ADDENDUM 2

SUBJECT: SAPD Academy Track Pavement, (ID No.: 23-04058), Date of Issue: Friday, August 1, 2025, Scheduled to Close: Tuesday, September 16, 2025

FROM: Jaime E. Contreras, Procurement Manager

DATE: September 12, 2025

THIS NOTICE SHALL SERVE AS ADDENDUM NO. 2 –
TO THE ABOVE REFERENCED INVITATION FOR BIDS

This addendum is separated into sections for convenience; however, all Respondents, and other parties shall be responsible for reading the entire addendum. The failure to list an item or items in all affected sections of this addendum does not relieve any party affected from performing as per instructions, providing that the information is set forth one time any place in this addendum. These documents shall be attached to and become part of the Contract Documents for this project. The Respondent shall be required to acknowledge the receipt of this addendum.

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1. The following changes and/or additions to the Contract Documents, via this addendum, shall apply to submittals made for and to the execution of the various parts of the work affected thereby.
2. Careful note of the addendum shall be taken by all interested parties and all trades affected shall be fully advised in their performance of the work involved.
3. This Addendum is hereby made part of the project requirements and contract documents for the above reference project. Ensure to acknowledge this Addendum in CivCast when downloading this Addendum. Acknowledgement of this Addendum is a requirement in order to submit bid in CivCast. This addendum consists of the items and their associated attachments as listed below:

THE ABOVE-MENTIONED INVITATION FOR BIDS IS HEREBY AMENDED AS FOLLOWS:

GENERAL INFORMATION

Engineers Estimate:

1. Current: $5,998,036.00
   Revised: $6,562,415.42

Reference Attachments:

1. Geotechnical Report & Memo Letters:
    - 90235085 SAPD Academy – Driving Track Improvements & Parking Expansion (Geotech Report) - Signed

ADMINISTRATIVE CHANGES TO SOLICATION DOCUMENTS

QUESTIONS SUBMITTED IN ACCORDANCE WITH THE 040 STANDARD INSTRUCTIONS TO BIDDER/RESPONDENT:

QUESTIONS SUBMITTED ON CIVCAST

Question 21: For traffic signal work, why are you running conduit in the ground when this is a wood pole intersection, and everything will be run overhead? The plans state controller and cabinet will be located in the observation tower, but the plans show it to be installed next to the intersection. Will detection need to be provided at the intersection? If so, what type? Who will be responsible for programming the controller?
Response: Conduit is included at the new signalized intersection to accommodate future lighting additions not part of this contract. The controller and cabinet are to be located at the observation tower as clarified on Sheet C11.1 (see also Sheet C11.0 for conduit run). No vehicle detection is required or included under this contract. The training signal will operate pre-timed. Owner will provide the timing/phasing parameters. The Contractor shall load the provided program into the controller and perform functional testing with the Owner.

Question 22: Traffic signal plan notes say to see C12.0 for conduit to observation tower. C12.0 shows a cross section of the road, and no conduit runs for the signal.
Response: Sheet C11.1 has been revised for clarity. See sheet C11.0 for the conduit run to the observation tower.

Question 23: Addendum 1 says that Geotechnical report will be issued but I can't find it.
Response: The Geotechnical Report has been attached to this Addendum No. 2.

Question 24: Bid form shows Embankment item with LF units. The quantity was lowered to 1168 LF in Addendum 1. Please confirm unit is LF.
Response: Per standard COSA specifications, embankment is measured and paid by cubic yards (CY). The bid form has been revised accordingly in this Addendum 2.

Question 25: Specifications manual for this project does not include Embankment specifications. The item description in bid form does not specify type of embankment. Please let us know if proposed embankment can be done with onsite excavated material or needs to be off-site borrowed material.
Response: The bid form has been revised per standard COSA specifications. Embankment material shall comply with COSA Standard Specification Item 132 – Embankment. On-site excavated material may be used provided it meets COSA specification requirements; otherwise, off-site borrowed material shall be used.

Question 26: Can the City provide, at least, a lump sum bid item for traffic control?
Response: A lump sum bid item for traffic control will be provided under CoSA Standard Specification Item 530 – Barricades, Signs, and Traffic Handling. The contractor shall include all associated costs for furnishing, installation, maintenance, and removal of traffic control devices within this lump sum item.

Question 27: Please confirm new items asphalt treated base refers to asphalt type B as per the City of San Antonio specifications.
Response: Per the geotechnical report, Asphalt Treated Base (ATB) shall be Type B in accordance with COSA specifications.

Question 28: Please provide line item for excavation of existing base to install the 4" of proposed asphalt type B.
Response: A line item has been added. See the updated bid form included with this addendum.

Question 29: Due to the addition of concrete wall item and other items, plus the addition of tack items, plus the change from cement treated base to asphalt base, plus the possible addition of excavation items for the new prosed 4" base, can the engineer provide an updated engineers estimate?
Response: The Engineer's Estimate has been provided and included with this addendum.

Question 30: What is the spec thickness of sand cushion below 2' catch swale.
Response: The swale detail has been revised for clarity. See sheet C12.3.

Question 31: Pavement markings state typical please verify that it is same for entire project and not thermoplastic.
Response: All stop bars shall be thermoplastic. Track lane striping shall be thermoplastic per project specifications. See sheet C11.2

REVISIONS TO CONSULTANT'S DOCUMENTS (SPECIFICATIONS, PLANS, ETC.)

Consultant's revisions listed below will be issued as an attachment to this addendum.

REVISIONS SUBMITTED TO BID FORM

ADDITIONS:

Construction Phase 1:

1. Add line item - Davis Loop - Phase 1C - 104.1 - Street Excavation (1,000 CY < X < 10,000 CY)
2. Add line item 104.1 - Sisco Parkway - Phase 1B - Street Excavation (< 1,000 CY)
3. Add line item 104.1 - Brackman BLVD - Phase 1A - Street Excavation (< 1,000 CY)
4. Add line item 104.1 - Henerie CT - Phase 1A - Street Excavation (< 1,000 CY)
5. Add line item 104.1 - Garcia Street - Phase 1A - Street Excavation (< 1,000 CY)

Construction Phase 2:

6. Add line item 104.1 - Antillion Loop (South, West, & East) - Construction Phase 2A - Street Excavation (< 1,000 CY)
7. Add line item 104.1 - Parking Area - Construction Phase 2B - Street Excavation (< 1,000 CY)

Construction Phase 3 (Training Pads):

8. Add line item 104.1 - Training Pad 1 - Construction Phase 3C - Street Excavation (< 1,000 CY)
9. Add line item 104.1 - Training Pad 2 - Construction Phase 3B - Street Excavation (< 1,000 CY)
10. Add line item 104.1 - Training Pad 3 - Construction Phase 3A - Street Excavation (< 1,000 CY)

Construction Phase 3 (Not Including Training Pads):

11. Add line item 104.1 - Wheeler Way - Construction Phase 3A - Street Excavation (< 1,000 CY)
12. Add line item 104.1 - Morales Ave. - Construction Phase 3B - Street Excavation (< 1,000 CY)
13. Add line item 104.1 - Moinnis Dr. - Construction Phase 3C - Street Excavation (< 1,000 CY)

New Intersection - Construction Phase 1C:

14. Add line item 600 - Remove Existing Controller (Traffic Signal Note #3 Sheet C11.0)

Miscellaneous:

15. Add line item 530 - Attenuation Barrels (Furnish Only)
16. Add line item 530 – Traffic Control

REVISIONS:

New Intersection - Construction Phase 1C:

1. Revise line item 615.1 – Description change from "UGE Pull Box" to "UGE Pull Box (Traffic Signal Note #2 Sheet C11.0)" Quantity change from 28 to 29.
2. Revise line item 618.1 – Description change from "2" Electrical Conduit" to "2" Electrical Conduit (Traffic Signal Note #2 Sheet C11.0)" Quantity change from 692 to 762.
3. Revise line item 615 – Description change from "2070 Linux Controller & Type 336 Cabinet" to "2070 Linux Controller & Type 336 Cabinet (Traffic Signal Note #5 C11.0)"

Detention Pond - Construction Phase 1A:

1. Revise line item 107 – Embankment – Units updated from LF to CY.

REVISIONS SUBMITTED TO PLANS

1. Remove the following sheets and replace them with the attached revised sheets:
   C0.0 – Cover Sheet
   C11.0 – Conduit Sleeves and MBGF Plan – Added notes for clarification and coordination with new observation tower.

C11.1 - Traffic Signal - Added notes for clarification and coordination with new observation tower.
C11.2 - Striping Plan - Added notes for pavement striping clarification.
C12.3 - Pavement Details - Revised concrete swale detail.

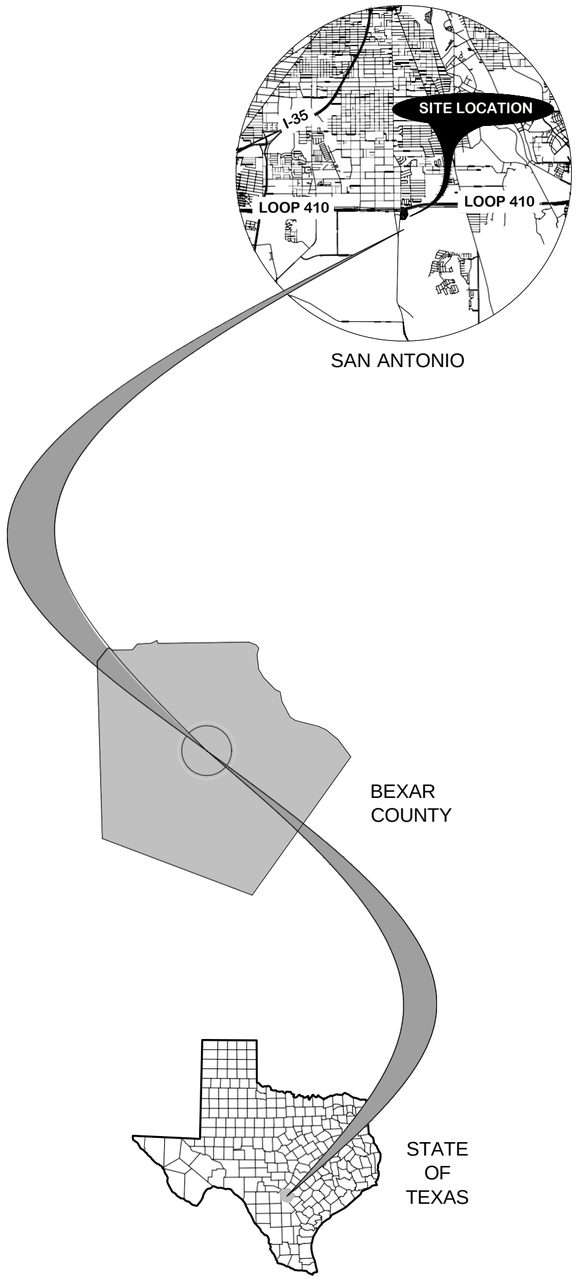
2. Construction Drawings:
   - C0.0 COVER SHEET
   - C11.0 Conduit, sleeves & MBGF plan
   - C11.1 TRAFFIC SIGNAL 9.9.25
   - C11.2 STRIPING PLAN
   - C12.3 Details 9.9.25

SIGNED AND SEALED BY CONSULTANT (Engineer/Architect of Record). By signing and sealing this addendum, the Engineer/Architect of Record acknowledges that the sign/seal is only for changes/clarifications to the items associated with the Engineer's/Architect's work referenced in this addendum.

Jaime E. Contreras

Jaime E. Contreras
Procurement Manager
Procurement Division, Finance Department

END OF ADDENDUM 2



Know what's below. Call before you dig. 811

ONE CALL – DIAL 811
CALL 3 WORKING DAYS BEFORE
YOU DIG
1-800-344-8377

CONSTRUCTION DOCUMENTS

FOR THE DEVELOPMENT OF

SAPD ACADEMY TRACK PAVEMENT

SITUATED WITHIN THE COUNTY OF BEXAR, TEXAS
OCTOBER 2024

SAPD ACADEMY TRACK
N.T.S.

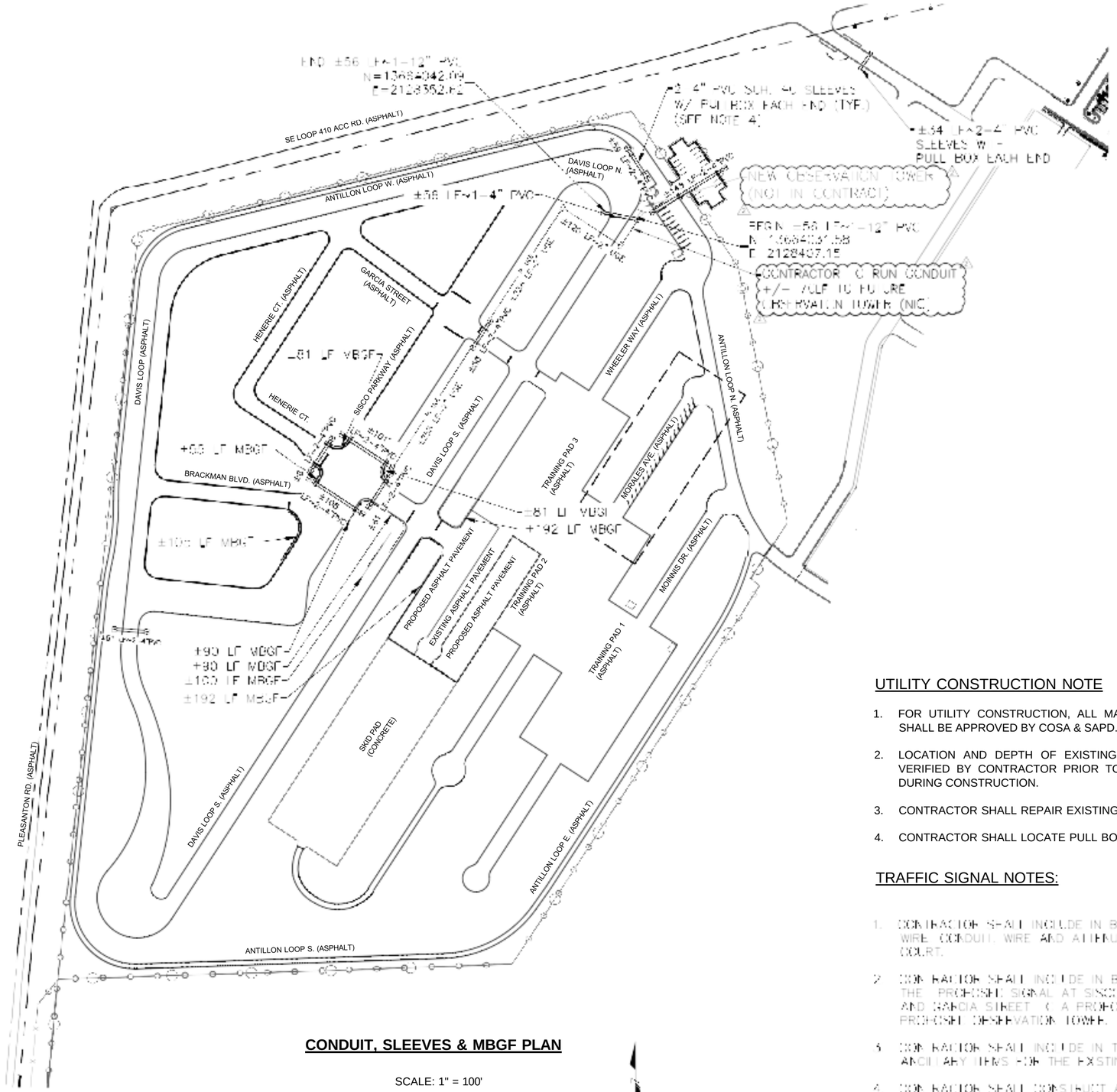
PREPARED BY
SLAY ENGINEERING CO., INC.
CIVIL ENGINEERING - SURVEYING - CONSULTING
123 ALTGELT AVENUE
SAN ANTONIO, TEXAS 78201
TELEPHONE (210) 734-4388
SLAYENGINEERING.COM
TBPE FIRM REGISTRATION No. F1901
S.E.C. JOB No. 22-069

STATE OF TEXAS
MICHAEL M. SLAY
44379
REGISTERED
PROFESSIONAL ENGINEER
10/18/2024

Sheet List Table

2 ADDENDUM NO. 2 - 9/9/25

C0.0



CONDUIT, SLEEVES & MBGF PLAN

SCALE: 1" = 100'

0 100 200 Feet

MBGF NOTES:

1. SEE SHEET C13.0 FOR METAL BEAM GUARD FENCE DETAIL.
2. CONTRACTOR SHALL INSTALL GUARD FENCE BI-DIRECTIONAL DELINEATORS ON MBGF, SPACED 20 FT, MINIMUM 3; MOUNT APPROX. 4 FT ABOVE PAVEMENT, 2–8 FT FROM EDGE.

LEGEND:

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- EXIST. NG WHITE PAINTED STRIPE
- EXIST. NG WHITE PAINTED STRIPE (DASHED)
- EXISTING EDGE OF ASPHALT
- EXIST. NG CHAINLINK FENCE
- EXIST. NG GAS LINE
- NEW OBSERVATION TOWER
- PROPOSED TRAFFIC SIGNAL CONDUIT
- EXIST. NG FIRE HYDRANT
- EXIST. NG GUY WIRE
- EXIST. NG SANITARY SEWER MANHOLE
- EXIST. NG STORM DRAIN MANHOLE
- EXIST. NG SIGN
- EXIST. NG SPRINKLER VALVE
- EXISTING TREE
- 4" SLEEVES W/ PULL BOX EACH END (UNLESS OTHERWISE SPECIFIED)

BENCHMARKS:

SURVEY CONTROL POINT "BH102"
MAG NAIL WITH WASHER
NORTHING: 13,664,041.93
EASTING: 2,127,394.46
ELEV: 600.78'

SURVEY CONTROL POINT "BH103"
MAG NAIL WITH WASHER
NORTHING: 13,662,380.92
EASTING: 2,127,237.64
ELEV: 602.12'

SURVEY CONTROL POINT "BH100"
1/2" IRON ROD WITH CAP
NORTHING: 13,663,689.06
EASTING: 2,128,794.78
ELEV: 609.23'

UTILITY CONSTRUCTION NOTE

1. FOR UTILITY CONSTRUCTION, ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY COSA & SAPD.
2. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN ON PLANS ARE APPROXIMATE ONLY. ACTUAL DEPTHS MUST BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
3. CONTRACTOR SHALL REPAIR EXISTING PAVEMENT REMOVED FOR 2" UGE.
4. CONTRACTOR SHALL LOCATE PULL BOXES MINIMUM 10' FROM EDGE OF PAVEMENT EACH WAY.

TRAFFIC SIGNAL NOTES:

1. CONTRACTOR SHALL INCLUDE IN BASE BID THE PROPOSED INSTALLATION OF TRAFFIC SIGNALS, POLES, SPAN WIRE, CONDUIT, WIRE AND ATTENUATION BARRELS AROUND FACE FOR AT SISCO PARKWAY AND HENERIE COURT.
2. CONTRACTOR SHALL INCLUDE IN BASE BID THE PROPOSED INSTALLATION OF 2" CONDUIT AND PULL BOX FROM THE PROPOSED SIGNAL AT SISCO PARKWAY AND HENERIE COURT @ THE EXISTING SIGNAL AT SISCO PARKWAY AND GARCIA STREET @ A PROPOSED PULL BOX AND CONTINUING @ A PULL BOX AT THE BASE OF THE PROPOSED OBSERVATION TOWER.
3. CONTRACTOR SHALL INCLUDE IN THE BASE BID THE COST TO REMOVE THE EXISTING CONTROLLER AND ANCILLARY ITEMS FOR THE EXISTING TRAFFIC SIGNAL
4. CONTRACTOR SHALL CONSTRUCT A TRAFFIC SIGNAL SYSTEM THAT OPERATES BOTH THE PROPOSED SIGNAL AND EXISTING SIGNAL FROM A CONTROLLER COUNTED WITHIN THE NEW OBSERVATION TOWER.
5. THE $160,000 ALLOWANCE PROVIDED IN THE BID SHALL PROVIDE FOR A NEW 2070LX CONTROLLER IN SPECIAL 336 MC CABINET, BASE CONTROL CABINET, SIMULATOR/FLASH PANEL RELAYS, HARDENED POWER SUPPLY, WIRELESS BRIDGE UNIT AND ALL ANCILLARY ITEMS NECESSARY FOR A FULLY OPERATIONAL TRAFFIC CONTROL SYSTEM THAT OPERATES BOTH TRAFFIC SIGNALS FROM THE NEW OBSERVATION TOWER.
6. CONTRACTOR SHALL INCLUDE IN THE BASE BID 6 ATTENUATION BARRELS AS SHARED FOR SAN ANTONIO POLICE DEPARTMENT (SAPD).

SLAY ARCHITECTURE

MICHAEL W. SLAY 42201 LICENSED ARCHITECT STATE OF TEXAS 10/16/25

100% CONSTRUCTION DOCUMENTS

SAPD ACADEMY TRACK PAVEMENT

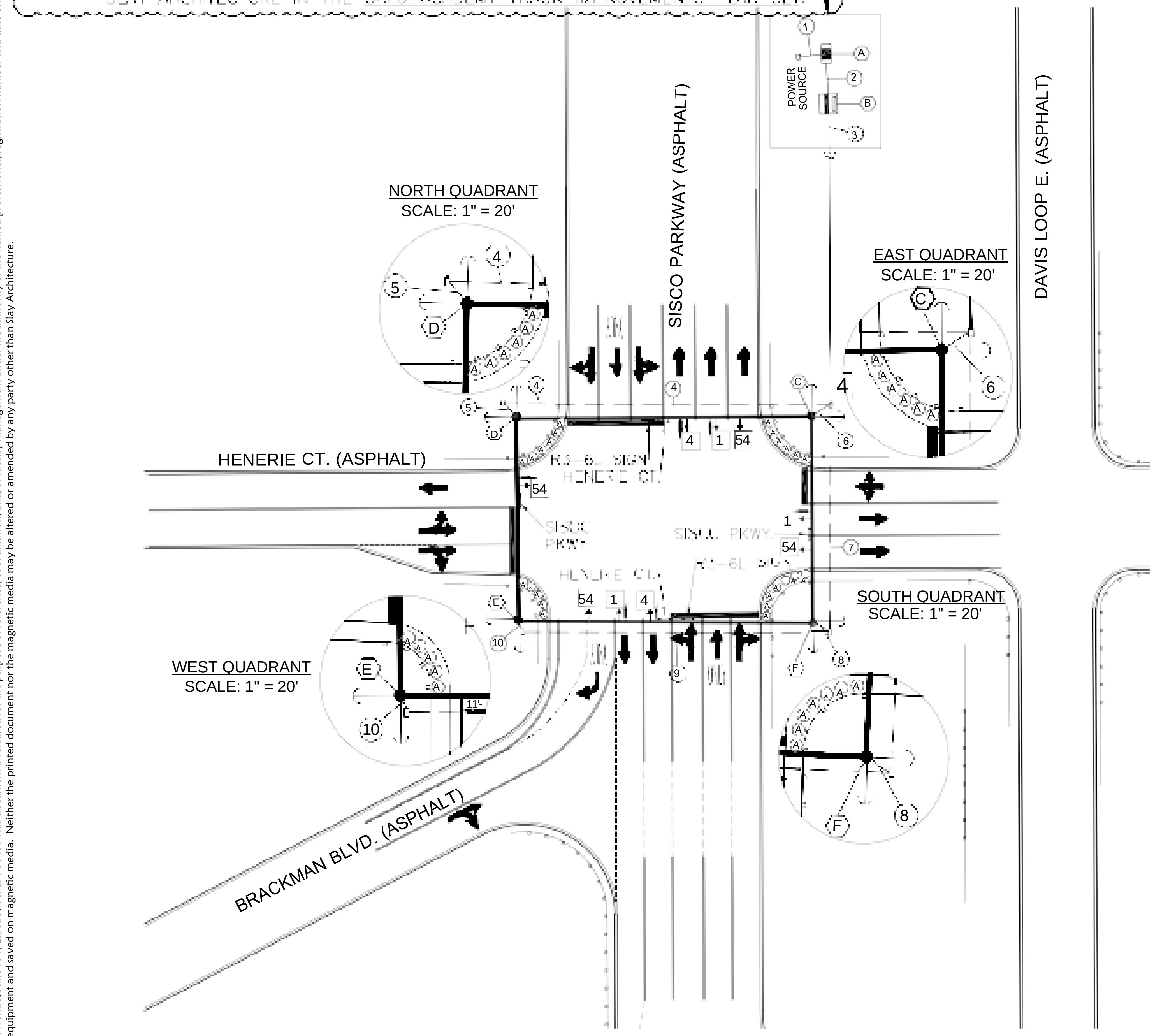
12200 SE. LOOP 410, SAN ANTONIO, TEXAS 78214

Project No. 24004
Date 9/9/2025
Revisions: "Addenda No. 1" - 8/22/25
"Addenda No. 2" - 9/9/2025

C11.0

CONDUIT, SLEEVES & MBGF PLAN

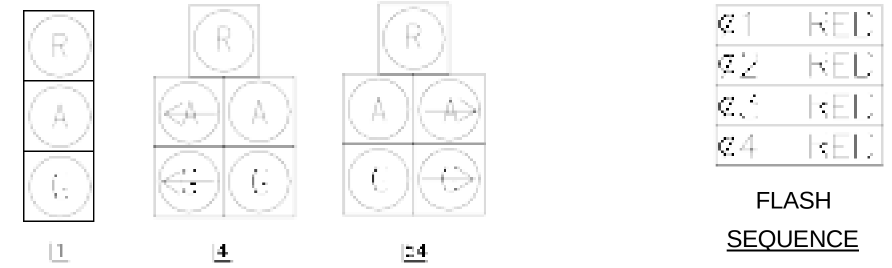
CONTROLLER SHOWN SCHEMATICALLY ON THIS SHEET FOR REFERENCE ONLY. FINAL CONTROLLER LOCATION TO BE COORDINATED WITH ARCHITECTURAL PLANS NOT IN CONTRACT AND WILL BE INSTALLED IN THE NEW OBSERVATION TOWER AS DESIGNED BY SLAY ARCHITECTURE IN THE SAPD ACADEMY TRACK IMPROVEMENTS PLAN SET.



SISCO PKWY. AND HENERIE CT.
TRAFFIC SIGNALIZATION PLAN

SCALE: 1" = 30'

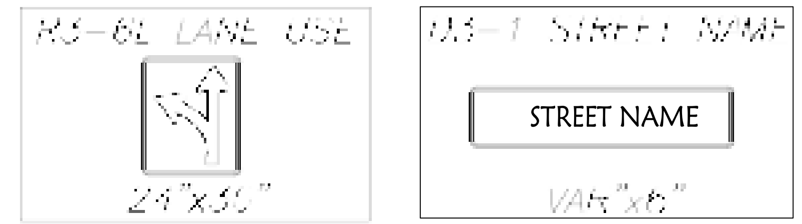
0 30 60 Feet

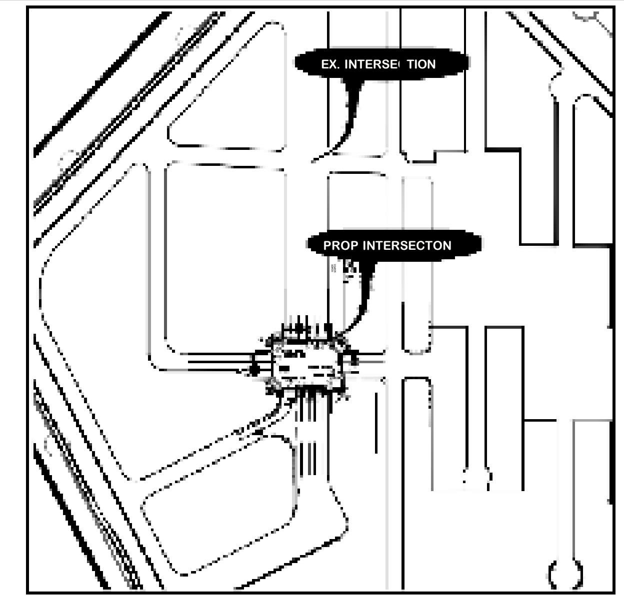


SIGNAL FACES

FLASH SEQUENCE (ALL RED)

ADD SIGN ADJACENT EACH SIGNAL HEAD ON MAST ARM:





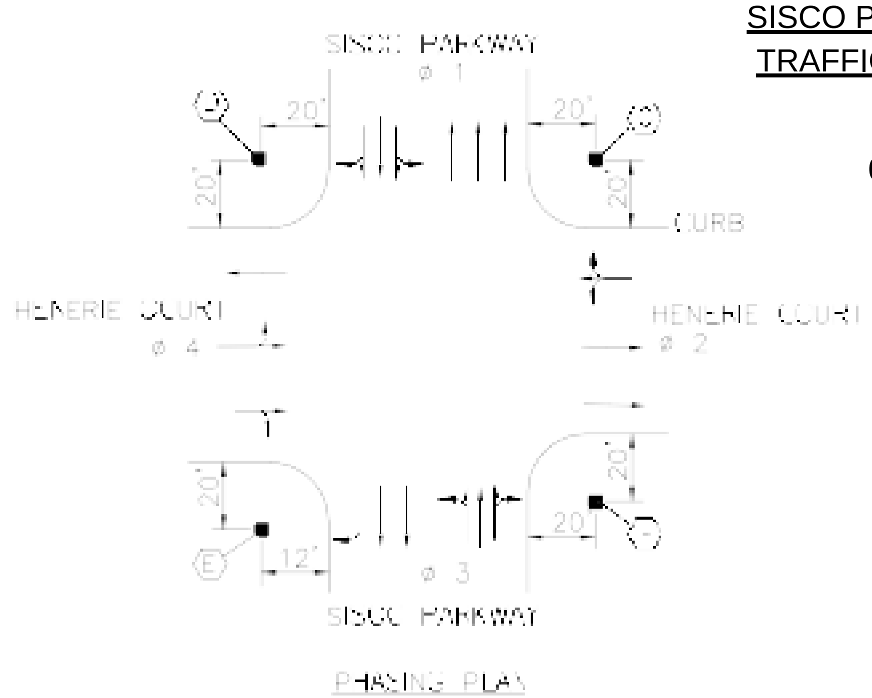
LOCATION MAP
1" = 200'

SIGNALIZATION LEGEND

#3 1/2 PULLBOX	STREET LIGHT WITH ARM
#5 PULLBOX	TRAFFIC SIGNAL ON SPAN
#7 PULLBOX	TRAFFIC SIGNAL ON ARM
WOOD POLE	TRAFFIC WITH BACKPLATE
STEEL POLE WITH ARM	COMBINATION ST. LIGHT/SIGNAL POLE
CONTROLLER ON PEDESTAL	SIGNAL WITH LEFT TURN ARROW
CONTROLER ON FOUNDATION	PEDESTRIAN SIGNAL ON POLE
SERVICE POLE WITH METER	PEDESTRIAN SIGNAL AND BUTTON ON POLE
SERVICE PEDESTAL CABINET	FLASHING SIGNAL AMBER
RAILROAD CABINET	FLASHING SIGNAL RED
GUY AND ANCHOR	POLE IDENTIFIER
SIGNAL CONDUIT	CONDUIT IDENTIFIER
TELEPHONE LINE U.G.	SIGNAL HEAD IDENTIFIER
TELEPHONE LINE O.H.	PEDESTRIAN BUTTON ON SIGNAL POLE
SEWER LINE	
STORM DRAIN LINE	LOOP IDENTIFIER (PHASE, LANE, SET)
ELECTRIC LINE U.G.	
ELECTRIC LINE O.H.	MAST ARM
GAS LINE	CAMERA DETECTION
CABLE T.V. LINE U.G.	ATTENUATION BARRELS
CABLE T.V. LINE O.H.	
PROPERTY LINE	
FENCE LINE	
WOOD FENCE	

TRAFFIC SIGNALIZATION – CONDUIT SCHEDULE FOR SAPD TRAINING ACADEMY DRIVING TRACK, SAN ANTONIO, TEXAS

		1	2	3	4	5	6	7	8	9	10
	CONDUIT RUN NUMBER	1	2	3	4	5	6	7	8	9	10
	CONDUIT SIZE IN INCHES	2	2	3	3	3	3	3	3	3	3
	CONDUIT RUN TYPE (E-EXISTING, B-BORED, T-TRENCHED)	T	T	T	T	T	T	T	T	T	T
IMSA CABLE #14 7-COND	SIGNALS: #3 FROM (C) POLE			1			1				
	SIGNALS: #2 FROM (D) POLE			1	1	1					
	SIGNALS: #1 FROM (E) POLE			1				1		1	1
	SIGNALS: #4 FROM (F) POLE			1				1	1		
IMSA CABLE #14 9-COND	(C)										
	(D)										
	(E)										
	(F)										
#6 SOLID BARE	BARE BOND GROUND	+	1	1	1	1	1	1	1	1	1
#6 THW	120 V POWER HOT	+	1								
	120 V POWER GROUND	+	1								
2 IN 1 COMM. CABLE & POWER SUPPLY											
SSR COMM. CABLE	COMMUNICATION CABLE										



PHASING PLAN

1	2	3	4

PROGRAM

NOTE:

INTERSECTION SIGNALS CAN BE PROGRAMMED WITH THROUGH TRAFFIC AND PERMISSIVE LEFT TURNS.

GENERAL NOTES:

LOCATE NEW WOOD STRAND WIRE SIGNAL POLES, ALL AT SAME DISTANCE OFF NEW CURBS (20' TO PROVIDE CLEARANCE FROM PAVEMENT AND VEHICLES)

NOTES:

- (A) NEW SERVICE PEDESTAL
- (B) NEW 2070 LINUX CONTROLLER IN 336 CABINET (PROGRAMMED BY CONTRACTOR) - LOCATED IN OBSERVATION TOWER
- (C) NEW WOOD POLE WITH TWO GUY WIRES FOR ZINC COAT STL WIRE STRAND
- (D) NEW WOOD POLE WITH TWO GUY WIRES FOR ZINC COAT STL WIRE STRAND
- (E) NEW WOOD POLE WITH TWO GUY WIRES FOR ZINC COAT STL WIRE STRAND
- (F) NEW WOOD POLE WITH TWO GUY WIRES FOR ZINC COAT STL WIRE STRAND
- (G) REFER TO SHEET C11.0 FOR CONDUIT TO OBSERVATION TOWER

SLAY ARCHITECTURE

SAN ANTONIO
123 Altgelt Avenue
San Antonio, Texas 78201
T: 210.736.3009

LAREDO
9901 McPherson Avenue, #104
Laredo, Texas 78045
T: 956.791.0405

100% CONSTRUCTION DOCUMENTS

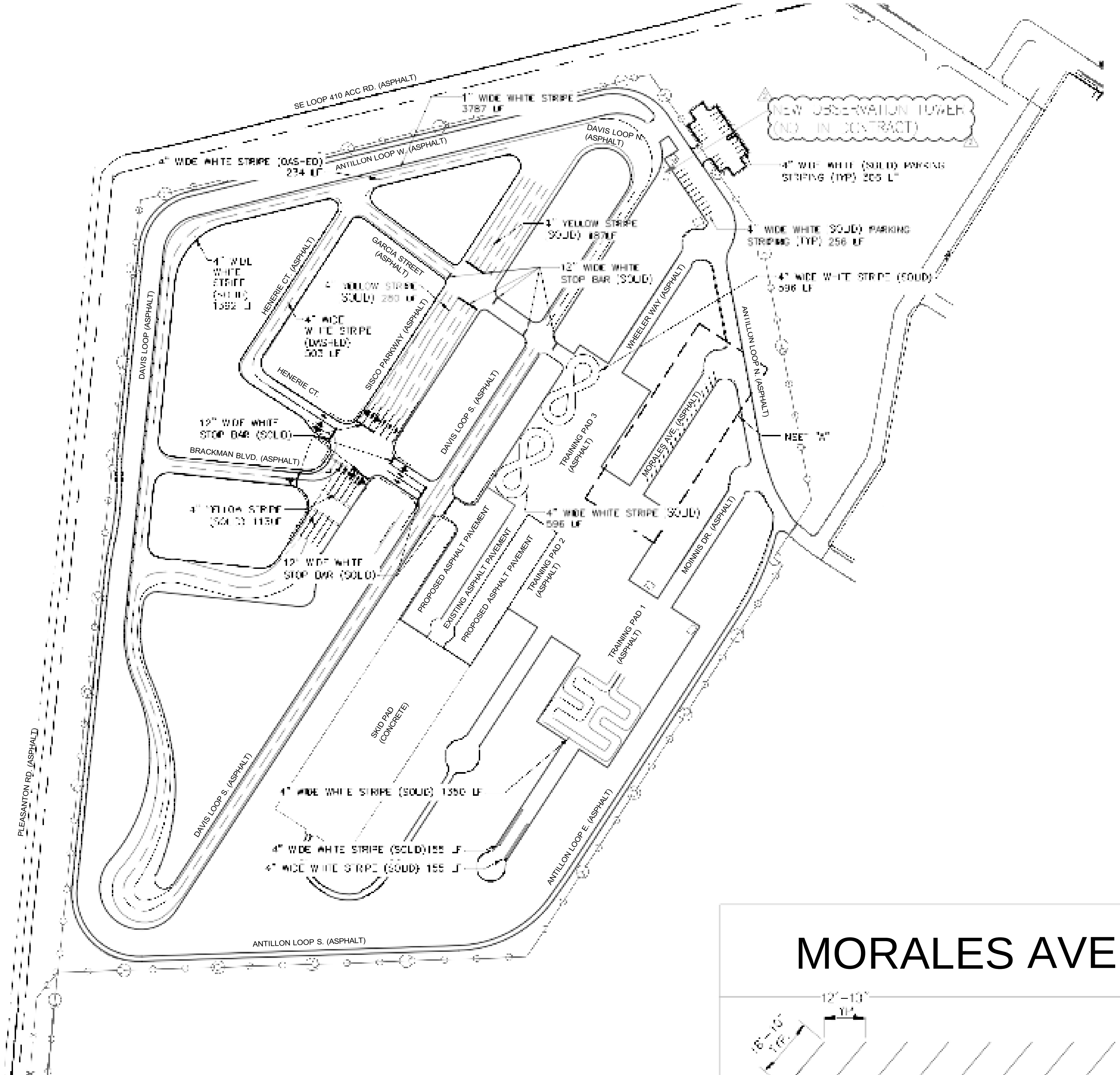
SAPD ACADEMY TRACK PAVEMENT

12200 SE. LOOP 410, SAN ANTONIO, TEXAS 78214

Project NO.: 22028
Date:9/9/2025
Revisions: "Addenda No. 1" - 8/22/25
"Addenda No. 2" - 9/9/2025

C11.1

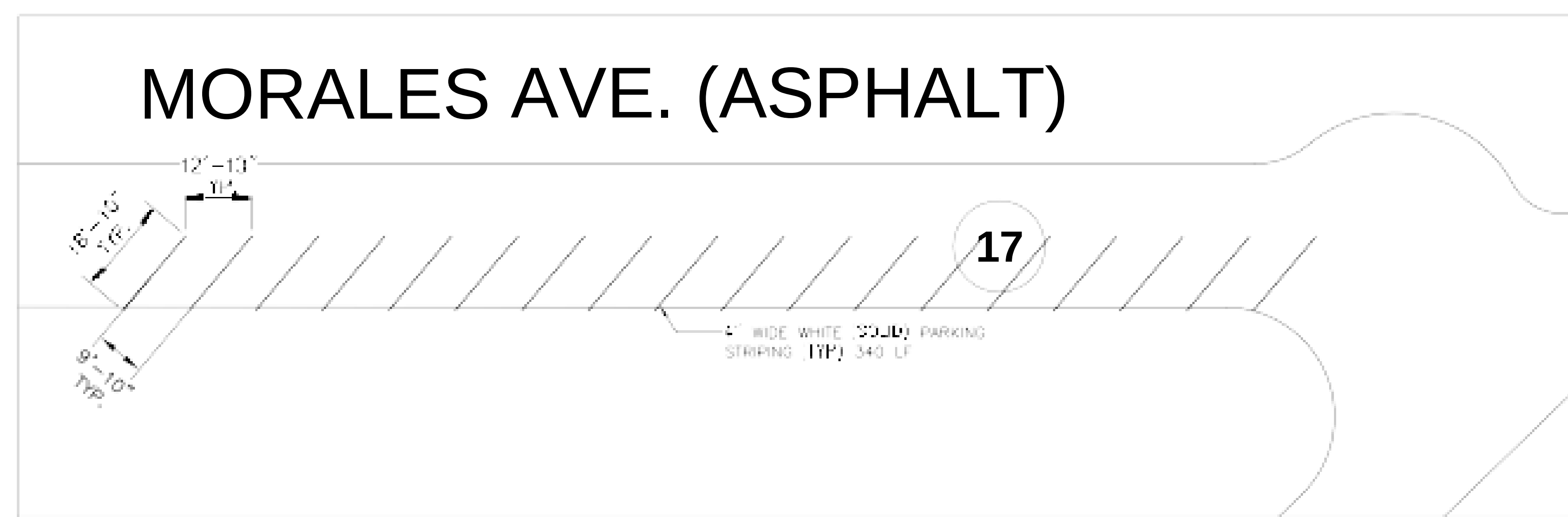
TRAFFIC SIGNAL



STRIPING PLAN

0 100 200 Feet

SCALE: 1" = 100'



INSET "A"

0 20 40 Feet

SCALE: 1" = 20'

LEGEND:

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- EXISTING WHITE PAINT STRIPE
- EXISTING WHITE PAINT STRIPE (DASHED)
- EXISTING EDGE OF ASPHALT
- EXISTING CHAINLINK FENCE

STRIPING NOTES:

1. A STRIPING SHALL BE USED TO INDICATE PARKING SPACES, NO PARKING, AND LANE STRIPING AREA. PARKING SPACE SHALL BE INDICATED BY FOUR INCHES (4") PAINTED WHITE STRIPED, NINE FEET TO TEN FEET (9'-10') ON CENTER. NO PARKING AREA SHALL BE NOTED BY 4 INCH WHITE LINES WITH FORTY-EIGHT INCHES (48") SEPARATION, PAINTED DIAGONALLY ACROSS THE AREA. LANE STRIPING SHALL BE FOUR FEET (4') PAINTED WHITE STRIPING, UNLESS OTHERWISE SPECIFIED.
2. ALL 4" STRIPING IS WHITE UNLESS OTHERWISE SPECIFIED.

TOTAL STRIPING LENTGTHS:

1. 4" WHITE SOLID LINE (THERMOPLASTIC) – 14,265 LF
2. 4" WHITE DASHED LINE (THERMOPLASTIC) – 5,582 LF
3. 4" YELLOW SOLID LINE (THERMOPLASTIC) – 571 LF
4. 12" WIDE WHITE STOP BAR (THERMOPLASTIC) – 304 LF
5. 4" WHITE PARKING SOLID LINE (THERMOPLASTIC) – 801 LF

SLAY ARCHITECTURE

100% CONSTRUCTION DOCUMENTS

SAPD ACADEMY TRACK PAVEMENT

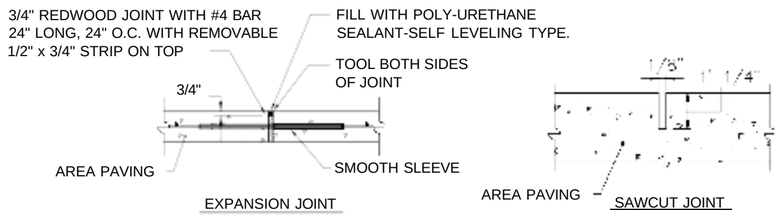
12200 SE. LOOP 410, SAN ANTONIO, TEXAS 78214

9/9/2025

Revisions: "Addenda No. 1" - 8/22/25
"Addenda No. 2" - 9/9/2025

C11.2

STRIPING PLAN

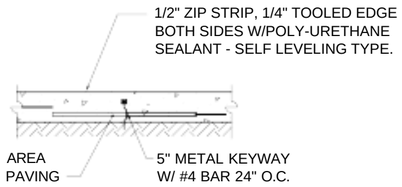


GENERAL NOTES:

SAWCUT JOINTS BETWEEN 18 AND 24 HOURS AFTER CONCRETE POUR.

1 / C 2.3 CONTROL JOINTS

NOT TO SCALE

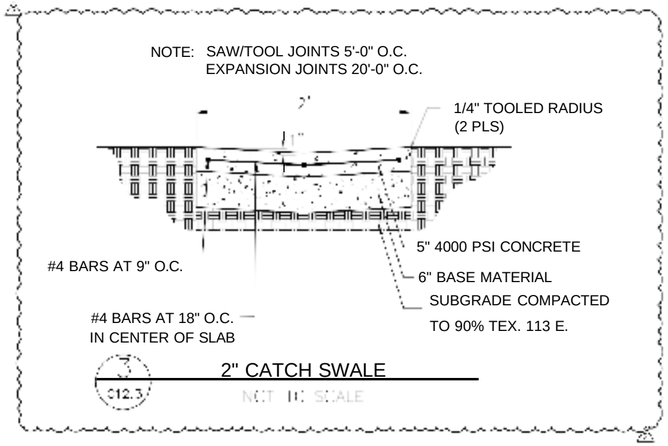


GENERAL NOTES:

CONSTRUCTION JOINTS TO BE USED ON PIPE CHASES AND BETWEEN CONCRETE POURS ONLY.

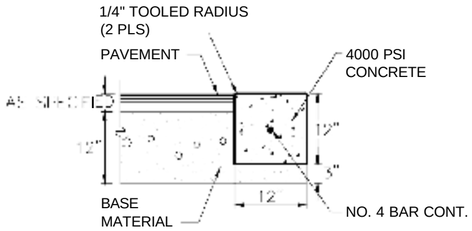
2 / C 2.3 CONSTRUCTION JOINT

NOT TO SCALE



3 / C12.3 2" CATCH SWALE

NOT TO SCALE

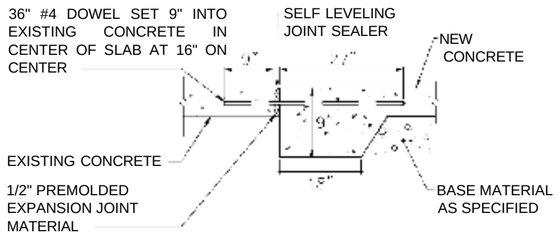


GENERAL NOTES:

SAW JOINTS 10' ON CENTER AND EXPANSION JOINTS AT 40' ON CENTER. WHERE CURB ABUTS SIDEWALKS AND OR CONCRETE PAVEMENT, JOINTS SHALL MATCH UNLESS OTHERWISE SHOWN ON PLANS.

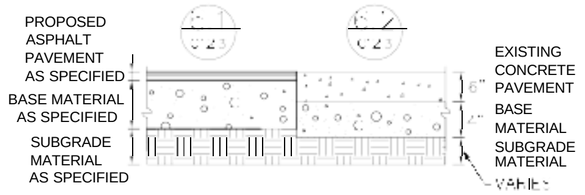
4 / C 2.3 FLUSH CURB

NOT TO SCALE



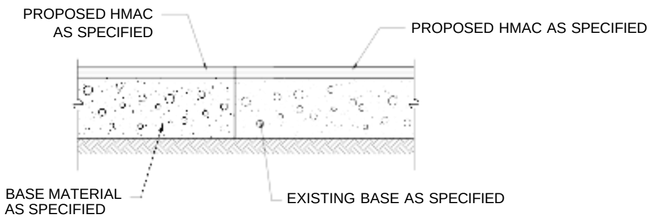
5 / C 2.3 NEW CONCRETE TO EXISTING CONCRETE

NOT TO SCALE



6 / C 2.3 CONCRETE TO ASPHALT PAVEMENT

NOT TO SCALE

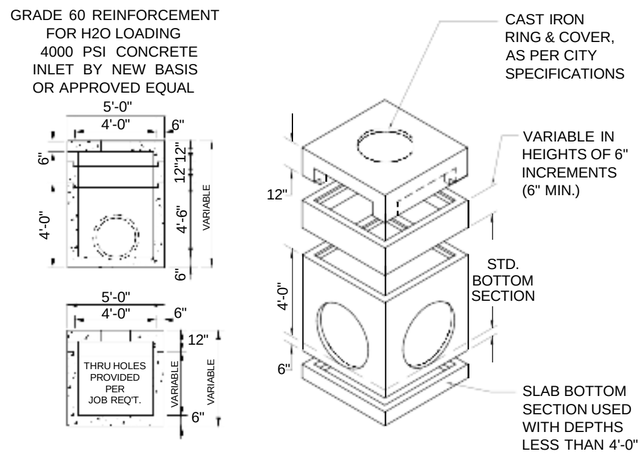


7 / C 2.3 NEW ASPHALT TO EXISTING ASPHALT

NOT TO SCALE

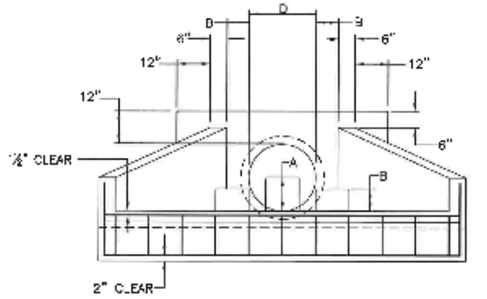
GENERAL NOTES:

TACK COAT SHALL CONFORM TO COSA ITEM 203 AND BE APPLIED TO ALL EXISTING ASPHALT SURFACES PRIOR TO PLACEMENT OF NEW HMAC.



8 / C 2.3 4'-0"x4'-0" VAR. CURB INLET OR "Y"INLET

NOT TO SCALE



SECTION B-B

NOTES:

1. ALL CONCRETE SHALL BE TYPE "C" AS PER SPEC. 4035, CONCRETE FOR STRUCTURES.
2. CHAMFER ALL EXTERNAL VISIBLE CORNERS.
3. DISSIPATOR BLOCKS REQUIRED ON DISCHARGE HEADWALLS ONLY

D	15"	21"	24"	27"	30"	33"	36"	42"	48"	54"	60"
A	9"	10"	12"	14"	15"	15"	18"	21"	24"	27"	30"
B	6"	7"	8"	9"	10"	11"	12"	14"	16"	18"	20"
C	90"	105"	120"	135"	150"	165"	180"	210"	240"	270"	300"
L	54"	63"	72"	81"	90"	99"	108"	126"	144"	162"	180"
E	12"	14"	16"	18"	20"	22"	24"	28"	32"	36"	40"

DISCHARGE VELOCITIES GREATER THAN 3 METERS/SECOND (10 fps) REQUIRE ROCK OUTLET PROTECTION.

9 / C 2.3 STANDARD HEADWALL AND ENERGY DISSIPATORS

NOT TO SCALE

PAVEMENT DETAILS

SLAY ARCHITECTURE

SAN ANTONIO
123 Altgelt Avenue
San Antonio, Texas 78201
T: 210.736.3009

LAREDO
9901 McPherson Avenue, #104
Laredo, Texas 78045
T: 956.791.0405

9/5/2025 2:52:10 PM M:\2022\22-069 COSA Training Academy Driving Track Improvements\DWG\C13.0 DETAILS.dwg

100% CONSTRUCTION DOCUMENTS

SAPD ACADEMY TRACK PAVEMENT

12200 SE. LOOP 410, SAN ANTONIO, TEXAS 78214

Project NO.: 22028
Date:9/9/2025
Revisions: "Addenda No. 1" - 8/22/25
"Addenda No. 2" - 9/9/2025

C12.3

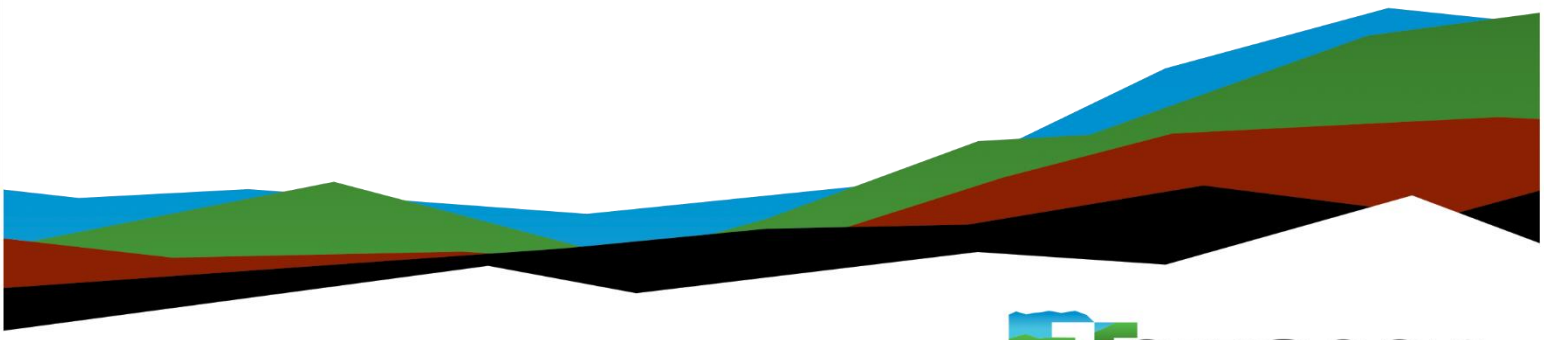
PAVEMENT DETAILS

SAPD Academy – Driving Track Improvements & Parking Expansion

Geotechnical Engineering Report

Prepared for:

Slay Engineering Co., Inc
123 Altgelt Avenue
San Antonio, Texas 78201



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San Antonio, TX 78216
P (210) 641-2112
Terracon.com

October 5, 2023

Slay Engineering Co., Inc
123 Altgelt Avenue
San Antonio, Texas 78201

Attn: Roger Lawhead, PE
P: (210) 734–4388
E: rlawhead@slayengineering.com

Re: Geotechnical Engineering Report
SAPD Academy – Driving Track Improvements & Parking Expansion
12200 SE Loop 410
San Antonio, Texas
Terracon Project No. 90235085

Dear Mr. Lawhead:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations to be used for the design of foundations for the proposed tower and pavements. We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

Terracon
(Firm Registration No. F3272)

Carlos Cotilla
Senior Staff Engineer

Arin Barkataki, P.E.
Principal

STATE OF TEXAS
ARINDAM BARKATAKI
104544
LICENSED
PROFESSIONAL ENGINEER

Table of Contents

Attachments

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed monopole tower and pavements to be located at 12200 SE Loop 410 in San Antonio, Texas. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Pavement recommendations

The geotechnical engineering Scope of Services for this project included the advancement of 10 test borings to a depth of approximately 5 feet below existing grade, one boring to a depth of 40 feet below existing grade, and laboratory testing, engineering analysis, and preparation of this report.

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

Project Description

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

Item	Description
Information Provided	We have been provided the pertinent project details by the Client via an email dated March 10, 2023.

Item	Description
Proposed Structure	The project consists of improvements to the existing track pavement (replace pavement or overlay), adding new track pavement, adding additional parking pavement at tower, drainage, new tower and new 400' south access drive. "Parking" consists of expanding the existing parking lot in the northeast corner of the site. The existing track pavement will be cored (566,000 SF) in order to estimate the existing thickness of the pavement sections and determine if the existing asphalt can be milled and overlaid. The existing concrete in the track area will not be rehabilitated however at the request of the client, we will collect a few cores if the scope increases for rehabilitation of the concrete pavement.
Pavements	Both rigid (concrete) and flexible (asphalt) pavement sections will be considered.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

ITEM	DESCRIPTION
Location	The project site is located at 12200 SE Loop 410 in San Antonio, Texas.
Current Ground Surface	Bare soil and grass.
Existing Development	There is an existing building in the vicinity of the project site.
Existing Topography	Based on our visual observation, the site is relatively level.

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. Conditions observed at the exploration point are indicated on the individual logs The individual logs can be found in the **Exploration Results** and the GeoModel can be found as an attachment of this report.

Model	Layer Name	General Description
1	Lean Clay	Dark Brown, Dark Brown and Gray; Medium Stiff to Very Stiff
2	Fat Clay	Dark Brown and Brown; Stiff to Hard

Groundwater

Groundwater water generally appears as either a permanent or temporary water source. Permanent subsurface water is generally present year-round, which may or may not be influenced by seasonal and climatic changes. Temporary groundwater water is also referred to as a "perched" water source, which generally develops as a result of seasonal and climatic conditions.

Subsurface water was observed at 20 feet while drilling and at 38 feet after boring completion in boring B-11 only. Groundwater levels are influenced by seasonal and climatic conditions which generally result in fluctuations in the elevation of the groundwater level over time. The foundation contractor should check the groundwater conditions just before foundation excavation activities. The boring was backfilled with soil cuttings after the drilling operations were completed.

Recommendations for Design and Construction for the Tower

Geotechnical Considerations

The foundations being considered to provide support for the planned communications tower must satisfy two independent engineering criteria with respect to the subsurface conditions encountered at the tower location. One criterion is the foundation system must be designed with an appropriate factor of safety to reduce the possibility of soil failure when subjected to axial and lateral load conditions. The other criterion is foundation movements, whether vertical, horizontal or rotational, must be within the allowable limits of the subsurface materials and within the operational limits of the foundation and structure.

Of the improvements planned, the communications tower is the primary structure. The equipment building, due to its prefabricated construction, will be somewhat forgiving to whatever foundation system supports it. Typically, the equipment building can be supported on a cast-in-place concrete slab foundation or a compacted crushed limestone or gravel base pad. Some of the support equipment modules are miniaturized to such an extent that they may be attached to the tower near its base.

The communications tower foundation will need to be designed to resist high loads due to its height and the imposed forces from wind loading. Generally, 3 load cases are applied to tower structures: axial compressive loading, axial tensile (uplift) loading and lateral loading. Monopole towers experience high lateral loading, which nearly always controls the foundation design. Axial loading of the foundation is relatively low and seldom controls the foundation design. However, the foundation should always be analyzed for the 3 load cases to verify the controlling load case.

Foundation Recommendations

We understand the proposed tower will be supported on a drilled pier foundation system. Recommendations for drilled pier foundation are provided in the following sections.

Drilled Pier Foundation

Our recommendations for the tower provided below are based on the subsurface information encountered at boring location B-11. If the location of the new tower changes, we should be consulted prior to the design and construction of foundations. Minimum pier depth should be 20 feet.

It is recommended that the drilled shaft design should incorporate a factor of safety of 3.0 for end bearing and 2 for side resistance, when subjected to axial compression loading situation. A factor of safety of 3.0 is recommended for side resistance against uplift loading situation. Soil parameters for axial and lateral design of drilled shaft are provided in the following section.

Axial and Lateral Design Parameters

Recommended geotechnical parameters of drilled shaft foundations have been developed for use in the SHAFT and L-PILE computer programs. Based on the encountered subsurface conditions, laboratory test results, and field penetration test results, generalized engineering properties have been provided, as shown in the following table:

B-11						
Soil Type	Depth to Bottom of Layer (1) (feet)	Effective Unit Weight (pcf)	Cohesion (psf)	Strain, E_{50} [2]	Ultimate Skin Friction (ksf)[3,4]	Ultimate End Bearing (ksf)[4]
Stiff Clay w/o Free Water	4	120	1,000	Default	---	---
Stiff Clay w/o Free Water	10	120	2,000	Default	0.98	--
Stiff Clay w/o Free Water	20	125	3,000	Default	1.2	18
Stiff Clay w/o Free Water	40	63	4,000	Default	1.36	36

Notes:
(1) Depth referenced to existing ground surface.
(2) Use LPILE default values.
(3) The side resistance of the uppermost 4 feet of the soil should be ignored due to the potential for disturbance caused during the drilled shaft construction.
(4) The provided values are ultimate..

Drilled shaft length may need to be adjusted (increased) to resist the lateral loads and moments acting at or near the ground surface elevation (structural loads). Soil Parameters and Models for Lateral Load Analyses of Drilled Shafts section provided above for the detailed lateral load analyses of drilled shaft foundation.

Drilled Pier Construction Considerations

The pier excavations should be augured and constructed in a continuous manner. In the case of an anchor bolted structure, reinforcing steel, the anchor bolt assembly, and concrete should be placed in the pier excavation immediately following drilling and evaluation for proper bearing stratum, embedment, and cleanliness. In the case of direct embedded poles, the pole should be placed in the excavation and concrete or cementations grout should be placed immediately following drilling and evaluation for proper bearing stratum, embedment, and cleanliness. In no circumstances should the excavation remain open overnight.

During the time of our drilling operations, subsurface water observed in the soil boring for the tower. Subsurface water levels are influenced by seasonal and climatic conditions which result in fluctuations in subsurface water elevations. The contractor should be prepared to use temporary casing to reduce sloughing of the excavation sidewalls occur. The casing method is discussed in the following paragraphs.

Casing Method - Casing should provide stability of the excavation walls and should reduce water influx; however, casing may not completely eliminate subsurface water influx potential. In order for the casing to be effective, a "water tight" seal must be achieved between the casing and surrounding soils. The

drilling subcontractor should determine casing depths and casing procedures. Water that accumulates in excess of 3 inches in the bottom of the pier excavation should be pumped out prior to steel and concrete placement. If the water is not pumped out, a closed-end tremie should be used to place the concrete completely to the bottom of the pier excavation in a controlled manner to effectively displace the water during concrete placement. If water is not a factor, concrete may be placed with a short tremie so the concrete is directed to the bottom of the pier excavation. The concrete should not be allowed to ricochet off the walls of the pier excavation nor off the reinforcing steel. If this operation is not successful or to the satisfaction of the foundation contractor, the pier excavation should be flooded with fresh water to offset the differential water pressure caused by the unbalanced water levels inside and outside of the casing. The concrete should be tremied completely to the bottom of the excavation with a closed-end tremie.

Removal of casing should be performed with extreme care and under proper supervision to reduce mixing of the surrounding soil and water with the fresh concrete. Rapid withdrawal of casing or the auger may develop suction that could cause the soil to intrude into the excavation. An insufficient head of concrete in the casing during its withdrawal could also allow the soils to intrude into the wet concrete. Both of these conditions may induce "necking", a section of reduced diameter, in the pier.

All aspects of concrete design and placement should comply with the American Concrete Institute (ACI) 318 Code Building Code Requirements for Structural Concrete, ACI 336.1 Standard Specification for the Construction of Drilled Piers, and ACI 336.3R entitled Suggested Design and Construction Procedures for Pier Foundations.

Seismic Considerations

Description	Value
2021 International Building Code Site Classification (IBC) [1]	D [2]

1	The site class definition was determined using SPT N-values in conjunction with section 1613.3.2 in the 2021 IBC and Table 20.3-1 in the 2010 ASCE-7.
2	Boring extended to a maximum depth of 40 feet, and this seismic site class definition considers that similar condition continues below the maximum depth of the subsurface

Earthwork

The comments and suggestions in this section are provided for planning and informational purposes so project specifications can be prepared, and to inform the reader of

conventional methods to achieve the intent of our design recommendations. Details about excavation, dewatering, casing installation, selection of equipment/machinery, trafficability, project site safety, shoring, and other similar construction techniques that require "means and methods" to accomplish the work are the sole responsibility of the project contractor. It should be recognized that the comments contained in this report are based on the observations of small diameter borehole and the performance of large diameter drilled holes (foundation auger holes) may differ significantly as a result of the differences in hole sizes.

Site Preparation

Site preparation should consist of removing loose soils in the construction area. The estimated Potential Vertical Rise (PVR) is about 2 inches in its present conditions. If the slab for the tower equipment building needs to be designed for about 1-inch PVR, then the upper 3 feet of onsite soil needs to be removed and replaced with select fill. The exposed subgrade should be proofrolled with a water truck or similar pneumatic vehicle. After proofrolling, if fill is needed to raise grade for the equipment building slab, it should consist of the select fill described in the following section. Proper site drainage should be maintained during foundation construction, so ponding of surface runoff does not occur and cause construction delays. All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size.

Clean on-site soils or approved imported materials may be used as fill material for the following:

- general site grading
- foundation backfill
- foundation areas

Select fill and on-site soils should meet the following criteria:

Fill Type [1]	USCS Classification	Acceptable Location for Placement
Select Fill [2]	CL, SC, GC, Crushed Limestone ■ LL≤40 and 7<PI≤20 ■ % passing #200 sieve ≥35% ■ Maximum particle size 1½"	All locations and elevations
On-Site Soils	CH, CL	CH and CL soils should not be used as select fill. They can be used as general fill outside of structure areas.
1	Controlled, compacted fill should consist of approved materials that are free of organic matter and debris or materials exceeding 3 inches in maximum dimension. A sample of each material type should be submitted for testing.	
2	Low plasticity cohesive soil, granular soil with a PI between 7 and 20 percent or crushed limestone meeting TxDOT item 247 Type A Grade 1-2 requirements.	

Compaction Requirements

ITEM	DESCRIPTION [1]
Fill Lift Thickness	All fill should be placed in thin, loose lifts of about 8 inches, with compacted thickness not to exceed 6 inches.
Compaction of On-Site Soil, Select Fill and Granular Material	95 percent of the material's standard Proctor maximum dry density (ASTM D 698).
Moisture Content of Select Fill and Granular Material	The materials should be moisture conditioned between -2 and +3 percentage points of the optimum moisture content.
Moisture Content of On-Site Soil	The materials should be moisture conditioned between 0 and +4 percentage points of the optimum moisture content.

[1] Unless otherwise noted within this report all compaction requirements are provided above.

Equipment Building Floor Slab

For a ground-supported equipment building, the foundations will likely be either a cast-in-place concrete slab foundation system or the prefabricated unit will be placed directly on a compacted pad of crushed limestone or gravelly base material. Such an equipment building is a self-supported and self-contained structure. Therefore, the foundation system is not a critical or sensitive component of the structure. We understand the foundation selection (slab or compacted base) is dependent on the locale of the tower site. In most incorporated areas, a slab foundation is generally used due to building code requirements. In rural areas, a compacted base pad is constructed.

The concrete slab foundation can be designed as a slab and grade beam system. The selection should be based on the performance expected and local code requirements. In expansive soil environments, the monolithic slab and grade beam would provide the more rigid system. If the prefabricated structure is affected by subgrade conditions sometime within its service life, the structure can easily be restored to an appropriate orientation by jacking and re-leveling.

The following recommendations primarily apply to the cast-in-place concrete slab foundation. Details regarding selection, placement and compaction of base materials for pad construction are presented in the section **Earthwork**.

Design Recommendations

The grade beam and slab can be designed for a net allowable bearing pressure of 2,000 psf with a factor of safety of 3. We recommend that the exterior perimeter grade beams bear at least 18 inches below final exterior grade. These recommendations are for proper development of bearing capacity for the continuous beam sections of the foundation system and to reduce the potential for water to migrate beneath the slab foundation. These recommendations are not based on structural considerations. Grade beam depths may need to be greater than recommended herein for structural considerations and should be properly evaluated and designed by the Structural Engineer. The grade beams or slab portions may be thickened and widened to serve as spread footings at concentrated load areas.

Construction Considerations

For a slab on grade, the grade beams should preferably be neat excavated or, if necessary, may be overexcavated and formed. Excavation should be accomplished with a smooth-mouthed bucket. If a toothed bucket is used, excavation with this bucket should be stopped 6 inches above the final grade beam bearing surface and the excavation completed with a smooth-mouthed bucket or by hand labor. Due to the presence of gravel in the upper 3 feet, excavation may be need more effort as well as prone to sloughing. Contractor should be prepared to address these situations.

Debris in the bottom of the excavation should be removed prior to steel placement. The grade beam bottoms should be excavated with a slight slope to create internal sumps for runoff collection and removal. If surface runoff water in excess of 1 inch accumulates at the bottom of the foundation excavation, it should be collected and removed and not allowed to adversely affect the quality of the bearing surface.

PAVEMENTS

Both flexible and rigid pavement systems may be considered for the project. Based on our knowledge of the project, we anticipate that traffic loads will be produced primarily by automobile traffic, delivery trucks, and trash removal trucks.

We performed 6 asphalt cores at the track to observe the asphalt thickness. The asphalt thicknesses at the core locations are furnished in the table below.

Location	Asphalt Thickness (inches)
C-1	2 ⅛
C-2	2 ⅛
C-3	2 ⅝
C-4	2 ¼

Location	Asphalt Thickness (inches)
C-5	1 ⅞
C-6	2 ½

Existing Pavement Section

The base thickness measured was about 18 inches at B-9. Based on the existing asphalt thicknesses, we recommend milling the existing asphalt and expose the base. Thereafter, proofroll the exposed base under the supervision of a geotechnical engineer. Any failed proofroll should be repaired prior to pavement construction. Thereafter, apply prime coat to the exposed base and then place 2 inches of a Type D surface course.

Subgrade Preparation for New Pavement

Prior to construction, any vegetation, loose topsoil and any otherwise unsuitable materials should be removed from the new pavement areas. After stripping, the subgrade should be proofrolled where possible to aid in locating loose or soft areas. Proofrolling can be performed with a fully loaded dump truck or equivalent pneumatic tired vehicle. Wet, soft, low-density or dry material should either be removed or moisture conditioned and recompacted to the moisture contents and densities described in section **Fill Compaction Requirements** prior to placing fill.

Due to the presence of the clay soil at the site, movement up to 2 inches should be expected. If the movement of the pavement is not acceptable, then the pavement subgrade should be built with 3 feet of select fill underneath the pavement section.

Design Recommendations

For this project Light and Heavy pavement section alternatives have been provided. Light is for areas expected to receive only car traffic. Heavy assumes areas with heavy traffic, such as trash pickup areas, main access drive areas, bus lanes and fire lanes.

The flexible pavement section was designed in general accordance with the National Asphalt Pavement Association (NAPA) Information Series (IS-109) method (Class 1 for Light and Medium; Class 2 for Heavy). The rigid pavement section was designed using the American Concrete Institute (ACI 330R-01) method (Traffic Category A (ADTT=1) for Light and Medium; A-1 (ADTT=10) for Heavy). If heavier traffic loading is expected, Terracon should be provided with the information and allowed to review these pavement sections.

	FLEXIBLE (ASPHALT) PAVEMENT SYSTEM (inches)	
	Parking Area	**New Track/Cool Down Area**
Hot Mix Asphaltic Concrete	2.0	3.0
Granular Base Material	8.0	12.0
Lime Treated Subgrade [2]	6.0	6.0

	RIGID (CONCRETE) PAVEMENT SYSTEM (inches)	
	Light Duty	**Heavy Duty**
Reinforced Concrete	6.0	7.0
Lime Treated Subgrade [1]	6.0	6.0

Pavement areas that will be subjected to heavy wheel and traffic volumes, such as waste bin or "dumpster" areas, entrance/exit ramps, and delivery areas, should also be a heavy duty rigid pavement section constructed of reinforced concrete. The concrete pavement areas should be large enough to properly accommodate the vehicular traffic and loads. For example:

- The dumpster pad should be large enough so that the wheels of the collection truck are entirely supported on the concrete pavement during lifting of the waste bin; and
- The concrete pavement should extend beyond any areas that require extensive turning, stopping, and maneuvering.

The pavement design engineer should consider these and other similar situations when planning and designing pavement areas. Waste bin and other areas that are not designed to accommodate these situations often result in localized pavement failures.

The pavement section has been designed using generally recognized structural coefficients for the pavement materials. These structural coefficients reflect the relative strength of the pavement materials and their contribution to the structural integrity of the pavement. If the pavement does not drain properly, it is likely that ponded water will infiltrate the pavement materials resulting in a weakening of the materials. As a result, the structural coefficients of the pavement materials will be reduced, and the life and performance of the pavement will be shortened. The Asphalt Institute recommends a minimum of 2 percent slope for asphalt pavements. The importance of proper drainage cannot be overemphasized and should be thoroughly considered by the project team.

Sulfate Testing

The sulfate test results indicate that the sulfate concentration of the subgrades soils at the project site is about 179 to 787 mg/Kg. The sulfate concentration values are below the threshold level for adverse reactions based on TxDOT (>3,000mg/Kg), the National Lime Association (>3,000mg/Kg) and AASHTO (>5,000mg/Kg).

Based on the test results, the severity of potential exposure of concrete to sulfate attack falls under Class 1. The degradation of concrete is caused by chemical agents in the soil or groundwater that react with concrete to either dissolve the cement paste or precipitate compounds which cause cracking and flaking. The concentration of water-soluble sulfates in the soils is a good indicator of the potential for chemical attack of concrete. Sulfate concentrations in soil can be used to evaluate the need for protection of concrete based on the following table.

Water Soluble Sulfate Content in Soil (mg/kg)	Severity of Potential Exposure
> 10,000	Class 3
1,500 – 10,000	Class 2
150 – 1,500	Class 1
0 – 150	Class 0

Other Construction Considerations

The pavement sections have been designed using generally recognized structural coefficients for the pavement materials. These structural coefficients reflect the relative strength of the pavement materials and their contribution to the structural integrity of the pavement. If the pavement does not drain properly, it is likely that ponded water will infiltrate the pavement materials resulting in a weakening of the materials as previously discussed. As a result, the structural coefficients of the pavement materials will be reduced, and the life and performance of the pavement will be shortened. The Asphalt Institute recommends a minimum of 2 percent slope for asphalt pavements. The importance of proper drainage cannot be overemphasized and should be thoroughly considered by the project team.

Proper perimeter drainage is very important and should be provided so infiltration of surface water from unpaved areas surrounding the pavement is minimized. Water can migrate through the untreated coarse aggregate base material (i.e. where used in flexible pavements) and into the subgrade.

Pavement Section Materials

Presented below are selection and preparation guidelines for various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material. The submittals should be reviewed by the Geotechnical Engineer and appropriate members of the design team and should provide test information necessary to verify full compliance with the recommended or specified material properties.

- **Hot Mix Asphaltic Concrete Surface Course -** The asphaltic base material should meet the specification requirements of 2014 TxDOT Standard Specification Item 341 or SS3076/3077, Type C or D.

- **Concrete -** Concrete should have a minimum 28-day design compressive strength of 4,000 psi.

- **Granular Base Material -** Base material may be composed of crushed limestone base or crushed concrete meeting all of the requirements of 2014 TxDOT Item 247, Type A, Grade 1-2; including triaxial strength. The material should be compacted to at least 95 percent of the maximum dry density as determined in accordance with ASTM D 1557 at moisture contents ranging from -2 and +3 percentage points of the optimum moisture content.

- **Lime Treated Subgrade** - Due to the presence of clay at this site, the subgrade may be modified with hydrated lime in accordance with TxDOT Item 260 in order to improve its strength and improve its load carrying capacity. We anticipate that approximately 5 percent hydrated lime will be required. This is equivalent to about 24 pounds of hydrated lime per square yard for a 6-inch treatment depth. However, the actual percentage should be determined by laboratory tests on samples of the clay subgrade prior to construction. The subgrade soil was tested for sulfates and test results shows the soil is suitable for the use of lime. The optimum lime content should result in a soil-lime mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977, Appendix XI and should reduce the Plasticity Index to 20 or less.

  The lime should be initially blended with a mixing device such as a Pulvermixer, sufficient water added, and be allowed to cure for at least 48 hours. After curing, the lime-soil should be remixed to meet the in-place gradation requirements of Item 260 and compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D 698 at moisture contents ranging from optimum and 4 percentage points above the optimum moisture content.

Details regarding subgrade preparation, fill materials, placement and compaction are presented in **Earthwork** section under subsections **Fill Material Types** and **Fill Compaction Requirements.**

Pavement Joints and Reinforcement

The following is recommended for all concrete pavement sections in this report. Refer to ACI 330 "Guide for Design and Construction of Concrete Parking Lots" for additional information.

Item	Description
Distributed Reinforcing Steel	No. 3 reinforcing steel bars at 18 inches on-center-each-way, Grade 60. It is imperative that the distributed steel be positioned accurately in the pavement cross section, namely 2 inches from the top of the pavement.
Contraction Joint Spacing	12.5 feet each way for pavement thickness of 5 to 5.5 inches. 15 feet each way for pavement thickness of 6 inches or greater. Saw cut control joints should be cut within 6 to 12 hours of concrete placement.
Contraction Joint Depth	At least ¼ of pavement thickness.
Contraction Joint Width	One-fourth inch or as required by joint sealant manufacturer.
Construction Joint Spacing	To attempt to limit the quantity of joints in the pavement, consideration can be given to installing construction joints at contraction joint locations, where it is applicable.
Construction Joint Depth/Width	Full depth of pavement thickness. Construct sealant reservoir along one edge of the joint. Width of reservoir to be ¼ inch or as required by joint sealant manufacturer. Depth of reservoir to be at least ¼ of pavement thickness.
Isolation Joint Spacing	As required to isolate pavement from structures, etc.
Isolation Joint Depth	Full depth of pavement thickness.
Isolation Joint Width	One-half to 1 inch or as required by the joint sealant manufacturer.

Item	Description
Expansion Joint	In this locale, drying shrinkage of concrete typically significantly exceeds anticipated expansion due to thermal affects. As a result, the need for expansion joints is eliminated provided all joints (including saw cuts) are sealed. Construction of an unnecessary joint may be also become a maintenance problem. All joints should be sealed. If all joints, including sawcuts, are not sealed then expansion joints should be installed.

All construction joints have dowels. Dowel information varies with pavement thickness as presented as follows:

Pavement Thickness	6 inches	7 inches
Dowels	¾ inch diameter	$^{7}/_{8}$ inch diameter
Dowel Spacing	12 inches on center	12 inches on center
Dowel Length	12 inches long	14 inches long
Dowel Embedment	6 inches	7 inches

Pavement Drainage and Maintenance

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section.

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:

- 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.
- Slope subgrade in landscape islands to low points should drain to an appropriate outlet.

- Edge drains are recommended along pavement/ landscape borders.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations 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 this report, to provide observation and testing services during pertinent construction phases. 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.

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 to support the services provided by Terracon to our client. 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 effect 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. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition

survey of surrounding development. 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

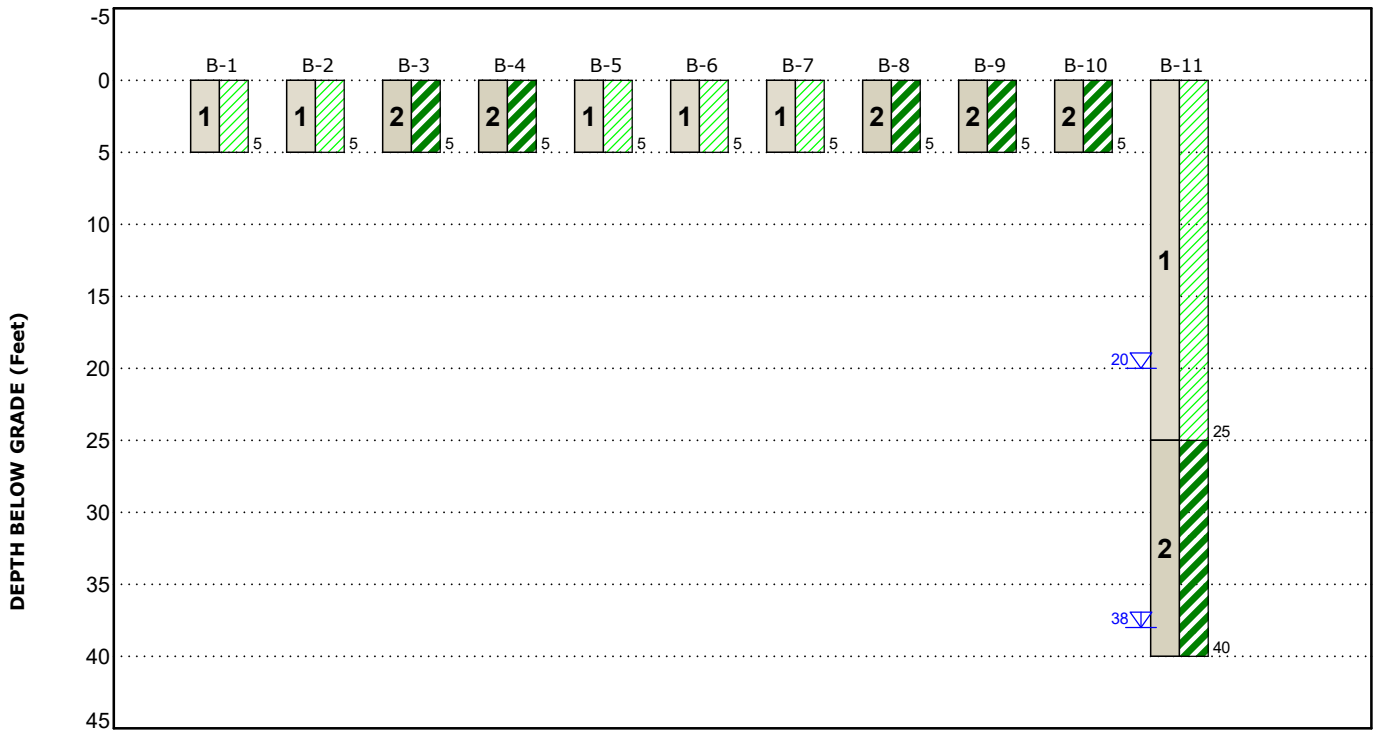
Figures

Contents:

SAPD Academy - Driving Track Improvements & Parking Expansion
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

6911 Blanco Rd
San Antonio, TX

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend
1	Lean Clay	Dark Brown, Dark Brown and Gray; Medium Stiff to Very Stiff	Lean Clay / Fat Clay
2	Fat Clay	Dark Brown and Brown; Stiff to Hard	

▽ First Water Observation
▽ Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Exploration and Testing Procedures

Field Exploration

Number of Borings	Planned Boring Depth (feet) [1]	Planned Location
4 (B-1 through B-4)	5	Planned parking lot expansion area
5 (B-5 thru B-9)	5	Planned track improvements area
1 (B-10)	5	Planned 400 LF south access road (cool down road)
1 (B-11)	40	Planned Tower

1. Below ground surface.

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±20 feet) and referencing existing site features.

Subsurface Exploration Procedures: We advanced the soil borings with a truck-mounted drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Five samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Soil sampling was performed using split-barrel sampling procedures. In the split barrel sampling procedure, a standard 2-inch outer diameter split barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration was recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion.

We also observed the borehole while drilling and at the completion of drilling for the presence of groundwater. Groundwater was observed at a depth of 29 feet below existing grade during drilling and after boring completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring log. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared a field boring log as part of the drilling operations. The field log included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. A final boring log was

prepared from the field log. The final boring log represents the Geotechnical Engineer's interpretation of the field log and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Atterberg Limits
- Percent Passing No. 200 sieve
- Sulfate Content

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

Site Location and Exploration Plans

Contents:

Site Location

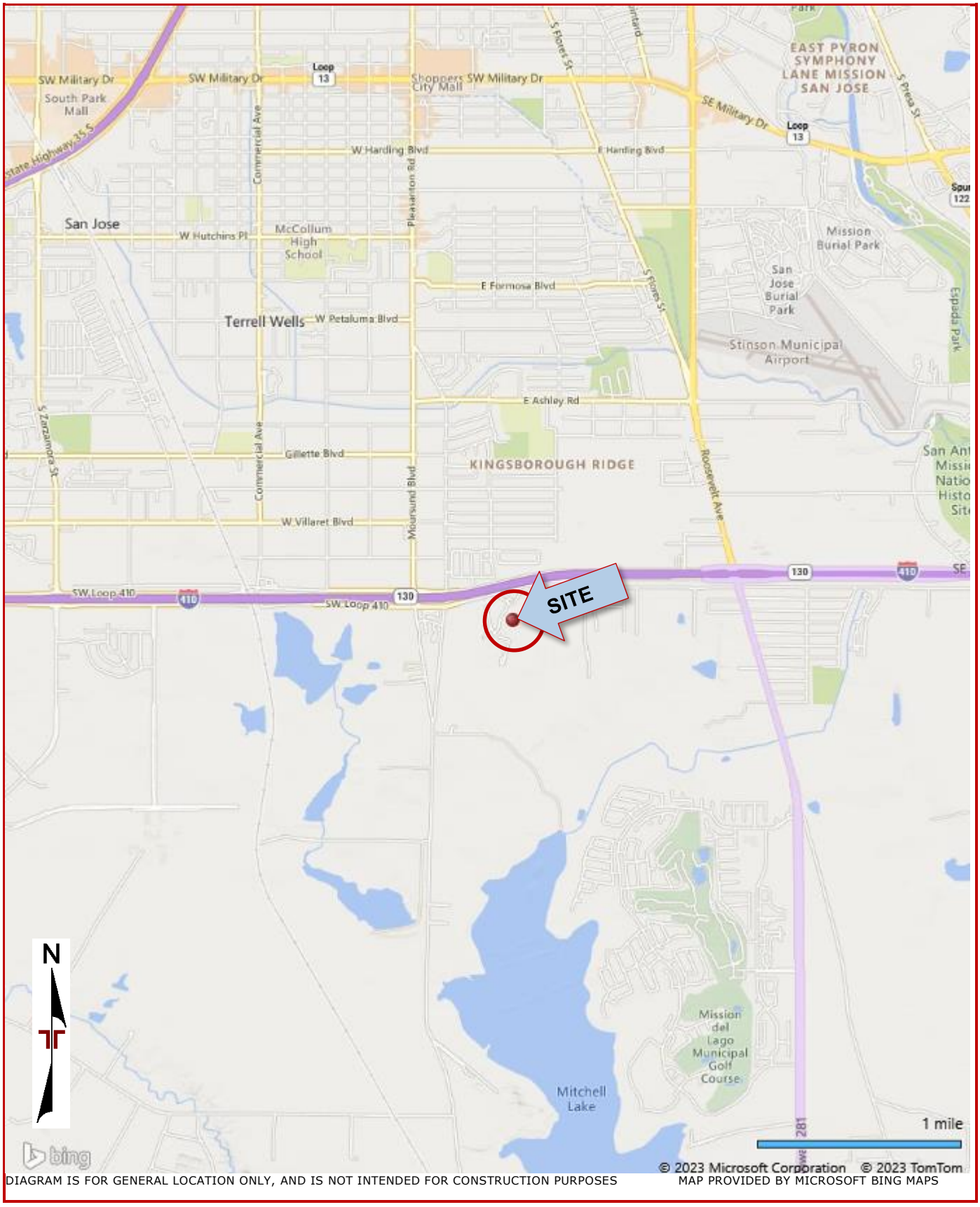


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

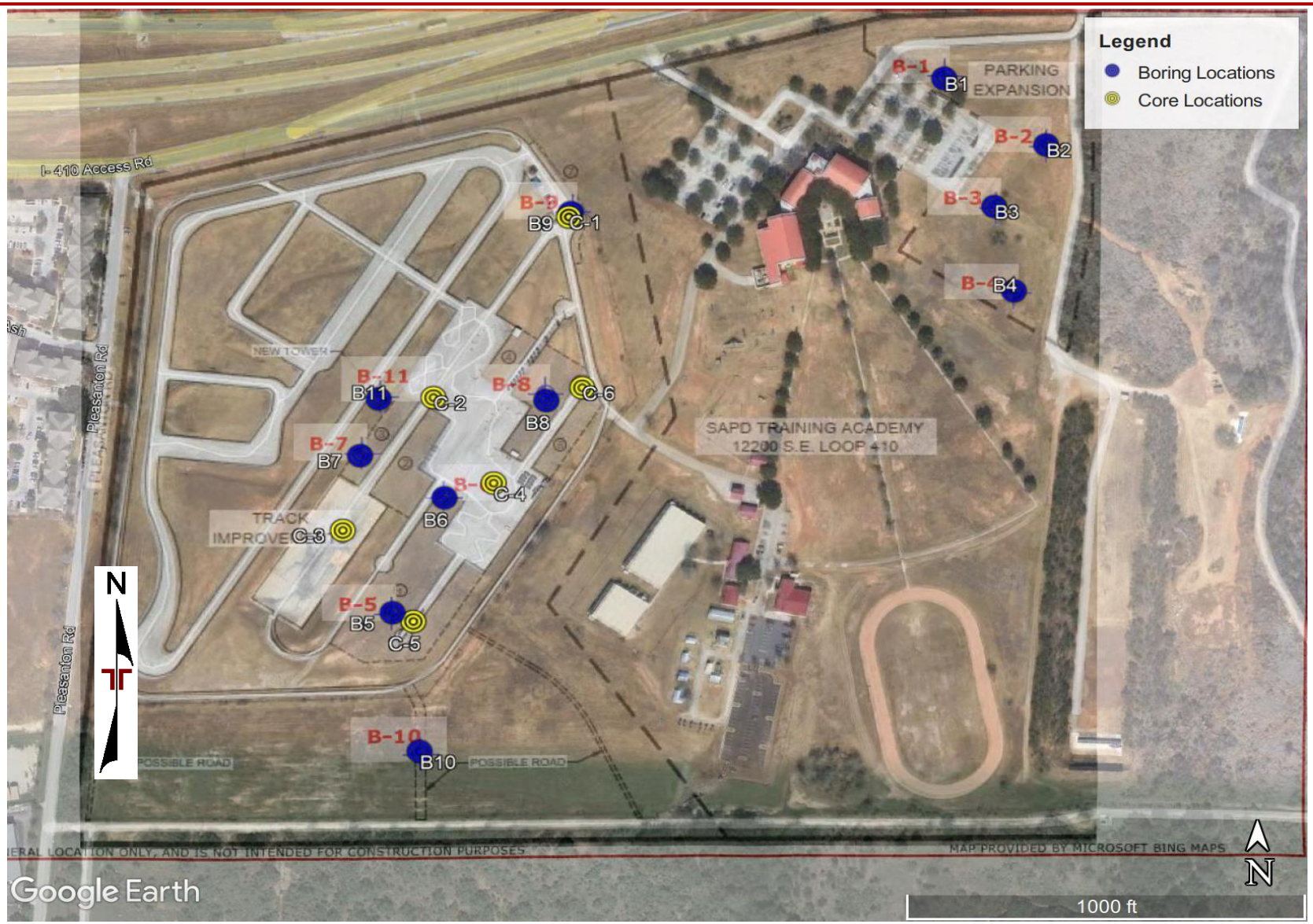


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3203° Longitude: -98.4956° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown, stiff to very stiff - with gravel between 0 to 2 feet				3-5-6 N=11	8.3		
		- with calcareous nodules below 3 feet				8-11-11 N=22	8.7	42-14-28	
		5.0				12-11-13 N=24	10.2		
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3197° Longitude: -98.4939° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown and brown, stiff to very stiff - with gravel between 0 to 2 feet				5-5-7 N=12	6.1		54
						7-10-13 N=23	9.6		
		5.0				10-9-10 N=19	10.3		
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

Notes

Advancement Method
Flight Auger

Abandonment Method

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-3

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3192° Longitude: -98.4942° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
2		**FAT CLAY (CH)**, sandy, dark brown and brown, stiff to very stiff				7-5-8 N=13	12.7	51-15-36	
						6-9-12 N=21	12.4		
		5.0				7-5-6 N=11	7.2		51
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-4

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3186° Longitude: -98.4942° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
2		**FAT CLAY (CH)**, sandy, dark brown and brown, very stiff to hard				6-7-9 N=16	12.5		
		- with calcareous nodules below 3 feet				9-11-15 N=26	9.9		
		5.0				12-16-15 N=31	11.4		
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-5

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3164° Longitude: -98.4992° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown and brown, medium stiff to stiff				3-2-4 N=6	10.9		
		- with calcareous nodules below 3 feet				5-4-6 N=10	8.3		65
		5.0				6-5-6 N=11	9.2		
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

Notes

Advancement Method
Flight Auger

Abandonment Method

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-6

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3172° Longitude: -98.4986° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown and brown, stiff to very stiff			X	7-5-6 N=11	7.7		
					X	7-8-8 N=16	8.0		
		- with calcareous nodules below 3 feet			X	11-9-16 N=25	7.3		61
		5.0	5						
		Boring Terminated at 5 Feet							

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

Notes

Advancement Method
Flight Auger

Abandonment Method

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-7

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3175° Longitude: -98.4992° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown and brown, very stiff			X	6-8-9 N=17	8.3		
		- with calcareous nodules below 3 feet			X	11-8-9 N=17	10.1	43-14-29	
		5.0			X	11-13-12 N=25	11.0		
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-8

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3178° Longitude: -98.4978° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
2		**FAT CLAY (CH)**, sandy, dark brown and gray, very stiff to hard				8-17-22 N=39	8.2		
						15-10-14 N=24	11.1		62
		5.0				8-9-13 N=22	23.9	54-19-35	
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-9

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.3192° Longitude: -98.4975° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		0.2 **Asphalt 2 inches thick**							
		1.7 **Base Material 18 inches thick**							
2		**FAT CLAY (CH)**, sandy, dark brown and brown, stiff to very stiff				8-7-9 N=16	19.2		31
		- Clayey Gravel (GC), medium dense between 3 to 5 feet	5			5-6-6 N=12	6.9		59
		6.2				4-4-7 N=11	13.3		
		Boring Terminated at 6.2 Feet							

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-10

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 29.315278° Longitude: -98.498889° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
2		**FAT CLAY (CH)**, sandy, dark brown, very stiff				7-10-12 N=22	9.5		
						12-12-13 N=25	9.8		
		5.0				10-13-13 N=26	11.0	51-15-36	
		Boring Terminated at 5 Feet	5						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

SAPD Academy Improvements
12200 SE Loop 410 | San Antonio, TX
Terracon Project No. 90235085

Terracon
6911 Blanco Rd
San Antonio, TX

Boring Log No. B-11

Location: See Exploration Plan

Latitude: 29.3178° Longitude: -98.4992°

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
1		**LEAN CLAY (CL)**, sandy, dark brown and gray, very stiff to hard			7-8-8 N=16	8.6		58
					8-8-9 N=17	11.1	43-20-23	
		- with calcareous nodules between 4 to 6 feet			9-9-11 N=20	10.2		
					24-23-28 N=51	14.5	48-14-34	
					7-7-10 N=17	18.4		55
					8-12-18 N=30	28.0		
			▽		9-11-16 N=27	26.8	44-14-30	72
					10-12-18 N=30	30.1		
		25.0						
2		**FAT CLAY (CH)**, gray and reddish brown, hard			11-15-18 N=33	26.3	66-18-48	98
					11-13-23 N=36	32.2		
			▽		9-16-30 N=46	22.7		
		40.0						
		Boring Terminated at 40 Feet						

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

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

▽ 20 feet while drilling

▽ 38 feet after boring completion

Notes

Advancement Method
Flight Auger

Abandonment Method

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Derrick

Logged by
Johny

Boring Started
07-24-2023

Boring Completed
07-24-2023

Supporting Information

Contents:

Terracon
6911 Blanco Rd
San Antonio, TX

General Notes

Sampling	Water Level	Field Tests
Split Spoon	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered 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 as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. 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		
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**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

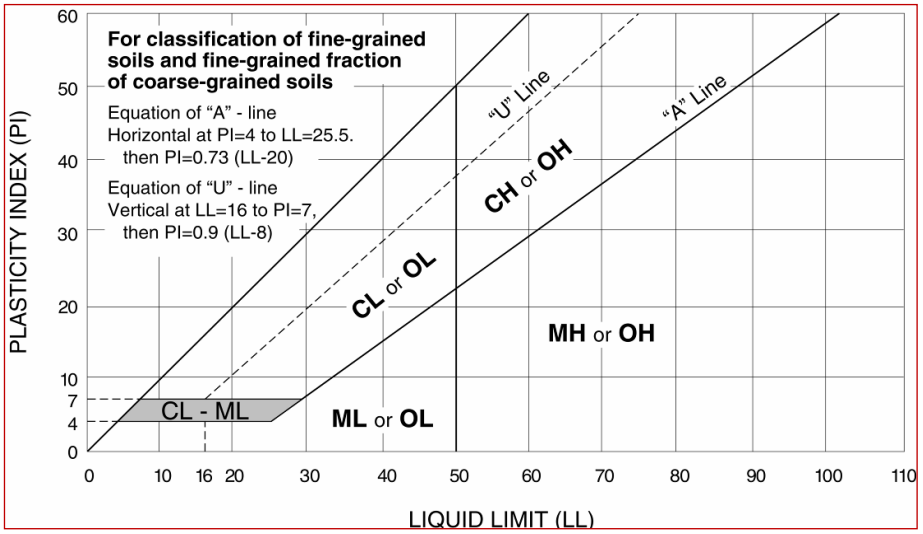
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



6000 Northwest Parkway, Suite 100
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P (210) 641-2112
Terracon.com

Project Memorandum

To:	Mr. Mike Slay, P.E.
With:	Slay Engineering Co., Inc.
Date:	May 30, 2024
Re:	Pavement Recommendations for large pads in the Track Area
Project:	SAPD Academy – Driving Track Improvements & Parking Expansion
	Terracon Project No. 90235085
From:	Carlos Cotilla
Reviewed:	Arin Barkataki, P.E.

The memo contains the pavement recommendations for the pads in the track area that will be rehabilitated.

Prior to construction, existing Hot Mix Asphaltic Concrete (HMAC) layer should be removed to expose the base material in the proposed rehabilitation areas. Proofroll the exposed base layer with a fully loaded dump truck to identify any weak zones. After proofrolling and replacement of any weak zones , cement stabilize the upper 8 inches of the existing base with 3 percent cement. After the cement treatment is performed and cured as per TxDOT Item 275, microcrack the cement treated base (CTB). The CTB layer should be verified for compaction and stabilized material should be tested for compressive strength. Apply prime coat on the CTB before placing the 2 inches of new HMAC. .

In the event, the base is not in a good condition, remove 4 inches of the base. Proofroll the exposed base and replace any weak zones. Thereafter, apply a prime coat on the exposed base before placing 4 inches of the asphaltic base course Type B and then place the asphaltic surface course Type D. Tack coat should be applied if the surface temperature is not adequate before placing Type D surface course.

The following table shows the two options.

Components	FLEXIBLE (ASPHALT) PAVEMENT SYSTEM (inches)	
	Pads in the Track Area (option 1)	Pads in the Track Area (option 2)
Hot Mix Asphaltic Concrete Surface Course (Type D)	2.0	2.0
Hot Mix Asphaltic Concrete Base Course (Type B)	---	4.0
Cement Treated Granular Base Material	8.0	---
Granular Base Material	---	6.0

Pavement Section Materials

Presented below are selection and preparation guidelines for various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material. The submittals should be reviewed by the Geotechnical Engineer and appropriate members of the design team and should provide test information necessary to verify full compliance with the recommended or specified material properties.

- **Hot Mix Asphaltic Concrete Surface Course -** The asphaltic base material should meet the specification requirements of 2014 TxDOT Standard Specification Item 341 or SS3076/3077, Type D.

- **Asphaltic Base Course -** The asphaltic base material should meet the specification requirements of 2014 TxDOT Standard Specification Item 340, Type B.

- **Cement Treated Base –** The base may be treated with cement with accordance with TxDOT Item 275 in order to improve its strength and load carrying capacity. The subgrade soil should be tested for sulfate prior to the use of cement. We anticipate that approximately 3 percent cement will be required. This is equivalent to about 27 pounds of cement per square yard for a 8-inch treatment depth. However, the actual percentage should be determined by laboratory tests on samples of the subgrade prior to construction. The cement soil mixture should be remixed and compacted to at least 95 percent of the maximum dry density determined in accordance with

ASTM D 698 at moisture contents ranging from -2 to +3 percentage points of the optimum moisture content. Compaction should be completed within 6 hours of cement soil mixing. After the cement treatment is performed and cured as per TxDOT Item 275, microcrack the cement treated base (CTB). The CTB layer should be verified for compaction and stabilized material should be tested for compressive strength. Apply prime coat on the CTB before placing the 2 inches of new HMAC. .

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Project Memorandum

To:	Mr. Mike Slay, P.E.
With:	Slay Engineering Co., Inc.
Date:	May 30, 2024
Re:	New Parking Lot and Cooldown Recommendations
Project:	SAPD Academy – Driving Track Improvements & Parking Expansion
	Terracon Project No. 90235085
From:	Carlos Cotilla
Reviewed:	Arin Barkataki, P.E.

The memo contains the pavement recommendations for the new parking lot and cooldown area.

Subgrade Preparation for New Pavement

Prior to construction, any vegetation, loose topsoil and any otherwise unsuitable materials should be removed from the new pavement areas. After stripping, the subgrade should be proofrolled where possible to aid in locating loose or soft areas. Proofrolling can be performed with a fully loaded dump truck or equivalent pneumatic tired vehicle. Wet, soft, low-density or dry material should either be removed or moisture conditioned and recompacted to the moisture contents and densities described in section Fill Compaction Requirements prior to placing fill.

Due to the presence of the clay soil at the site, movement up to 2 inches should be expected. If the movement of the pavement is not acceptable, then the pavement subgrade should be built with 3 feet of select fill underneath the pavement section.

Components	FLEXIBLE (ASPHALT) PAVEMENT SYSTEM (inches)	
	Parking Area	New Track/Cool Down Area
Hot Mix Asphaltic Concrete (Type D)	2.0	3.0
Granular Base Material	8.0	12.0
Lime Treated Treated Subgrade	6.0	6.0

Pavement Section Materials

Presented below are selection and preparation guidelines for various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material. The submittals should be reviewed by the Geotechnical Engineer and appropriate members of the design team and should provide test information necessary to verify full compliance with the recommended or specified material properties.

- **Hot Mix Asphaltic Concrete Surface Course** - The asphaltic base material should meet the specification requirements of 2014 TxDOT Standard Specification Item 341 or SS3076/3077, Type C or D.

- **Granular Base Material** - Base material may be composed of crushed limestone base or crushed concrete meeting all of the requirements of 2014 TxDOT Item 247, Type A, Grade 1-2; including triaxial strength. The material should be compacted to at least 95 percent of the maximum dry density as determined in accordance with ASTM D 1557 at moisture contents ranging from -2 and +3 percentage points of the optimum moisture content.

- **Lime Treated Subgrade** - Due to the presence of clay at this site, the subgrade may be modified with hydrated lime in accordance with TxDOT Item 260 in order to improve its strength and improve its load carrying capacity. We anticipate that approximately 5 percent hydrated lime will be required. This is equivalent to about 24 pounds of hydrated lime per square yard for a 6-inch treatment depth. However, the actual percentage should be determined by laboratory tests on samples of the clay subgrade prior to construction. The subgrade soil was tested for sulfates and test results shows the soil is suitable for the use of lime. The optimum lime content should result in a soil-lime

mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977, Appendix XI and should reduce the Plasticity Index to 20 or less.

The lime should be initially blended with a mixing device such as a Pulvermixer, sufficient water added, and be allowed to cure for at least 48 hours. After curing, the lime-soil should be remixed to meet the in-place gradation requirements of Item 260 and compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D 698 at moisture contents ranging from optimum and 4 percentage points above the optimum moisture content.

Dated Prepared: 2/7/25 - Addendum No. 1 - 8/22/25 - Addendum No. 2 - 9/9/25

Project: COSA Training Academy Driving Track Pavement

LEGEND
Yellow = New Line Item
Lite Blue = Modified Description, no change to quantity or unit
Gray w/ Red Text = Quantity or Unit Change
Green = Deleted Item (entirely)

Slay Job Number: 22-069

COSA TRAINING ACADEMY DRIVING TRACK
UNIT PRICING FORM
2025 DRIVING TRACK PAVEMENT

Item #	DESC. CODE	S.P. NO	Bid Item Description	Unit	Quantity	Unit Bid Price	Amount
			Construction Phase 1				
			Davis Loop - Phase 1C				
104.1			Street Excavation (1,000 CY < X < 10,000 CY)	CY	1,585		$ -
			Sisco Parkway - Phase 1B				
104.1			Street Excavation (>1,000 CY)	CY	956		$ -
			Brackman BLVD - Phase 1A				
104.1			Street Excavation (>1,000 CY)	CY	99		$ -
			Henerie CT - Phase 1A				
104.1			Street Excavation (>1,000 CY)	CY	208		$ -
			Garcia Street - Phase 1A				
104.1			Street Excavation (>1,000 CY)	CY	70		$ -

			Construction Phase 2					
			Antillion Loop (North) - Construction Phase 2B					
104.1			Street Excavation (>1,000 CY)	CY	197		$	-
						Subtotal	$	-
			Parking Area - Construction Phase 2B					
104.1			Street Excavation (>1,000 CY)	CY	82		$	-
			Construction Phase 3 (Training Pads)					
			Training Pad 1 - Construction Phase 3C					
104.1			Street Excavation (>1,000 CY)	CY	544		$	-
			Training Pad 2 - Construction Phase 3B					
104.1			Street Excavation (>1,000 CY)	CY	550		$	-

			Training Pad 3 - Construction Phase 3A				
104.1			Street Excavation (>1,000 CY)	CY	549		$ -
			Construction Phase 3 (Not Including Training Pads)				
			Wheeler Way - Construction Phase 3A	SY	1,918		
104.1			Street Excavation (>1,000 CY)	CY	214		$ -
			Morales Ave. - Construction Phase 3B	SY	2,475		
104.1			Street Excavation (>1,000 CY)	CY	275		$ -
			Moinnis Dr. - Construction Phase 3C	SY	1,904		
104.1			Street Excavation (>1,000 CY)	CY	212		$ -

			New Intersection - Construction Phase 1C				
615.1			UGE Pull Box (Traffic Signal Note #2 Sheet C11.0)	EA	29		$ -
618.1			2" Electrical Conduit (Traffic Signal Note #2 Sheet C11.0)	LF	762		$ -
615			2070 Linux Controller & Type 336 Cabinet (Traffic Signal Note #5 C11.0)	EA	1		$ -
600			Remove Existing Controller (Traffic Signal Note #3 Sheet C11.0)				

			Detention Pond - Construction Phase 1A				
107			Embankment	CY	1,168		$ -

530			Attenuation Barrels (Furnish Only)	ES	6		$	-
530			Traffic Control	LS	1		$	-