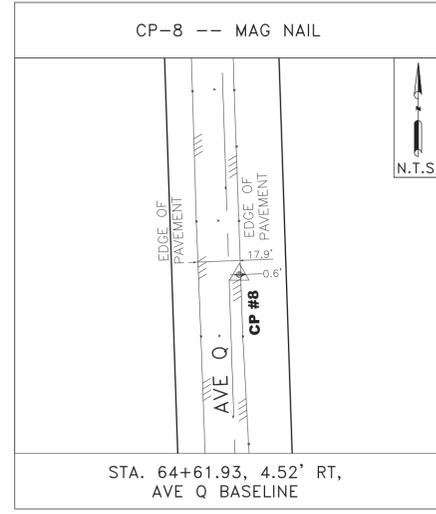
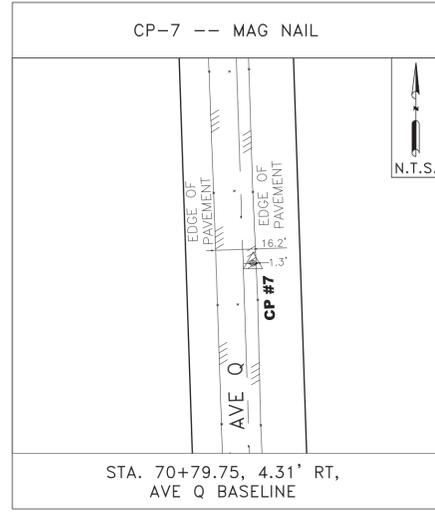
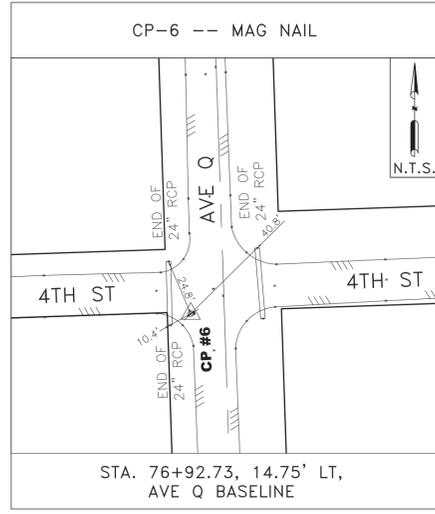
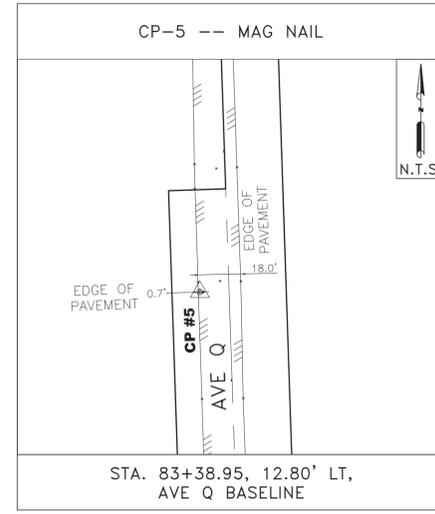
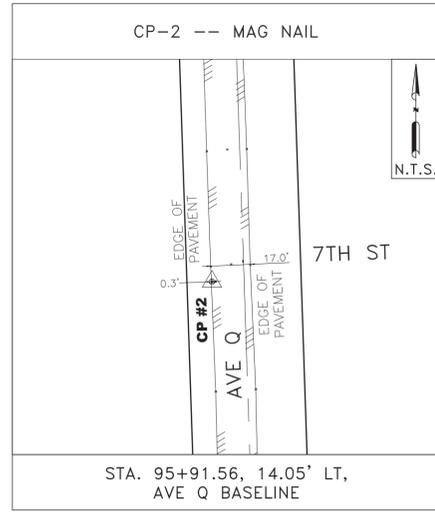
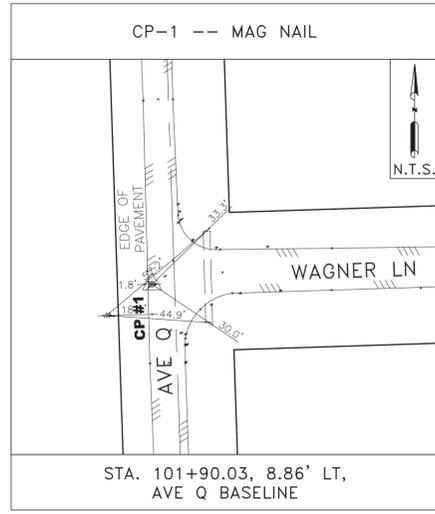
REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL SWINGTIES
AVE T
(SHEET 7 OF 11)**

	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200
	DRAWN BY: TD SCALE: N.T.S. PROJECT No. 0600-1902 CHECKED BY: ADG DATE: DECEMBER 2019 CONTRACT: 1

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NOTES:

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REV. NO.	DESCRIPTION	DATE	APP.
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1	COMMENT REVISIONS	02/18/20	WR

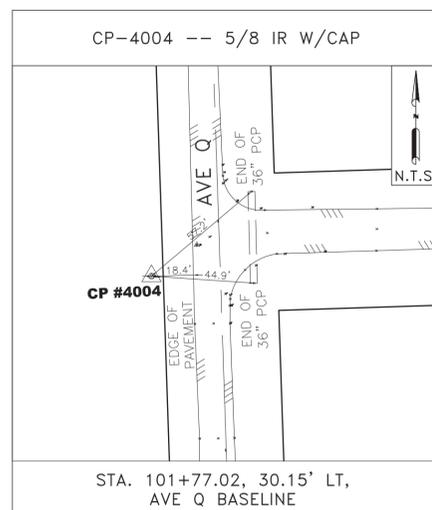
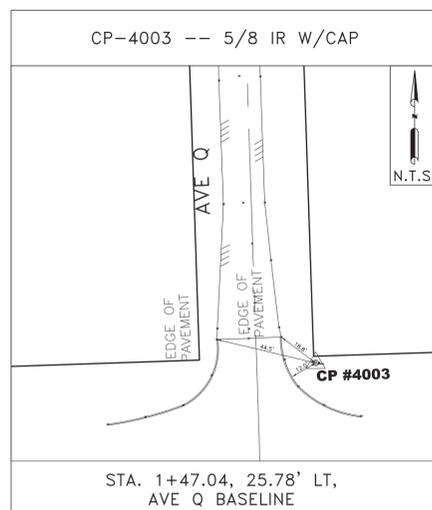
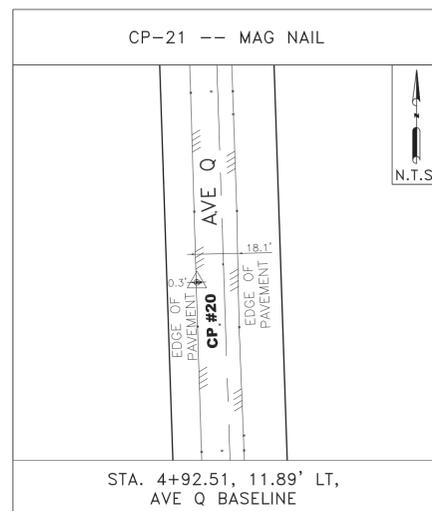
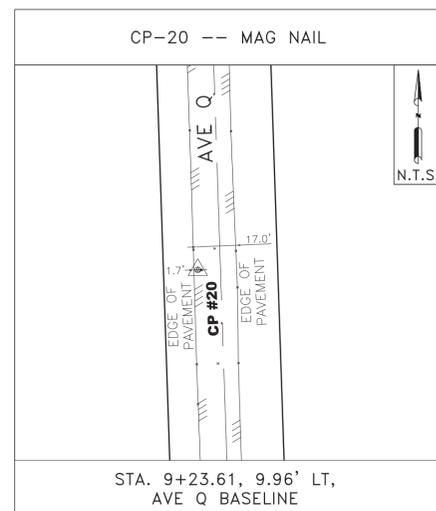
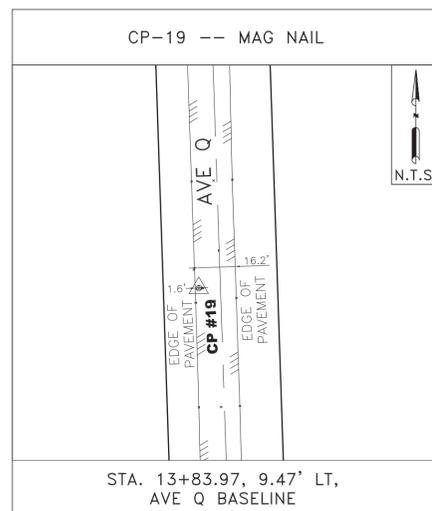
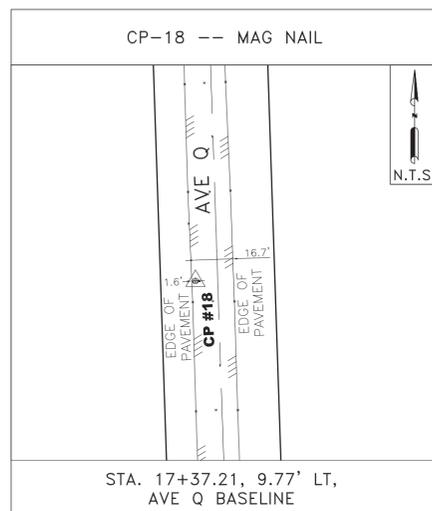
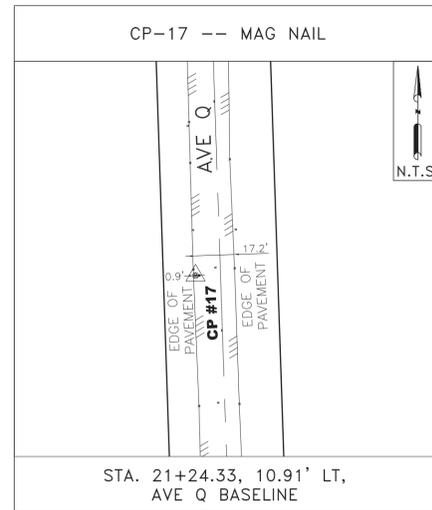
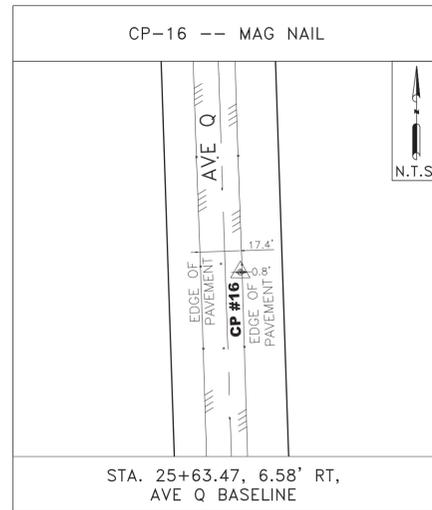
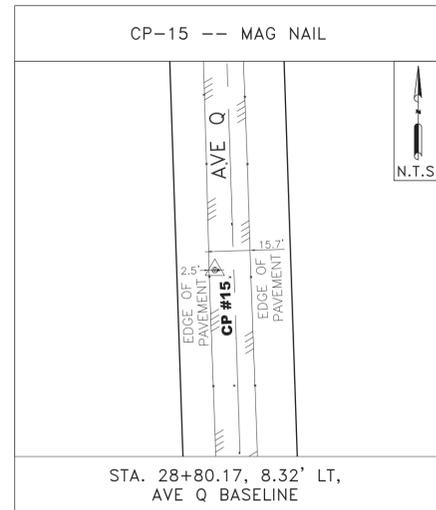
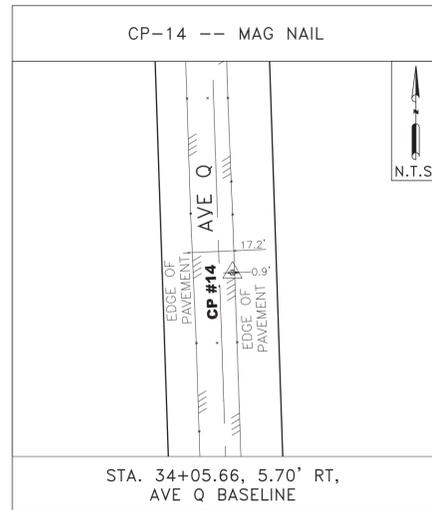
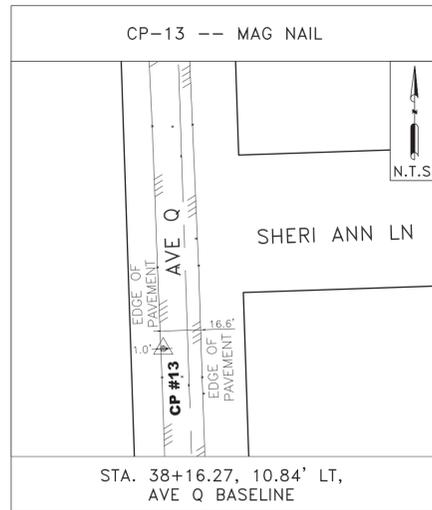
**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL SWINGTIES
AVE Q
(SHEET 8 OF 11)**

AMANI ENGINEERING, INC.
 8303 SOUTHWEST FREEWAY
 SUITE 600
 HOUSTON, TEXAS 77074
 TEL: (713) 270-5700
 TBPE REG. NO. F-4528
 TBPELS REG. NO. 1028200

DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902 CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 17

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NOTES:

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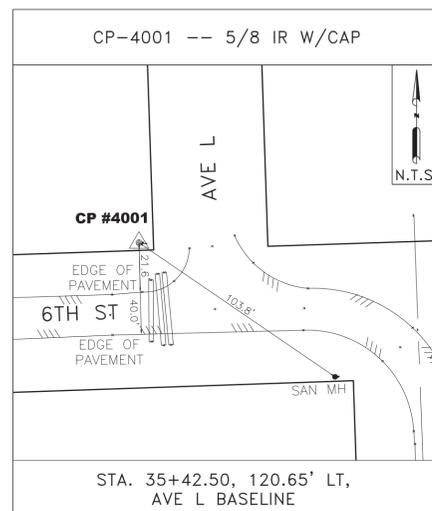
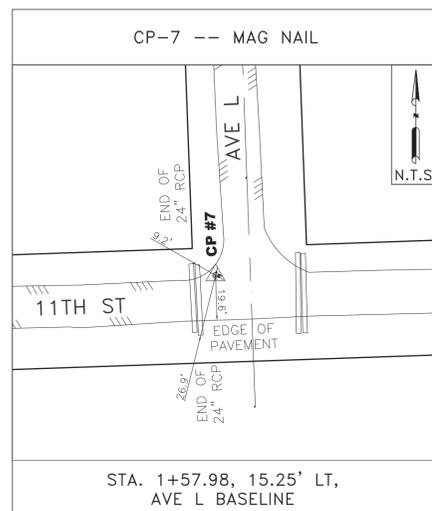
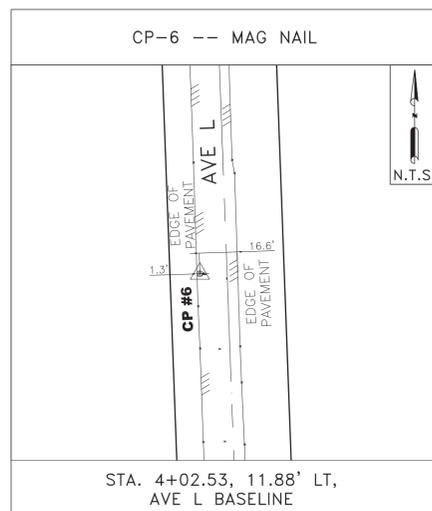
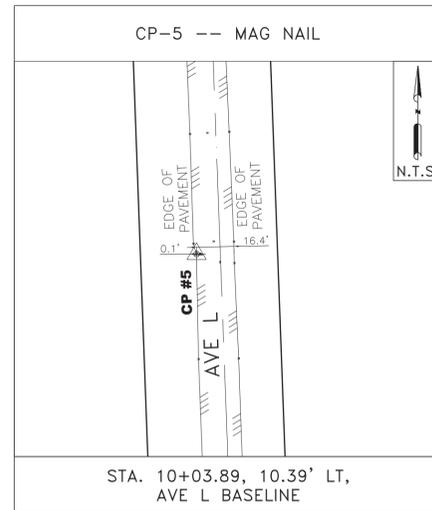
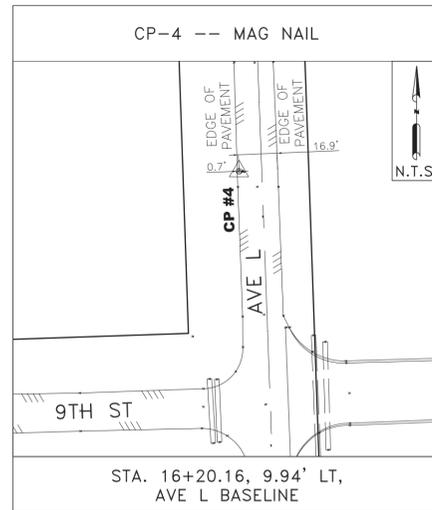
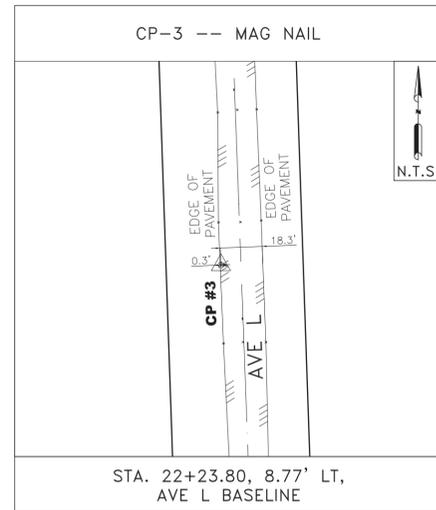
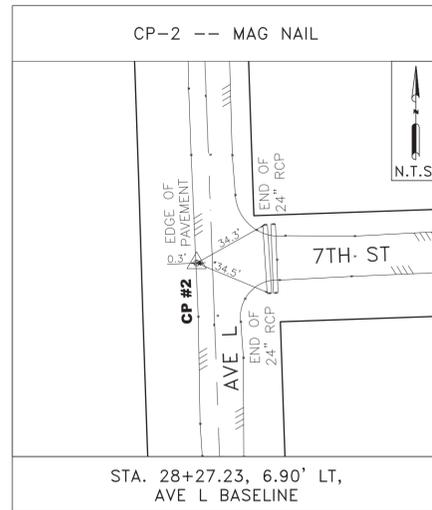
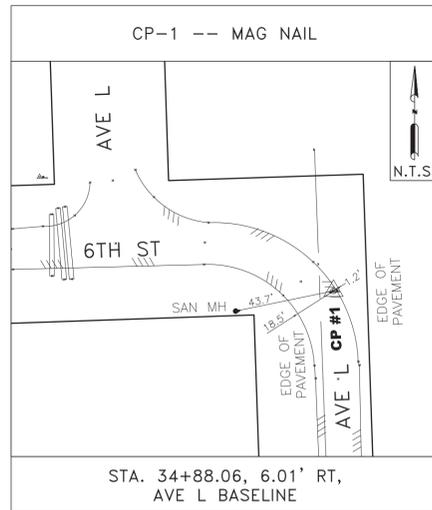
REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

SANTA FE
VARIOUS STREET IMPROVEMENTS

SURVEY CONTROL SWINGTIES
AVE Q
(SHEET 9 OF 11)

	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBP REG. NO. F-4528 TBP REG. NO. 1028200
	DRAWN BY: TD SCALE: N.T.S. PROJECT No. 0600-1902 CONTRACT: 1
CHECKED BY: ADG DATE: DECEMBER 2019	SHEET 18

F:\Cadd\2019\19033 - Terra Assoc - Santa Fe Road Repair, Gal Cty Pct.2\CAD_DWG\Survey_Control Drawings\SWINGTIES.dwg Jun 10, 2020-3:57pm Terra Associates Inc., Bill Reimer



NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

ALL DISTANCES ARE SURFACE VALUES.

RIGHT OF WAY (ROW) IS APPROXIMATE.

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



REV. NO.	DESCRIPTION	DATE	APP.
2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**SURVEY CONTROL SWINGTIES
AVE L
(SHEET 10 OF 11)**

	AMANI ENGINEERING, INC.	8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200
	DRAWN BY: TD	SCALE: N.T.S.
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 19

CONTROL POINTS AND TEMPORARY BENCH MARKS:

CP	Grid Coordinates		Surface Coordinates		Elevation	Description	Station	Remarks
	Northing	Easting	Northing	Easting				
1	13,705,527.13	3,208,182.57	13,707,353.64	3,208,610.11	27.09	5/8IR	STA. 61+42.78, 25.87' LT	AVE T
2	13,705,057.23	3,208,203.58	13,706,883.67	3,208,631.13	28.83	MAG NAIL ON ASPHALT	STA. 56+70.71, 20.49' LT	AVE T
3	13,704,383.28	3,208,229.94	13,706,209.63	3,208,657.49	29.12	MAG NAIL ON ASPHALT	STA. 49+96.16, 16.71' LT	AVE T
4	13,703,811.38	3,208,253.56	13,705,637.66	3,208,681.11	28.99	MAG NAIL ON ASPHALT	STA. 44+23.72, 12.24' LT	AVE T
5	13,703,259.49	3,208,298.13	13,705,085.69	3,208,725.69	27.41	60D	STA. 38+70.57, 13.84' RT	AVE T
6	13,702,722.17	3,208,317.54	13,704,548.30	3,208,745.11	27.44	60D	STA. 33+32.83, 15.26' RT	AVE T
7	13,702,263.40	3,208,293.26	13,704,089.47	3,208,720.82	26.63	60D	STA. 28+75.07, 24.37' LT	AVE T
8	13,701,550.51	3,208,359.15	13,703,376.48	3,208,786.73	25.32	1/2"IRC	STA. 21+60.28, 17.64' RT	AVE T
9	13,701,205.77	3,208,365.98	13,703,031.70	3,208,793.56	24.38	60D	STA. 18+15.46, 12.93' RT	AVE T
10	13,700,614.83	3,208,383.94	13,702,440.68	3,208,811.52	22.93	1/2"IRC	STA. 12+24.17, 11.10' RT	AVE T
11	13,700,070.97	3,208,374.09	13,701,896.74	3,208,801.66	22.94	60D	STA. 6+80.87, 16.95' LT	AVE T
12	13,699,527.14	3,208,422.90	13,701,352.85	3,208,850.48	22.42	1/2"IRC	STA. 1+35.04, 13.63' RT	AVE T
1	13,708,139.65	3,214,920.58	13,709,966.50	3,215,349.03	22.57	MAG NAIL ON ASPHALT	STA. 34+88.06, 6.01' RT	AVE L
2	13,707,478.87	3,214,932.18	13,709,305.63	3,215,360.62	20.91	MAG NAIL ON ASPHALT	STA. 28+27.23, 6.90' LT	AVE L
3	13,706,875.86	3,214,952.61	13,708,702.54	3,215,381.06	19.16	MAG NAIL ON ASPHALT	STA. 22+23.80, 8.77' LT	AVE L
4	13,706,272.67	3,214,973.75	13,708,099.27	3,215,402.20	20.29	MAG NAIL ON ASPHALT	STA. 16+20.16, 9.94' LT	AVE L
5	13,705,656.89	3,214,996.08	13,707,483.41	3,215,424.53	20.70	MAG NAIL ON ASPHALT	STA. 10+03.89, 10.39' LT	AVE L
6	13,705,055.97	3,215,016.82	13,706,882.41	3,215,445.28	20.96	MAG NAIL ON ASPHALT	STA. 4+02.53, 11.88' LT	AVE L
7	13,704,811.49	3,215,022.49	13,706,637.90	3,215,450.95	21.08	MAG NAIL ON ASPHALT	STA. 1+57.98, 15.25' LT	AVE L
1	13,720,433.54	3,210,273.70	13,722,262.03	3,210,701.52	18.99	MAG NAIL ON ASPHALT	STA. 101+90.03, 8.86' LT	AVE Q
2	13,719,835.37	3,210,289.49	13,721,663.78	3,210,717.32	18.99	MAG NAIL ON ASPHALT	STA. 95+91.56, 14.05' LT	AVE Q
3	13,719,556.44	3,210,299.11	13,721,384.81	3,210,726.94	19.47	MAG NAIL ON ASPHALT	STA. 93+12.43, 13.76' LT	AVE Q
4	13,719,187.86	3,210,312.21	13,721,016.19	3,210,740.04	19.80	MAG NAIL ON ASPHALT	STA. 89+43.57, 12.97' LT	AVE Q
5	13,718,583.67	3,210,332.58	13,720,411.91	3,210,760.41	20.94	MAG NAIL ON ASPHALT	STA. 83+38.95, 12.80' LT	AVE Q
6	13,717,937.83	3,210,352.21	13,719,765.99	3,210,780.05	22.77	MAG NAIL ON ASPHALT	STA. 76+92.73, 14.75' LT	AVE Q
7	13,717,325.91	3,210,391.73	13,719,153.99	3,210,819.57	22.77	MAG NAIL ON ASPHALT	STA. 70+79.75, 4.31' RT	AVE Q
8	13,716,708.52	3,210,412.56	13,718,536.51	3,210,840.40	22.09	MAG NAIL ON ASPHALT	STA. 64+61.93, 4.52' RT	AVE Q
9	13,716,055.62	3,210,432.10	13,717,883.53	3,210,859.95	22.56	MAG NAIL ON ASPHALT	STA. 58+08.65, 2.24' RT	AVE Q
10	13,715,498.96	3,210,431.95	13,717,326.80	3,210,859.80	23.24	MAG NAIL ON ASPHALT	STA. 52+52.24, 16.50' LT	AVE Q
11	13,714,993.06	3,210,450.71	13,716,820.83	3,210,878.56	23.31	MAG NAIL ON ASPHALT	STA. 47+45.92, 14.65' LT	AVE Q
12	13,714,491.30	3,210,467.27	13,716,319.00	3,210,895.12	22.85	MAG NAIL ON ASPHALT	STA. 42+43.82, 14.86' LT	AVE Q
13	13,714,064.18	3,210,485.56	13,715,891.82	3,210,913.41	24.54	MAG NAIL ON ASPHALT	STA. 38+16.27, 10.84' LT	AVE Q
14	13,713,654.40	3,210,515.80	13,715,481.99	3,210,943.66	24.98	MAG NAIL ON ASPHALT	STA. 34+05.66, 5.70' RT	AVE Q
15	13,713,128.81	3,210,519.34	13,714,956.32	3,210,947.20	25.40	MAG NAIL ON ASPHALT	STA. 28+80.17, 8.32' LT	AVE Q
16	13,712,812.82	3,210,544.80	13,714,640.30	3,210,972.66	25.56	MAG NAIL ON ASPHALT	STA. 25+63.47, 6.58' RT	AVE Q
17	13,712,373.40	3,210,541.99	13,714,200.82	3,210,969.85	26.98	MAG NAIL ON ASPHALT	STA. 21+24.33, 10.91' LT	AVE Q
18	13,711,986.59	3,210,556.06	13,713,813.95	3,210,983.92	26.33	MAG NAIL ON ASPHALT	STA. 17+37.21, 9.77' LT	AVE Q
19	13,711,633.60	3,210,568.15	13,713,460.92	3,210,996.02	26.58	MAG NAIL ON ASPHALT	STA. 13+83.97, 9.47' LT	AVE Q
20	13,711,173.54	3,210,583.03	13,713,000.79	3,211,010.90	27.20	MAG NAIL ON ASPHALT	STA. 9+23.61, 9.96' LT	AVE Q
21	13,710,742.68	3,210,595.50	13,712,569.88	3,211,023.36	26.42	MAG NAIL ON ASPHALT	STA. 4+92.51, 11.89' LT	AVE Q
4001	13,708,189.35	3,214,792.08	13,710,016.21	3,215,220.51	21.85	5/8" IRC	STA. 35+42.50, 120.65' LT	AVE L
4002	13,704,829.97	3,215,000.19	13,706,656.38	3,215,220.21	19.72	5/8" IRC	STA. 1+77.27, 36.86 LT	AVE L
4003	13,710,398.70	3,210,644.68	13,712,225.85	3,211,072.55	26.19	5/8" IRC	STA. 1+47.04, 25.78' RT	AVE Q
4004	13,720,419.89	3,210,253.86	13,722,248.38	3,210,681.68	17.66	5/8" IRC	STA. 101+77.02, 30.15' LT	AVE Q

NOTES:

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE (4204) NAD83 (2011 ADJ) 2010 EPOCH. COORDINATES SHOWN HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY DIVIDING BY THE COMBINED SCALE FACTOR OF 0.99986675.

ALL DISTANCES ARE SURFACE VALUES.

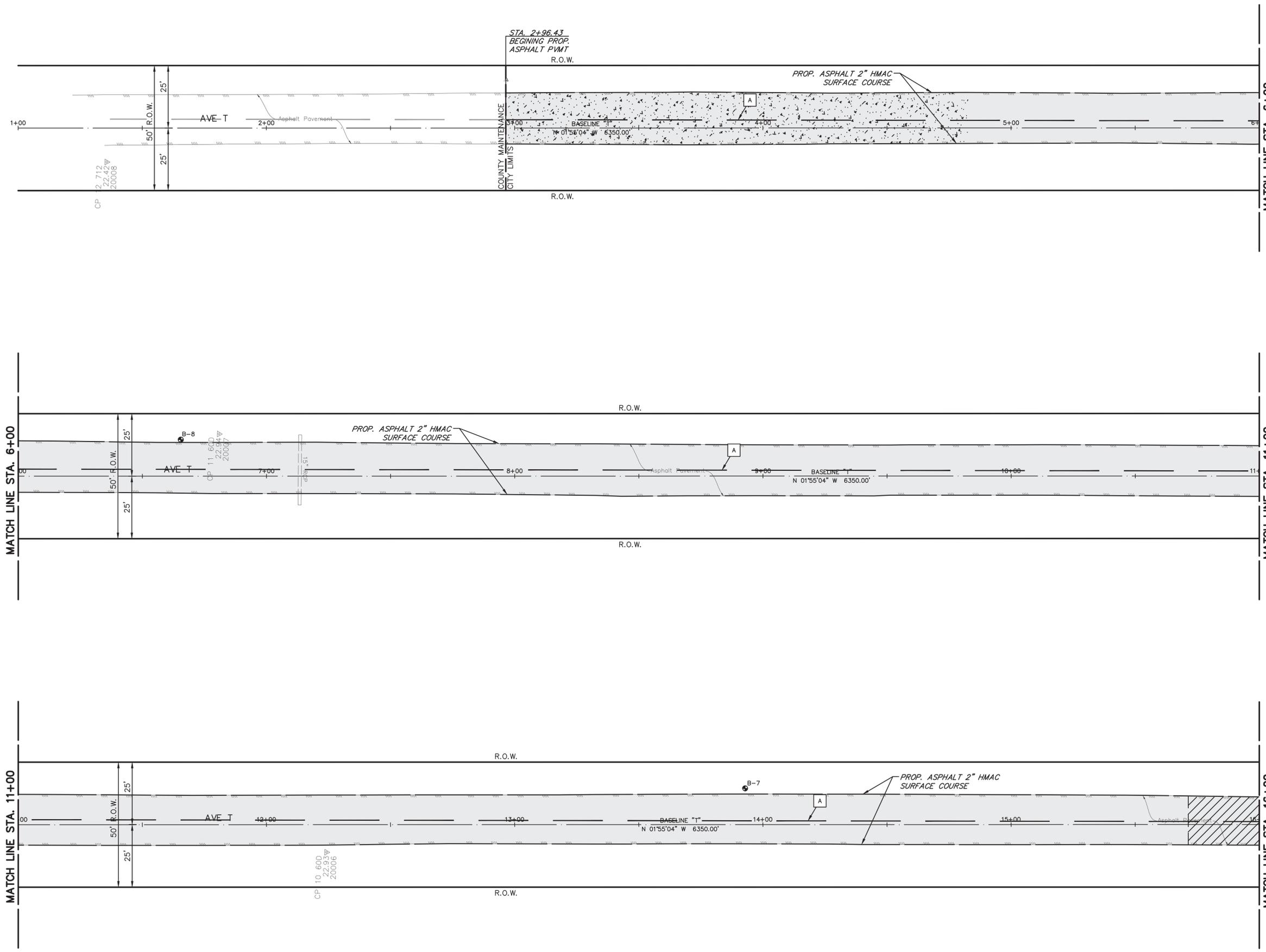
RIGHT OF WAY (ROW) IS APPROXIMATE.

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.

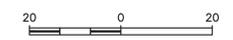


2	TITLE BLOCK CHANGE	06/10/20	WR
1	COMMENT REVISIONS	02/18/20	WR
REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
SURVEY CONTROL (SHEET 11 OF 11)			
AMANI ENGINEERING, INC.		8303 SOUTHWEST FREEWAY SUITE 600 HOUSTON, TEXAS 77074 TEL: (713) 270-5700 TBPE REG. NO. F-4528 TBPELS REG. NO. 1028200	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 20	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\21 AVENUE T PLAN STA. 1+00 TO STA. 16+00.dwg Jul 02, 2020-11:12pm Terra Associates Inc., Ricardo Bello



BENCHMARK
 ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.

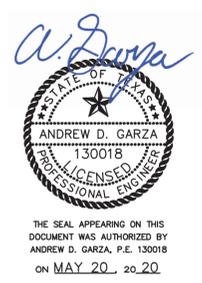


- LEGEND**
- PROPOSED ASPHALT 2" HMA SURFACE COURSE
 - PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
 - PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 7.

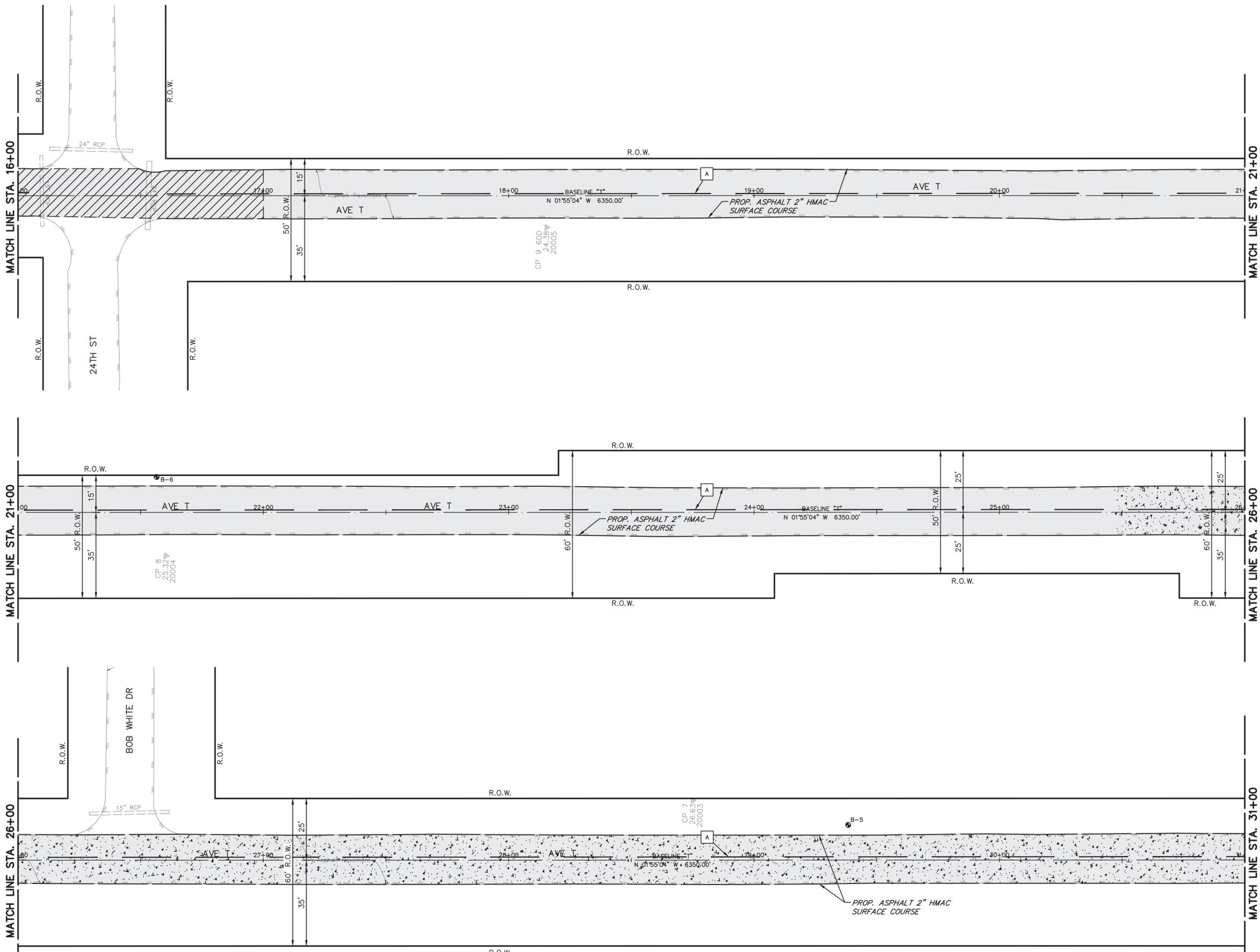
- CONSTRUCTION NOTE:**
- CONTRACTOR TO REPLACE ALL TRAFFIC STRIPING PER EXISTING LAYOUT.

- PAVEMENT MARKING LEGEND**
- A** REFLECTOR MRK TY II (Y) (4") (BRKN)
 - B** REFLECTOR MRK TY II (W) (12") (SLD)
 - C** REFLECTOR MRK TY II (W) (24") (SLD)
 - D** REFERENCE SHEET 45 FOR RAILROAD STRIPING

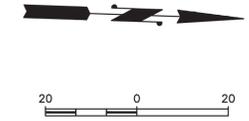


REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE T PLAN STA. 1+00 TO STA. 16+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 21	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\22 AVENUE T PLAN STA. 16+00 TO STA. 31+00.dwg Jul 02, 2020-1:12pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.



- LEGEND**
-  PROPOSED ASPHALT 2" HMA SURFACE COURSE
 -  PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
 -  PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

- GENERAL NOTES:**
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
 2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 3. REFERENCE TYPICAL SECTION ON PAGE 7.

- CONSTRUCTION NOTE:**
1. CONTRACTOR TO REPLACE ALL TRAFFIC STRIPING PER EXISTING LAYOUT.

- PAVEMENT MARKING LEGEND**
-  REFLECTOR MRK TY II (Y) (4") (BRKN)
 -  REFLECTOR MRK TY II (W) (12") (SLD)
 -  REFLECTOR MRK TY II (W) (24") (SLD)
 -  REFERENCE SHEET 45 FOR RAILROAD STRIPING

A. D. Garza



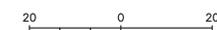
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE T PLAN STA. 16+00 TO STA. 31+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 22	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\23 AVENUE T PLAN STA. 31+00 TO STA. 46+00.dwg Jul 02, 2020-1:13pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.

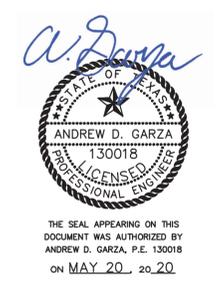


- LEGEND**
-  PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)
 -  PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
 -  PROPOSED ASPHALT 2" HMA SURFACE COURSE

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 7.

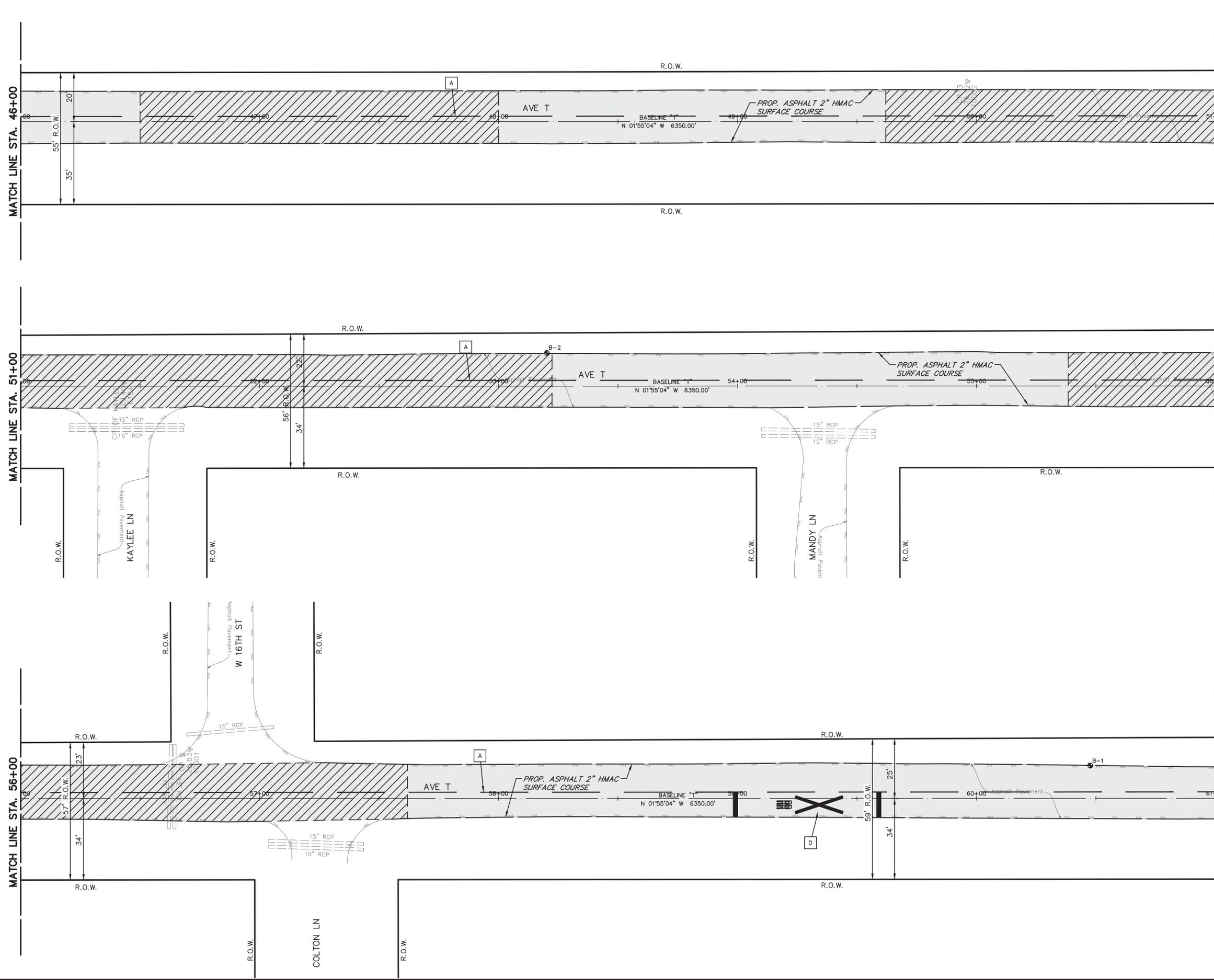
- CONSTRUCTION NOTE:**
- CONTRACTOR TO REPLACE ALL TRAFFIC STRIPING PER EXISTING LAYOUT.

- PAVEMENT MARKING LEGEND**
-  REFLECTOR MRK TY II (Y) (4") (BRKN)
 -  REFLECTOR MRK TY II (W) (12") (SLD)
 -  REFLECTOR MRK TY II (W) (24") (SLD)
 -  REFERENCE SHEET 45 FOR RAILROAD STRIPING

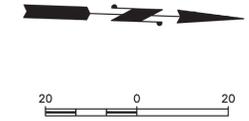


REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE T PLAN STA. 31+00 TO STA. 46+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 23	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\24 AVENUE T PLAN STA. 46+00 TO STA. 61+00.dwg Jul 02, 2020-1:13pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.

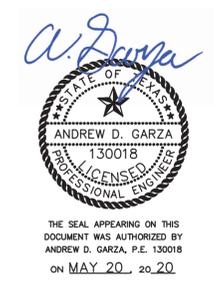


- LEGEND**
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
 - PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
 - PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 7.

- CONSTRUCTION NOTE:**
- CONTRACTOR TO REPLACE ALL TRAFFIC STRIPING PER EXISTING LAYOUT.

- PAVEMENT MARKING LEGEND**
- REFLECTOR MKR TY II (Y) (4") (BRKN)
 - REFLECTOR MKR TY II (W) (12") (SLD)
 - REFLECTOR MKR TY II (W) (24") (SLD)
 - REFERENCE SHEET 45 FOR RAILROAD STRIPING

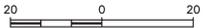


REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE T PLAN STA. 46+00 TO 61+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 24	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\25 AVENUE T PLAN STA. 61+00 TO END.dwg Jul 02, 2020-1:13pm Terra Associates Inc., Ricardo Bello

BENCHMARK

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.



LEGEND

-  PROPOSED ASPHALT 2" HMAC SURFACE COURSE
-  PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
-  PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

GENERAL NOTES:

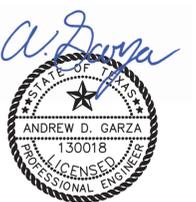
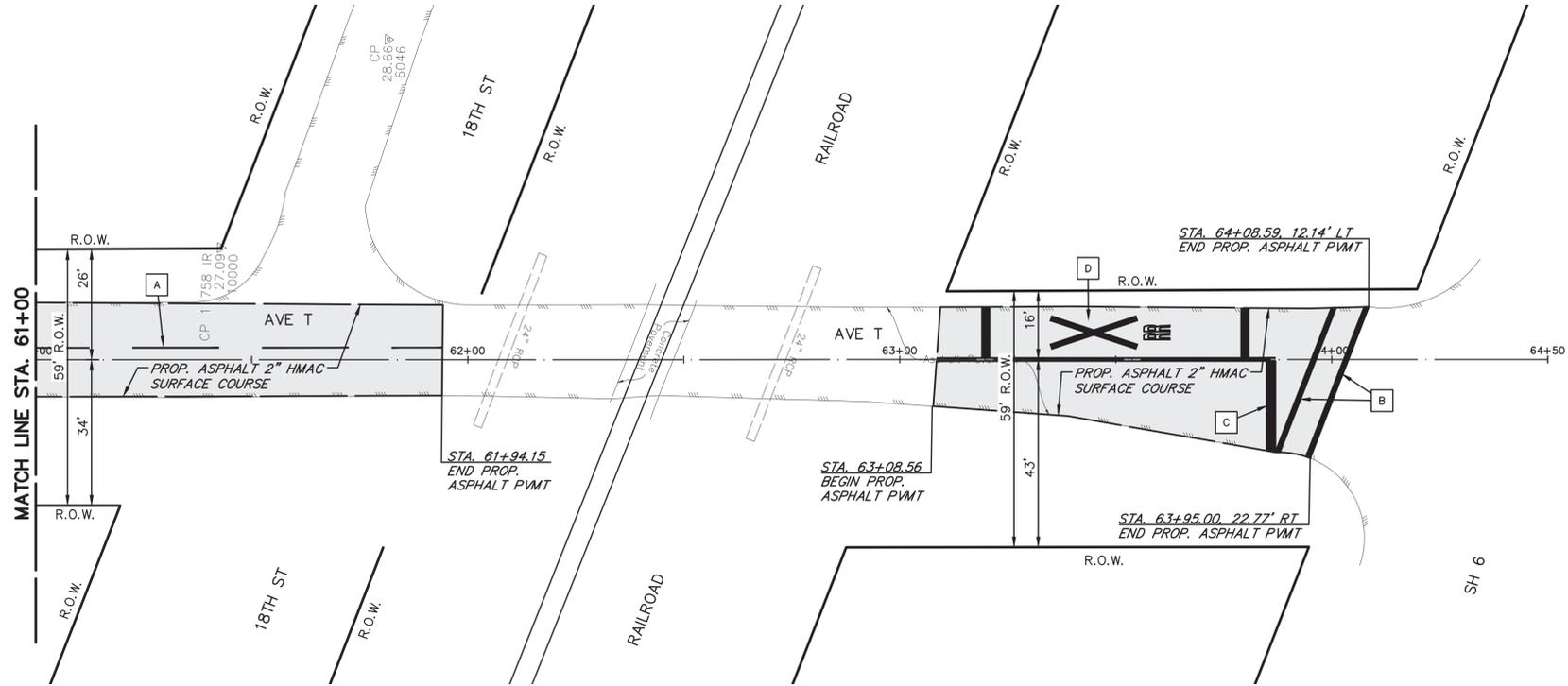
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
3. REFERENCE TYPICAL SECTION ON PAGE 7.

CONSTRUCTION NOTE:

1. CONTRACTOR TO REPLACE ALL TRAFFIC STRIPING PER EXISTING LAYOUT.

PAVEMENT MARKING LEGEND

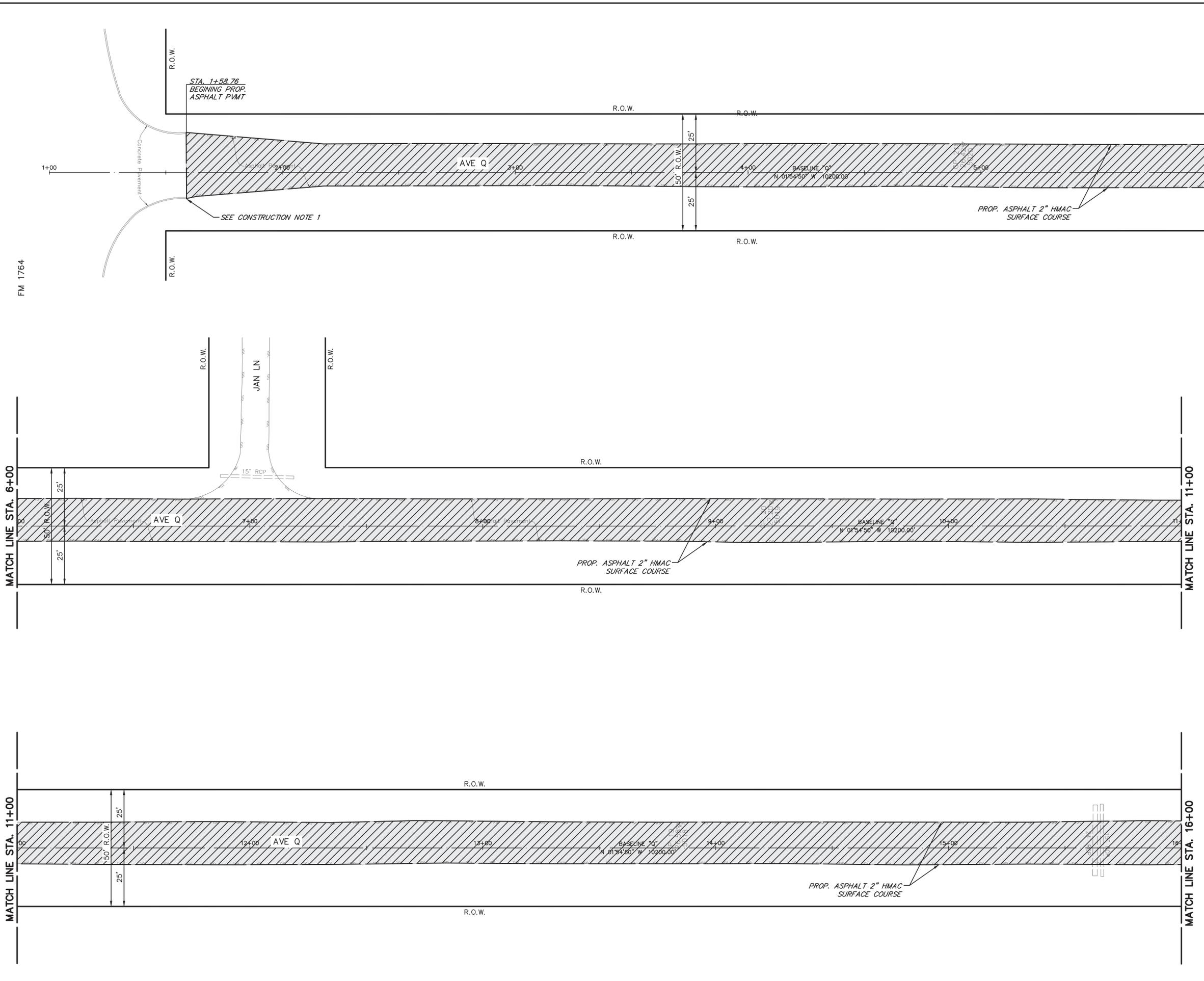
-  REFLECTOR MRK TY II (Y) (4") (BRKN)
-  REFLECTOR MRK TY II (W) (12") (SLD)
-  REFLECTOR MRK TY II (W) (24") (SLD)
-  REFERENCE SHEET 45 FOR RAILROAD STRIPING



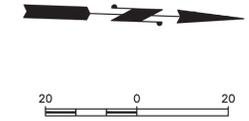
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE T PLAN STA. 61+00 TO END			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 25	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\26 AVENUE Q PLAN STA. 1+00 TO STA. 16+00.dwg Jul 02, 2020-1:13pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.



LEGEND

	PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE
	PROPOSED ASPHALT 2" HMA SURFACE COURSE

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
- CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.

A. D. Garza

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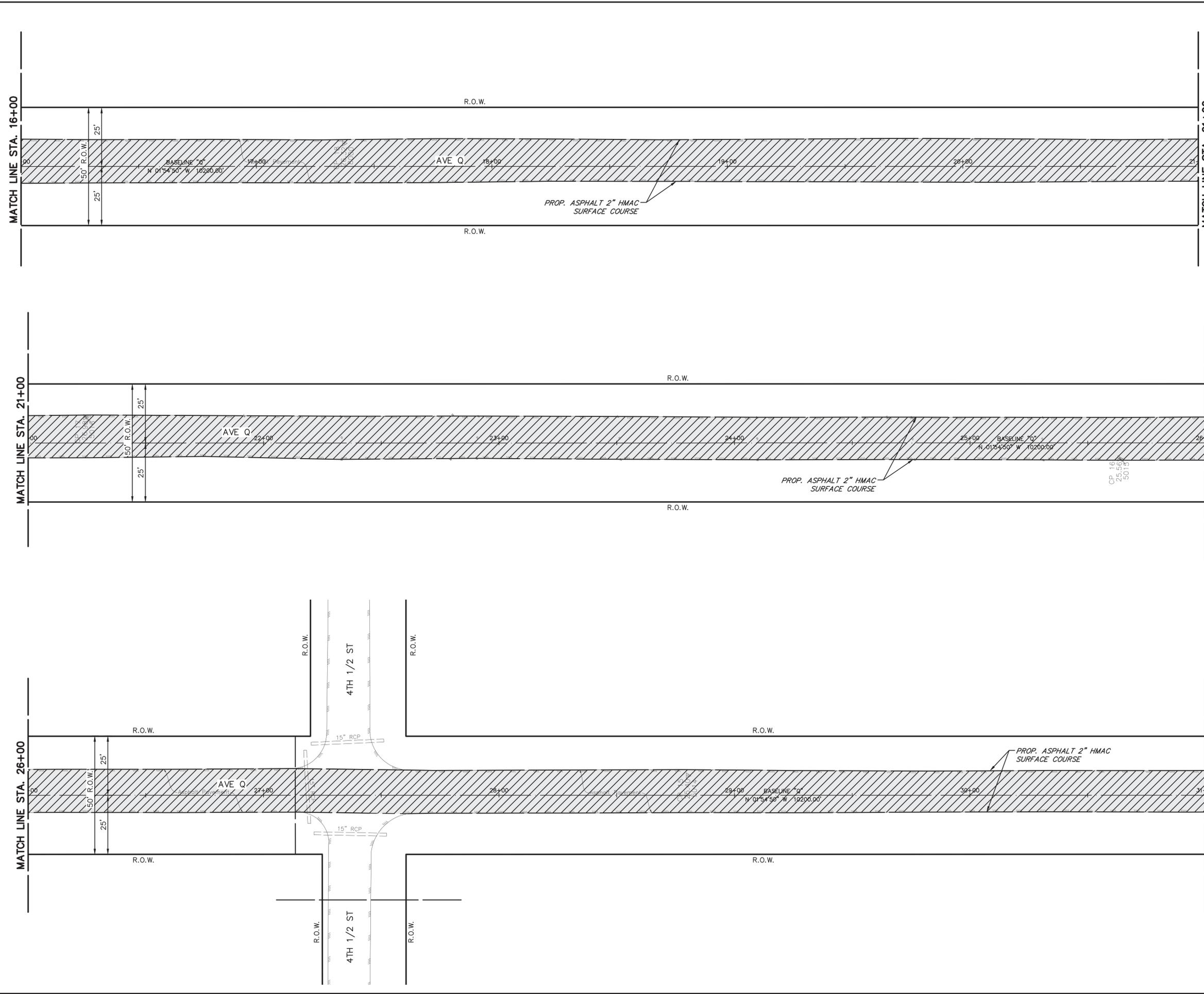
REV. NO.	DESCRIPTION	DATE	APP.

**SANTA FE
VARIOUS STREET IMPROVEMENTS
AVENUE Q
PLAN
STA. 1+00 TO STA. 16+00**

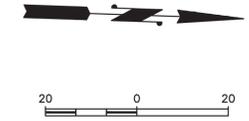
TERRA ASSOCIATES, INC. 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
TBPE Registration No.: F-003832

DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 26

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\27 AVENUE Q PLAN STA. 16+00 TO STA. 31+00.dwg Jul 02, 2020-1:13pm Terra Associates Inc., Ricardo Bello



BENCHMARK
 ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



- LEGEND**
- PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE
 - PROPOSED ASPHALT 2" HMA SURFACE COURSE

- GENERAL NOTES:**
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
 2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 3. REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
1. CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.

A. D. Garza

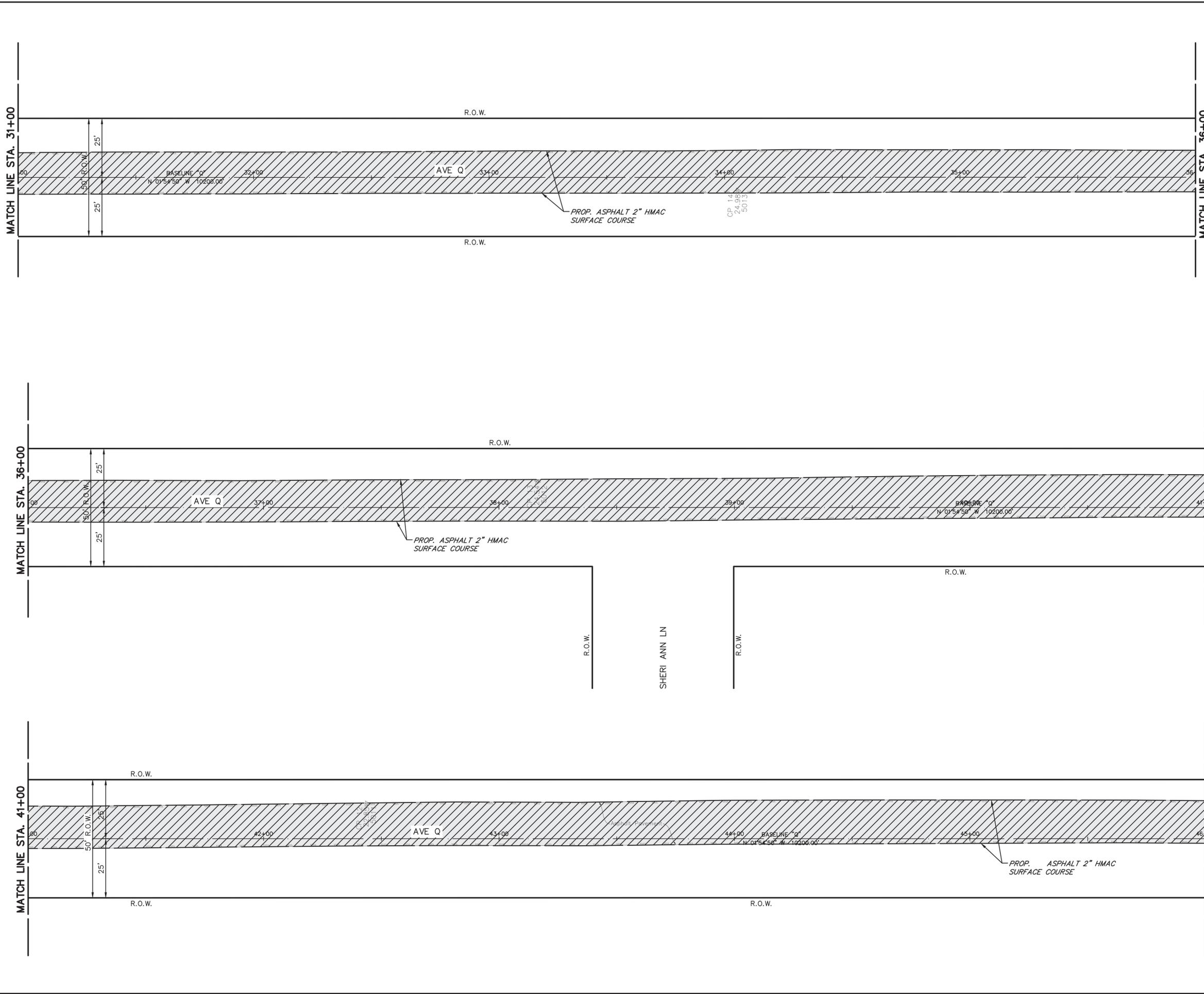
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.

SANTA FE
VARIOUS STREET IMPROVEMENTS
AVENUE Q
PLAN
STA. 16+00 TO STA. 31+00

TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS	1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832
DRAWN BY: TD	SCALE: 1" = 20'
CHECKED BY: ADG	DATE: DECEMBER 2019
PROJECT No. 0600-1902	CONTRACT: 1
SHEET 27	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\28 AVENUE Q PLAN STA. 31+00 TO STA. 46+00.dwg Jul 02, 2020-11:13pm Terra Associates Inc., Ricardo Bello



BENCHMARK

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



LEGEND

- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE

GENERAL NOTES:

1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
3. REFERENCE TYPICAL SECTION ON PAGE 8.

CONSTRUCTION NOTE:

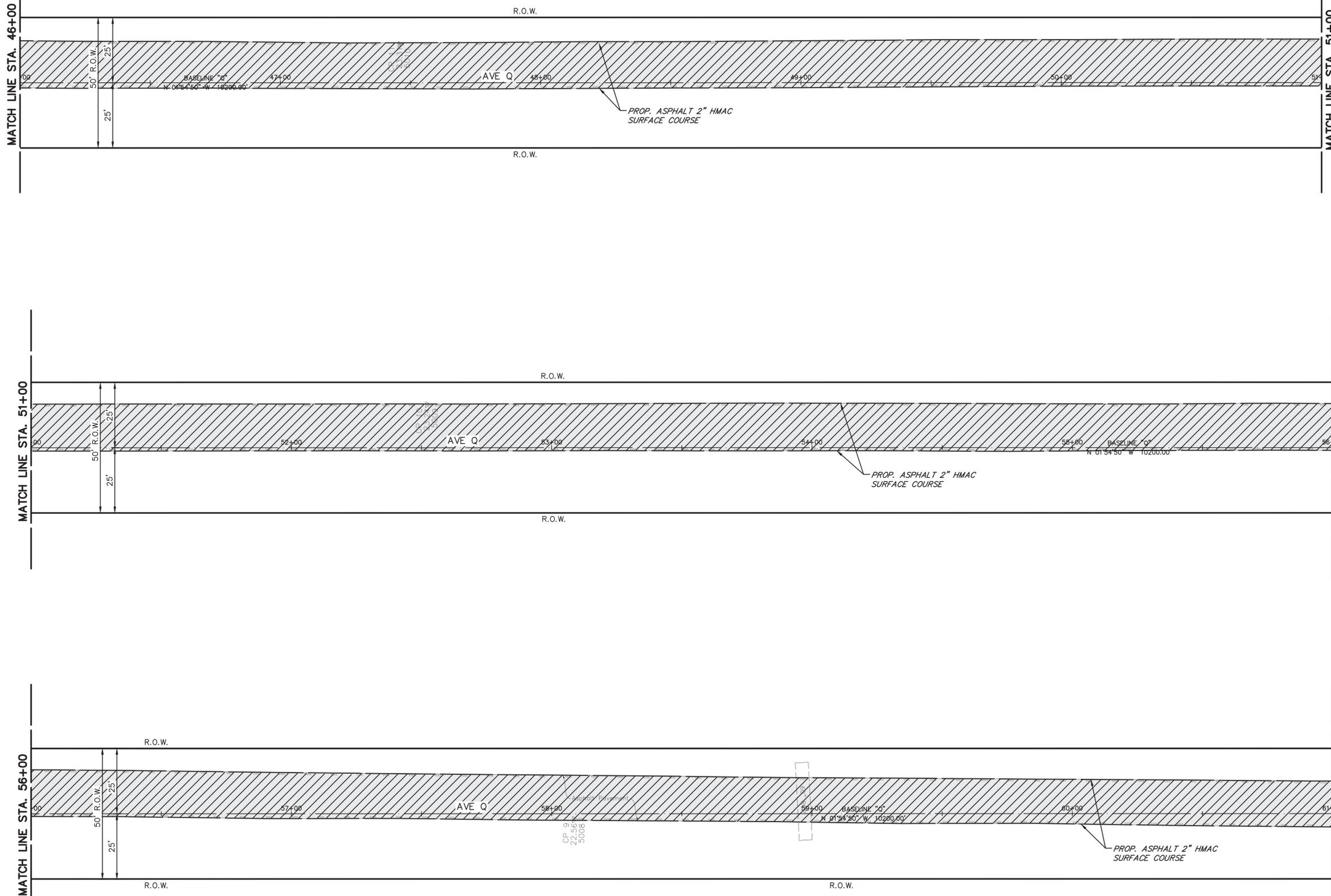
1. CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.



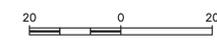
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
<p>SANTA FE VARIOUS STREET IMPROVEMENTS</p> <p>AVENUE Q PLAN</p> <p>STA. 31+00 TO STA. 46+00</p>			
<p>TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS</p>		<p>1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832</p>	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 28	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\0 AVENUE Q PLAN STA. 46+00 TO STA. 61+00.dwg Jul 02, 2020-11:44pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



- LEGEND**
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
 - PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE

- GENERAL NOTES:**
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 3. REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
1. CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.

A. D. Garza

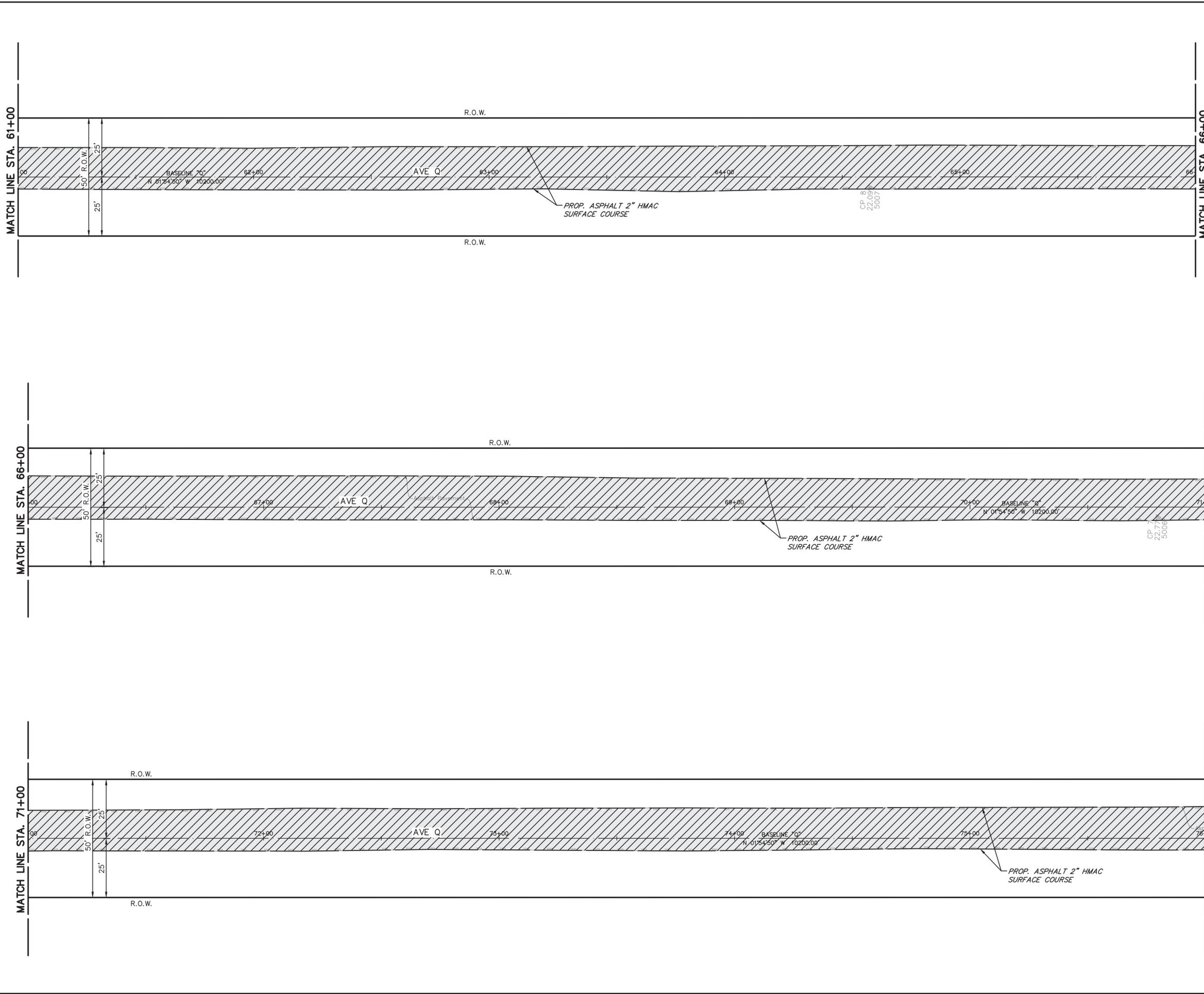
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REV. NO.	DESCRIPTION	DATE	APP.

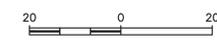
SANTA FE
VARIOUS STREET IMPROVEMENTS
AVENUE Q
PLAN
STA. 46+00 TO STA. 61+00

TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS	1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 29

F:\Clients\0600-Culveston County\0600-1902-Santa Fe Streets\Drawings\29 AVENUE Q PLAN STA. 61+00 TO STA. 76+00.dwg Jul 02, 2020-1:22pm Terra Associates Inc., Ricardo Bello



BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



LEGEND

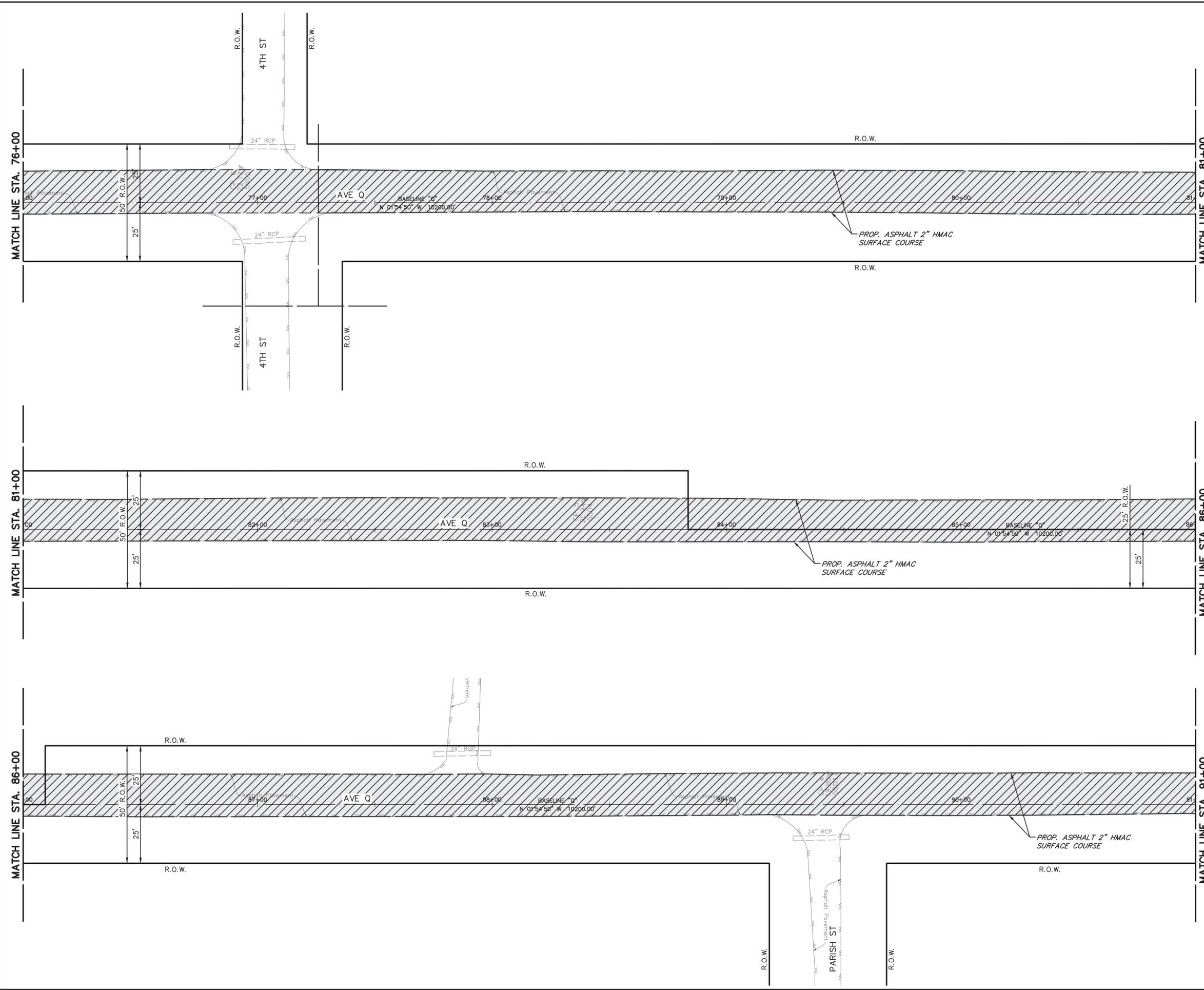
	PROPOSED ASPHALT 2" HMAC SURFACE COURSE
	PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE

- GENERAL NOTES:**
- EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 - CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 - REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
- CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.

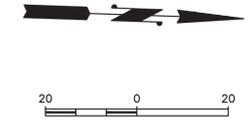
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE Q PLAN STA. 61+00 TO STA. 76+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 30	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\31 AVENUE Q PLAN STA. 76+00 TO STA. 91+00.dwg Jul 02, 2020-1:14pm Terra Associates Inc., Ricardo Bello

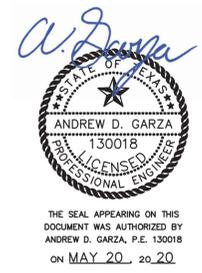


BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



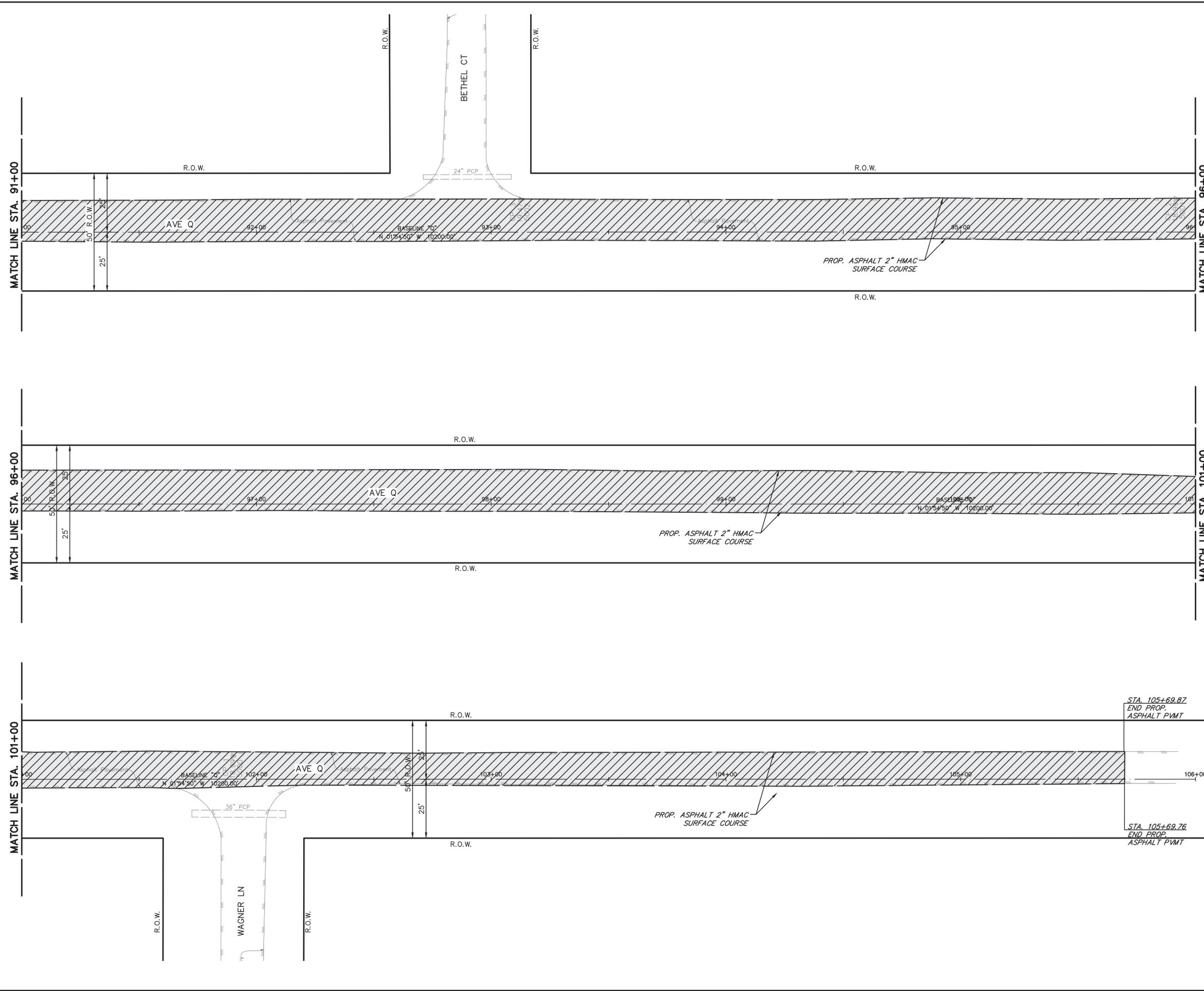
- LEGEND**
- PROPOSED ASPHALT 2" HMA SURFACE COURSE
 - PROPOSED ASPHALT 2" HMA SURFACE COURSE WITH 10" BLACK BASE

- GENERAL NOTES:**
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMA SURFACE COURSE.
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 3. REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
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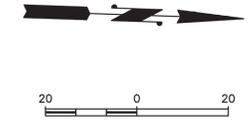


REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE Q PLAN STA. 76+00 TO STA. 91+00			
1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832			
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 31	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\32 AVENUE Q PLAN STA. 91+00 TO END.dwg Jul 02, 2020-1:14pm Terra Associates Inc., Ricardo Bello

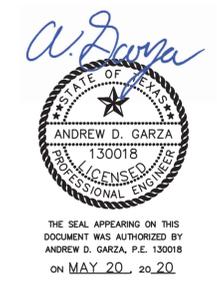


BENCHMARK
ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.



- LEGEND**
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
 - PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE

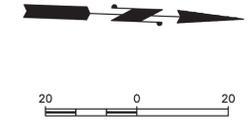
- GENERAL NOTES:**
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 2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 3. REFERENCE TYPICAL SECTION ON PAGE 8.
- CONSTRUCTION NOTE:**
1. CONTRACTOR TO PRIORITIZE AVENUE T, THEN PROCEED TO REPAIR AVENUE Q FROM 4TH STREET TO 4-1/2TH STREET, AND THEN THE REMAINDER OF Q.



REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE Q PLAN STA. 91+00 TO END			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 32	

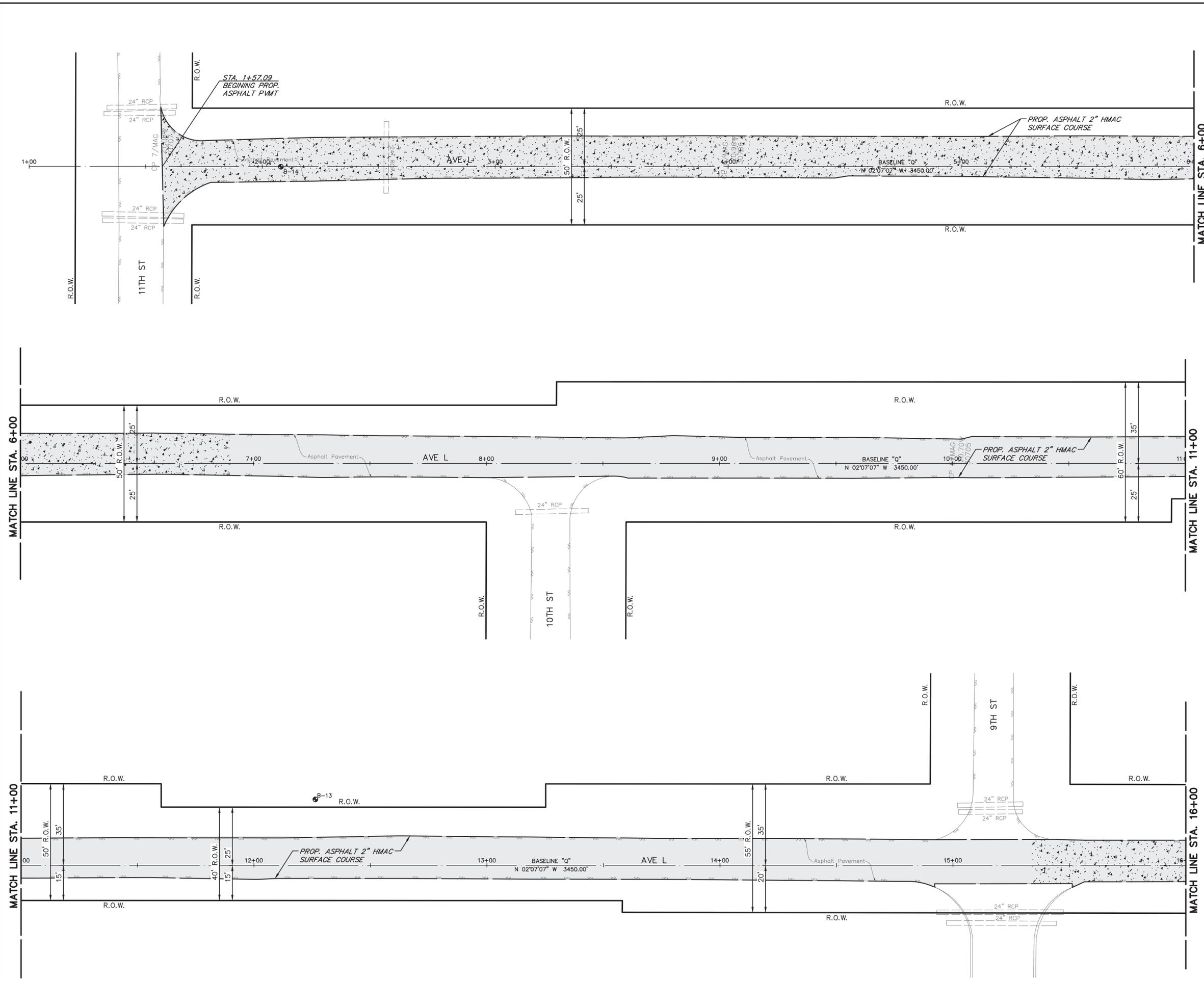
F:\Clients\0600-Culveston County\0600-1902-Santa Fe Streets\Drawings\33 AVENUE L PLAN STA. 1+00 TO STA. 16+00.dwg Jul 02, 2020-1:14pm Terra Associates Inc., Ricardo Bello

BENCHMARK
 ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.



- LEGEND**
-  PROPOSED ASPHALT 2" HMAC SURFACE COURSE
 -  PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
 -  PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

- GENERAL NOTES:**
1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
 2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
 3. REFERENCE TYPICAL SECTION ON PAGE 9.



A. D. Garza

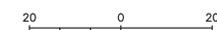


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REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE L PLAN STA 1+00 TO STA 16+00			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 33	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\34 AVENUE L PLAN STA. 16+00 TO STA. 31+00.dwg Jul 02, 2020-1:14pm Terra Associates Inc., Ricardo Bello

BENCHMARK
 ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOID18.

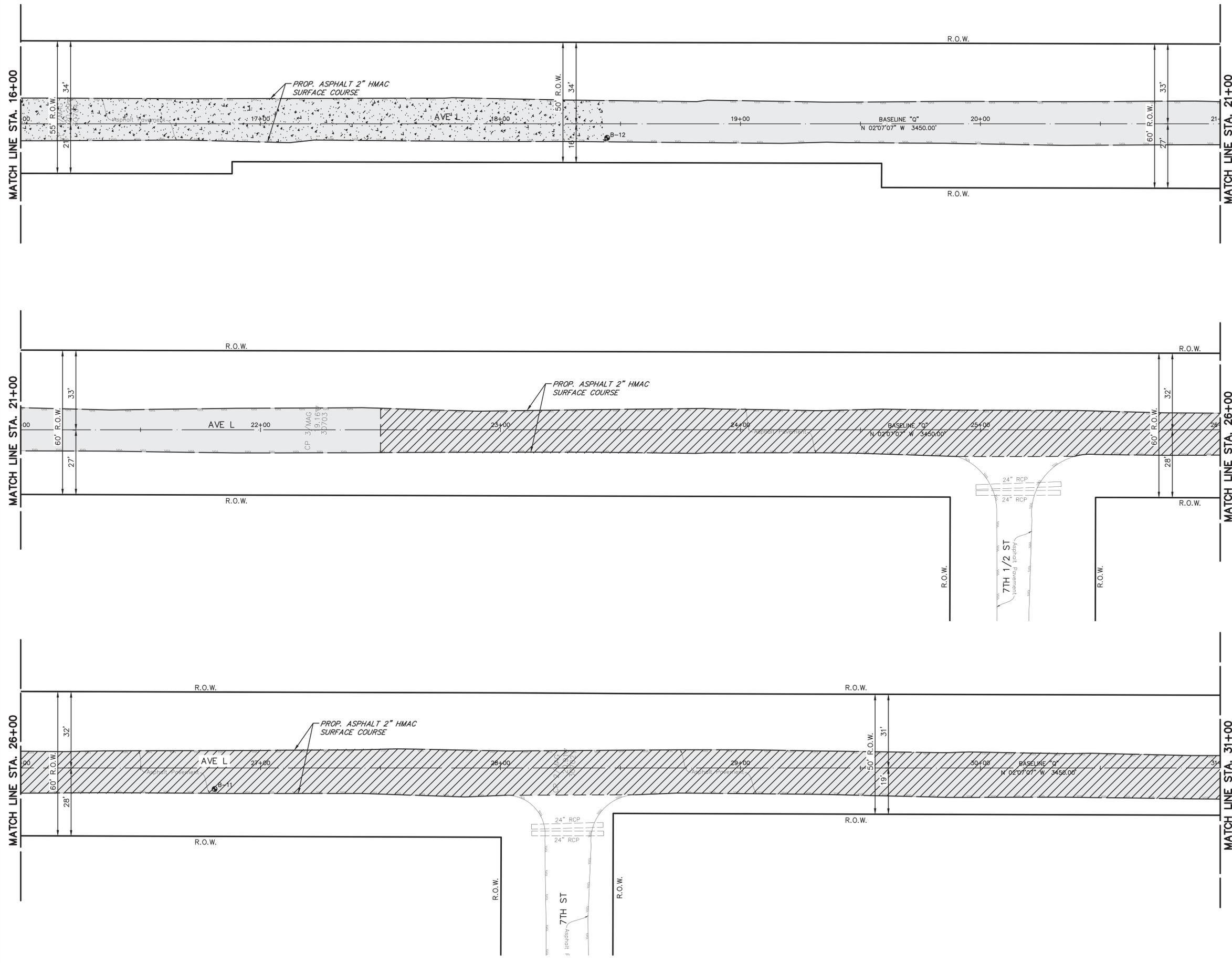


LEGEND

- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

GENERAL NOTES:

1. EXISTING ASPHALTIC CONCRETE SURFACE LAYER SHOULD BE MILLED TO ITS FULL DEPTH TO ACCOMMODATE PLACEMENT OF NEW HMAC SURFACE COURSE.
2. CONTRACTOR TO ENSURE PROPOSED OVERLAY ELEVATIONS OF ROADWAY ARE NOT HIGHER THAN EXISTING ROADWAY ELEVATIONS.
3. REFERENCE TYPICAL SECTION ON PAGE 9.



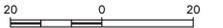
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS AVENUE L PLAN STA 16+00 TO STA 31+00			
TERRA <small>ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS</small>		1445 N. LOOP WEST - SUITE 450 <small>HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832</small>	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 34	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\35 AVENUE L PLAN STA. 31+00 TO END.dwg Jul 02, 2020-1:14pm Terra Associates Inc., Ricardo Bello

BENCHMARK

ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) GEOD18.

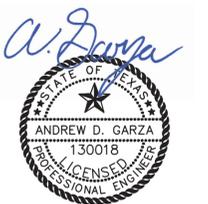
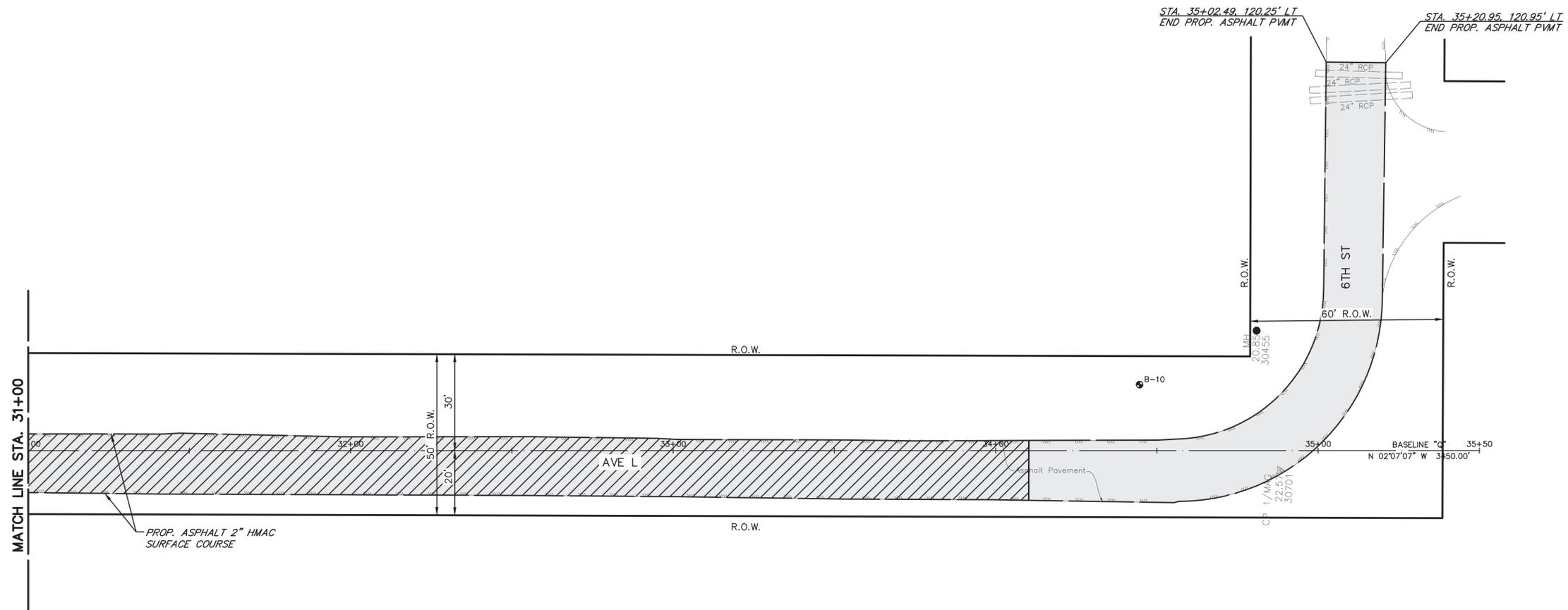


LEGEND

- PROPOSED ASPHALT 2" HMAC SURFACE COURSE
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" CHEMICALLY TREATED BASE MATERIAL (PARTIAL BASE REPAIR)
- PROPOSED ASPHALT 2" HMAC SURFACE COURSE WITH 10" BLACK BASE (FULL BASE REPAIR)

GENERAL NOTES:

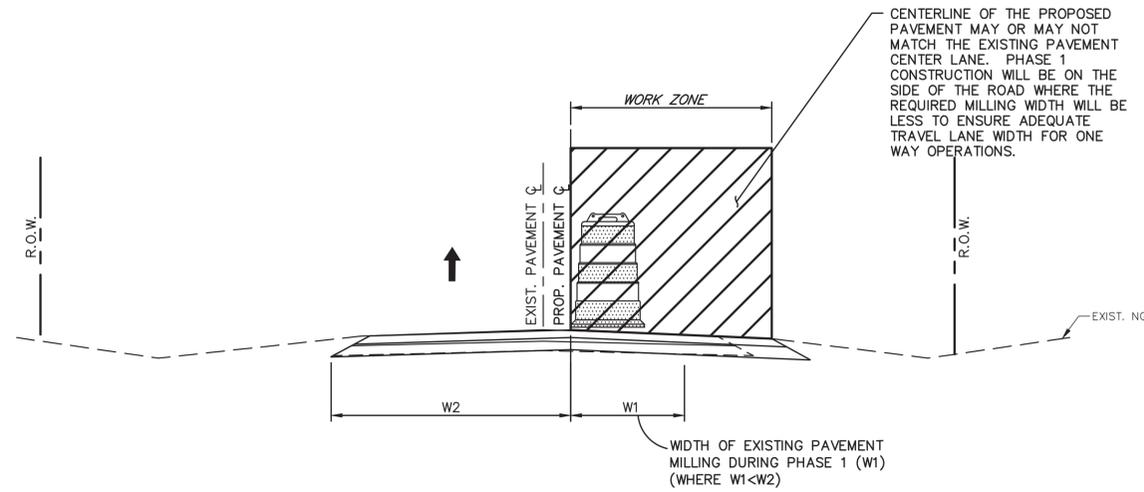
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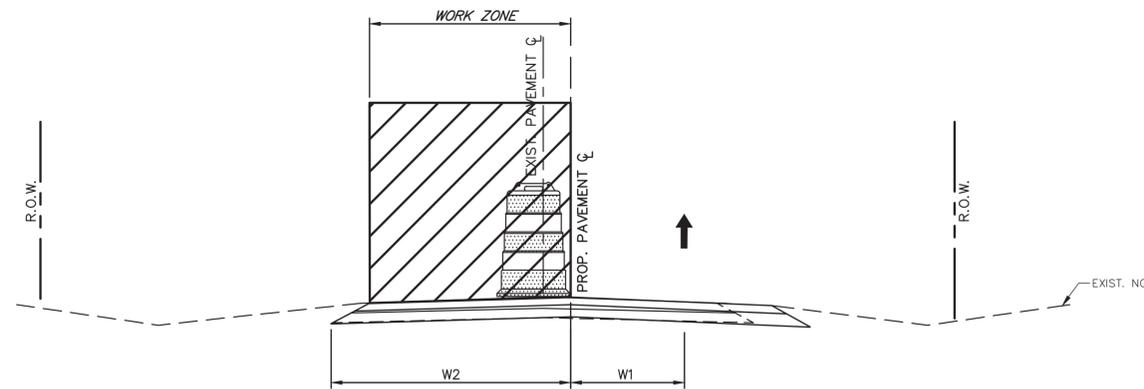
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REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
AVENUE L PLAN STA. 31+00 TO END			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1" = 20'	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 35	

F:\Clients\0600-Culveston County\0600-1902 Santa Fe Streets\Drawings\36 TRAFFIC CONTROL PLAN ROADWAY OVERLAY TYPICAL.dwg Jul 02, 2020-1:15pm Terra Associates Inc., Ricardo Bello



**TYPICAL WORK ZONE SECTION
(PHASE 1)**



**TYPICAL WORK ZONE SECTION
(PHASE 2)**

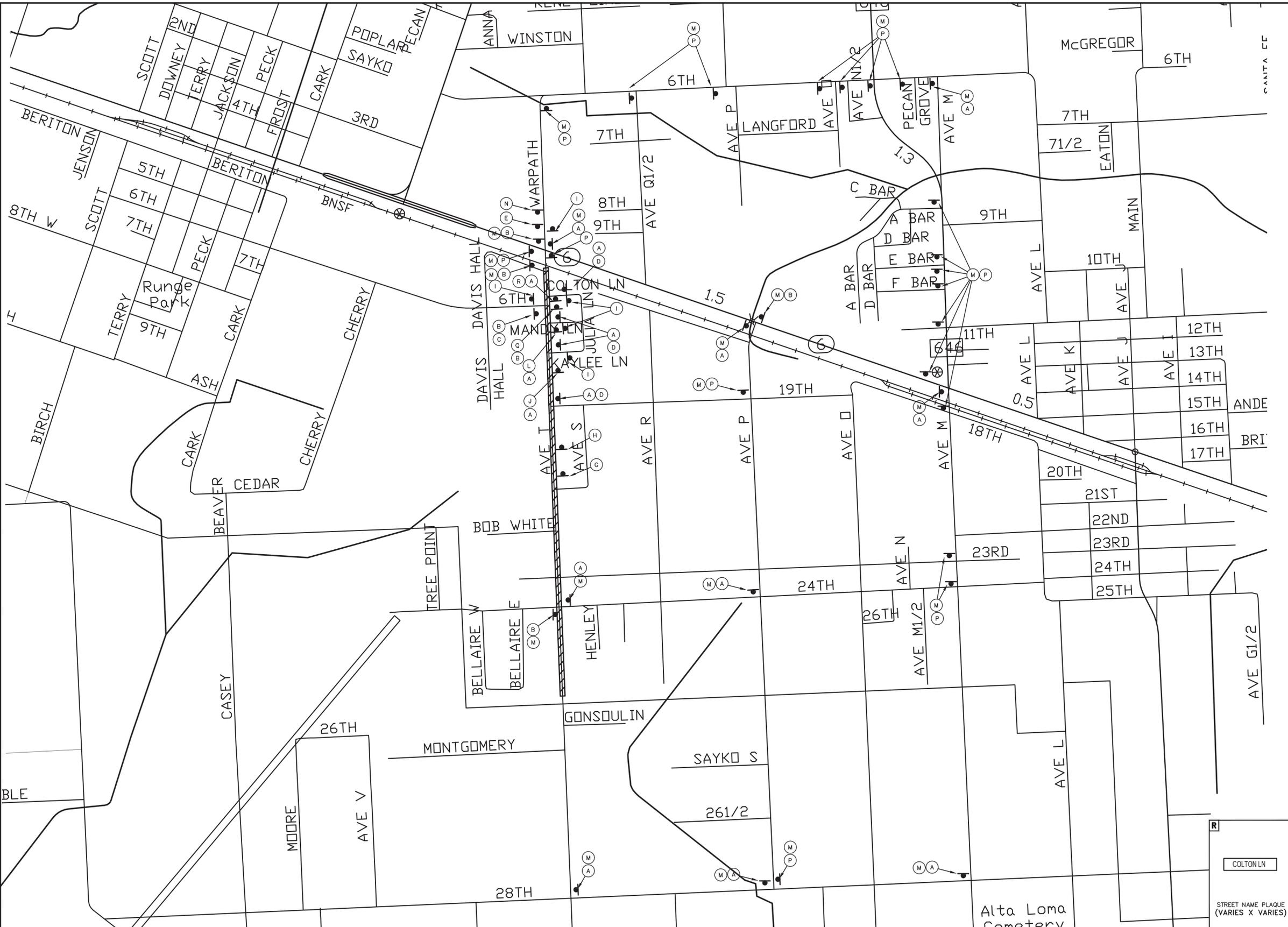
LEGEND	
	WORK ZONE
	EXISTING PAVEMENT
	PROPOSED PAVEMENT
	DIRECTIONAL ARROW



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
TRAFFIC CONTROL PLAN ROADWAY OVERLAY TYPICAL			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 36	

F:\Clients\Galveston County\0600-1902 Santa Fe Streets\Drawings\37 AVENUE T - DETOUR PLAN.dwg Jul 02, 2020-1:15pm Terra Associates Inc., Ricardo Bello



LEGEND		LENGTH FOR LONGITUDINAL BUFFER	
	CONSTRUCTION ZONE		
	SIGN	POSTED SPEED (MPH)	LENGTH IN FEET (ft)
	FLAGGER / POLICE OFFICER	30	45
	TYPE III BARRICADE	45	50
	FLASHING ARROW PANEL	50	
	BARREL/DRUM	TYPICAL SIGN SPACING AND TAPER LENGTHS	
	OPEN TRAFFIC LANE	MIN. DESIRABLE TAPER LENGTH "L"	
		POSTED SPEED (MPH)	MIN. DESIRABLE TAPER LENGTH "L"
		30	100'
		45	150'
		50	200'

- NOTE:**
- FOR ROADWAY OVERLAY CONSTRUCTION AT 4-WAY INTERSECTIONS, REFER TO "TCP 4-WAY INTERSECTION PHASES 1-4".
 - FOR ROADWAY OVERLAY CONSTRUCTION AT 3-WAY INTERSECTIONS, REFER TO "TCP TYPICAL 3-WAY INTERSECTION PHASES 1-3".
 - THE DIRECTION OF THE TRAFFIC FLOW ALONG AVENUE T SHALL BE NORTHBOUND FOR ALL PHASES OF CONSTRUCTION.
 - DETOUR PLAN SHALL BE IMPLEMENTED DURING ALL PHASES OF CONSTRUCTION.
 - FOR CONSTRUCTION, SEE TCP ROADWAY OVERLAY TYPICALS.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020

M4-9R (30" X 24")	M4-9(L) (30" X 24")	R3-1 (24" X 24")	R3-2 (24" X 24")	(36" X 36")	M4-8a	CW20-1 (36" X 36")	CW20-4 (36" X 36")	G20-2 (48" X 24")	STREET NAME PLAQUE (VARIES X VARIES)	M4-8 (24" X 12")	STREET NAME PLAQUE (VARIES X VARIES)	STREET NAME PLAQUE (VARIES X VARIES)		M4-9(Sp) (30" X 24")	STREET NAME PLAQUE (VARIES X VARIES)

REV. NO.	DESCRIPTION	DATE	APP.

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

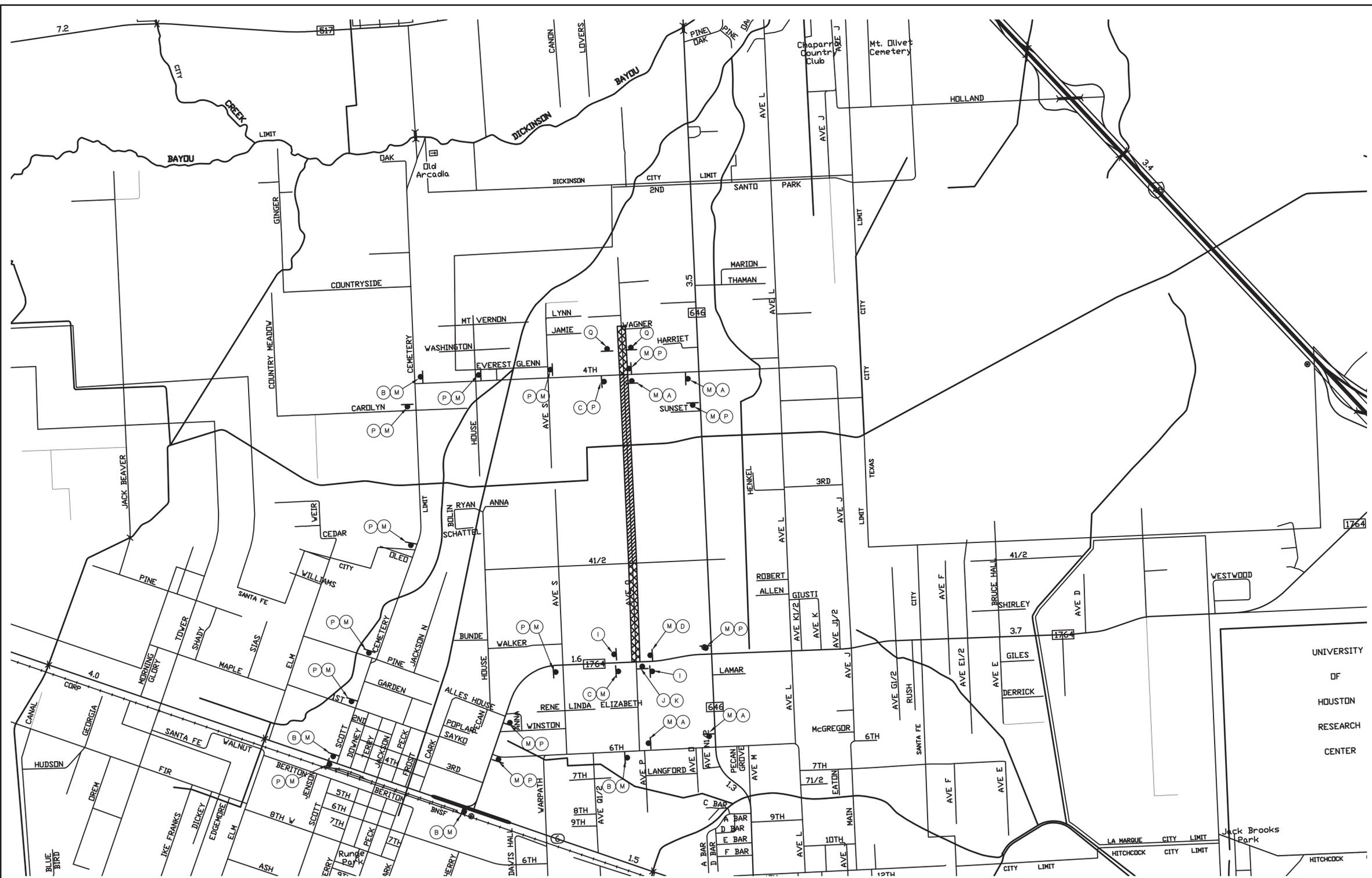
**AVENUE T - DETOUR
PLAN**

TERRA ASSOCIATES, INC.
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS

1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-003832

DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 37

F:\Clients\0600-Galveston County\0600-1902 Santa Fe Streets\Drawings\38 AVENUE Q - DETOUR PLAN.dwg Jul 02, 2020-1:15pm Terra Associates Inc., Ricardo Bello



LEGEND	LENGTH FOR LONGITUDINAL BUFFER	
	POSTED SPEED (MPH)	LENGTH IN FEET (ft)
CONSTRUCTION ZONE SEGMENT 1	30	50
CONSTRUCTION ZONE SEGMENT 2	45	75
SIGN		
FLAGGER / POLICE OFFICER		
TYPE III BARRICADE		
FLASHING ARROW PANEL	TYPICAL SIGN SPACING AND TAPER LENGTHS	
BARRELOURUM		
OPEN TRAFFIC LANE		
	MIN. DESIRABLE TAPER LENGTH "L"	
	POSTED SIGN SPACING "X"	10' OFFSET
	11' OFFSET	12' OFFSET
	30	120'
	45	150'
	60	200'
	75	250'
	90	300'

- NOTES:**
- FOR ROADWAY OVERLAY CONSTRUCTION AT 4-WAY INTERSECTION, REFER TO "TOP 4-WAY INTERSECTION PHASES 1-4".
 - FOR ROADWAY OVERLAY CONSTRUCTION AT 3-WAY INTERSECTION, REFER TO "TOP TYPICAL 3-WAY INTERSECTION PHASES 1-3".
 - THE DIRECTION OF THE TRAFFIC FLOW ALONG AVENUE Q SHALL BE NORTHBOUND FOR ALL PHASES OF CONSTRUCTION.
 - DETOUR PLAN SHALL BE IMPLEMENTED DURING ALL PHASES OF CONSTRUCTION.
 - FOR CONSTRUCTION, SEE TOP ROADWAY OVERLAY TYPICALS.
 - FOR THE CONSTRUCTION OF SEGMENT II (NORTH OF 4TH STREET) CONTRACTOR MUST CONSTRUCT OVERLAY IN MULTIPLE SEGMENTS UNTIL CONSTRUCTION IS COMPLETED. SEGMENTS SHALL BE COMPLETED IN ITS ENTIRETY IN 1 WORKING DAY. LANE CLOSURES MUST BE REOPENED AT THE END OF CONSTRUCTION EACH DAY. FOR SEGMENT II CONSTRUCTION REFER TO "TOP TYPICAL 1-LANE 2-WAY" SHEET. CONTRACTOR SHALL DEEM THE LENGTH OF EACH SEGMENT.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020

REV. NO.	DESCRIPTION	DATE	APP.

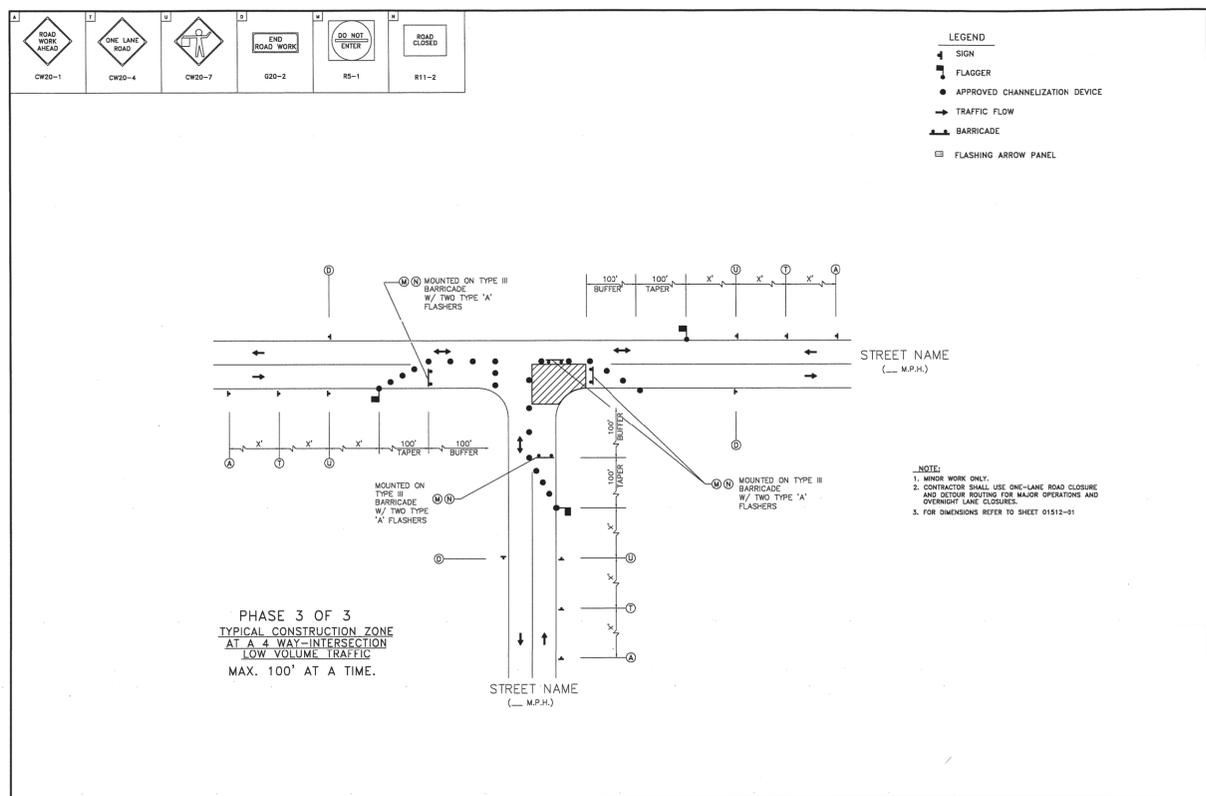
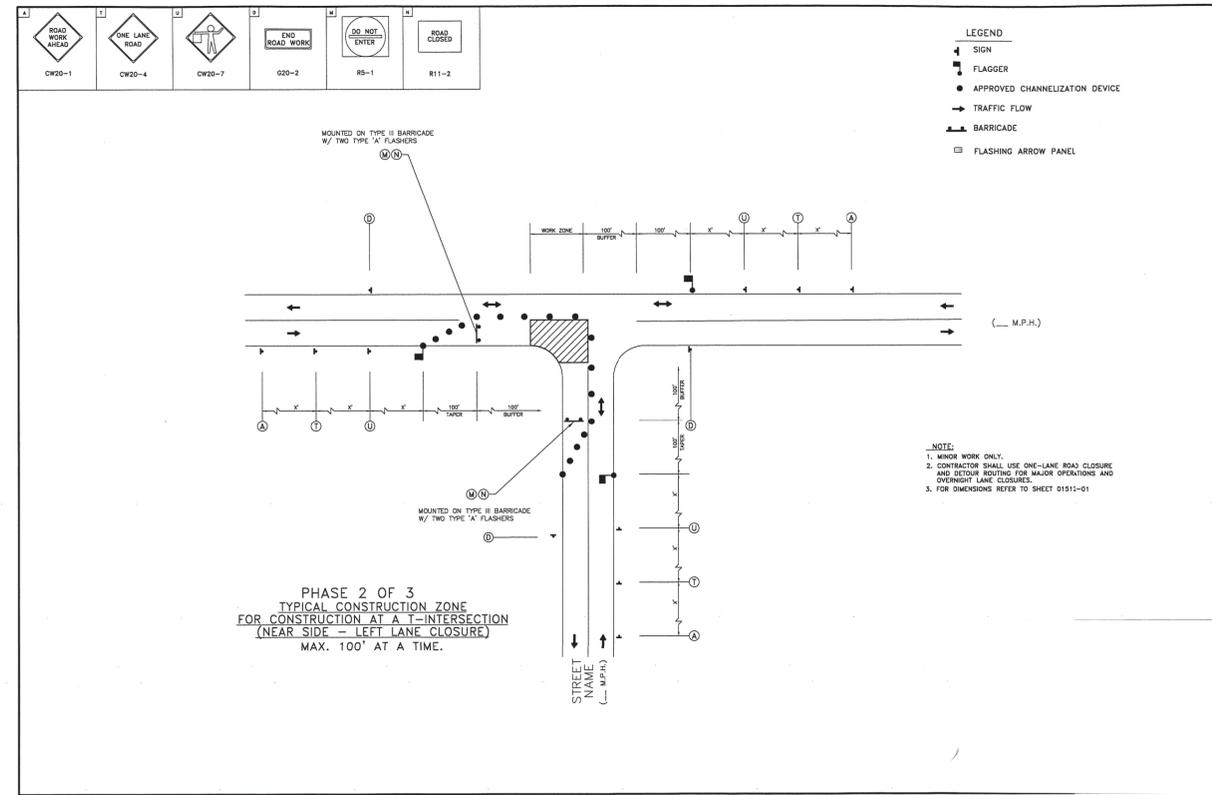
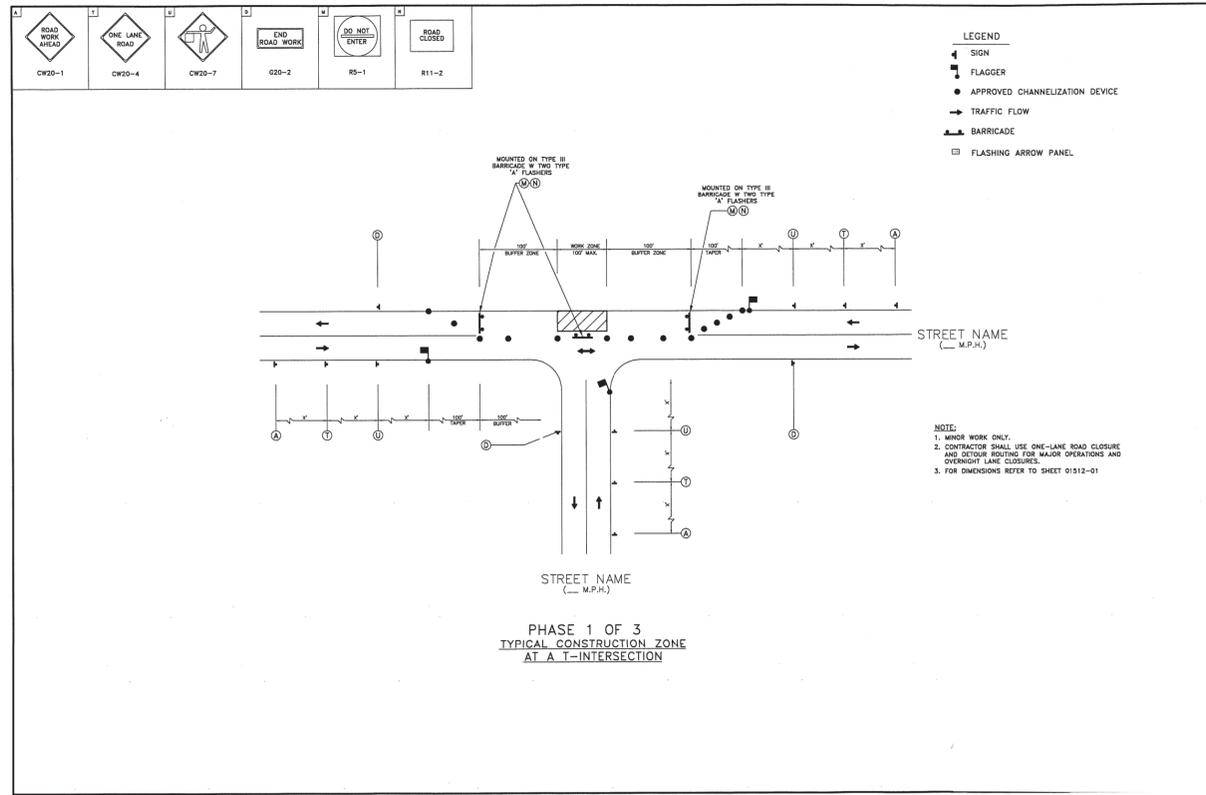
**SANTA FE
VARIOUS STREET IMPROVEMENTS**

**AVENUE Q - DETOUR
PLAN**

TERRA ASSOCIATES, INC. 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
TBPE Registration No.: F-003832

DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 38

 M4-9R (30" X 24")	 M4-9(L) (30" X 24")	 R3-1 (24" X 24")	 R3-2 (24" X 24")	 (36" X 36")	 M4-8a	 CW20-1 (36" X 36")	 CW20-4 (36" X 36")	 G20-2 (48" X 24")	 STREET NAME PLAQUE (VARIES X VARIES)	 M4-8 (24" X 12")	 STREET NAME PLAQUE (VARIES X VARIES)	 M4-9(Sp) (30" X 24")	 R11-3
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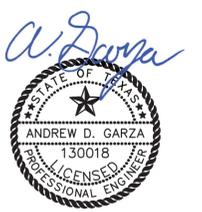
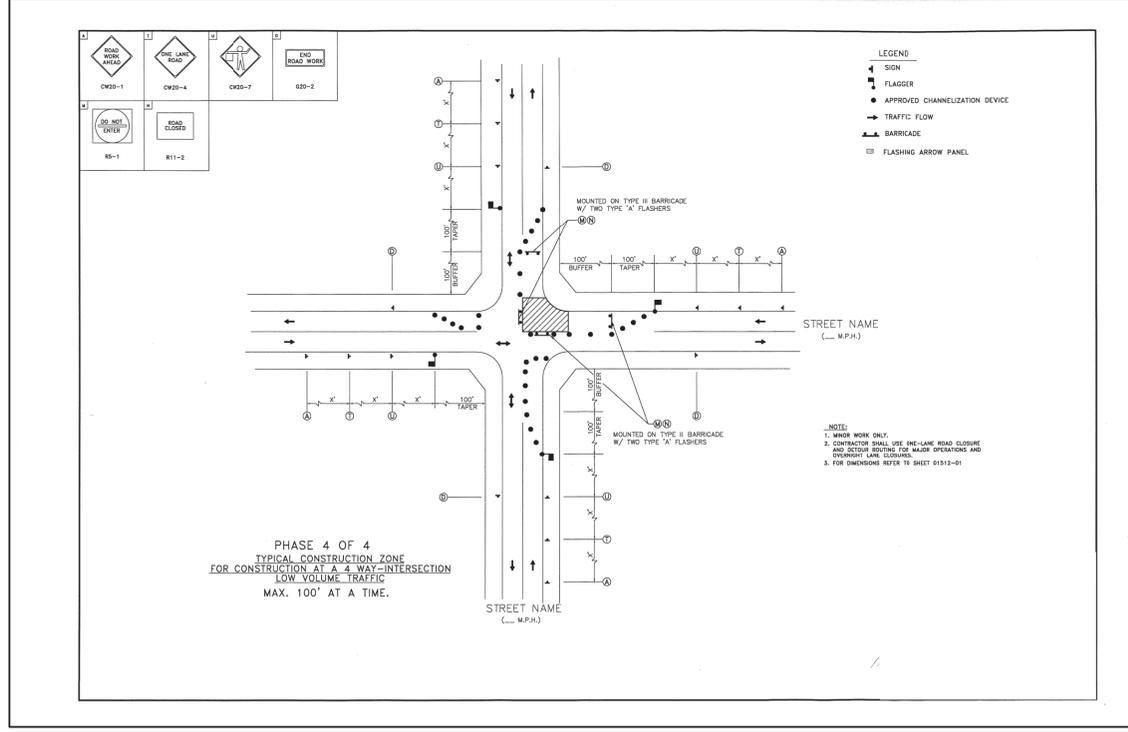
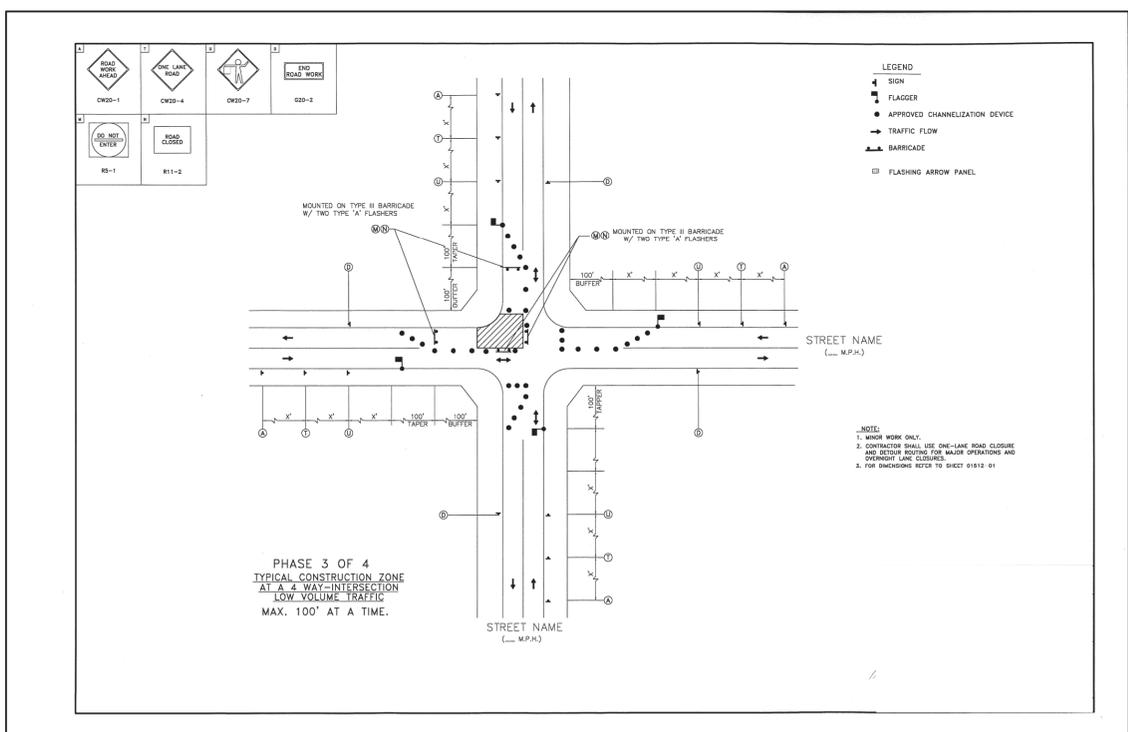
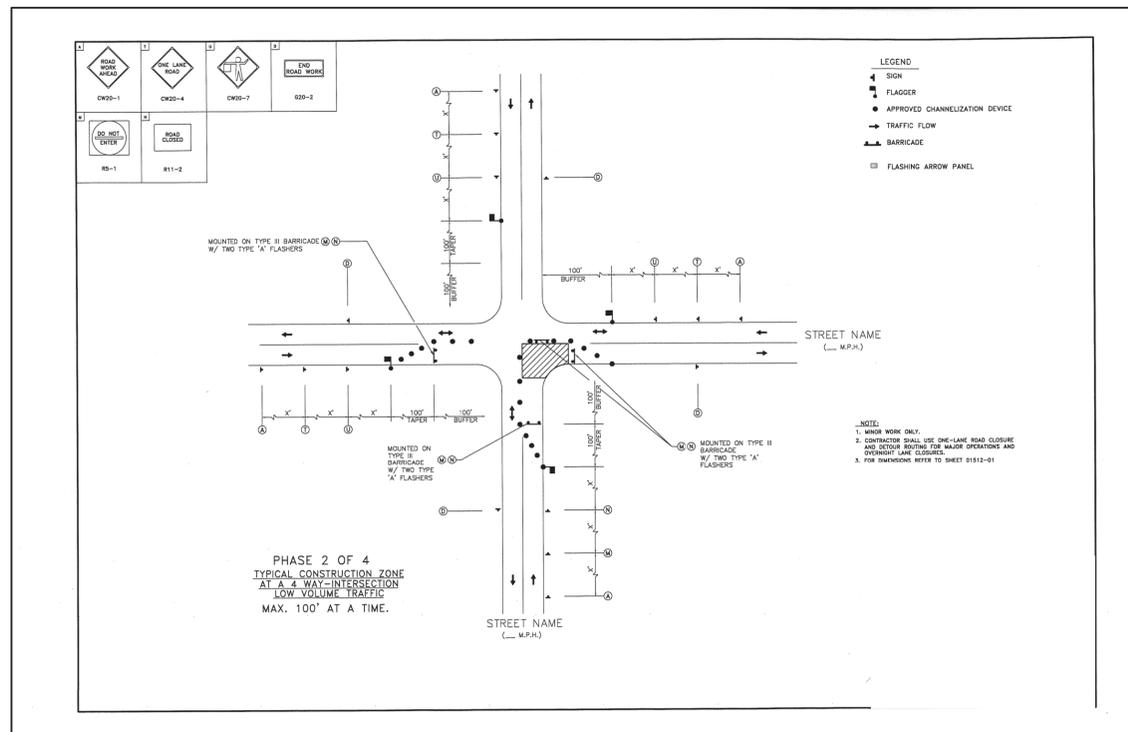
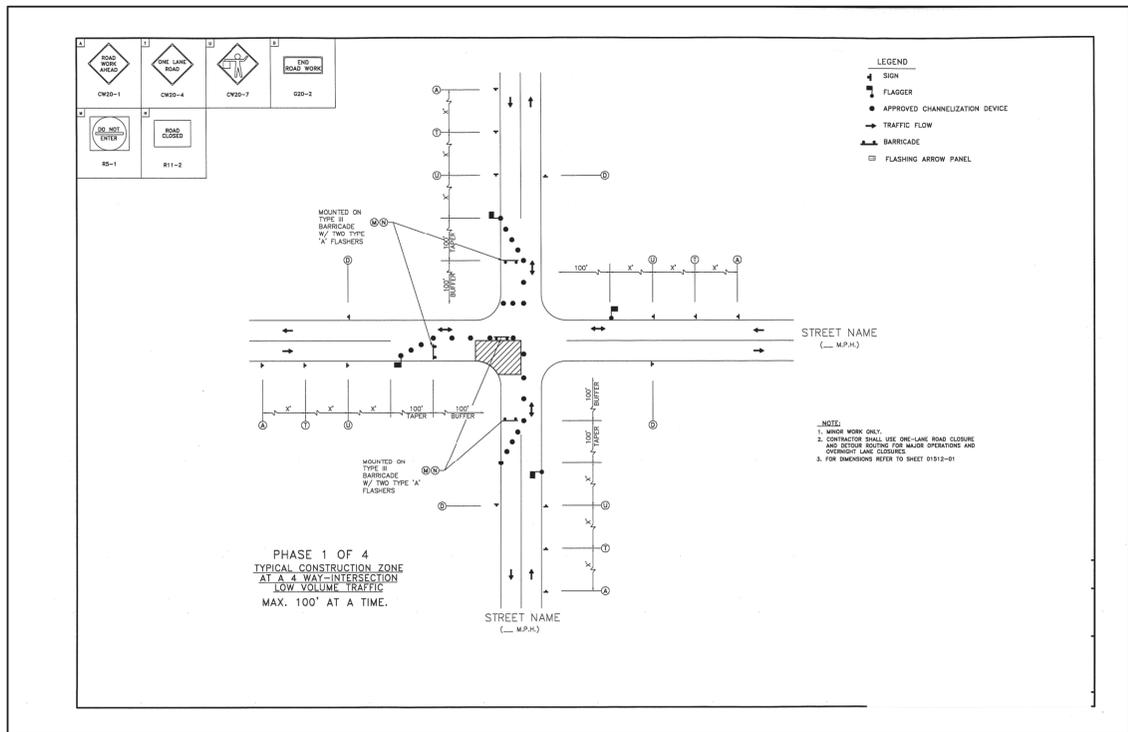


A. D. Garza

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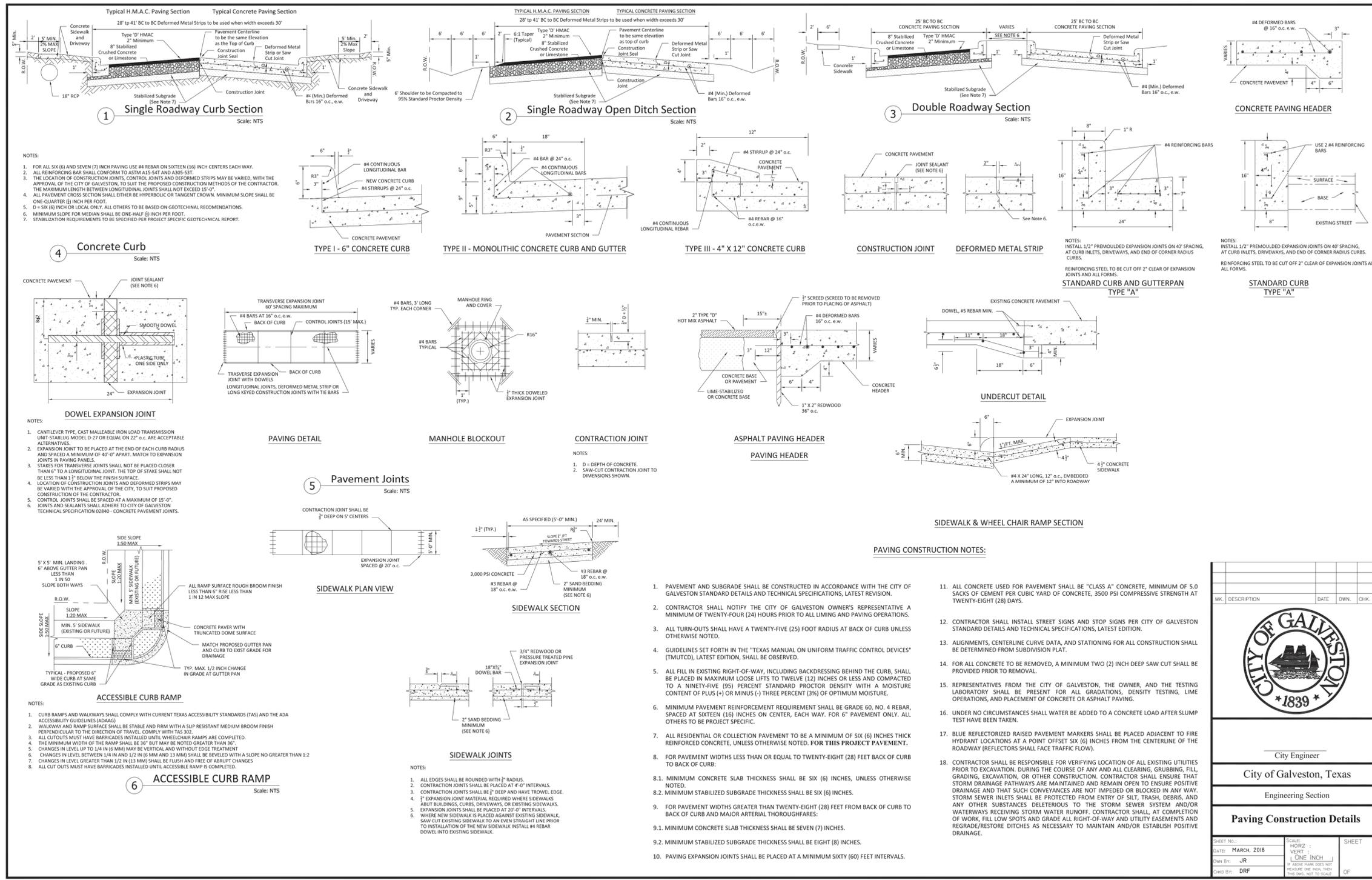
REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
TRAFFIC CONTROL PLAN TYPICAL 3-WAY INTERSECTION PHASE 1-3			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: 1:30	PROJECT No. 0600-1902 CONTRACT: 1	
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 40	

F:\Clients\0600-Galveston County\0600-1902 Santa Fe Streets\Drawings\41 TOP 4-WAY INTERSECTION DETAIL.dwg Jul 02, 2020-1:16pm Terra Associates Inc., Ricardo Bello



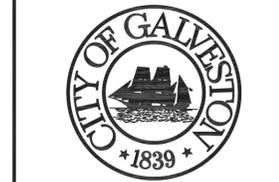
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020

REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
TRAFFIC CONTROL PLAN TYPICAL 4-WAY INTERSECTION PHASE 1-4			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET	41



REV. NO.	DESCRIPTION	DATE	APP.

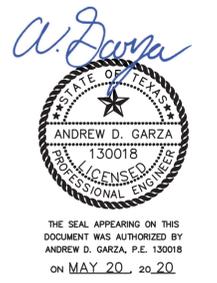
MK.	DESCRIPTION	DATE	DWN.	CHK.



City Engineer
City of Galveston, Texas

Engineering Section
Paving Construction Details

SHEET NO.:	SCALE:	SHEET
DATE: MARCH, 2018	HORIZ: 1" = 10'	OF
DWN BY: JR	VERT: 1" = 10'	
CHKD BY: DRF	IF ANNOT. MARK. DOES NOT PRECEDE PER. MARK. THIS SHEET SHALL NOT BE USED.	



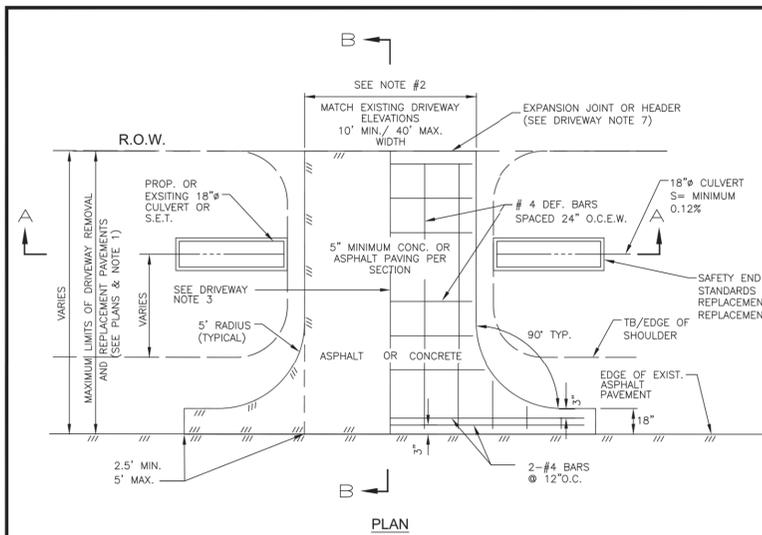
SANTA FE
VARIOUS STREET IMPROVEMENTS

PAVING CONSTRUCTION DETAILS

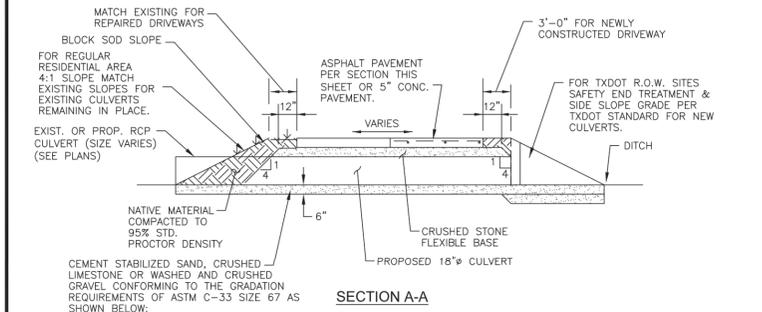
TERRA ASSOCIATES, INC. 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
TBPE Registration No.: F-003832

DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 43

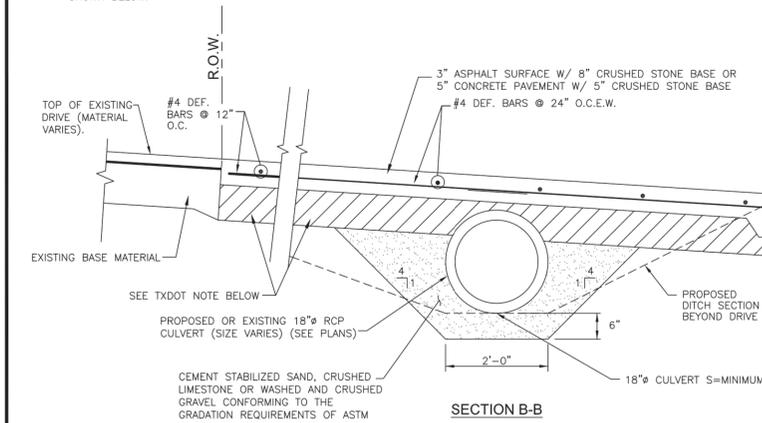
F:\Clients\0600-Galveston County\0600-1902-Santa Fe Streets\Drawings\44-DRIVEWAY CONSTRUCTION DETAILS.dwg Jul 02, 2020-1:16pm Terra Associates Inc., Ricardo Ballo



PLAN



SECTION A-A

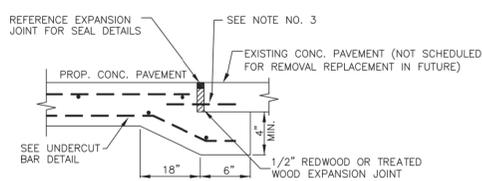


SECTION B-B

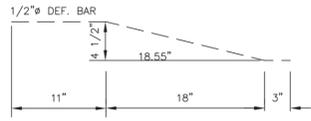
PASSING	1 INCH SIEVE	100%
PASSING	3/4 INCH SIEVE	90 - 100%
PASSING	3/8 INCH SIEVE	20 - 55%
PASSING	NO. 4 SIEVE	0 - 10%
PASSING	NO. 8 SIEVE	0 - 5%

TXDOT NOTE:
6" MINIMUM CONCRETE AND ANY ASPHALT DRIVEWAYS TO BE REPAIRED/REPLACED IN TXDOT RIGHT-OF-WAY SHALL MATCH EXISTING TXDOT PAVEMENT SECTION. BASE MATERIAL FOR ASPHALT DRIVEWAYS SHALL BE CRUSHED LIMESTONE. CRUSHED RECYCLED CONCRETE IS NOT ACCEPTABLE TO TXDOT.

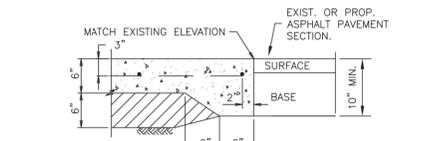
CONCRETE OR ASPHALT DRIVEWAY DETAIL
SCALE: N.T.S.



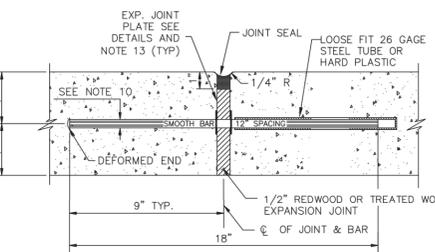
TYPE I PAVING HEADER DETAIL
SCALE: N.T.S.



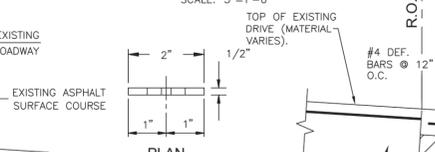
UNDERCUT BAR DETAIL



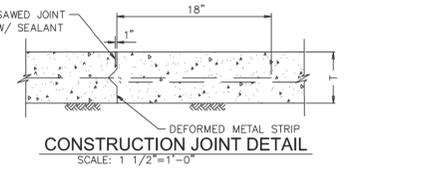
CONCRETE TO ASPHALT TYPE II PAVING HEADER



DOWEL TYPE EXPANSION JOINT DETAIL
SCALE: 3"=1'-0"



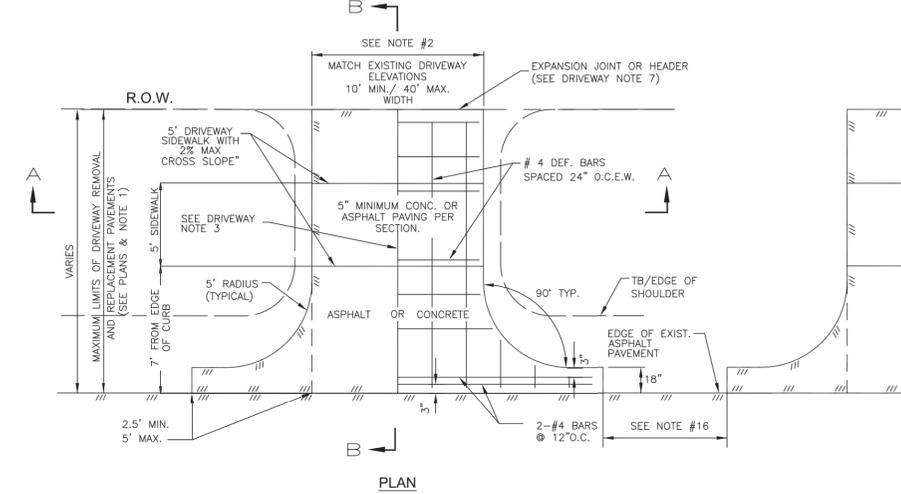
PRE-MFG. JOINT PLATE DETAIL
SCALE: N.T.S.



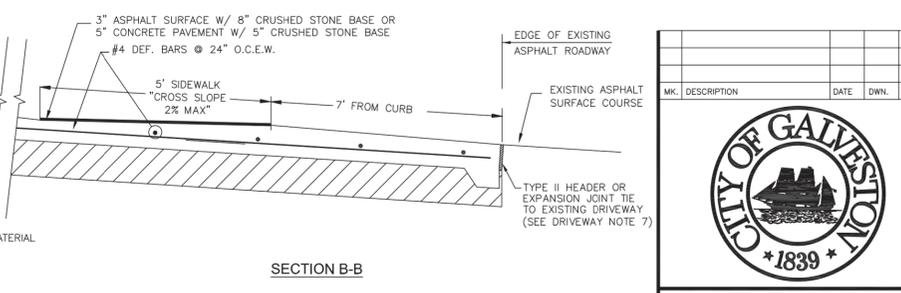
CONSTRUCTION JOINT DETAIL
SCALE: 1 1/2"=1'-0"

DRIVEWAY NOTES:

- IN THE EVENT TOTAL DRIVEWAY AND/OR CULVERT REMOVAL & REPLACEMENT IS REQUIRED, IT SHALL BE DONE PER DETAILS ON THIS SHEET. ASPHALT DRIVEWAYS IN TXDOT R.O.W. SHALL MATCH TXDOT PAVEMENT SECTION.
- THE MAXIMUM LIMIT OF DRIVEWAY REMOVAL AND REPLACEMENT SHALL BE LOCATED AT THE RIGHT-OF-WAY UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER (SEE NOTE 7).
- DRIVEWAYS SHALL BE CONSTRUCTED TO MATCH EXISTING DRIVEWAY WIDTH MEASURED AT THE RIGHT-OF-WAY TO A MAXIMUM WIDTH OF 40'-0". WHEN DRIVEWAY EXCEEDS 20'-0" IN WIDTH, A 3/4" REDWOOD BOARD EXPANSION JOINT W/ STEEL RUNNING THROUGH IT, OR APPROVED EQUAL, SHALL BE INSTALLED THE FULL LENGTH OF THE DRIVEWAY. EXCEPTIONS WILL BE MADE ON A CASE BY CASE BASIS BY CITY ENGINEER'S OFFICE.
- PROPOSED DRIVEWAY FINISH SURFACE MATERIAL SHALL MATCH EXISTING MATERIALS SUCH AS PEA GRAVEL, INLID BRICK, STAMPED OR COLORED CONCRETE, EXISTING ASPHALT, SHELL, SHELLORITE, DIRT, GRAVEL OR GRASS DRIVEWAYS SHALL BE REPAIRED IN KIND AS REQUIRED UNLESS OTHERWISE SHOWN ON PLANS. ASPHALT DRIVEWAYS SHALL BE REPAIRED PER PROPOSED PAVEMENT REPLACEMENT SECTION.
- DRIVEWAYS SHALL BE MATCHED TO STREET PAVEMENT ELEVATIONS.
- NATIVE MATERIALS SHALL BE USED AS A BASE LEVELER AND /OR AS BACKFILL REQUIRED WHEN OVER EXCAVATION OCCURS DUE TO POOR SOILS OR ANY OTHER CONDITION RESULTING IN POOR CONDITION PROVIDE TYPE II PAVING HEADER (DRIVEWAYS ONLY).
- WHERE TYING INTO EXISTING CONCRETE DRIVEWAY AND CONDITION OF EXISTING DRIVEWAY ALLOWS, PROVIDE 1/4" REDWOOD BOARD W/24" LONG #4 DEFORMED BARS @ 12" O.C.E.W. THROUGH IT DRILLED INTO EXISTING DRIVEWAY. WHERE EXISTING CONCRETE IS IN POOR CONDITION PROVIDE TYPE II PAVING HEADER (DRIVEWAYS ONLY).
- FILL AT CULVERTS SHALL BE CONTROLLED BY 4H:1V SL OPE RATHER THAN DRIVEWAY SHOULDER WIDTH TO MINIMIZE AMOUNT OF CULVERT PIPE EXPOSED. FOR DRIVEWAYS IN FM3005 R.O.W. SLOPES SHALL CONFORM TO TXDOT STANDARDS. (SEE NOTE 9)
- IN THE EVENT TOTAL CULVERT REMOVAL IS REQUIRED, SAFETY END TREATMENTS SHALL BE REPLACED OR ADDED PER TXDOT STANDARDS IF NONE EXISTED AT NO. SEPARATE PAV. (APPLICABLE TO DRIVEWAYS IN TXDOT R.O.W. ONLY)
- DOWELS FOR PAVEMENT EXPANSION JOINTS SHALL BE 1" DIA. FOR 6" PAVEMENT THICKNESS.
- ALL JOINT SEAL MATERIAL SHALL BE HOT POURED ASPHALT RUBBER OR AS APPROVED IN ACCORDANCE W/ ASTM DESIGNATION D3405.
- DEFORMED METAL STRIPS SHALL BE STAKED IN PLACE W/ #3 BARS.
- PRE-MANUFACTURED JOINT PLATE, TWO PER LOAD TRANSFER DEVICE, LOOSE FIT ON EXPANSION END AND TACK WELD TO FIXED END.
- PROVIDE 3/4" (5" THICK PAVEMENT) DIAMETER SMOOTH STEEL BAR, 20" LONG ON 12" CENTERS. END DIAMETER SMOOTH STEEL BAR, 20" LONG ON 12" CENTERS. END TREATMENT SHALL MATCH EXPANSION JOINT ADJACENT TO HEADER. WHERE THE ADJACENT EXPANSION JOINT HAS A SLIP SLEEVE ADJACENT TO HEADER, DRILL HOLE AND DRIVE DOWEL INTO EXISTING PAVEMENT. WHERE ADJACENT EXPANSION JOINT HAS A SLIP SLEEVE OPPOSITE TO THE HEADER, DRILL AND EPOXY DOWEL INTO EXISTING PAVEMENT W/"PRO-ROC" OR EQUAL AND PROVIDE SLIP SLEEVE ON EXPOSED END. WHEN TYPE II PAVING HEADER IS ADJACENT TO PROPOSED ASPHALT PAVEMENT, PLACEMENT OF EXPANSION JOINT AND SMOOTH BAR IS NOT APPLICABLE.
- ALL PROPOSED SUBGRADE SHALL BE PROOF ROLLED, IF SOFTSPOTS OR WET SUBGRADE IS ENCOUNTERED TREAT IT WITH FLYASH TO ESTABLISH FIRM SUBGRADE.
- PROPERTIES WITH TWO DRIVEWAYS SHALL MAINTAIN A 20' MIN. DISTANCE BETWEEN FLARES AT STREET.



PLAN



SECTION B-B

TXDOT NOTE:
6" MINIMUM CONCRETE AND ANY ASPHALT DRIVEWAYS TO BE REPAIRED/REPLACED IN TXDOT RIGHT-OF-WAY SHALL MATCH EXISTING TXDOT PAVEMENT SECTION. BASE MATERIAL FOR ASPHALT DRIVEWAYS SHALL BE CRUSHED LIMESTONE. CRUSHED RECYCLED CONCRETE IS NOT ACCEPTABLE TO TXDOT.

CONCRETE OR ASPHALT DRIVEWAY DETAIL
SCALE: N.T.S.

MR.	DESCRIPTION	DATE	DWN.	CHK.
				
City Engineer City of Galveston, Texas				
Engineering Section Driveway Construction Details				
SHEET NO.:	DATE:	DWN. BY:	CHKD. BY:	SCALE:
	FEBRUARY, 2018	JR	DRF	HORIZ: 1"=10'
				VERT: 1"=12"
				LINE INCH
				OF



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020

REV. NO.	DESCRIPTION	DATE	APP.

**SANTA FE
VARIOUS STREET IMPROVEMENTS**

DRIVEWAY CONSTRUCTION DETAILS

TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS
 1445 N. LOOP WEST - SUITE 450
 HOUSTON, TEXAS 77008
 713-993-0333
 TBPE Registration No.: F-003832

DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902
CHECKED BY: ADG	DATE: DECEMBER 2019	CONTRACT: 1
		SHEET 44

DISCLAIMER: This drawing is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the engineer for the use of this drawing for any purpose other than that intended. The user assumes all liability for any damage resulting from the use of this drawing.

DATE: FILE:

2-WAY, MULTIPLE LANES EACH DIRECTION

DETAIL A

NOTES

- A1: Center of RR most to center of rail: 12' minimum, 15' typical.
- A2: Tip of gate to center of rail: 12' minimum, 15' typical.
- B: Center of most (cantilever, gate, or most flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).
- C: Center of detectable warning device to nearest rail: 6' minimum.
- D: Center of gate most to center of cantilever most: 6' typical. NOTE: Cantilever may be located in front or behind gates.
- E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.
- F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.
- G: Length of panels along rail: 8' typical.
- H: Width of field panels: 2' typical (check with railroad company).
- I: Distance between rails: 4'-8.5'.
- J: Tip of gate to tip of gate: 2' maximum for Quiet Zone SSM or 90% of traveled way covered by gates for all other locations.
- K: Nearest edge of RR cabin from edge of pavement: 30' typical. NOTE: Cabin not required to be parallel to edge of pavement.
- L: Nearest edge of RR cabin from nearest rail: 25' typical.
- M: Center of RR most to edge of sidewalk: 6' minimum.
- N: Center of gate most to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60' will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.
- O: Width of median: 8'-6' minimum, 10' typical when using median gates. NOTE: Center of gate most minimum 4'-3" from face of curb.
- P: Center of RR most to face of curb: 4'-3" minimum. Center of RR most to edge of pavement (with shoulder): 6' minimum. Center of RR most to edge of pavement (no shoulder): 8'-3" minimum. NOTE: BNSF prefers 5'-3", 7', and 9'-3" minimums, respectively.
- Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.
- R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.
- S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.

TABLE 1

Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND

- Sign
- Object Marker
- Traffic Flow
- Cantilever
- Gate Assembly
- Most Flasher Pair

GENERAL NOTES

- Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
- Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
- Medians preferred whenever possible to prevent vehicles from driving around gates.
- Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
- See SMD standard sheets for sign mounting details.
- See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

CROSSING SURFACE CROSS SECTION

2 LANES, 2-WAY

1-WAY STREET WITH CURB

PASSIVE CROSSING

PATHWAY CROSSING

2-WAY

2-WAY WITH MEDIAN

1-WAY

GRADE CROSSING NEAR A PARALLEL STREET

T-INTERSECTION

2 ADJACENT CROSSINGS

TABLE 1

Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

GENERAL NOTES

- Railroad company to provide active traffic control devices, CROSSBUCK (R15-1), NUMBER OF TRACKS PLOQUE (R15-2P) (if more than 1 track), and EMERGENCY NOTIFICATION (I-13) signs.
- LOW GROUND CLEARANCE (W10-5) signs may be relocated further upstream of crossing to provide advance warning of alternate route.
- GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2) signs may be modified as needed to fit roadway geometry.
- Table 1 placement distances may vary per Sect. 2C.05 of the MUTCD.
- See Table 1 to determine placement of STOP AHEAD (W3-1) and YIELD AHEAD (W3-2) signs unless shown otherwise.
- DO NOT STOP ON TRACKS (R8-B) signs installed when potential for vehicles stopping on tracks is significant as determined by sealing engineer. Install no sign does not block view of RR most.
- See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

SIGNS

RAILROAD CROSSING DETAILS SIGNING & STRIPING

RCD (2) - 16

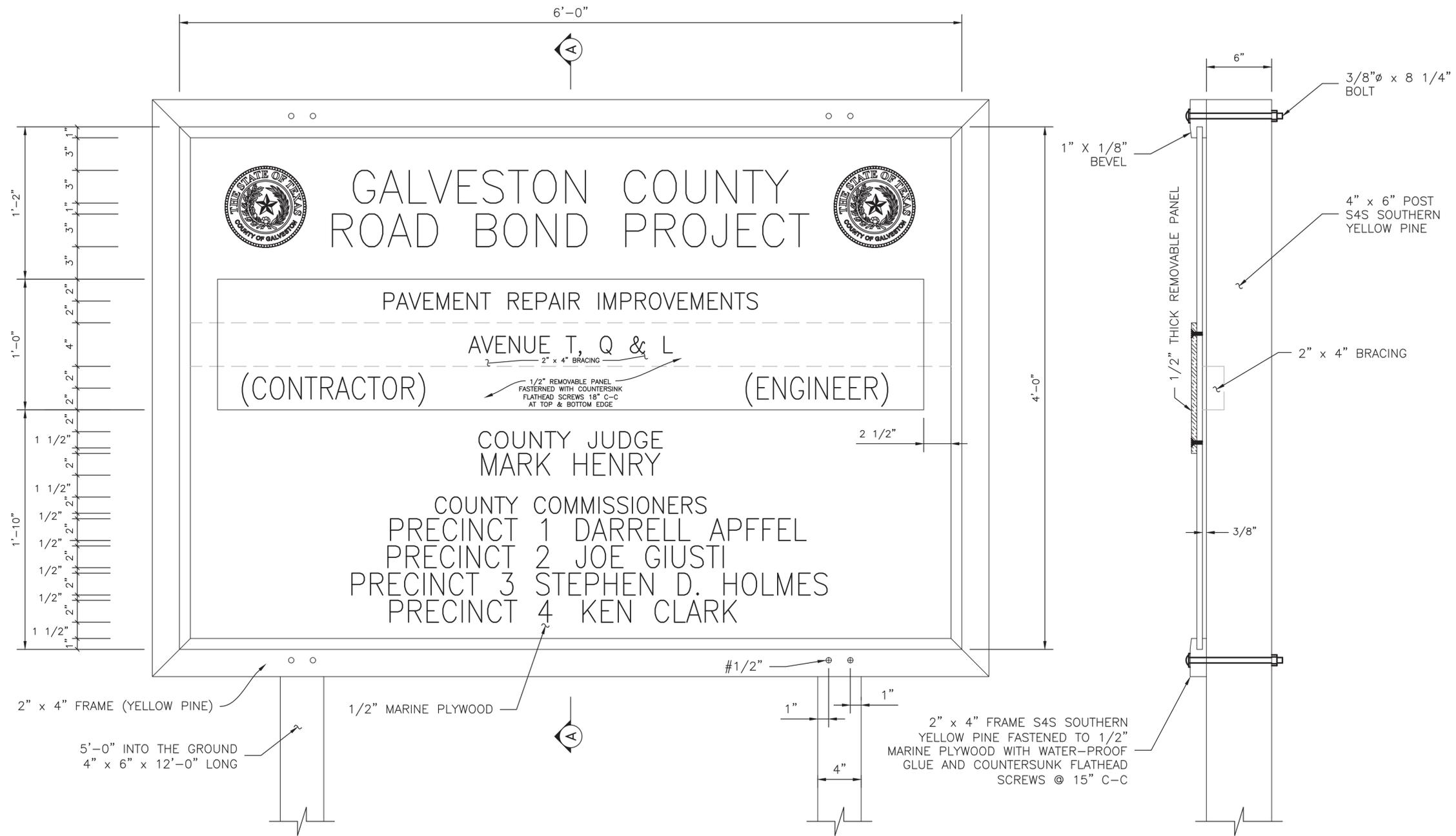
Texas Department of Transportation Traffic Operations Division Standard

Andrew D. Garza

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ANDREW D. GARZA, P.E. 130018 ON MAY 20, 2020.

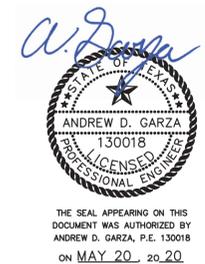
REV. NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
RAILROAD PAVEMENT MARKING DETAILS			
TERRA ASSOCIATES, INC.		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333	
CONTRACT: 0600-1902		TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET 45	

F:\Clients\0600-Galveston County\0600-1902 Santa Fe Streets Drawings\46 PROJECT SIGN.dwg Jul 02, 2020-1:16pm Terra Associates Inc., Ricardo Bello



NOTES:

1. THE SIGN SHALL HAVE BLACK LETTERS WITH WHITE BACKGROUND.
2. SIGN SHALL BE MOUNTED ON 4" x 6" POSTS AND LOCATED BY THE ENGINEER.
3. REMOVABLE PANEL SHALL BE 1/2" MARINE PLYWOOD.
4. ALL BOLTS SHALL BE GALVANIZED OR CADMIUM PLATED.
5. 4" x 6" POST SHALL BE WOLMANIZED OR PENTACHLOROPHENOL TREATED.
6. ALL WOOD SURFACES SHALL HAVE PRIME COAT AND TWO (2) COATS OF SHERWIN-WILLIAMS KEM-LUSTRA ENAMEL OR EQUAL.
7. PROJECT SIGN WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502: BARRICADES, SIGNS AND TRAFFIC HANDLING.



SECTION A-A

REV.NO.	DESCRIPTION	DATE	APP.
SANTA FE VARIOUS STREET IMPROVEMENTS			
PROJECT SIGN			
TERRA ASSOCIATES, INC. CONSULTING ENGINEERS LANDSCAPE ARCHITECTS		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-003832	
DRAWN BY: TD	SCALE: N.T.S.	PROJECT No. 0600-1902	CONTRACT: 1
CHECKED BY: ADG	DATE: DECEMBER 2019	SHEET	46



Geotechnical Engineering Report

Avenue L, Q, and T Road Repair

Santa Fe, Texas

November 13, 2019

Terracon Project No. 91195042

Prepared for:

Terra Associates, Inc.

Houston, Texas

Prepared by:

Terracon Consultants, Inc.

League City, Texas

terracon.com

The Terracon logo, consisting of the word "Terracon" in a white, bold, sans-serif font, set against a dark red rectangular background.

Environmental



Facilities



Geotechnical



Materials

November 13, 2019

Terra Associates, Inc.
1445 North Loop West
Houston, Texas 77008



Attn: Mr. Lyle E. Henkel, P.E.

Re: Geotechnical Engineering Report
Avenue L, Q, and T Road Repair
Santa Fe, Texas
Terracon Project No. 91195042

Dear Mr. Henkel:

Terracon Consultants, Inc. (Terracon) is pleased to submit our geotechnical engineering report for the project referenced above in Santa Fe, Texas. We trust that this report is responsive to your project needs. Please contact us if you have any questions or if we can be of further assistance.

We appreciate the opportunity to work with you on this project and look forward to providing additional geotechnical engineering and construction materials testing services in the future.

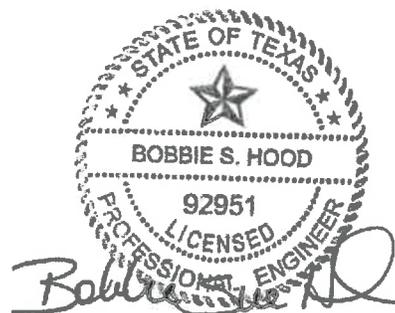
Sincerely,

Terracon Consultants, Inc.

(Texas Firm Registration No.: F-3272)

A handwritten signature in blue ink that reads "Rehan Khan".

Rehan Khan, E.I.T.
Staff Geotechnical Engineer



Bobbie S. Hood, P.E.
Geotechnical Services Manager

Enclosures

Copies submitted: Addressee (1) Electronic

Terracon Consultants, Inc. 551 League City Parkway, Suite F League City, Texas 77573
Registration No. F-3273

Environmental



Facilities



Geotechnical



Materials

REPORT TOPICS

- INTRODUCTION..... 1**
- PROJECT DESCRIPTION AND SITE CONDITIONS..... 1**
- GEOTECHNICAL CHARACTERIZATION..... 2**
- GEOTECHNICAL OVERVIEW 4**
- WET WEATHER/SOFT SUBGRADE CONSIDERATIONS..... 5**
- PAVEMENTS..... 5**
- GENERAL COMMENTS..... 8**

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

- EXPLORATION AND TESTING PROCEDURES**
- SITE LOCATION AND EXPLORATION PLANS**
- EXPLORATION RESULTS** (Boring Logs and Laboratory Data)
- SUPPORTING INFORMATION** (General Notes and Unified Soil Classification System)

Geotechnical Engineering Report

Avenue L, Q, and T Road Repair

Santa Fe, Texas

Terracon Project No. 91195042

November 13, 2019

INTRODUCTION

Terracon Consultants, Inc. (Terracon) is pleased to submit our geotechnical engineering report for the proposed street improvements at Avenue L, Q, and T in Santa Fe, Texas. This project was authorized by Mr. Lyle E. Henkel, P.E., President of Terra Associates, through signature on our proposal on September 30, 2019. The project scope was performed in general accordance with Terracon Document No. P91195042, dated May 14, 2019.

The purpose of this report is to describe the subsurface conditions observed at the 29 test borings drilled for this project, analyze and evaluate the test data, and provide recommendations with respect to:

- Site and subgrade preparation; and
- Pavement rehabilitation guidelines.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section of this report.

PROJECT DESCRIPTION AND SITE CONDITIONS

Our initial understanding of the project was provided in our proposal and was discussed in the project planning stage. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Project location	The project site includes the following streets in Santa Fe, Texas. <ul style="list-style-type: none">■ Avenue L – 6th Street to 11th Street (about 3,300 linear feet)■ Avenue Q – FM 1764 to dead end (about 10,700 linear feet)■ Avenue T – SH 6 to the southern city limits (about 6,200 linear feet) See Site Location .
Existing conditions ¹	Two-lane asphaltic concrete roadways with roadside ditches. These roadways exhibit signs of distress.

Item	Description
Proposed improvements	We understand that the pavement repair is planned to consist of milling the existing asphaltic concrete and underlying base material followed by overlay of new hot mix asphaltic concrete (HMAC) surface course. In addition, base repair is planned in certain areas. We understand no utility improvements are planned.
Final grade (assumed)	Within approximately one feet above existing grade.

1. Based on site visit in association with our field program.

GEOTECHNICAL CHARACTERIZATION

Geology

Based on the geologic maps published by the Bureau of Economic Geology, the site for the proposed construction is located on the Beaumont formation, a deltaic nonmarine Pleistocene deposit. The Beaumont formation is heterogeneous containing thick interbedded layers of clay, fine sand, and silt.

The coastal plain in this region has a complex tectonic geology, several major features of which are: Gulf Coastal geosyncline, salt domes, and major sea level fluctuations during the glacial stages, subsidence and geologic faulting activities. Most of these geologic faulting activities have ceased for millions of years, but some are still active. A detailed geologic fault investigation and study of the site geology are beyond the scope of this report.

Subsurface Profile

The particular subsurface stratigraphy, as evaluated from our field and laboratory programs, is shown in detail on the Boring Logs in the **Exploration Results** section of this report. Stratification boundaries on the Boring Logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual.

Fill soils were observed under the pavement at borings B-1, B-3, and B-8 and extended to depths that ranged from about 2 to 4 feet below top of the pavement. The subsurface soil consisted of lean clay, silty clay, and fat clay soils to the termination depth of the borings (approximately 5 feet).

The results of our field and laboratory programs can be summarized as follows:

Geotechnical Engineering Report

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
November 13, 2019 ■ Terracon Project No. 91195042



Description	Plasticity Index	Moisture Content (%)	Moisture Content vs. Plastic Limit ¹	Undrained Shear Strength ² (psf)
Fill: Lean Clay	20 to 21	13 to 17	-2 to +1	2.25 to 4.0 ³
Lean Clay and Silty Clay	7 to 33	14 to 22	-5 to +12	500 to 2,300
Fat Clay	33 to 43	15 to 28	-2 to +10	1,700

^{1.} The difference between a soil sample's moisture content and its corresponding plastic limit.
^{2.} Based on unconfined compressive strength tests.
^{3.} Hand penetrometer readings in tons per square feet.

The approximate pavement layer thicknesses observed at the boring locations are presented in the table below.

Street	Boring Number	Asphaltic Concrete Surface Course (inches)	Crushed Stone and Sand (inches)
Avenue T	B-1	2½	10
	B-2	2	10
	B-3	2	11
	B-4	2½	14½
	B-5	2	8
	B-6	2	11
	B-7	2½	11
	B-8	3	12
	B-9	2½	8
Avenue L	B-10	2	10
	B-11	2	9
	B-12	1½	8
	B-13	1	10
	B-14	1½	9
Avenue Q	B-15	2	6 ¹
	B-16	1½	6 ¹
	B-17	2	6 ¹
	B-18	2	7 ¹
	B-19	1½	6 ¹
	B-20	1½	4 ¹
	B-21	1½	4 ¹

Geotechnical Engineering Report

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
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Street	Boring Number	Asphaltic Concrete Surface Course (inches)	Crushed Stone and Sand (inches)
	B-22	2	3 ¹
	B-23	2	4 ¹
	B-24	2	6 ¹
	B-25	2	6 ¹
	B-26	2	6½ ¹
	B-27	2	7 ¹
	B-28	1½	4 ¹
	B-29	1½	4½ ¹

1. Does not meet the minimum thickness requirements as stipulated in Galveston County specifications.

Groundwater Conditions

In an effort to evaluate groundwater conditions at the time of our field program, borings B-1 through B-29 were advanced using dry drilling techniques to their termination depth (approximately 5 feet). Groundwater was not observed at borings B-1 through B-29 during or upon completion of drilling.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the pavement may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project and should be evaluated prior to construction.

GEOTECHNICAL OVERVIEW

The existing base material thickness along Avenue Q does not meet the minimum thickness requirements as stated in Galveston County “Rules, Regulations and Requirements Relating to the Approval and Acceptance of Improvements in Subdivisions or Re-Subdivisions” document. Based on our experience with pavements comprising of insufficient pavement component thicknesses, a significantly reduced service life for the proposed pavement rehabilitation should be expected as compared to a newly constructed pavement section. In addition, increased levels of cracking and distress resulting in the need for more frequent maintenance should be expected for the repaired pavement.

This summary should be used in conjunction with the entire report for design purposes. Details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **General Comments** should be read for an understanding of the report limitations.

WET WEATHER/SOFT SUBGRADE CONSIDERATIONS

Construction operations may encounter difficulties due to the wet or soft surface soils becoming a general hindrance to equipment due to rutting and pumping of the soil surface, especially during and soon after periods of wet weather. If the subgrade cannot be adequately compacted to minimum densities as described above, one of the following measures will be required: 1) removal and replacement with select fill, 2) chemical treatment of the soil to dry and improve the condition of the subgrade, or 3) drying by natural means if the schedule allows. In our experience with similar soils in this area, chemical treatment is an efficient and effective method to increase the supporting value of wet and weak subgrade. Terracon should be contacted for additional recommendations if chemical treatment of the soils is planned due to soft and/or wet subgrade.

PAVEMENTS

We understand that plans to repair the existing pavement will consist of milling the existing asphaltic concrete and underlying crushed stone and sand material followed by overlay of new HMAC surface course throughout the majority of the alignment of the streets and base repair in certain isolated distressed areas. We assume that the final grade will be within one foot above existing grade.

The existing asphaltic concrete surface layer should be milled to its full depth to accommodate placement of the new HMAC surface course. Pavement design was beyond our scope of services for this project. However, based on TxDOT specifications, we recommend a minimum of 1.5 inches of new HMAC surface course be overlaid on top of the pulverized existing pavement materials.

Once milling is completed, the exposed surface should be carefully proofrolled with a 20-ton pneumatic roller or equivalent equipment, such as a fully loaded dump truck, to detect weak areas. Special care should be exercised when proofrolling areas containing fill soils in an attempt to observe soft/weak zones within the fill soils. Weak areas detected during proofrolling, as well as zones of fill containing organic matter and/or debris, should be removed to expose firm subgrade and replaced with either chemically treated base material or HMAC base course (black base) meeting the specifications provided in **Material Requirements**. The removal of the existing pavement and subgrade should extend at least 2 feet horizontally beyond the limits of the weak areas. Subsequent to proofrolling and prior to placement of the chemically treated base layer or

black base, it must be ensured that the exposed subgrade has a compaction of at least 95 percent of the Standard Effort (ASTM D698) maximum dry density at a moisture content within 2 percent of the optimum moisture content. Proper site drainage should be maintained during construction so that ponding of surface runoff does not occur and cause construction delays and/or inhibit site access. Proofrolling should be performed under the direct observation of the geotechnical engineer or his/her representative.

In areas requiring base repair, the existing pavement and subgrade should be overexcavated to a sufficient depth to accommodate 2 inches of asphaltic concrete surface course over 10 inches of black base. The removal of the existing pavement and subgrade should extend at least 2 feet horizontally beyond the limits of the distress and expose firm subgrade. The exposed subgrade should then be proofrolled as described previously and compacted to at least 95 percent of the Standard Effort (ASTM D698) maximum dry density at a moisture content within 2 percent of the optimum moisture content, prior to placement of the black base and HMAC surface course.

The existing base material thickness along Avenue Q does not meet the minimum thickness requirements as stated in Galveston County “Rules, Regulations and Requirements Relating to the Approval and Acceptance of Improvements in Subdivisions or Re-Subdivisions” document. Based on our experience with pavements comprising of insufficient pavement component thicknesses, a significantly reduced service life for the proposed pavement rehabilitation should be expected as compared to a newly constructed pavement section. In addition, increased levels of cracking and distress resulting in the need for more frequent maintenance should be expected for the repaired pavement.

In order to extend the service life of the repaired pavement, we recommend chemically treating the pulverized existing pavement materials with lime-flyash. Recommendations for lime-flyash treatment are provided in **Material Requirements**.

Material Requirements

HMAC Surface Course – The asphaltic concrete surface course should be plant mixed, hot laid Type D (Fine Graded Surface Course) meeting the requirements in TxDOT 2014 Standard Specifications Item 340. Specific criteria for the job specifications should include compaction to within an air void range of 5 to 9 percent calculated using the maximum theoretical specific gravity of the mix measured by TxDOT Tex-227-F. The asphalt cement content by percent of total mixture weight should be within ± 0.5 percent asphalt cement from the job mix design.

HMAC Base Course (Black Base) – The black base should be plant mixed, hot laid Type A (Coarse Base) or Type B (Fine Base) meeting the requirements in TxDOT 2014 Standard Specifications Item 340. Specific criteria for the job specifications should include compaction to within an air void range of 5 to 9 percent calculated using the maximum theoretical specific gravity

of the mix measured by TxDOT Tex-227-F. The asphalt cement content by percent of total mixture weight should be within ± 0.5 percent asphalt cement from the job mix design.

Chemically Treated Base Material – Base material should be composed of crushed limestone or crushed concrete meeting the requirements of TxDOT 2014 Standard Specifications Item 247, Type A or D, Grade 1-2. The base material should be compacted to at least 95 percent of the Modified Effort (ASTM D1557) maximum dry density at moisture content within 2 percent of the optimum moisture content. The maximum allowed plasticity index (PI) of a Grade 1-2 base material is 12. Therefore, we recommend that lime-flyash be utilized for treatment of the base material in accordance with TxDOT 2014 Standard Specifications Item 265. We recommend about 2 percent lime and 8 percent flyash by dry weight be used for estimating and planning. The percentages are given as application by dry weight of soil. Lime-flyash is also available pre-mixed, typically in percentages of 20 to 30 percent lime and 70 to 80 percent flyash, and may be used if preferred.

Chemically Treated Existing Milled Pavement Material – The existing milled pavement material should be treated with lime-flyash in accordance with TxDOT 2014 Standard Specifications Item 265. We recommend about 2 percent lime and 8 percent flyash by dry weight be used for estimating and planning. The percentages are given as application by dry weight of soil. Lime-flyash is also available pre-mixed, typically in percentages of 20 to 30 percent lime and 70 to 80 percent flyash, and may be used if preferred.

The pavement design methods described above are intended to provide structural sections with adequate thickness over a particular subgrade such that wheel loads are reduced to a level the subgrade can support. The support characteristics of the subgrade for pavement design do not account for shrink/swell movements of an expansive clay subgrade such as the soils encountered at this site. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. Post-construction subgrade movements and some cracking of pavements are not uncommon for clay subgrade conditions such as those observed at this site. Reducing moisture changes in the subgrade is important to reduce shrink/swell movements. Although chemical treatment will help to reduce such movement/cracking, this movement/cracking cannot be feasibly eliminated.

Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations and environmental factors which will significantly affect the service life must be included in the preparation of the construction drawings and specifications. Normal periodic maintenance will be required.

Long-term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and providing for preventative maintenance. The following recommendations should be implemented to help promote long-term pavement performance:

Geotechnical Engineering Report

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
November 13, 2019 ■ Terracon Project No. 91195042



- The subgrade and the pavement surface should be designed to promote proper surface drainage, preferably at a minimum grade of 2 percent;
- Install joint sealant and seal cracks immediately;
- Extend curbs into the treated subgrade for a depth of at least 4 inches to help reduce moisture migration into the subgrade soils beneath the pavement section; and
- Place compacted, low permeability clayey backfill against the exterior side of the curb and gutter.

Preventative maintenance should be planned and provided for the pavements at this site. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and consist of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Prior to implementing any maintenance, additional engineering observations are recommended to determine the type and extent of preventative maintenance.

GENERAL COMMENTS

Our work is conducted with the understanding of the project as described in the proposal, and incorporates collaboration with the design team as we complete our services to verify assumptions. Revision of our understanding to reflect actual conditions important to our work was based on these verifications and it is reflected in this report. The design team should collaborate with Terracon to confirm these assumptions and to prepare the final design plans and specifications. This facilitates the incorporation of our opinions related to implementation of our geotechnical recommendations. Any information conveyed prior to the final report is for informational purposes only and should not be considered or used for decision-making purposes.

Our analysis and opinions are based upon our understanding of the geotechnical conditions in the area, the data obtained from our site exploration and from our understanding of the project. Variations will occur between exploration point locations, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in the final report, to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our scope of services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Geotechnical Engineering Report

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Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third party beneficiaries intended. Any third party access to services or correspondence is solely for information purposes only. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet) ¹	Location
9	5	Avenue T
5	5	Avenue L
15	5	Avenue Q

¹. Below existing grade.

Boring Layout and Elevations: We used handheld GPS equipment to locate borings with an estimated horizontal accuracy of +/-25 feet. Field measurements from existing site features were also utilized.

Subsurface Exploration Procedures: We advanced the soil borings with truck-mounted drilling equipment using continuous flight augers (solid stem). Three samples were obtained at each boring location at 2-foot intervals.

Soil samples were recovered using open-tube samplers. Hand penetrometer tests were performed on the samples to serve as a general measure of consistency. The samples were placed in appropriate containers, taken to our soil laboratory for testing, and classified by a geotechnical engineer.

Our exploration team prepared field logs as part of standard drilling operations. Field logs include sampling depths, penetration distances, and other relevant sampling information. Field logs include visual classifications of materials encountered during drilling, and our interpretation of subsurface conditions between samples. Final boring logs, prepared from field logs, represent the geotechnical engineer's interpretation, and include modifications based on observations and laboratory tests.

Property Disturbance: We backfilled borings with auger cuttings after completion and patched at the surface with asphaltic concrete. Excess auger cuttings were dispersed in the general vicinity of the borings. Because backfill material often settles below the surface after a period, we recommend borings be checked periodically and backfilled, if necessary.

Laboratory Testing

The project engineer reviewed field data and assigned various laboratory tests to better understand the engineering properties of various soil strata. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied

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Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
November 13, 2019 ■ Terracon Project No. 91195042



as a result of local practices and professional judgment. Standards noted below include reference to other related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D2166/D2166M Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
- ASTM D1140 Standard Test Methods for Amount of Materials in Soils Finer than the No. 200 Sieve

The laboratory testing program included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified soil samples in accordance with the Unified Soil Classification System (USCS).

Samples not tested in the laboratory will be stored for a period of 30 days subsequent to submittal of this report and will be discarded after this period, unless we are notified otherwise.

SITE LOCATION AND EXPLORATION PLANS

SITE LOCATION

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
November 12, 2019 ■ Terracon Project No. 91195042

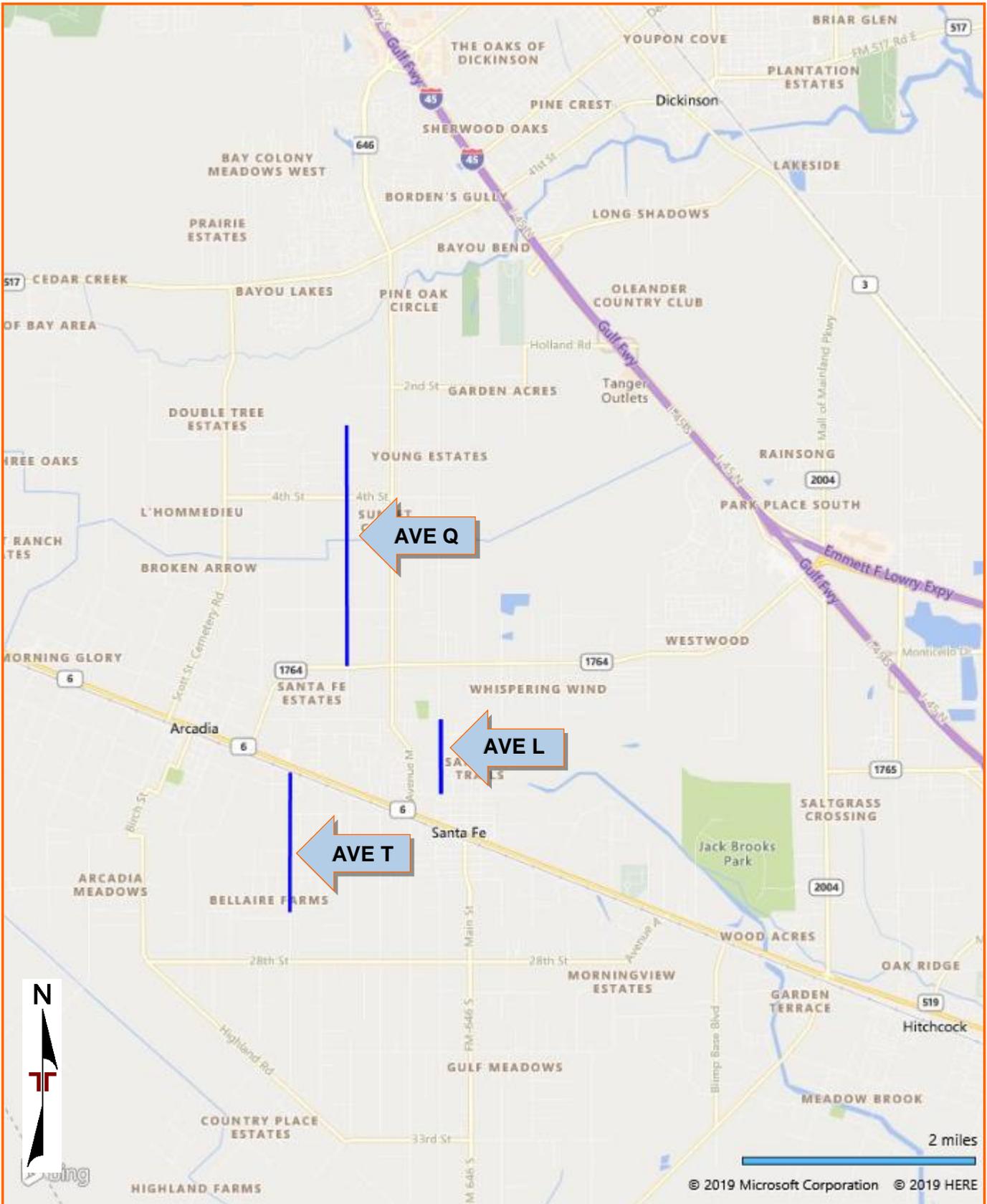


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN: Avenue L and T

Avenue L, Q, and T Road Repair ■ Santa Fe, TX
November 12, 2019 ■ Terracon Project No. 91195042

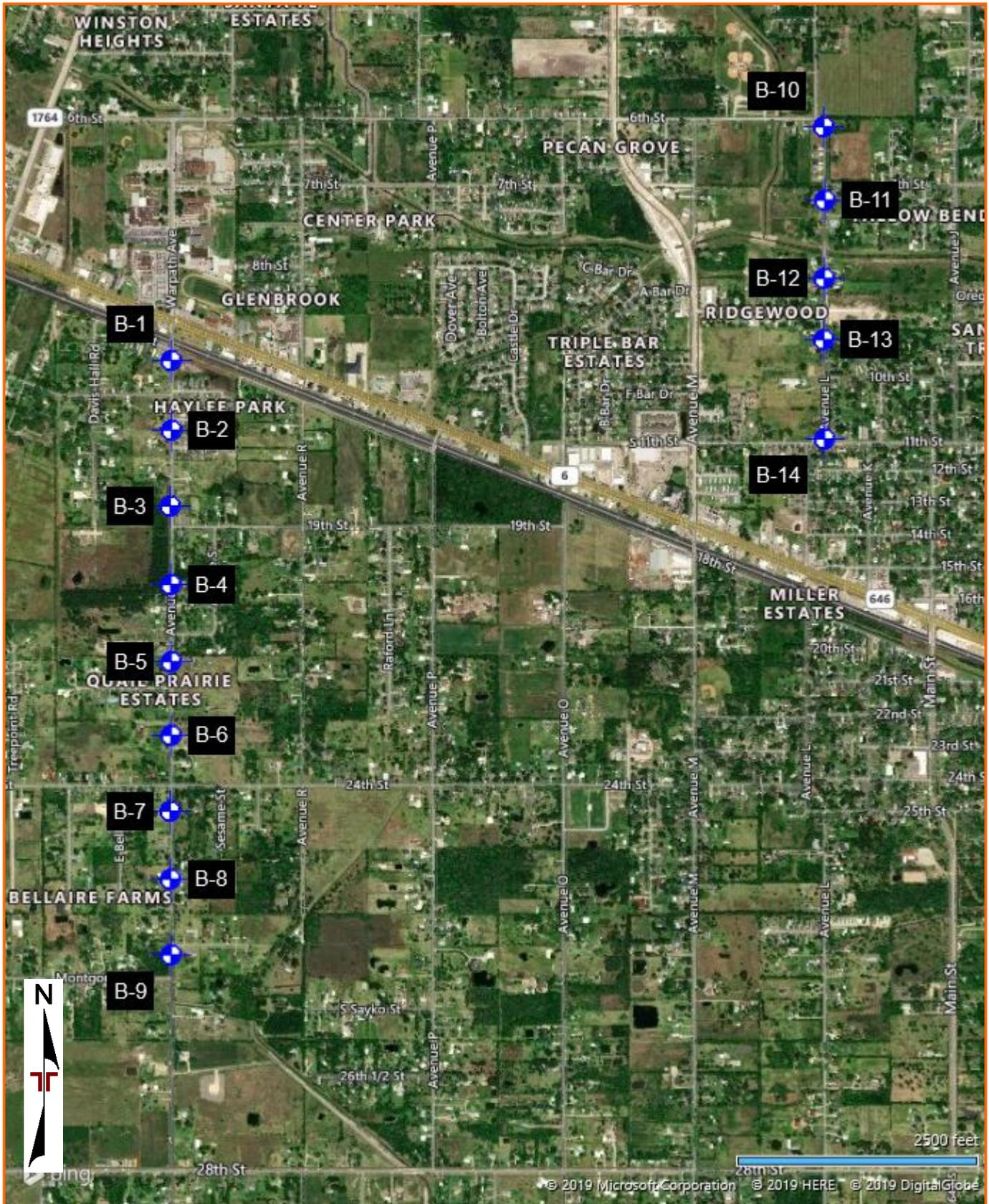


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN : Avenue Q

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas
November 12, 2019 ■ Terracon Project No. 91195042

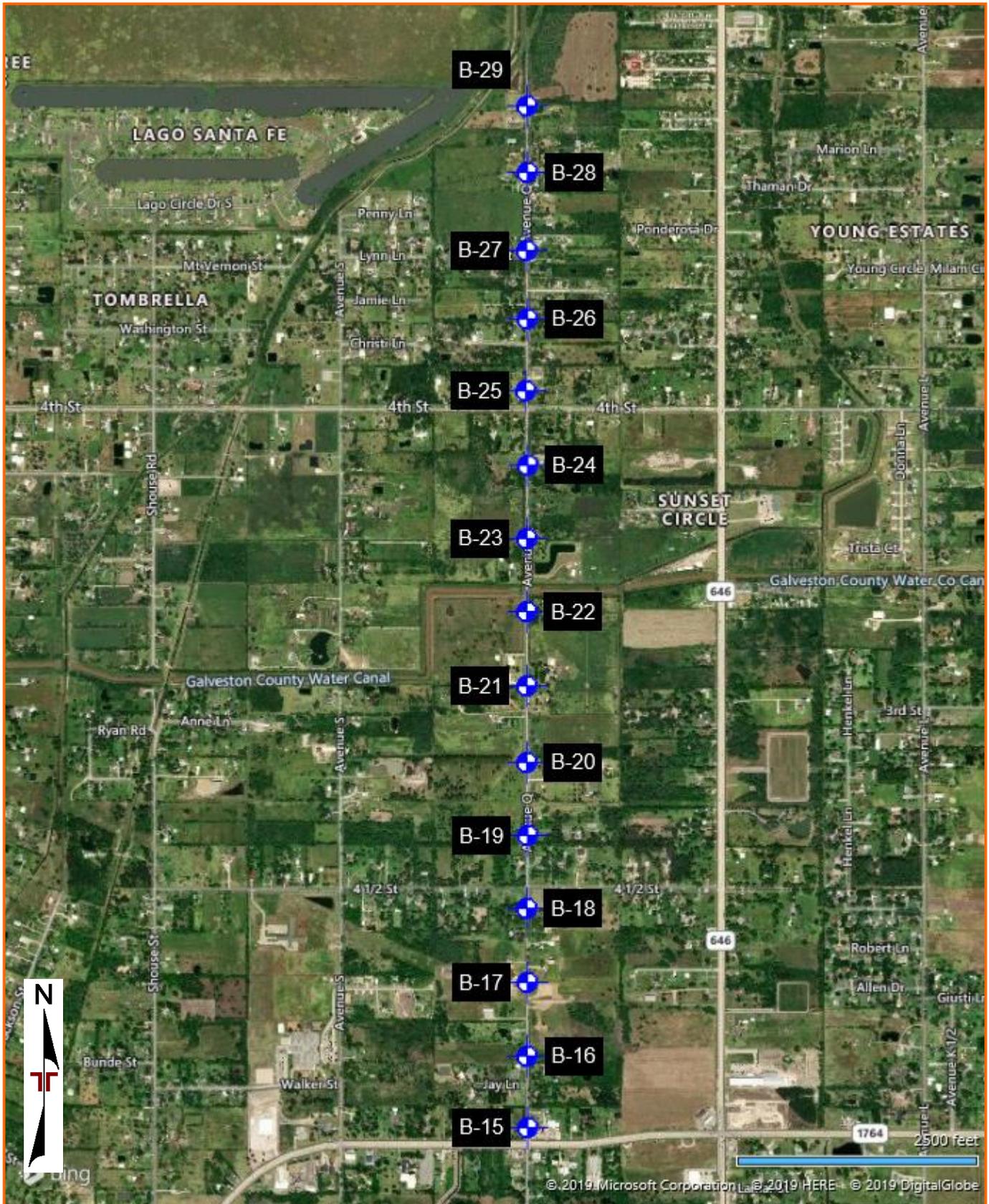


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

BORING LOG NO. B-1

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3775° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
1.0	PAVEMENT , Approximately 2.5 inches asphaltic concrete underlain by about 10 inches sand with stones											
2.0	FILL - LEAN CLAY (CL) , dark gray and brown, with shell fragments				4.0 (HP)			17			37-16-21	
5.0	LEAN CLAY (CL) , light gray, stiff, with ferrous and calcareous nodules				1.75 (HP)							
	LEAN CLAY (CL) , light gray, stiff, with ferrous and calcareous nodules				1.75 (HP)							
	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

<p>Advancement Method: Dry augered to a depth of about 5 feet</p>	<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p>	<p>Notes:</p>						
<p>Abandonment Method: Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete</p>								
<p>WATER LEVEL OBSERVATIONS <i>No free water observed</i></p>	<p>551 W League City Pkwy, Ste F League City, TX</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Boring Started: 10-10-2019</td> <td style="width: 50%;">Boring Completed: 10-10-2019</td> </tr> <tr> <td>Drill Rig: Truck-mounted</td> <td>Driller: Herman Drilling</td> </tr> <tr> <td colspan="2">Project No.: 91195042</td> </tr> </table>	Boring Started: 10-10-2019	Boring Completed: 10-10-2019	Drill Rig: Truck-mounted	Driller: Herman Drilling	Project No.: 91195042	
Boring Started: 10-10-2019	Boring Completed: 10-10-2019							
Drill Rig: Truck-mounted	Driller: Herman Drilling							
Project No.: 91195042								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-2

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3755° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
1.0	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 10 inches sand with stone fragments and clay pockets												
5.0	LEAN CLAY (CL) , dark gray, medium stiff to very stiff -with silt seams 1 to 4 feet -with calcareous nodules below 4 feet	5			4.5 (HP)								
					1.25 (HP)	UC	0.95	9.6	22	103	34-13-21		
					1.25 (HP)								
Boring Terminated at 5 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-3

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3734° Longitude: -9510661°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
1.0	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 11 inches sand with stone fragments and clay pockets												
4.0	FILL - LEAN CLAY (CL) , dark gray and brown, with shell fragments				4.0 (HP)			13			35-15-20		
4.0					2.25 (HP)								
5.0	FILL - LEAN CLAY (CL) , dark gray, medium stiff, with silt seams				1.0 (HP)								
	Boring Terminated at 5 Feet	5											

Stratification lines are approximate. In-situ, the transition may be gradual.

<p>Advancement Method: Dry augered to a depth of about 5 feet</p>	<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p>	<p>Notes:</p>						
<p>Abandonment Method: Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete</p>								
<p>WATER LEVEL OBSERVATIONS <i>No free water observed</i></p>	<p>551 W League City Pkwy, Ste F League City, TX</p>	<table style="width: 100%;"> <tr> <td style="width: 50%;">Boring Started: 10-10-2019</td> <td style="width: 50%;">Boring Completed: 10-10-2019</td> </tr> <tr> <td>Drill Rig: Truck-mounted</td> <td>Driller: Herman Drilling</td> </tr> <tr> <td colspan="2">Project No.: 91195042</td> </tr> </table>	Boring Started: 10-10-2019	Boring Completed: 10-10-2019	Drill Rig: Truck-mounted	Driller: Herman Drilling	Project No.: 91195042	
Boring Started: 10-10-2019	Boring Completed: 10-10-2019							
Drill Rig: Truck-mounted	Driller: Herman Drilling							
Project No.: 91195042								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-4

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3711° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
1.3	PAVEMENT , Approximately 2.5 inches asphaltic concrete underlain by about 14.5 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff -with silt seams 1 to 2 feet -gray below 2 feet				4.0 (HP)							
					1.5 (HP)	1.67	12.8	17	114	38-15-23		
					1.25 (HP)							
	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

<p>Advancement Method: Dry augered to a depth of about 5 feet</p>	<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p>	<p>Notes:</p>						
<p>Abandonment Method: Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete</p>								
<p>WATER LEVEL OBSERVATIONS <i>No free water observed</i></p>	<p>551 W League City Pkwy, Ste F League City, TX</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Boring Started: 10-10-2019</td> <td style="width: 50%;">Boring Completed: 10-10-2019</td> </tr> <tr> <td>Drill Rig: Truck-mounted</td> <td>Driller: Herman Drilling</td> </tr> <tr> <td colspan="2">Project No.: 91195042</td> </tr> </table>	Boring Started: 10-10-2019	Boring Completed: 10-10-2019	Drill Rig: Truck-mounted	Driller: Herman Drilling	Project No.: 91195042	
Boring Started: 10-10-2019	Boring Completed: 10-10-2019							
Drill Rig: Truck-mounted	Driller: Herman Drilling							
Project No.: 91195042								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-5

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3959° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.8	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 8 inches sand with stones												
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff -with silt seams 1 to 2 feet -reddish brown and gray below 4 feet	5			4.0 (HP)			18		24-14-10			
	Boring Terminated at 5 Feet				1.5 (HP)								
					1.25 (HP)								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-6

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3668° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
1.0	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 11 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, stiff -tan and light gray with ferrous and calcareous nodules below 2 feet	5			1.5 (HP)			20		47-14-33		
Boring Terminated at 5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-7

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3647° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
1.1	PAVEMENT , Approximately 2.5 inches asphaltic concrete underlain by about 11 inches sand with stone fragments												
5.0	LEAN CLAY (CL) , dark gray, medium stiff to stiff -with silt seams 1 to 2 feet -tan and gray with ferrous and calcreous nodules below 2 feet	5			2.75 (HP)	UC	0.98	8.3	20	108	31-15-16		
					1.75 (HP)								
					1.25 (HP)								
	Boring Terminated at 5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-8

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3627° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
DEPTH												
1.3	PAVEMENT , Approximately 3 inches asphaltic concrete underlain by about 12 inches sand with stone fragments											
2.0	FILL - LEAN CLAY (CL) , dark gray, with shell fragments				4.0 (HP)							
2.0	LEAN CLAY (CL) , dark gray, stiff				1.25 (HP)			19		44-16-28		
5.0	-gray below 4 feet				1.5 (HP)							
	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-9

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue T
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3606° Longitude: -95.1066°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.8	PAVEMENT , Approximately 2.5 inches asphaltic concrete underlain by about 8 inches sand with stones											
5.0	FAT CLAY (CH) , dark gray, stiff -gray below 4 feet				1.25 (HP)			24		51-18-33		
					1.75 (HP)							
					1.5 (HP)							
	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

<p>Advancement Method: Dry augered to a depth of about 5 feet</p>	<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p>	<p>Notes:</p>						
<p>Abandonment Method: Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete</p>								
<p>WATER LEVEL OBSERVATIONS <i>No free water observed</i></p>	<p>551 W League City Pkwy, Ste F League City, TX</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Boring Started: 10-10-2019</td> <td style="width: 50%;">Boring Completed: 10-10-2019</td> </tr> <tr> <td>Drill Rig: Truck-mounted</td> <td>Driller: Herman Drilling</td> </tr> <tr> <td colspan="2">Project No.: 91195042</td> </tr> </table>	Boring Started: 10-10-2019	Boring Completed: 10-10-2019	Drill Rig: Truck-mounted	Driller: Herman Drilling	Project No.: 91195042	
Boring Started: 10-10-2019	Boring Completed: 10-10-2019							
Drill Rig: Truck-mounted	Driller: Herman Drilling							
Project No.: 91195042								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT_11/12/19

BORING LOG NO. B-10

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue L
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3842° Longitude: -95.0853°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
1.0	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 10 inches sand with stones											
1.0 - 5.0	LEAN CLAY (CL) , dark gray, soft to stiff -gray below 4 feet				0.5 (HP)			17		35-17-18		
5.0	Boring Terminated at 5 Feet	5			1.5 (HP)							
					1.5 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-11

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue L
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3821° Longitude: -95.0852°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
0.9	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 9 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, stiff -gray below 4 feet	5			2.0 (HP)			15		36-16-20		
					2.0 (HP)							
					1.5 (HP)							
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-12

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue L
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3798° Longitude: -95.0852°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.8	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 8 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, medium stiff to stiff -with silt seams 1 to 2 feet -gray below 4 feet	5			0.75 (HP)							
					1.5 (HP)	UC	1.43	13.5	21	104	40-15-25	
					2.0 (HP)							
Boring Terminated at 5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-13

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue L
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3781° Longitude: -95.0853°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
0.9	PAVEMENT , Approximately 1 inch asphaltic concrete underlain by about 10 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff -with calcareous nodules below 2 feet -tan and light gray with ferrous nodules below 4 feet	5			2.5 (HP)			21		29-15-14		
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-14

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue L
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3753° Longitude: -95.0852°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.9	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 9 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, medium stiff to stiff -with silt seams below 4 feet	5			1.5 (HP)	UC	1.11	14.3	19	110	30-14-16	
					1.0 (HP)							
					1.25 (HP)							
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE GDT_ 11/12/19

BORING LOG NO. B-15

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3912° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.6	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 6 inches sand with stones				1.0 (HP)							
5.0	LEAN CLAY (CL) , dark gray, medium stiff to stiff -with calcareous nodules below 4 feet	5			1.5 (HP)	UC	1.13	12.8	22	103	36-10-26	
	Boring Terminated at 5 Feet				1.25 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-16

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3933° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.6	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 6 inches sand with stones											
	LEAN CLAY (CL) , dark gray, stiff to very stiff				1.75 (HP)			17		35-14-21		
	-tan and light gray with calcareous nodules below 2 feet				2.0 (HP)							
					2.5 (HP)							
5.0	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-17

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3954° Longitude: -95.985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.6	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 6 inches sand with stone fragments												
	LEAN CLAY (CL) , dark gray, stiff to very stiff -with silt seams 1 to 2 feet				2.5 (HP)			16			33-14-19		
	-with ferrous nodules 2 to 4 feet				1.5 (HP)								
5.0	Boring Terminated at 5 Feet	5			1.75 (HP)								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-18

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3975° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
0.8	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 7 inches sand with stones											
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff -with silt seams 1 to 2 feet -gray below 2 feet	5			2.25 (HP)			15		31-15-16		
					1.75 (HP)							
					2.25 (HP)							
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-19

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.3996° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.6	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 6 inches sand with stones				2.25 (HP)								
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff -with silt pockets 1 to 2 feet -with calcareous nodules below 4 feet	5			1.75 (HP)	UC	1.66	13.1	19	106	37-15-22		
Boring Terminated at 5 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-20

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4017° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI	
0.5	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 4 inches sand with stones FAT CLAY (CH) , dark gray, stiff to very stiff				2.0 (HP)			28		54-18-36		
-gray below 2 feet					1.5 (HP)							
5.0	Boring Terminated at 5 Feet	5			2.25 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-21

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4038° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.5	PAVEMENT , Approximately 1.5 inches asphaltic concrete underlain by about 4 inches sand with stone fragments LEAN CLAY (CL) , dark gray, stiff to very stiff				2.25 (HP)	UC	2.25	13.9	20	107	42-14-28		
5.0	-gray below 4 feet	5			1.25 (HP)								
	Boring Terminated at 5 Feet				1.75 (HP)								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-22

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.406° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.4	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 3 inches sand with stone fragments SILTY CLAY (CL-ML) , dark gray, medium stiff				1.0 (HP)	UC	0.81	15	14	217	26-19-7	
2.0	LEAN CLAY (CL) , tan and light gray, stiff, with calcareous nodules				1.5 (HP)							
5.0	Boring Terminated at 5 Feet	5			1.75 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-23

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.408° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.5	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 4 inches sand with stones FAT CLAY (CH) , gray, stiff to very stiff				2.0 (HP)			26		51-17-34		
5.0	-tan and light gray below 4 feet Boring Terminated at 5 Feet	5			2.25 (HP)							
					2.5 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT_ 11/12/19

BORING LOG NO. B-24

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4101° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.7	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 6 inches sand with stones												
5.0	LEAN CLAY (CL) , tan and light gray, soft to very stiff, with calcareous nodules				1.5 (HP)								
					1.75 (HP)	UC	0.49	7.8	18	104	33-15-18		
					2.25 (HP)								
	Boring Terminated at 5 Feet	5											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-09-2019

Boring Completed: 10-09-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-25

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4122° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.6	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 6 inches sand with stones											
	LEAN CLAY (CL) , dark gray, medium stiff to stiff				1.0 (HP)			15		32-14-18		
	-tan and light gray with ferrous and calcareous nodules below 2 feet				1.5 (HP)							
					1.0 (HP)							
5.0	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-26

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4143° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.7	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 6.5 inches sand with stone fragments											
2.0	LEAN CLAY (CL) , dark gray, very stiff				2.25 (HP)							
5.0	FAT CLAY (CH) , tan and light gray, stiff -with calcareous nodules 2 to 4 feet				2.25 (HP)	1.66	9.3	24	98	58-15-43		
	Boring Terminated at 5 Feet	5			1.75 (HP)							

Stratification lines are approximate. In-situ, the transition may be gradual.

<p>Advancement Method: Dry augered to a depth of about 5 feet</p>	<p>See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).</p> <p>See Supporting Information for explanation of symbols and abbreviations.</p>	<p>Notes:</p>						
<p>Abandonment Method: Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete</p>								
<p>WATER LEVEL OBSERVATIONS <i>No free water observed</i></p>	<p>551 W League City Pkwy, Ste F League City, TX</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Boring Started: 10-10-2019</td> <td style="width: 50%;">Boring Completed: 10-10-2019</td> </tr> <tr> <td>Drill Rig: Truck-mounted</td> <td>Driller: Herman Drilling</td> </tr> <tr> <td colspan="2">Project No.: 91195042</td> </tr> </table>	Boring Started: 10-10-2019	Boring Completed: 10-10-2019	Drill Rig: Truck-mounted	Driller: Herman Drilling	Project No.: 91195042	
Boring Started: 10-10-2019	Boring Completed: 10-10-2019							
Drill Rig: Truck-mounted	Driller: Herman Drilling							
Project No.: 91195042								

BORING LOG NO. B-27

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4162° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.8	PAVEMENT , Approximately 2 inches asphaltic concrete underlain by about 7 inches sand with stone fragments											
5.0	LEAN CLAY (CL) , dark gray, stiff to very stiff				1.75 (HP)			17		47-15-32		
					2.5 (HP)							
					2.75 (HP)							
	Boring Terminated at 5 Feet	5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-28

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4185° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)			LL-PL-PI		
0.5	<p>PAVEMENT, Approximately 1.5 inches asphaltic concrete underlain by about 4 inches sand with stones and clay pockets</p> <p>FAT CLAY (CH), dark gray, stiff to very stiff</p>				3.0 (HP)	UC	1.71	3.4	21	95	58-16-42		
2.5					2.5 (HP)								
2.25						2.25 (HP)							
5.0													
Boring Terminated at 5 Feet		5											

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_ 91195042 AVENUE L, Q, AND GPJ TERRACON DATATEMPLATE.GDT 11/12/19

BORING LOG NO. B-29

PROJECT: Avenue L, Q, and T Road Repair

CLIENT: Terra Associates, Inc.
Houston, Texas

SITE: Avenue Q
Santa Fe, Texas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 29.4204° Longitude: -95.0985°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (tsf)	STRAIN (%)				
0.5	<p>PAVEMENT, Approximately 1.5 inches asphaltic concrete underlain by about 4.5 inches sand with stone fragments and clay pockets</p> <p>FAT CLAY (CH), dark gray, stiff to very stiff</p>				4.0 (HP)			15		56-17-39		
3.5					3.5 (HP)							
5.0						2.0 (HP)						
Boring Terminated at 5 Feet		5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered to a depth of about 5 feet

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with soil cuttings and patched at the surface with asphaltic concrete

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed



Boring Started: 10-10-2019

Boring Completed: 10-10-2019

Drill Rig: Truck-mounted

Driller: Herman Drilling

Project No.: 91195042

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL_91195042 AVENUE L, Q, AND GPJ TERRACON_DATATEMPLATE.GDT 11/12/19

SUPPORTING INFORMATION

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Avenue L, Q, and T Road Repair ■ Santa Fe, Texas

November 12, 2019 ■ Terracon Project No. 91195042

SAMPLING	WATER LEVEL	FIELD TESTS
 Auger Cuttings  Shelby Tube	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	(N) Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer (UC) Unconfined Compressive Strength (PID) Photo-ionization Detector (OVA) Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (tsf)	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12

GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	Particle Size	Term	Plasticity Index
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm)	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		