BANDERA RETAIL CENTER

7706 BANDERA RD

SAN ANTONIO, TX 78238

ZONING / SUBDIVISION MAP

DESIGN ADHERES TO CODES LISTED BELOW:
2015 INTERNATIONAL BUILDING CODE
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL PLUMBING CODE
2015 INTERNATIONAL FIRE CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE

CLIENT

BANDERA PARTNERS, LLC

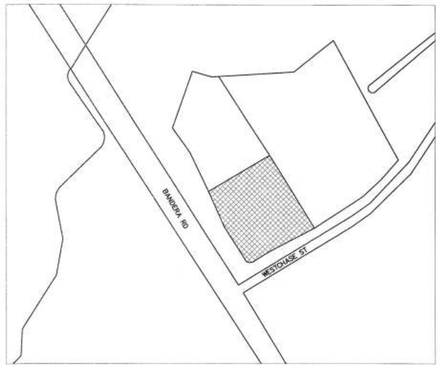
12300 W INTERSTAE 10, SAN ANTONIO, TX 77084
(210) 422-7500

CONSULTING ENGINEERS

PROFESSIONAL StruCIVIL ENGINEERS

CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD, SUITE 390, AUSTIN, TX 78759
(512) 238-6422 PSCE@PSCEINC.COM

LIST OF DRAWINGS



SITE LOCATION MAP

SUBMITTAL DATE	
PROJECT TITLE	BANDERA RETAIL CENTER
STREET ADDRESS	7706 BANDERA ROAD, SAN ANTONIO, TX 78148
PROPERTY OWNER	BANDERA PARTNERS, LLC 12300 W INTERSTATE 10, SAN ANTONIO, TX 78230 CONTACT: BIJAN BONAKCHI (210)-422-7500
ARCHITECT	TCHEN ARCHITECTS 11908 ANDERSON MILL, SUITE 325, AUSTIN, TX 78726 CONTACT: (512)-351-1801
DESIGN COMPANY	PROFESSIONAL STRUCIVIL ENGINEERS, INC. 12710 RESEARCH BLVD., SUITE 390, AUSTIN, TX 78759 CONTACT: MIRZA TAHIR BAIG (512) 238-6422 1904 FORTVIEW ROAD, AUSTIN, TX 78704
LANDSCAPE ARCHITECT	PLACE MATRIX DESIGN OFFICE PO BOX 41107, AUSTIN, TX 78704 CONTACT: (512)-599-4095
SURVEYOR	TRUE LINE CONSTRUCTION LAYOUT LLC 9918 MCCULLOUGH AVE., SAN ANTONIO, TX 78246 (210)-663-7208
NAME OF WATERSHED	UPPER LEON CREEK
100-YEAR FLOOD PLAIN	NO PORTION OF THE PROPERTY DESCRIBED HEREON IN LOCATED IN ZONE "X" AS SHOWN ON THE FEDERAL INSURANCE ADMINISTRATION FLOOD HAZARD BOUNDARY MAP, PANEL NO. 480035 0220 G, DATED: SEPTEMBER 29, 2010.
LEGAL DESCRIPTION	NCB 17973 BLK 12 LOT 2 (BANDERA HEIGHTS SUBD), RECORED IN BEXAR COUNTY, TEXAS.

APPROVED BY: _____ DATE: _____
SAN ANTONIO WATER SYSTEM

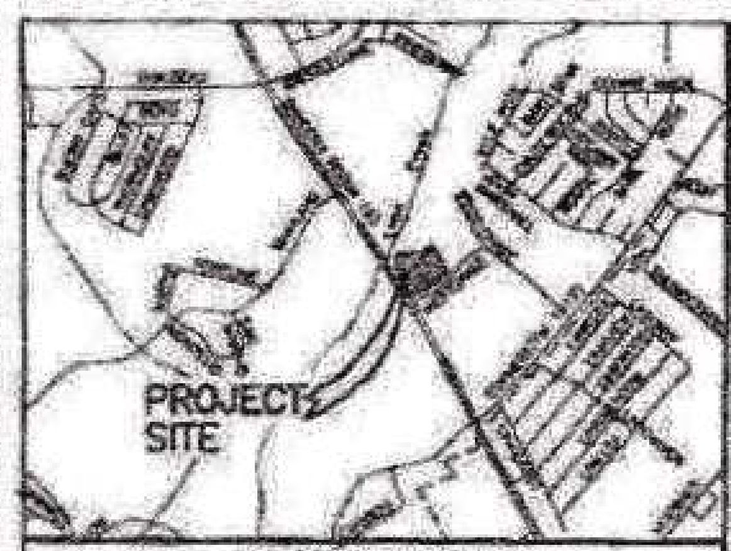
REVIEWED BY: _____ DATE: _____
CITY OF SAN ANTONIO

APPROVED BY: _____ DATE: _____
FIRE DEPARTMENT

UTILITY PROVIDER:

1) WATER IS PROVIDED BY SAN ANTONIO WATER SYSTEM.
2) WASTEWATER IS PROVIDED BY SAN ANTONIO WATER SYSTEM.

PLAT NUMBER : 080296



LOCATION MAP
NOT TO SCALE

OWNER/DEVELOPER:
EXPERT CAPITAL M.G. LTD.
3834 FREDERICKSBURG ROAD
SAN ANTONIO, TEXAS 78201
(210) 641-0400

SA DG INC — San Antonio Design Group Inc.
CONSULTING ENGINEERS
2101 LOCKHILL SELMA SUITE 218
SAN ANTONIO, TEXAS 78213
PH:(210) 342-6700 FAX:(210) 342-6701

NOTES

1. MONUMENTATION OR CONTROL INFORMATION AVAILABLE AT THE OFFICE OF SAN ANTONIO DESIGN GROUP, INC.
2. BASIS OF BEARINGS FOR THIS PLAT: NAD 83 TEXAS STATE PLANE COORDINATES.
3. 1/2" IRON ROD SET AT ALL CORNERS UNLESS OTHERWISE NOTED.
4. COORDINATES SHOWN BASED ON NAD '83 TEXAS STATE PLANE COORDINATES.
5. THIS PLAT DOES NOT AMEND, ALTER, RELEASE OR OTHERWISE AFFECT ANY EXISTING ELECTRIC, GAS, WATER, SEWER, DRAINAGE, TELEPHONE, CABLE EASEMENTS OR ANY OTHER EASEMENTS FOR UTILITIES UNLESS THE CHANGES TO SUCH EASEMENTS ARE DESCRIBED BELOW.
6. THE GRAPHIC LOCATION OF THE SUBJECT TRACT ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 48029-C0244F, EFFECTIVE DATE JANUARY 4, 2002, INDICATES THAT THE SUBJECT TRACT IS LOCATED WITHIN ZONE "X" (UN-SHADED) WHICH IS DEFINED BY FEMA AS "AREAS DETERMINED TO BE OUTSIDE 100-YEAR FLOOD PLAIN" THIS STATEMENT DOES NOT IMPLY THAT THE SUBJECT TRACT IS TOTALLY FLOOD FREE OF POTENTIAL FLOOD HAZARD. LOCALIZED FLOODING CAN OCCUR DUE TO NATURAL AND/OR MANMADE INFLUENCES. THIS FLOOD STATEMENT SHALL NOT CREATE ANY LIABILITY ON THE PART OF SAN ANTONIO DESIGN GROUP INC. OR THE UNDERSIGNED.
7. WILL COMPLY WITH THE STREET SCAPE STANDARD 35-512 DURING THE BUILDING PERMIT PHASE.
8. OWNER SHALL PROVIDE FOR SHARED CROSS ACCESS WITH ADJACENT LOTS IN COMPLIANCE WITH U.D.C. SECTION 35-506.
9. FINISHED FLOOR ELEVATION MUST BE A MINIMUM OF 8 INCHES ABOVE FINAL ADJACENT GRADE.

EDU NOTE:

THE NUMBER OF WASTEWATER EQUIVALENT DWELLING UNITS (EDU'S) PAID FOR THIS SUBDIVISION PLAT ARE KEPT ON FILE AT THE SAN ANTONIO WATER SYSTEM, UNDER THE PLAT NUMBER ISSUED BY THE CITY OF SAN ANTONIO DEVELOPMENT SERVICES DEPARTMENT.

A) NO STRUCTURES, FENCES, WALLS OR OBSTRUCTIONS OF ANY KIND SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENT OR R.O.W. SHOWN ON THIS PLAT. NO LANDSCAPING OR OTHER TYPES OF MODIFICATIONS WHICH ALTER THE CROSS SECTIONS OF THE DRAINAGE EASEMENT AS APPROVED SHALL BE ALLOWED WITHOUT THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS. THE CITY OF SAN ANTONIO AND BEXAR COUNTY SHALL HAVE THE RIGHT OF INGRESS AND EGRESS OVER GRANTOR'S ADJACENT PROPERTY TO REMOVE ANY OBSTRUCTIONS PLACED WITHIN THE LIMITS OF SAID DRAINAGE EASEMENT AND TO MAKE ANY MODIFICATIONS OR IMPROVEMENTS WITHIN SAID DRAINAGE EASEMENT.

B) MINIMUM FINISHED FLOOR ELEVATIONS FOR RESIDENTIAL AND COMMERCIAL LOTS SHALL BE ELEVATED AT LEAST 1 FOOT HIGHER THAN THE COMPUTED WATER SURFACE ELEVATION FOR THE 100 YEAR ULTIMATE DEVELOPMENT FLOOD.

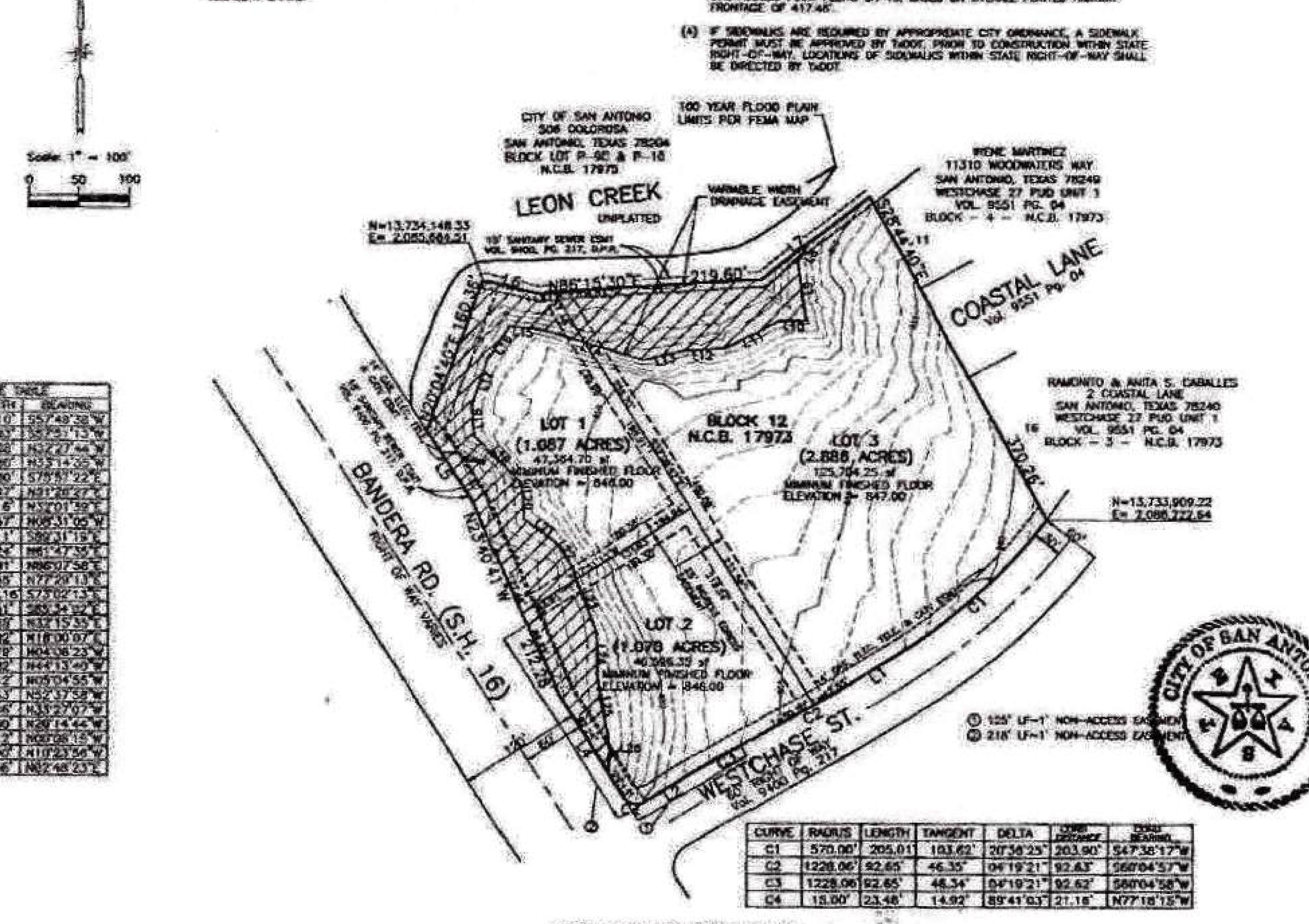
TXDOT NOTES:

(1) FOR RESIDENTIAL DEVELOPMENT DIRECTLY ADJACENT TO STATE RIGHT-OF-WAY, THE DEVELOPER SHALL BE RESPONSIBLE FOR ADEQUATE SETBACK AND/OR SOUND ABATEMENT MEASURES FOR FUTURE NOISE MITIGATION.

(2) OWNER/DEVELOPER IS RESPONSIBLE FOR PREVENTING ANY ADVERSE IMPACT TO THE EXISTING DRAINAGE SYSTEM WITHIN THE HIGHWAY RIGHT-OF-WAY.

(3) MAXIMUM ACCESS POINTS TO STATE HIGHWAY FROM THIS PROPERTY WILL BE REGULATED AS DIRECTED BY "REGULATIONS FOR ACCESS DRIVEWAYS TO STATE HIGHWAYS". THIS PROPERTY IS ELIGIBLE FOR A MAXIMUM COMBINED TOTAL OF ONE ACCESS POINT ALONG SH 16, BASED ON OVERALL PLATTED HIGHWAY FRONTAGE OF 417.48'.

(4) IF SIDEWALKS ARE REQUIRED BY APPROPRIATE CITY ORDINANCE, A SIDEWALK PERMIT MUST BE APPROVED BY TXDOT, PRIOR TO CONSTRUCTION WITHIN STATE RIGHT-OF-WAY. LOCATIONS OF SIDEWALKS WITHIN STATE RIGHT-OF-WAY SHALL BE DIRECTED BY TXDOT.



(1) 125' LF-1' NON-ACCESS EASEMENT
(2) 218' LF-1' NON-ACCESS EASEMENT

LINE TABLE		
LINE	LENGTH	BEARING
L1	50.10'	S57°49'28"W
L2	48.93'	S57°05'13"W
L4	121.36'	N32°27'44"W
L5	83.00'	N53°14'25"W
L6	58.00'	S78°57'22"E
L7	120.97'	N31°20'27"E
L8	22.16'	N53°01'58"E
L9	58.57'	N08°31'05"W
L10	28.11'	S82°31'19"E
L11	59.24'	N61°47'38"E
L12	42.01'	N86°07'58"E
L13	41.65'	N77°29'13"E
L14	110.16'	S73°02'13"E
L15	28.51'	S83°34'32"E
L16	37.69'	N32°15'35"E
L17	50.02'	N18°00'07"E
L18	31.79'	N04°08'23"W
L19	88.82'	N44°13'49"W
L20	35.12'	N05°04'55"W
L21	18.63'	N52°37'58"W
L22	26.95'	N35°27'07"W
L23	70.80'	N89°14'44"W
L24	42.12'	N08°08'15"W
L25	73.07'	N11°23'56"W
L26	24.66'	N67°48'23"E

CURVE	RADIUS	LENGTH	TANGENT	DELTA	CHORD DISTANCE	CHORD BEARING
C1	570.00'	205.01'	103.62'	20°36'25"	203.90'	S47°38'17"W
C2	1228.06'	92.65'	46.35'	04°19'21"	92.63'	S60°04'57"W
C3	1228.06'	92.65'	46.34'	04°19'21"	92.62'	S60°04'58"W
C4	15.00'	23.48'	14.92'	89°41'03"	21.16'	N77°18'15"W

SUBDIVISION PLAT ESTABLISHING

BANDERA HEIGHTS SUBDIVISION

BEING A TOTAL OF 5.04 ACRES OF LAND IN THE CITY OF SAN ANTONIO, BLOCK LOT P-113 (3.82AC), P-109 (.344AC), & P-110 (.872AC), N.C.B. 17973 AS DESCRIBED BY DEED RECORDED IN VOLUME 10395 PAGE 0433 BEING OF THE OFFICIAL PUBLIC RECORDS OF BEXAR COUNTY, TEXAS. ESTABLISHING LOT 1, LOT 2, AND LOT 3, BLOCK 12, NEW CITY BLOCK 17973 SAN ANTONIO, TEXAS BEXAR COUNTY PLAT RECORDS.

STATE OF TEXAS
COUNTY OF BEXAR

THE OWNER OF LAND SHOWN ON THIS PLAT, IN PERSON OR THROUGH A DULY AUTHORIZED AGENT, DEDICATES TO THE USE OF THE PUBLIC, EXCEPT AREAS IDENTIFIED AS PRIVATE, FOREVER ALL STREETS, ALLEYS, PARKS, WATERCOURSES, DRAINS, EASEMENTS AND PUBLIC PLACES THEREON SHOWN FOR THE PURPOSE AND CONSIDERATION THEREIN EXPRESSED.

BY: ______________

______________ DULY AUTHORIZED AGENT

STATE OF TEXAS
COUNTY OF BEXAR

BEFORE ME, THE UNDERSIGNED AUTHORITY ON THIS DAY PERSONALLY APPEARED KAMRAN HAJMANDI KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT, AND ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSES AND CONSIDERATIONS THEREIN EXPRESSED AND IN THE CAPACITY THEREIN STATED.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS 29 DAY OF July A.D. 2008

J. A. Saucedo Jr.
Notary Public
State of Texas
Comm. exp 05-06-2011

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

STATE OF TEXAS
COUNTY OF BEXAR

I HEREBY CERTIFY THAT THE PROPER ENGINEERING CONSIDERATION HAS BEEN GIVEN THIS PLAT TO THE MATTERS OF STREETS, LOTS AND DRAINAGE LAYOUT. TO THE BEST OF MY KNOWLEDGE THIS PLAT CONFORMS TO ALL REQUIREMENTS OF THE UNIFIED DEVELOPMENT CODE, EXCEPT FOR THOSE VARIANCES GRANTED BY THE SAN ANTONIO PLANNING COMMISSION.

STATE OF TEXAS — R.J. AKIONA — 58383 — REGISTERED PROFESSIONAL ENGINEER

LICENSED PROFESSIONAL ENGINEER

STATE OF TEXAS
COUNTY OF BEXAR

I HEREBY CERTIFY THAT THE ABOVE PLAT CONFORMS TO THE MINIMUM STANDARDS SET FORTH BY THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING ACCORDING TO AN ACTUAL SURVEY MADE ON THE GROUND BY: HENRY A. KUEHLEM, R.P.L.S.

STATE OF TEXAS — REGISTERED — HENRY A KUEHLEM — 4020 — PROFESSIONAL LAND SURVEYOR

REGISTERED PROFESSIONAL LAND SURVEYOR
H. A. KUEHLEM SURVEY COMPANY
14350 NORTHBROOK DR. SUITE 130
SAN ANTONIO, TEXAS 78232

THIS PLAT OF BANDERA HEIGHTS SUBDIVISION HAS BEEN SUBMITTED TO THE CITY OF SAN ANTONIO, TEXAS, AND HAVING BEEN REVIEWED BY THE DIRECTOR OF DEVELOPMENT SERVICES, IS HEREBY APPROVED IN ACCORDANCE WITH STATE AND LOCAL LAWS AND REGULATIONS AS INDICATED BELOW.

MINOR OR AMENDING PLAT APPROVED BY THE DIRECTOR OF DEVELOPMENT SERVICES DATED THIS 12 DAY OF August A.D. 20 08

BY: ______________ DIRECTOR OF DEVELOPMENT SERVICES

STATE OF TEXAS
COUNTY OF BEXAR

I, Gerard Rickhoff COUNTY CLERK OF SAID COUNTY, DO HEREBY CERTIFY THAT THIS PLAT WAS FILED FOR RECORD IN MY OFFICE, ON THE 15 DAY OF August A.D. 20 08 AT 3:05 PM AND DULY RECORDED THE 15 DAY OF August A.D. 20 08 AT 11:20 AM IN THE RECORDS OF DEEDS & PLATS OF SAID COUNTY, IN BOOK VOLUME 9594 ON PAGE 211

IN TESTIMONY WHEREOF, WITNESS MY HAND AND OFFICIAL SEAL OF OFFICE, THIS 15 DAY OF August A.D. 2008.

COUNTY CLERK, BEXAR COUNTY, TEXAS

BY: ______________ DEPUTY

STATE OF TEXAS — MIRZA TAHIR BAIG — 82577 — REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/20/2018
FIRM REGISTRATION F-4951

Rev.	Description	Date	Drawn
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5			
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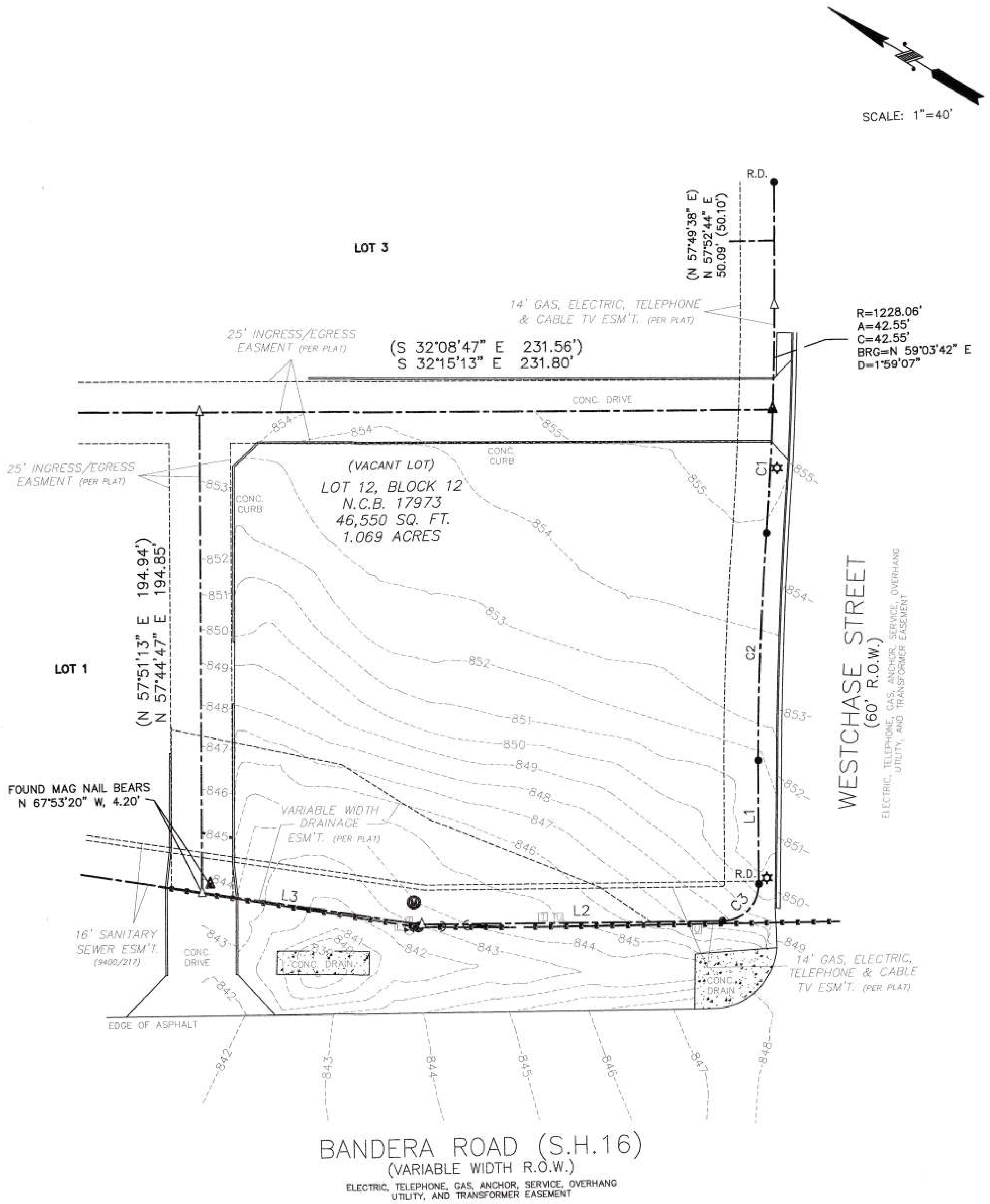
PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD, SUITE 390, AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.8095

Project :
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title :
FINAL PLAT

PROJECT 30434



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	1228.06'	50.23' (50.10')	50.23'	S 60°54'32" W	2°20'37"
C2	1228.06'	92.52' (92.65')	92.50'	S 60°12'21" W	4°18'59"
C3	15.00'	23.35' (23.48')	21.06'	N 77°26'30" W	89°11'48"

LINE	BEARING	DISTANCE
L1	S 57°44'47" W	49.90'
	(S 57°51'13" W)	(49.93')
L2	N 32°34'10" W	121.38'
	(N 32°27'44" W)	
L3	N 23°47'07" W	89.82'
	(N 23°40'41" W)	

THIS PROPERTY IS NOT SUBJECT TO THE ELECTRIC TRANSMISSION LINE EASEMENT RECORDED IN VOLUME 1077, PAGE 311, DEED RECORDS, BEXAR COUNTY, TEXAS.

THIS PROPERTY IS NOT SUBJECT TO THE SANITARY SEWER EASEMENT RECORDED IN VOLUME 7513, PAGE 728, DEED RECORDS, BEXAR COUNTY, TEXAS.

THIS PROPERTY IS NOT SUBJECT TO INGRESS AND EGRESS EASEMENT RECORDED IN VOLUME 2446, PAGE 1924, OFFICIAL PUBLIC RECORDS, BEXAR COUNTY, TEXAS.

NOTE:
Bearings shown hereon are based on actual GPS Observations, Texas State Plane Coordinates, South Central Zone, Grid.

THIS PROPERTY IS SUBJECT TO RESTRICTIVE COVENANTS, EASEMENTS, AGREEMENTS, AND/OR SETBACK LINES (IF ANY) AS FOLLOWS: VOLUME 9594, PAGE 211, DEED AND PLAT RECORDS; VOLUME 14700, PAGE 340, OFFICIAL PUBLIC RECORDS, BEXAR COUNTY, TEXAS.

NOTE:
PRIOR SURVEY (WESTAR JOB #80572) WAS USED FOR REFERENCE.

THIS SURVEY IS ACKNOWLEDGED AND IS ACCEPTED:

____

____

FLOOD ZONE INTERPRETATION: IT IS THE RESPONSIBILITY OF ANY INTERESTED PERSONS TO VERIFY THE ACCURACY OF FEMA FLOOD ZONE DESIGNATION OF THIS PROPERTY WITH FEMA AND STATE AND LOCAL OFFICIALS, AND TO DETERMINE THE EFFECT THAT SUCH DESIGNATION MAY HAVE REGARDING THE INTENDED USE OF THE PROPERTY. The property made the subject of this survey appears to be included in a FEMA Flood Insurance Rate Map (FIRM), identified as Community No. **48029C**, Panel No. **0220 G**, which is Dated **09/29/2010**. By scaling from that FIRM, it appears that all or a portion of the property may be in Flood Zone(s) **X&AE**. Because this is a boundary survey, the surveyor did not take any actions to determine the Flood Zone status of the surveyed property other that to interpret the information set out on FEMA's FIRM, as described above. THIS SURVEYOR DOES NOT CERTIFY THE ACCURACY OF THIS INTERPRETATION OF THE FLOOD ZONES, which may not agree with the interpretations of FEMA or State or local officials, and which may not agree with the tract's actual conditions More information concerning FEMA's Special Flood Hazard Areas and Zones may be found at http://www.fema.gov/index.shtm.

Property Address:
7800 BANDERA ROAD

Property Description:
LOT 2, BLOCK 12, NEW CITY BLOCK 17973, BANDERA HEIGHTS SUBDIVISION, CITY OF SAN ANTONIO, BEXAR COUNTY, TEXAS, ACCORDING TO MAP OR PLAT THEREOF RECORDED IN VOLUME 9594, PAGE 211 OF THE DEED AND PLAT RECORDS OF BEXAR COUNTY, TEXAS.

Owner:
DARIO PROPERTIES, LTD.

STATE OF TEXAS — REGISTERED — MARK J. EWALD — 5095 — PROFESSIONAL LAND SURVEYOR

I, MARK J. EWALD, Registered Professional Land Surveyor, State of Texas, do hereby certify that the above plat represents an actual survey made on the ground under my supervision, and there are no discrepancies, conflicts, shortages in area or boundary lines, or any encroachment or overlapping of improvements, to the best of my knowledge and belief, except as shown herein.

MARK J. EWALD
Registered Professional Land Surveyor
Texas Registration No. 5095

FIRM REGISTRATION NO. 10111700
Westar Alamo
LAND SURVEYORS, LLC.
P.O. BOX 1645 BOERNE, TEXAS 78006
PHONE (210) 372-9500 FAX (210) 372-9999

LEGEND
- △ = CALCULATED POINT
- ● = FND 1/2" IRON ROD
- ( ) = RECORD INFORMATION
- B.S. = BUILDING SETBACK
- R.D. = RECORD DIGNITY MONUMENT
- = POWER POLE
- = FND MAG NAIL
- = CABLE TELEVISION
- = TELEPHONE BOX
- = UNDERGROUND CABLE
- = ELECTRIC BOX
- = OVERHEAD ELECTRIC
- = GUY WIRE
- = SEWER MANHOLE
- = LIGHT POST

DRAWN BY: BLE/TS

G.F. NO. 2293150-SA68 | JOB NO. 80806 | COMPANY: PROFESSIONAL STRUCIVIL ENGINEERS, INC. | DATE: 02/06/2018

STATE OF TEXAS — MIRZA TAHIR BAIG — 82577 — REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/20/2018
FIRM REGISTRATION F-4951

Rev.	Description	Date	Drawn
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PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD., SUITE 390, AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.8095

Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title: EXISTING SURVEY

PROJECT 30434

GENERAL LEGEND

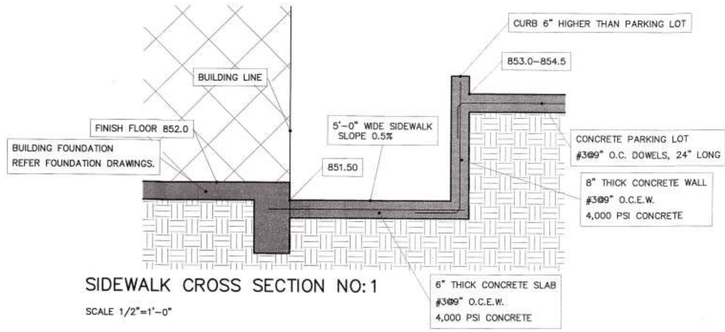
- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- SILT FENCE
- SILT FENCE & LOC
- PUE — PUBLIC UTILITY EASEMENT
- DE — DRAINAGE EASEMENT
- EE — ELECTRICAL EASEMENT
- SSE — SANITARY SEWER EASEMENT
- WSEL — WATER SURFACE ELEVATION
- CMP — CORRUGATED METAL PIPE
- ELEV. — EXISTING CONTOURS
- ELEV. — PROPOSED GRADING CONTOURS

UTILITY LEGEND

- FIRE HYDRANT
- GATE VALVE
- PLUG OR CAP
- STORM SEWER MANHOLE
- WASTEWATER MANHOLE
- WW CLEAN-OUT
- WATER LINE
- WASTEWATER LINE
- STORM SEWER LINE
- FLOW INDICATOR(SHOWN TO RIGHT)
- PROPOSED SERVICE TAP
- WATER METER
- IRRIGATION METER
- STORM SEWER INLET
- WATER SERVICE (SINGLE)
- WATER SERVICE (DOUBLE)
- UTILITY POLE
- LIGHT POLE
- OHP — OVERHEAD ELECTRIC
- WIRE FENCE

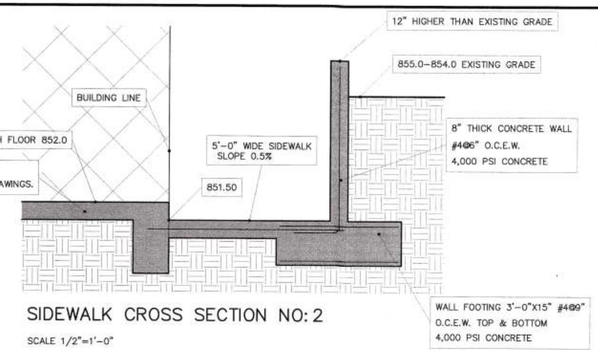
EROSON CONTROL LEGEND

- TREE (EXISTING)
- TREE (TO BE REMOVED) (R)
- TREE PROTECTION



SIDEWALK CROSS SECTION NO: 1

SCALE 1/2"=1'-0"



SIDEWALK CROSS SECTION NO: 2

SCALE 1/2"=1'-0"

SITE INFORMATION TABLE

LOT AREA	1.07 ACRES		
IMPERVIOUS COVER EXISTING	5,624.94 SF	0.129 ACRES	(12%)
IMPERVIOUS COVER PROPOSED	26,706.10 SF	0.613 ACRES	(57.29%)
TOTAL IMPERVIOUS COVER	32,329.04 SF	0.742 ACRES	(69.35%)
ZONING	C3		
PROPOSED USAGE	RETAIL SALES & SERVICE		
ALLOWABLE IMPERVIOUS COVER	85%		
LIMIT OF CONSTRUCTION	1.38 ACRES		

IMPERVIOUS COVER TABLE

BUILDING	9,918.00 SF		
PARKING	13,709.66 SF		
SIDEWALK	3,078.44 SF		
EXISTING	5,624.94 SF		
TOTAL	32,329.04 SF	0.742 ACRES	69.35%

BUILDING INFORMATION TABLE

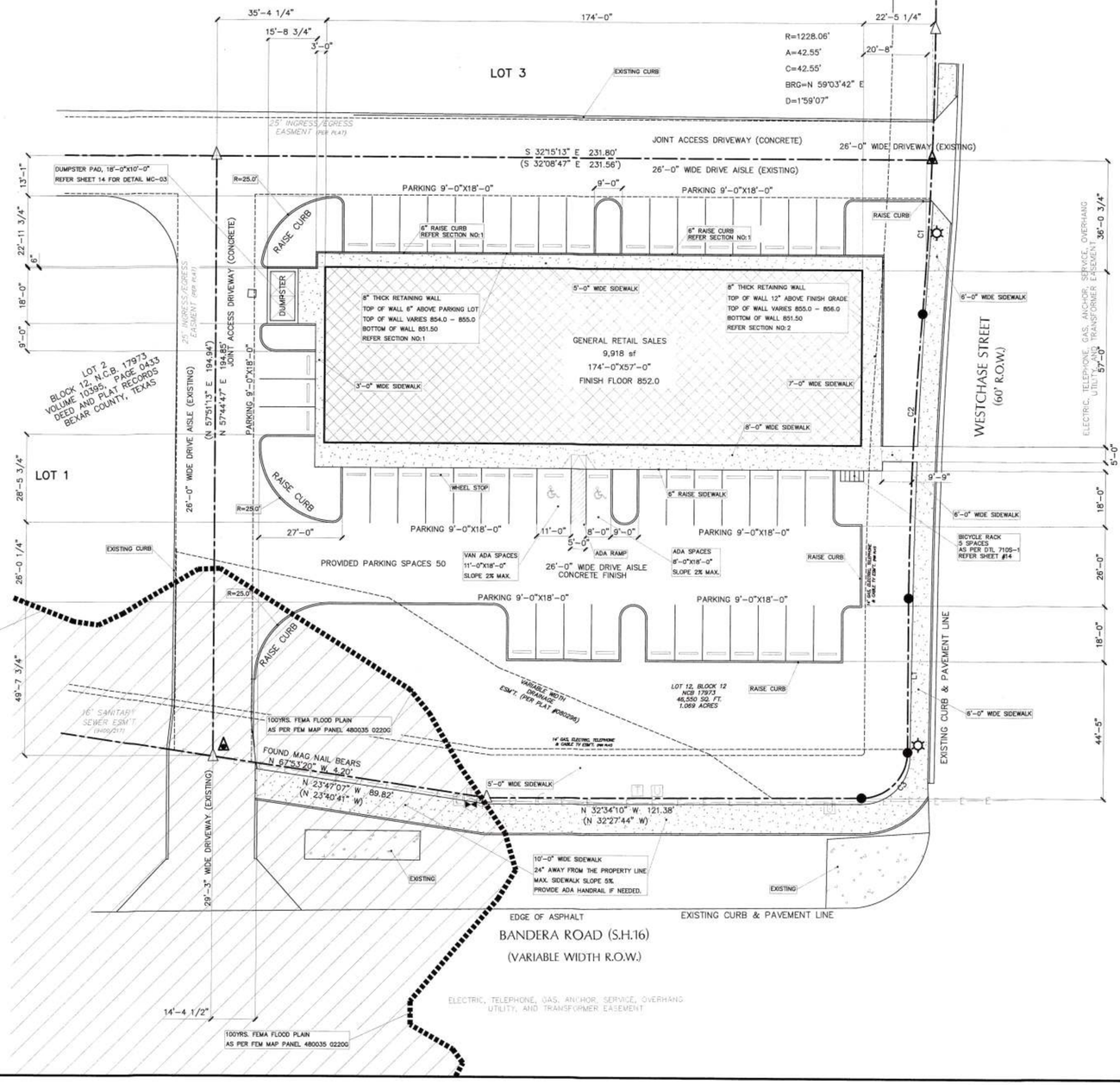
BUILDING COVERAGE	9,918 SF (21.27%)
NUMBER OF STORIES	1
TYPE OF CONSTRUCTION	II-B (STEEL STRUCTURE)
MAX. BUILDING HEIGHT	30'-8"
ALLOWABLE BUILDING HEIGHT	35'-0"
ALLOWABLE STRUCTURE COVERAGE	40%
OCCUPANCY CLASSIFICATION	M

PARKING TABLE

TOTAL PARKING SPACES REQUIRED	34
GENERAL RETAIL 10,000/200sf(MAX.)=50	
GENERAL RETAIL 10,000/300sf(MIN)=34	
TOTAL PARKING SPACES PROVIDED	47

SUMMARY OF PARKING SPACES

PROVIDED STANDARD SPACES	45
PROVIDED HANDICAP VAN	1
PROVIDED STANDARD HANDICAP	1
PROVIDED LOADING SPACE	0



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 10/24/2018
FIRM REGISTRATION F-4951

Rev.	Description	Date	Drawn
6			
5			
4	ISSUED FOR APPROVAL	10/24/18	
3	ISSUED FOR APPROVAL	10/01/18	
2	ISSUED FOR APPROVAL	09/10/18	
1	ISSUED FOR APPROVAL	05/07/18	
0	ISSUED FOR APPROVAL		

PROFESSIONAL STRUCVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD., SUITE 380, AUSTIN, TX 78759 | TEL: 512.238.9423 | FAX: 512.238.8095

Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title: DIMENSIONAL SITE PLAN

PROJECT 30434

SHEET 4 OF 25

GENERAL LEGEND

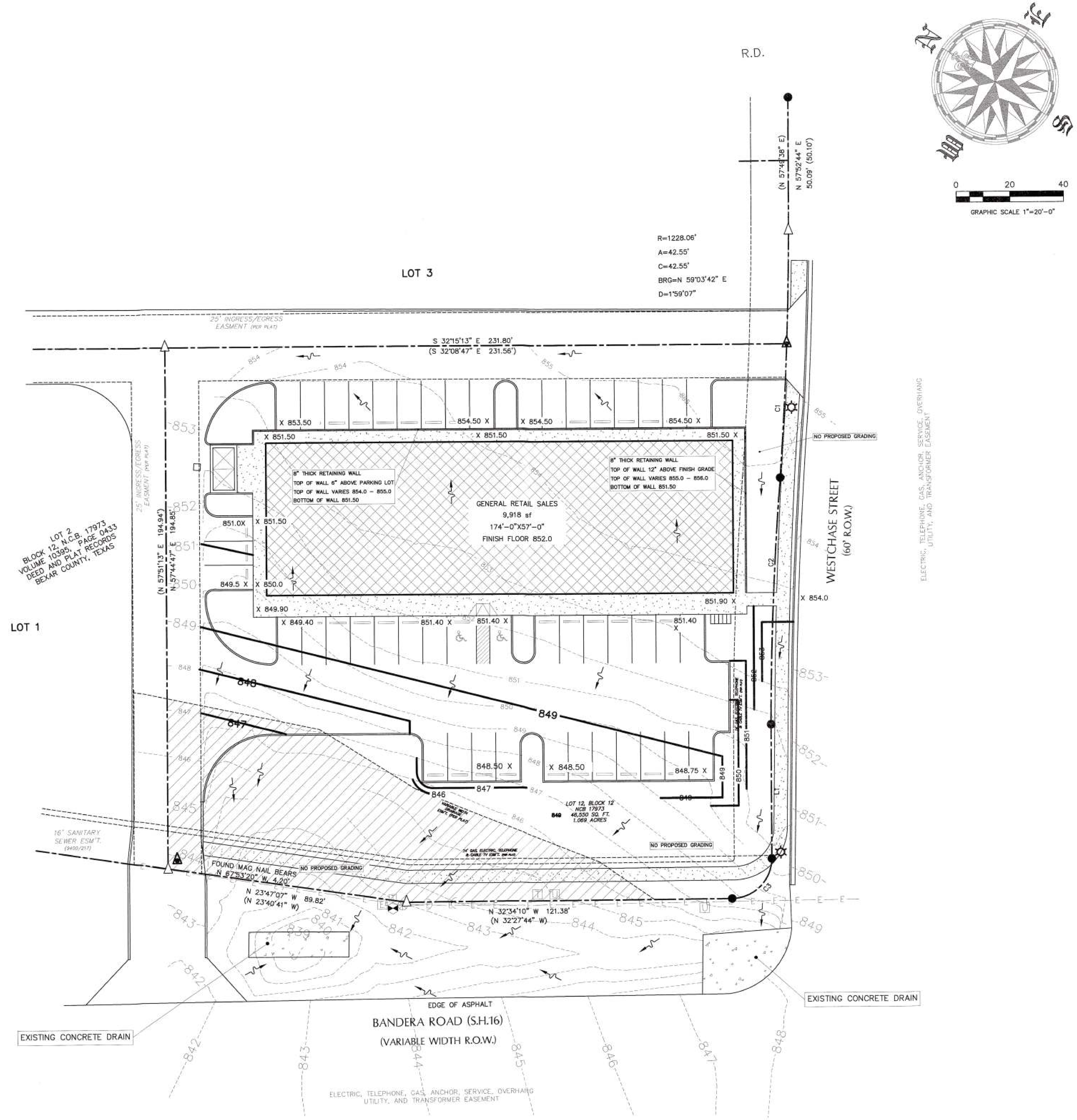
	PROPERTY LINE
	LIMITS OF CONSTRUCTION
	SILT FENCE
	SILT FENCE & LOC
PUE	PUBLIC UTILITY EASEMENT
DE	DRAINAGE EASEMENT
EE	ELECTRICAL EASEMENT
SSE	SANITARY SEWER EASEMENT
WSEL	WATER SURFACE ELEVATION
CMP	CORRUGATED METAL PIPE
ELEV.	EXISTING CONTOURS
ELEV.	PROPOSED GRADING CONTOURS

UTILITY LEGEND

- FIRE HYDRANT
- GATE VALVE
- PLUG OR CAP
- STORM SEWER MANHOLE
- WASTEWATER MANHOLE
- WW CLEAN-OUT
- WATER LINE
- WASTEWATER LINE
- STORM SEWER LINE
- FLOW INDICATOR(SHOWN TO RIGHT)
- PROPOSED SERVICE TAP
- WATER METER
- IRRIGATION METER
- STORM SEWER INLET
- WATER SERVICE (SINGLE)
- WATER SERVICE (DOUBLE)
- UTILITY POLE
- LIGHT POLE
- OVERHEAD ELECTRIC
- WIRE FENCE

EROSON CONTROL LEGEND

- TREE (EXISTING)
- TREE (TO BE REMOVED) (R)
- TREE PROTECTION



STATE OF TEXAS
MIRZA TAHIR BAIG
82577
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 08/29/2018
FIRM REGISTRATION F-4951

Rev.	Description	Date	Drawn
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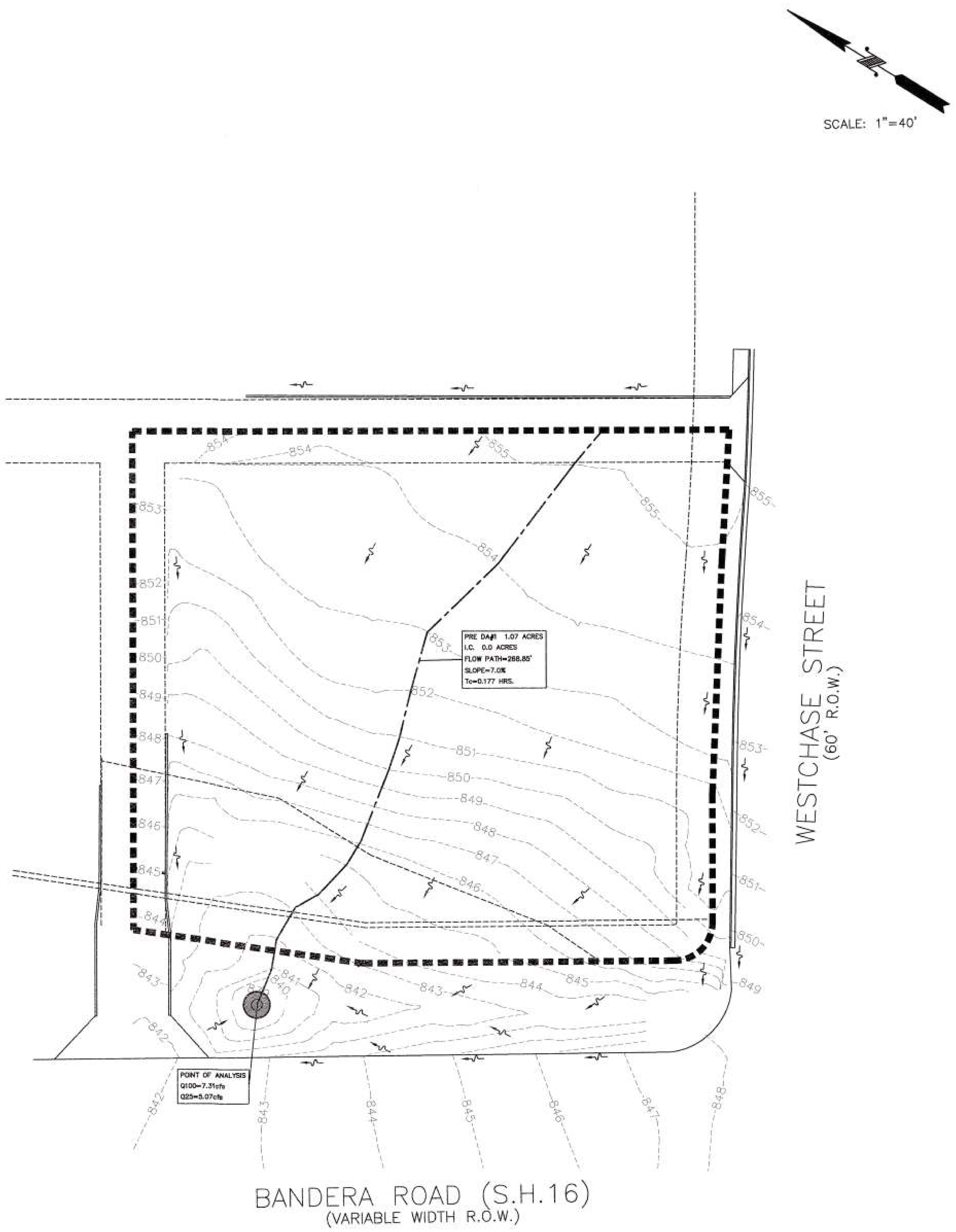
1	ISSUED FOR APPROVAL	08/29/18	
0	ISSUED FOR APPROVAL	05/07/18	

PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD., SUITE 390, AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.6095

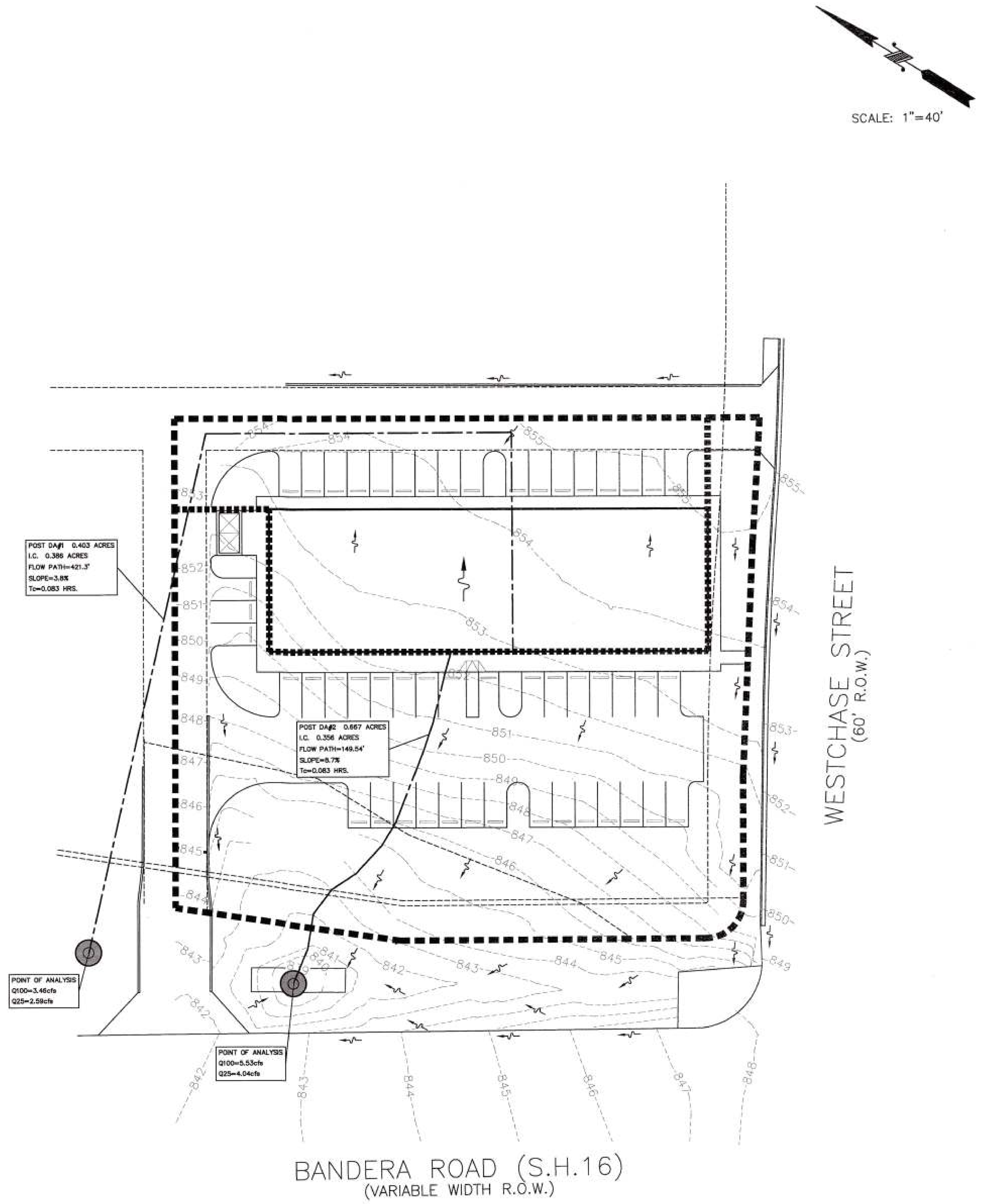
Project :
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title :
GRADING SITE PLAN

PROJECT
30434



PRE DEVELOPED CONDITIONS



POST DEVELOPED CONDITIONS

DRAINAGE SUMMARY TABLE (PRE & POST CONDITIONS)

BASIN NAME		PRE DA#1	POST DA#1	POST DA#2	TOTAL PRE "Q"	TOTAL POST "Q"	TOTAL POST "Q" RELEASE
DRAINAGE AREA	(acres)	1.07	0.403	0.667			
IMPERVIOUS COVER	(acres)	0.00	0.386	0..356			
CN		79	97	89			
CN	(adjusted)	79	96.47	92.60			
Tc	(hrs.)	0.177	0.083	0.083			
2YRS.	(cfs)	1.51	1.14	1.56	1.51	2.70	2.70
10YRS.	(cfs)	3.73	2.06	3.14	3.73	5.20	5.20
25YRS.	(cfs)	5.07	2.59	4.04	5.07	6.63	6.63
100YRS.	(cfs)	7.31	3.46	5.53	7.31	8.99	8.99

STATE OF TEXAS
MIRZA TAHIR BAIG
82577
REGISTERED
PROFESSIONAL ENGINEER

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CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD., SUITE 390, AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.8095

Project :
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title :
ON-SITE DRAINAGE AREA MAP

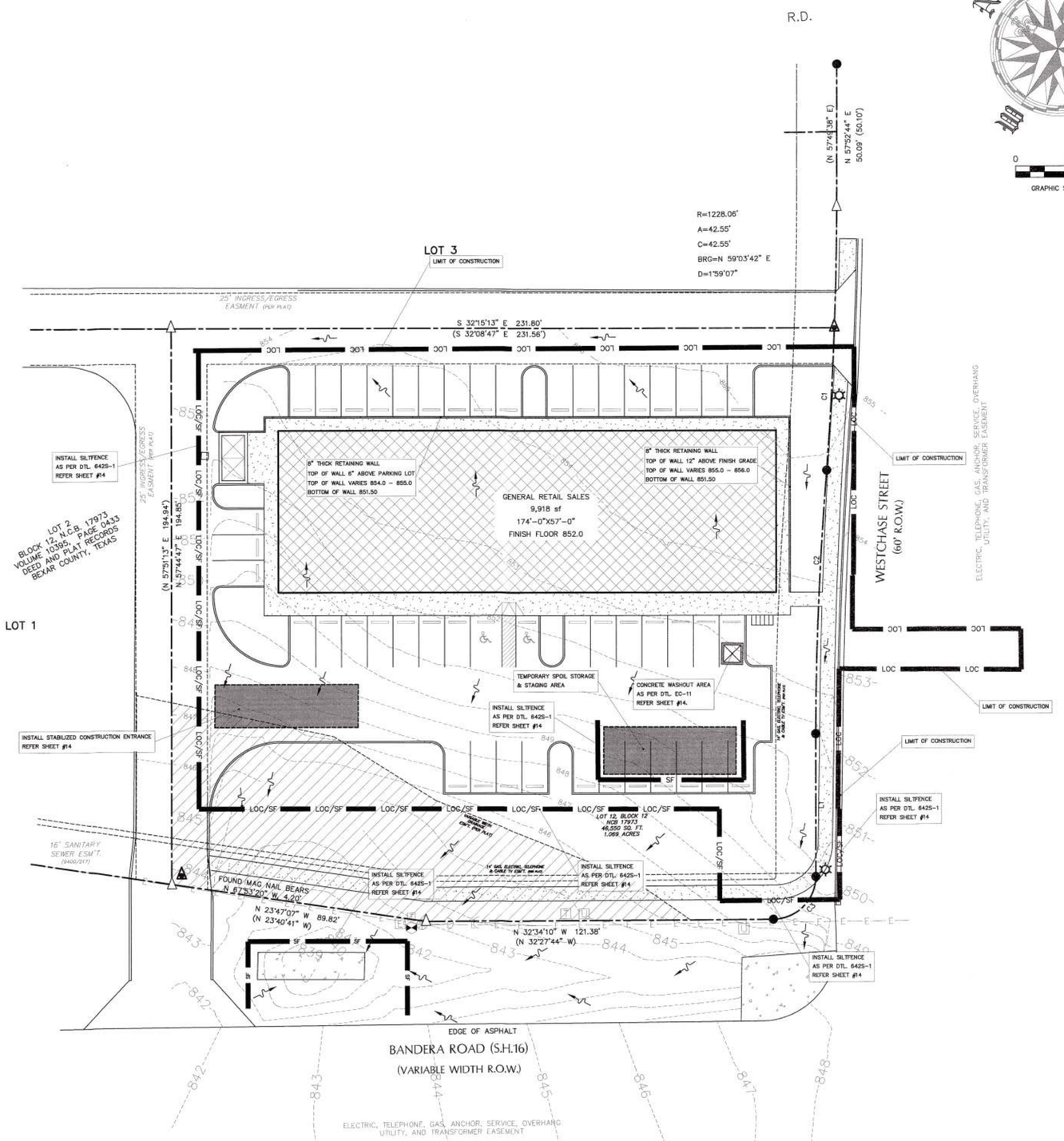
PROJECT
30434

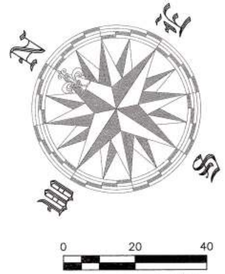
6
OF 25

GENERAL LEGEND	
	PROPERTY LINE
LOC	LIMITS OF CONSTRUCTION
SF	SILT FENCE
LOC/SF	SILT FENCE & LOC
PUE	PUBLIC UTILITY EASEMENT
DE	DRAINAGE EASEMENT
EE	ELECTRICAL EASEMENT
SSE	SANITARY SEWER EASEMENT
WSEL	WATER SURFACE ELEVATION
CMP	CORRUGATED METAL PIPE
ELEV.	EXISTING CONTOURS
ELEV.	PROPOSED GRADING CONTOURS

UTILITY LEGEND	
	FIRE HYDRANT
	GATE VALVE
	PLUG OR CAP
SS	STORM SEWER MANHOLE
WW	WASTEWATER MANHOLE
C.O.	WW CLEAN-OUT
W	WATER LINE
WW	WASTEWATER LINE
SS	STORM SEWER LINE
FLOW	FLOW INDICATOR(SHOWN TO RIGHT)
	PROPOSED SERVICE TAP
	WATER METER
	IRRIGATION METER
	STORM SEWER INLET
	WATER SERVICE (SINGLE)
	WATER SERVICE (DOUBLE)
	UTILITY POLE
	LIGHT POLE
OH	OVERHEAD ELECTRIC
	WIRE FENCE

EROSON CONTROL LEGEND	
	TREE (EXISTING)
	TREE (TO BE REMOVED) (R)
TP	TREE PROTECTION





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PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12770 RIESENACH BLVD., SUITE 350, AUSTIN, TX 78781 | TEL 512.238.8422 | FAX 512.238.8055

Project:
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title:
EROSION/SEDIMENTATION SITE PLAN

PROJECT 30434

SHEET 7 OF 25

SAWS CONSTRUCTION NOTES

COUNTER PERMIT AND GENERAL CONSTRUCTION PERMIT

GENERAL SECTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:
   A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) 'DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM'; TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND 'PUBLIC DRINKING WATER'; TAC TITLE 30 PART 1 CHAPTER 290.
   B. CURRENT TXDOT 'STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE';
   C. CURRENT 'SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION';
   D. CURRENT CITY OF SAN ANTONIO 'STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION';
   E. CURRENT CITY OF SAN ANTONIO 'UTILITY EXCAVATION CRITERIA MANUAL" (UECM).
2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK UNTIL THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPROVED COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE EXPENSE OF THE CONTRACTORS AND/OR THE DEVELOPER.
3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.
4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT (210) 233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING ANY WORK.
5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.
6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:
   - SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES
   - COSA DRAINAGE (210) 207-0724 OR (210) 207-8026
   - COSA TRAFFIC SIGNAL OPERATIONS (210) 206-8480
   - COSA TRAFFIC SIGNAL DAMAGES (210) 207-3951
   - TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF THE PROJECT'S CONSTRUCTION.
8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT REQUIREMENTS.
9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.
10. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.
11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.
    WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.
    ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.
12. COMPACTION NOTE (ITEM 804): THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.
13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUCTION INSPECTION DIVISION.

WATER SECTION

1. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.
   - FOR WATER MAINS 12" OR HIGHER: SAWS EMERGENCY OPERATIONS CENTER (210) 233-2014
2. ASBESTOS CEMENT (AC) PIPE, ALSO KNOWN AS TRANSITE PIPE WHICH IS KNOWN TO CONTAIN ASBESTOS- CONTAINING MATERIAL (ACM), MAY BE LOCATED WITHIN THE PROJECT LIMITS. SPECIAL WASTE MANAGEMENT PROCEDURES AND HEALTH AND SAFETY REQUIREMENTS WILL BE APPLICABLE WHEN REMOVAL AND/OR DISTURBANCE OF THIS PIPE OCCURS. SUCH WORK IS TO BE MADE UNDER SPECIAL SPECIFICATION ITEM NO. 3000, "SPECIAL SPECIFICATION FOR HANDLING ASBESTOS CEMENT PIPE".
3. VALVE REMOVAL: WHERE THE CONTRACTOR IS TO ABANDON A WATER MAIN, THE CONTROL VALVE LOCATED ON THE ABANDONING BRANCH WILL BE REMOVED AND REPLACED WITH A CAP/PLUG. (NSPI)
4. SUITABLE ANCHORAGE/THRUST BLOCKING OR JOINT RESTRAINT SHALL BE PROVIDED AT ALL OF THE FOLLOWING MAIN LOCATIONS: DEAD ENDS, PLUGS, CAPS, TEES, CROSSES, VALVES, AND BENDS, IN ACCORDANCE WITH THE STANDARD DRAWINGS DD-839 SERIES AND ITEM NO. 839, IN THE SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION.
5. ALL VALVES SHALL READ "OPEN RIGHT".
6. PRVS REQUIRED: CONTRACTOR TO VERIFY THAT NO PORTION OF THE TRACT IS BELOW GROUND ELEVATION OF 849.0 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 849.0 EET, THE DEVELOPER OR BUILDER SHALL INSTALL AT EACH LOT, ON THE CUSTOMER'S SIDE OF THE METER, AN APPROVED TYPE PRESSURE REGULATOR IN CONFORMANCE WITH THE PLUMBING CODE OF THE CITY OF SAN ANTONIO. NO DUAL SERVICES ALLOWED FOR ANY LOT(S) IF *PRV IS/ARE REQUIRED FOR SUCH LOT(S), ONLY SINGLE SERVICE CONNECTIONS SHALL BE ALLOWED. *NOTE: A PRESSURE REGULATOR IS ALSO KNOWN AS A PRESSURE REDUCING VALVE (PRV).
7. PIPE DISINFECTION WITH DRY HTH FOR PROJECTS LESS THAN 800 LINEAR FEET. (ITEM NO. 847.3): MAINS SHALL BE DISINFECTED WITH DRY HTH WHERE SHOWN IN THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE INSPECTOR, AND SHALL NOT EXCEED A TOTAL LENGTH OF 800 FEET. THIS METHOD OF DISINFECTION WILL ALSO BE FOLLOWED FOR MAIN REPAIRS. THE CONTRACTOR SHALL UTILIZE ALL APPROPRIATE SAFETY MEASURE TO PROTECT HIS PERSONNEL DURING DISINFECTION OPERATIONS.
8. BACKFLOW PREVENTION DEVICES:
   - ALL IRRIGATION SERVICES WITHIN RESIDENTIAL AREAS ARE REQUIRED TO HAVE BACKFLOW PREVENTION DEVICES.
   - ALL COMMERCIAL BACKFLOW PREVENTION DEVICES MUST BE APPROVED BY SAWS PRIOR TO INSTALLATION.
9. FINAL CONNECTION TO THE EXISTING WATER MAIN SHALL NOT BE MADE UNTIL THE WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED, AND SAWS HAS RELEASED THE MAIN FOR TIE-IN AND USE.

SEWER NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:
   A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT (210) 233-2014. PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.
   B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.
   C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.
   D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) AND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.
   E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.
   F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS.

SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA, TCEQ AND/OR ANY OTHER FEDERAL, STATE OR LOCAL AGENCIES.

NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.

2. IF BYPASS PUMPING IS REQUIRED, THE CONTRACTOR SHALL PERFORM SUCH WORK IN ACCORDANCE WITH SAWS STANDARD SPECIFICATION FOR WATER AND SANITARY SEWER CONSTRUCTION, ITEM NO. 864, "BYPASS PUMPING".
3. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT (210) 233-2973 AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.
4. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241, TAC 217.53 AND TCEQ 290.44(E)(4)(B). CONTRACTOR SHALL CENTER A 20' JOINT OF 160 PSI PRESSURE RATED PVC AT THE PROPOSED WATER CROSSING.
5. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY; IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECT'S IMPROVEMENTS. (NSPI)
6. SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER: ALL SPILLS, OVERFLOWS, OR DISCHARGES OF WASTEWATER, RECYCLED WATER, PETROLEUM PRODUCTS, OR CHEMICALS MUST BE REPORTED IMMEDIATELY TO THE SAWS INSPECTOR ASSIGNED TO THE COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP). THIS REQUIREMENT APPLIES TO EVERY SPILL, OVERFLOW, OR DISCHARGE REGARDLESS OF SIZE.
7. MANHOLE AND ALL PIPE TESTING (INCLUDING THE TV INSPECTION) MUST BE PERFORMED AND PASSED PRIOR TO FINAL FIELD ACCEPTANCE BY SAWS CONSTRUCTION INSPECTION DIVISION, AS PER THE SAWS SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.
8. ALL PVC PIPE OVER 14 FEET OF COVER SHALL BE EXTRA STRENGTH WITH MINIMUM PIPE STIFFNESS OF 115 PSI.

GENERAL LEGEND

	PROPERTY LINE
UNC	LIMITS OF CONSTRUCTION
SF	SILT FENCE
LOC/SF	SILT FENCE & LOC
PUE	PUBLIC UTILITY EASEMENT
DE	DRAINAGE EASEMENT
EE	ELECTRICAL EASEMENT
SSE	SANITARY SEWER EASEMENT
WSEL	WATER SURFACE ELEVATION
CMP	CORRUGATED METAL PIPE
ELEV.	EXISTING CONTOURS
ELEV.	PROPOSED GRADING CONTOURS

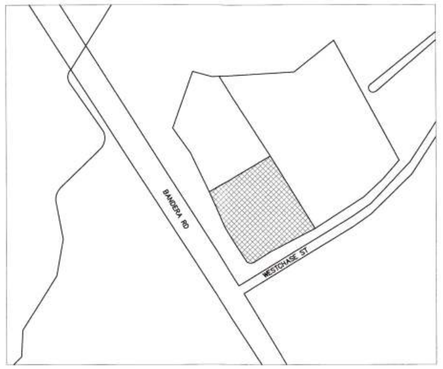
UTILITY LEGEND

	FIRE HYDRANT
	GATE VALVE
	PLUG OR CAP
SS	STORM SEWER MANHOLE
WW	WASTEWATER MANHOLE
CO	WW CLEAN-OUT
WW	WATER LINE
WW	WASTEWATER LINE
SS	STORM SEWER LINE
FLOW	FLOW INDICATOR(SHOWN TO RIGHT)
TAP	PROPOSED SERVICE TAP
	WATER METER
	IRRIGATION METER
	STORM SEWER INLET
	WATER SERVICE (SINGLE)
	WATER SERVICE (DOUBLE)
	UTILITY POLE
	LIGHT POLE
OHE	OVERHEAD ELECTRIC
	WIRE FENCE

EROSON CONTROL LEGEND

	TREE (EXISTING)
	TREE (TO BE REMOVED) (R)
	TREE PROTECTION

F.H.#4 EXISTING



SITE LOCATION MAP

REFER SAWS SPECIFICATIONS ITEM NO: 3000 FOR HANDLING ASBESTOS CEMENT PIPE

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12710 RESEARCH BLVD. SUITE 350, AUSTIN, TX 78759 | TEL 512.238.8422 | FAX 512.238.8095

Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title: UTILITY SITE PLAN

PROJECT 30434

GENERAL LEGEND

- PROPERTY LINE
- LIMITS OF CONSTRUCTION
- SILT FENCE
- SILT FENCE & LOC
- PUE — PUBLIC UTILITY EASEMENT
- DE — DRAINAGE EASEMENT
- EE — ELECTRICAL EASEMENT
- SSE — SANITARY SEWER EASEMENT
- WSEL — WATER SURFACE ELEVATION
- CMP — CORRUGATED METAL PIPE
- ELEV. — EXISTING CONTOURS
- ELEV. — PROPOSED GRADING CONTOURS

UTILITY LEGEND

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- PLUG OR CAP
- STORM SEWER MANHOLE
- WASTEWATER MANHOLE
- WW CLEAN-OUT
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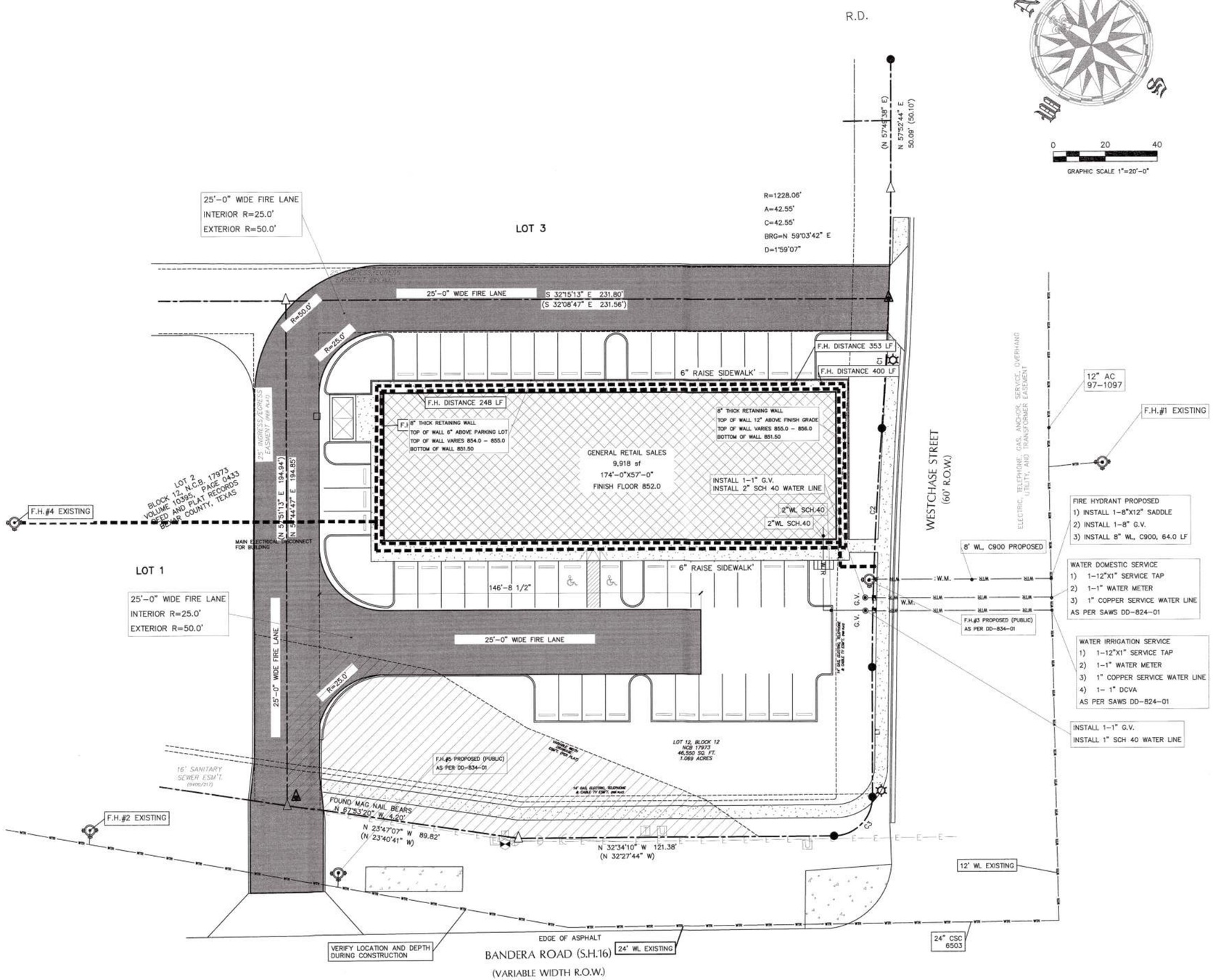

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GRAPHIC SCALE 1"=20'-0"

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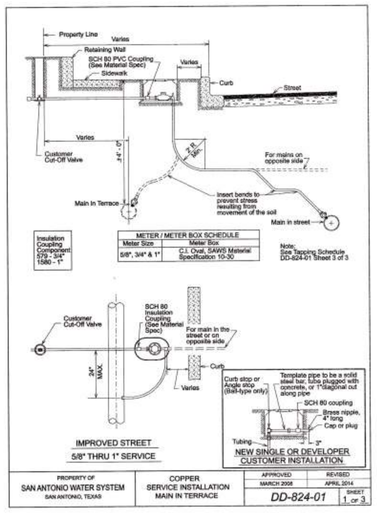
CONSULTING
12719 RESEARCH BLVD, SUITE 390, AUSTIN, TX 78759 | TEL 512.258.9423 | FAX 512.258.9056

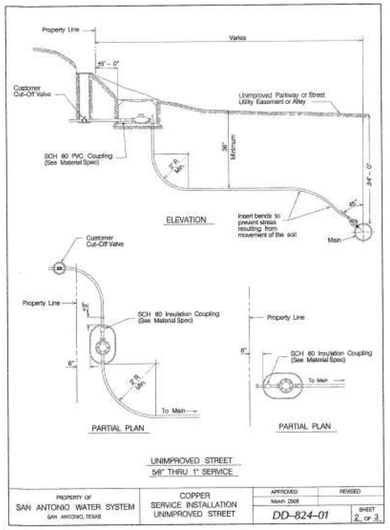
Project:
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

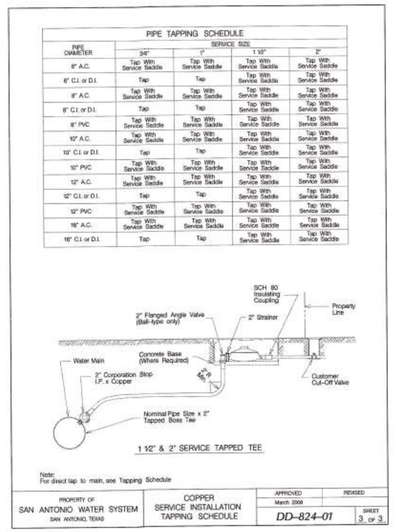
Title:
FIRE LANE & EMERGENCY ACCESS PLAN

PROJECT 30434

SHEET 9 OF 25

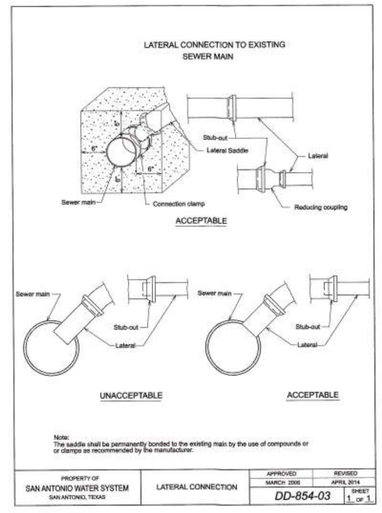


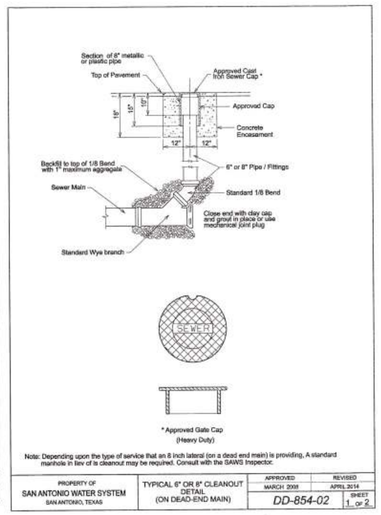




PIPE TAPPING SCHEDULE

PIPE DIAMETER	SERVICE SIZE: 3/4"	1"	1 1/2"	2"
6" A.C.	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
6" C.I. or D.I.	Tap	Tap	Tap With Service Saddle	Tap With Service Saddle
8" A.C.	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
8" C.I. or D.I.	Tap	Tap	Tap With Service Saddle	Tap With Service Saddle
8" PVC	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
10" A.C.	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
10" C.I. or D.I.	Tap	Tap	Tap With Service Saddle	Tap With Service Saddle
10" PVC	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
12" A.C.	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
12" C.I. or D.I.	Tap	Tap	Tap With Service Saddle	Tap With Service Saddle
12" PVC	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
16" A.C.	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle	Tap With Service Saddle
16" C.I. or D.I.	Tap	Tap	Tap With Service Saddle	Tap With Service Saddle





STATE OF TEXAS
MIRZA TAHIR BAIG
82577
REGISTERED PROFESSIONAL ENGINEER
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/20/2018
FIRM REGISTRATION F-4951

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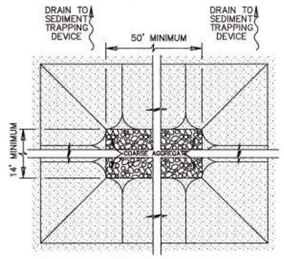
PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12770 RESEARCH BLVD., SUITE 390, AUSTIN, TX 78759 | TEL 512.238.8422 | FAX 512.258.8095

Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

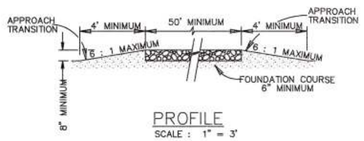
Title: GENERAL DETAILS

PROJECT 30434

SHEET 10 OF 25



PLAN
SCALE : 1" = 3'

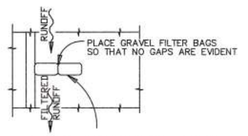


PROFILE
SCALE : 1" = 3'

GENERAL NOTES

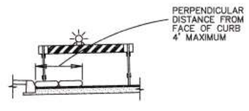
1. THE LENGTH OF THE TYPE 1 CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A SIZE OF 4" TO 8".
3. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6 : 1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
4. THE CONSTRUCTION EXIT FOUNDATION COURSE SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE.
6. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

CONSTRUCTION EXIT – TYPE 1



3 / 4" GRAVEL CONTAINED IN PERVIOUS BURLAP BAGS OR SYNTHETIC NET BAGS (1 / 8" MESH) APPROX. 24" LONG, 12" WIDE AND 6" HIGH

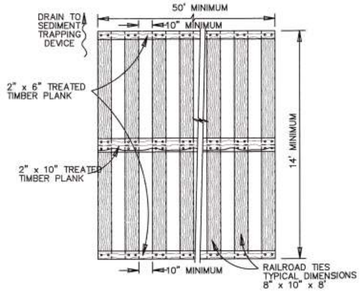
PLAN
SCALE : 1" = 5'



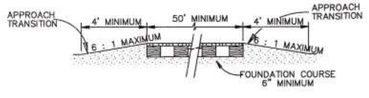
ELEVATION
SCALE : 1" = 5'

NOTE:
STRADDLE GRAVEL FILTER BAGS WITH TYPE 1 BARRICADES MOUNTED WITH TYPE "A" FLASHING WARNING LIGHT. SEE BARRICADE CONSTRUCTION SIGN DETAILS. PLACE FLASHING LIGHTS AWAY FROM GUTTER, FLUSH WITH OUTSIDE EDGE OF BAG CONFIGURATION.

GRAVEL FILTER BAGS



PLAN
SCALE : 1" = 3'

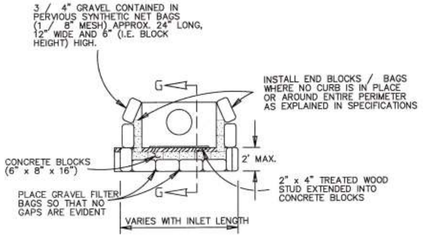


PROFILE
SCALE : 1" = 3'

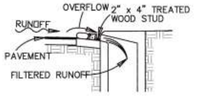
GENERAL NOTES

1. THE LENGTH OF THE TYPE 2 CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE TREATED TIMBER PLANKS SHALL BE ATTACHED TO THE RAILROAD TIES WITH 1 / 2" x 6" MIN. LAG BOLTS. OTHER FASTENERS MAY BE USED AS APPROVED BY THE ENGINEER.
3. THE TREATED TIMBER PLANKS SHALL BE #2 GRADE MIN., AND SHOULD BE FREE FROM LARGE AND LOOSE KNOTS.
4. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6 : 1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT FOUNDATION COURSE SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
6. THE CONSTRUCTION EXIT SHOULD BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE.
7. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

CONSTRUCTION EXIT – TYPE 2



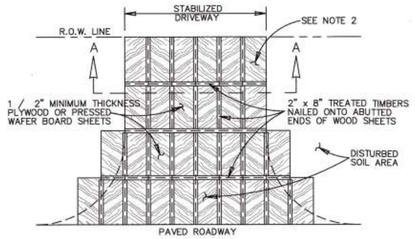
PLAN
SCALE : 1" = 5'



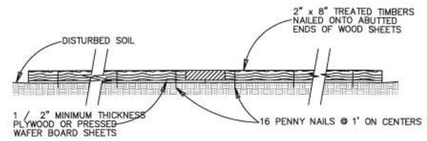
SECTION G–G
SCALE : 1" = 5'

NOTE:
GRAVEL FILTERS CAN BE USED ON PAVEMENT OR BARE GROUND.

CURB INLET GRAVEL FILTER



PLAN
SCALE : 1" = 10'

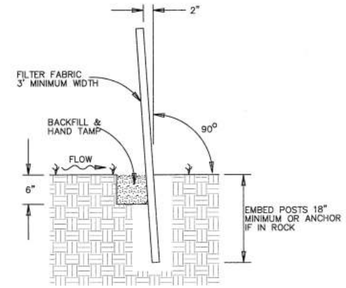


SECTION A–A
SCALE : 1" = 1'

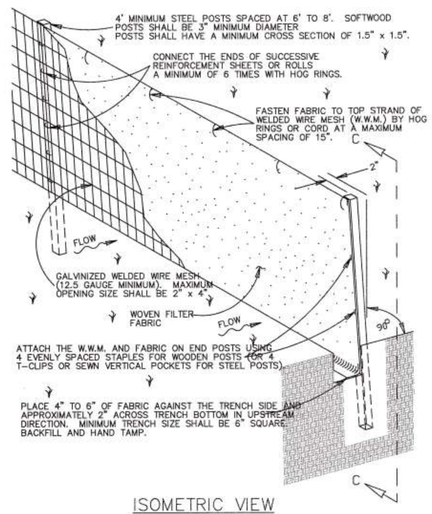
GENERAL NOTES

1. THE LENGTH OF THE TYPE 3 CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
2. THE TYPE 3 CONSTRUCTION EXIT MAY BE CONSTRUCTED FROM OPEN GRADED CRUSHED STONE WITH A SIZE OF 2 TO 4 INCHES SPREAD A MINIMUM OF 4 INCHES THICK TO THE LIMITS SHOWN ON THE PLANS.
3. THE TREATED TIMBER PLANKS SHALL BE #2 GRADE MIN., AND SHOULD BE FREE FROM LARGE AND LOOSE KNOTS.
4. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

CONSTRUCTION EXIT – TYPE 3



SECTION C–C
SCALE : 1" = 1'



ISOMETRIC VIEW
SCALE : 1" = 1'

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A SEDIMENT CONTROL FENCE MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUN-OFF. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED.

SEDIMENT CONTROL FENCE SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 100 GPM / FT SQUARED. SEDIMENT CONTROL FENCE IS NOT RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA LARGER THAN 2 ACRES.

GENERAL NOTES

1. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

TEMPORARY SEDIMENT CONTROL FENCE

JANUARY 2005

STANDARD PLANS
CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS

TEMPORARY EROSION, SEDIMENT & WATER POLLUTION CONTROL MEASURES STANDARDS 1

DRAWN BY: V. VASQUEZ	DATE	REVISIONS	SCALE: SEE ABOVE
CHECKED BY: NAT HARDY, P.E.			DATE:
			SHEET: OF

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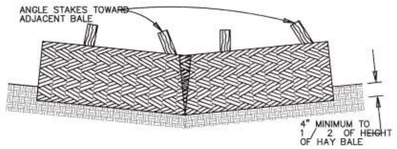
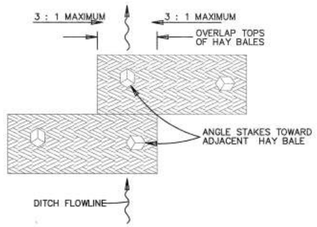
Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title: GENERAL DETAILS

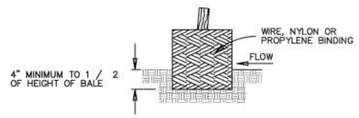
PROJECT 30434



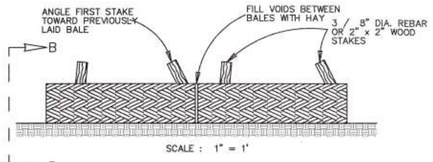
PROFILE VIEW
SCALE : 1" = 1'



PLAN VIEW
SCALE : 1" = 1'



SECTION B–B
SCALE : 1" = 1'



SCALE : 1" = 1'

BALED HAY USAGE GUIDELINES

A BAILED HAY INSTALLATION MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF. A TWO YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED. THE INSTALLATION SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 5 GPM / FT SQUARED OF CROSS SECTIONAL AREA. BALED HAY MAY BE USED AT THE FOLLOWING LOCATIONS:

1. WHERE THE RUNOFF APPROACHING THE BALED HAY FLOWS OVER DISTURBED SOIL FOR LESS THAN 100'. IF THE SLOPE OF THE DISTURBED SOIL EXCEEDS 10 %, THE LENGTH OF SLOPE UPSTREAM OF THE BAILED HAY SHOULD BE LESS THAN 50'.
2. WHERE THE INSTALLATION WILL BE REQUIRED FOR LESS THAN 3 MONTHS.
3. WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 1 / 2 ACRE.

FOR BALED HAY INSTALLATIONS IN SMALL DITCHES, THE FOLLOWING ADDITIONAL CONDITIONAL CONSIDERATIONS APPLY:

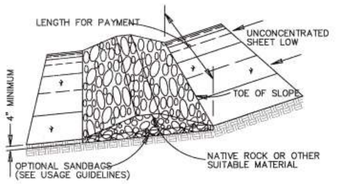
1. THE DITCH SIDESLOPES SHOULD BE GRADED AS FLAT AS POSSIBLE TO MAXIMIZE THE DRAINAGE FLOW RATE THRU THE HAY.
2. THE DITCH SHOULD BE GRADED LARGE ENOUGH TO CONTAIN THE OVERLAPPING DRAINAGE WHEN SEDIMENT HAS FILLED TO THE TOP OF THE BAILED HAY.

BALES SHOULD BE REPLACED USUALLY EVERY 2 MONTHS OR MORE OFTEN DURING WET WEATHER WHEN LOSS OF STRUCTURAL INTERGRITY IS ACCELERATED.

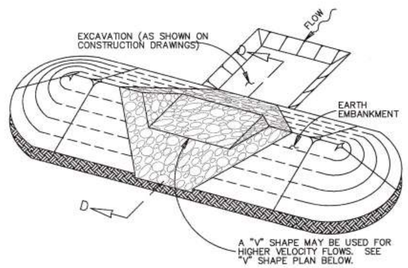
GENERAL NOTES

1. HAY BALES SHALL BE A MINIMUM OF 30" IN LENGTH AND WEIGH A MINIMUM OF 50 LBS.
2. HAY BALES SHALL BE BOUND BY EITHER WIRE OR NYLON OR POLYPROPYLENE STRING. THE BALES SHALL BE COMPOSED ENTIRELY OF VEGETABLE MATTER.
3. HAY BALES SHALL BE EMBEDDED IN THE SOIL A MININMUM OF 4" AND, WHERE POSSIBLE, ONE–HALF THE HEIGHT OF THE BALE.
4. HAY BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. THE BALES SHALL BE PLACED WITH BINDINGS PARALLEL TO THE GROUND.
5. HAY BALES SHALL BE SECURELY ANCHORED IN PLACE WITH 3 / 8" DIA. REBAR OR 2" x 2" WOOD STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE SHALL BE ANGLED TOWARDS THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER.
6. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

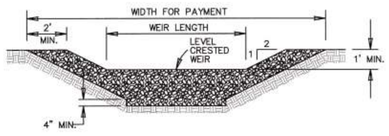
BALED HAY FOR EROSION CONTROL



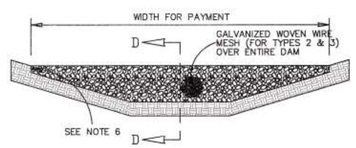
TYPE 1 FILTER DAM AT TOE OF SLOPE
SCALE : 1" = 5'



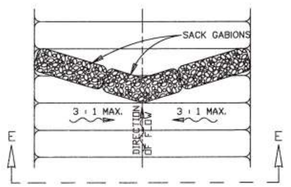
TYPE 1 & 2 FILTER DAM AT SEDIMENT TRAP
SCALE : 1" = 5'



PROFILE OF TYPE 1 & 2 FILTER DAM AT SEDIMENT TRAP
SCALE : 1" = 3'

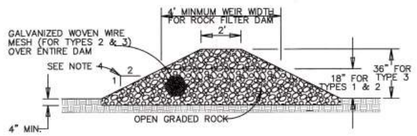


TYPE 1, 2 & 3 FILTER DAM AT CHANNEL SECTIONS
SCALE : 1" = 3'

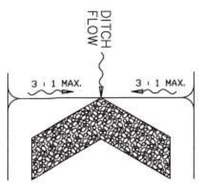


PLAN VIEW
SCALE : 1" = 5'

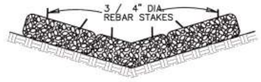
TYPE 4 FILTER DAM AT DITCHES & SMALLER CHANNELS PLAN VIEW



SECTION D–D
SCALE : 1" = 3'



"V" SHAPE PLAN VIEW
NOT TO SCALE



SECTION E–E
SCALE : 1" = 5'

ROCK FILTER DAMS

ROCK FILTER DAM USAGE GUIDELINES

ROCK FILTER DAMS SHOULD BE CONSTRUCTED DOWNSTREAM FROM DISTURBED AREAS TO INTERCEPT SEDIMENT FROM OVERLOAD RUNOFF AND / OR CONCENTRATED FLOW. THE DAMS SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 60 GPM / FT SQUARED OF CROSS SECTIONAL AREA.. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE.

TYPE 1 (18" HIGH WITH NO WIRE MESH) :

TYPE 1 MAY BE USED AT THE TOE OF SLOPES, AROUND INLETS, IN SMALL DITCHES AND AT DIKE OR SWALE OUTLETS. THIS TYPE OF DAM IS RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA OF 5 ACRES OR LESS. TYPE 1 MAY NOT BE USED IN CONCENTRATED HIGH VELOCITY FLOWS (APPROXIMATELY 8 FT. / SEC. OR MORE) IN WHICH AGGREGATE WASH OUT MAY OCCUR. SANDBAGS MAY BE USED AT THE EMBEDDED FOUNDATION (4" DEEP MIN.) FOR BETTER FILTERING EFFICIENCY OF LOW FLOWS IF CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

TYPE 2 (18" HIGH WITH WIRE MESH) :

TYPE 2 MAY BE USED IN DITCHES AND AT DIKE OR SWALE OUTLETS.

TYPE 3 (36" HIGH WITH WIRE MESH) :

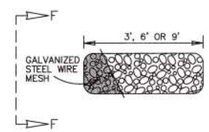
TYPE 3 MAY BE USED IN STREAM FLOW AND SHOULD BE SECURED TO THE STREAM BED.

TYPE 4 (SACK GABIONS) :

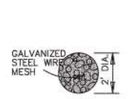
TYPE 4 MAY BE USED IN DITCHES AND SMALLER CHANNELS TO FORM AN EROSION CONTROL DAM.

GENERAL NOTES

1. IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER, FILTER DAMS SHOULD BE PLACED NEAR THE TOE OF SLOPES WHERE EROSION IS ANTICIPATED, UPSTREAM AND / OR DOWNSTREAM AT DRAINAGE STRUCTURES, AND IN ROADWAY DITCHES AND CHANNELS TO COLLECT SEDIMENT.
2. MATERIALS (AGGREGATE, WIRE MESH, SANDBAGS, ETC.) SHALL BE AS INDICATED BY THE SPECIFICATION FOR ROCK FILTER DAMS FOR EROSION AND SEDIMENTATION CONTROL.
3. THE ROCK FILTER DAM DIMENSIONS SHALL BE AS INDICATED ON THE STORM WATER POLLUTION PREVENTION PLANS.
4. SIDE SLOPES SHOULD BE 2 : 1 OR FLATTER. DAMS WITHIN THE SAFETY ZONE SHALL HAVE SIDE SLOPES OF 6 : 1 OR FLATTER.
5. MAINTAIN A MINIMUM OF 1' BETWEEN TOP OF ROCK FILTER DAM WEIR AND TOP OF EMBANKMENT FOR FILTER DAMS AT SEDIMENT TRAPS.
6. FILTER DAMS SHOULD BE EMBEDDED A MINIMUM OF 4" INTO THE EXISTING GROUND.
7. THE SEDIMENT TRAP FOR PONDING OF SEDIMENT LADEN RUNOFF SHALL BE OF THE DIMENSIONS SHOWN ON THE PLANS.
8. ROCK FILTER DAM TYPES 2 & 3 SHALL BE SECURED WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMETER HEXAGONAL OPENINGS. THE AGGREGATE SHALL BE PLACED ON THE MESH TO THE HEIGHT AND SLOPES SPECIFIED. THE MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE AGGREGATE AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS. IN STREAM USE, THE MESH SHOULD BE SECURED OR STAKED TO THE STREAM BED PRIOR TO AGGREGATE PLACEMENT.
9. SACK GABIONS SHOULD BE STAKED DOWN WITH 3 / 4" DIA. REBAR STAKES.
10. FLOW OUTLET SHOULD BE ONTO A STABILIZED AREA (VEGETATION, ROCK, ETC.).
11. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.



TYPE 4 SACK GABION DETAIL
SCALE : 1" = 3'



SECTION F–F
SCALE : 1" = 3'

JANUARY 2005

STANDARD PLANS
CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS

TEMPORARY EROSION, SEDIMENT & WATER POLLUTION CONTROL MEASURES STANDARDS 2

DRAWN BY: V. VASQUEZ	DATE	REVISIONS	SCALE: SEE ABOVE
CHECKED BY: NAT HARDY, P.E.			DATE:
			SHEET: OF

STATE OF TEXAS
MIRZA TAHIR BAIG
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REGISTERED PROFESSIONAL ENGINEER

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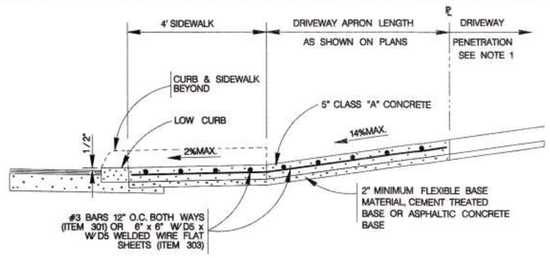
12719 RESEARCH BLVD., SUITE 280, AUSTIN, TX 78759 | TEL: 512.238.6422 | FAX: 512.258.8095

Project : BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title : GENERAL DETAILS

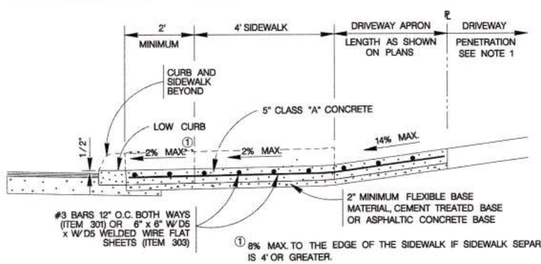
PROJECT 30434

SHEET 12 OF 25



TYPICAL RESIDENTIAL DRIVEWAY SECTION

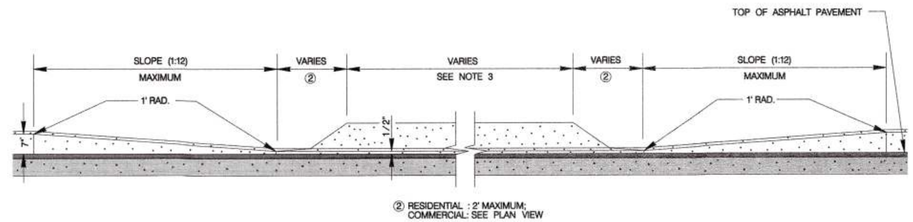
WITH SIDEWALK ABUTTING CURB
ITEM 503.1



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL RESIDENTIAL DRIVEWAY SECTION

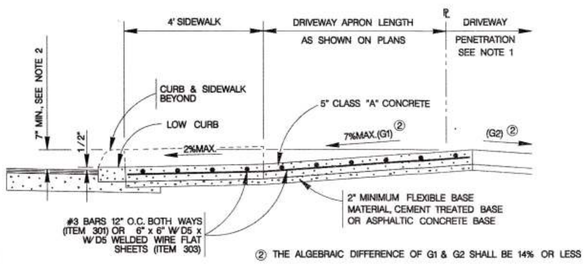
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

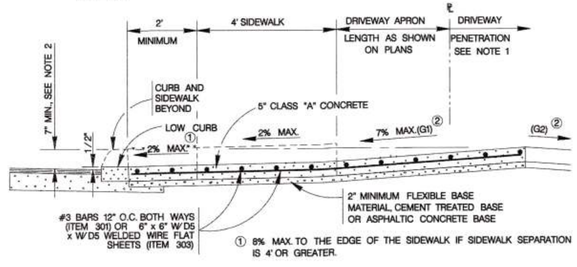
WITH SIDEWALK ABUTTING CURB



② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB
ITEM 503.1

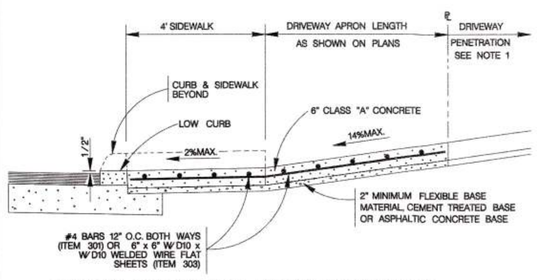


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

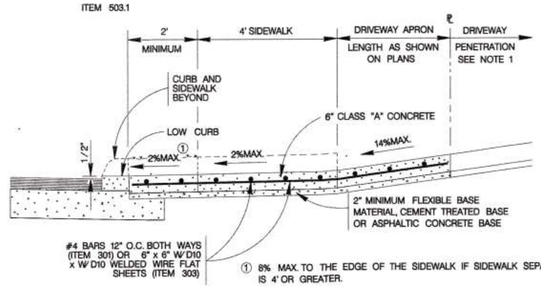
TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS SEPARATED FROM CURB
ITEM 503.1



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.2



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL COMMERCIAL DRIVEWAY SECTION

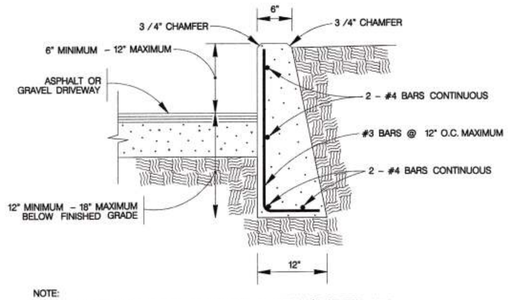
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

1. DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
   A.) CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.1 OR 503.2.
   B.) ASPHALTIC CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.4 AND SHALL INCLUDE A MINIMUM OF 1" ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
   C.) GRAVEL DRIVEWAY PAID FOR UNDER ITEM NO. 503.5 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
2. 7" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE. IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
3. THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

TYPE	MINIMUM	MAXIMUM
RESIDENTIAL	10'	20'
COMMERCIAL – ONE WAY	12'	20'
COMMERCIAL – TWO WAY	24'	30'

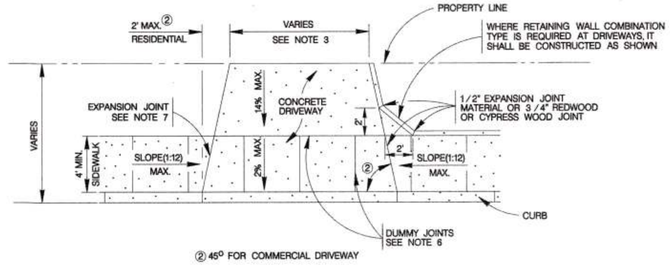
4. FOR LOCAL TYPE "A" STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
5. FOR OTHER THAN LOCAL TYPE "A" STREETS, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR, AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
6. DUMMY JOINTS PARALLEL TO THE CURB SHALL BE PLACED WHERE THE SIDEWALK MEETS THE DRIVEWAY. DUMMY JOINTS PERPENDICULAR TO THE CURB, AND WITHIN THE BOUNDARIES OF THE PARALLEL DUMMY JOINTS, SHALL BE PLACED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK.
7. A MINIMUM OF TWO ROUND AND SMOOTH DOWEL BARS 3 /8" IN DIAMETER AND 18" IN LENGTH SHALL BE SPACED 18" APART AT EACH EXPANSION JOINT.
8. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE. WHERE SIDEWALKS CROSS DRIVEWAYS, SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2%.
9. SIDEWALK RAMP SURFACE SHALL BE BRUSH FINISHED.



NOTE:
1. COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 307.1.
2. CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR CONCRETE DRIVEWAYS.

DRIVEWAY – CONCRETE RETAINING WALL

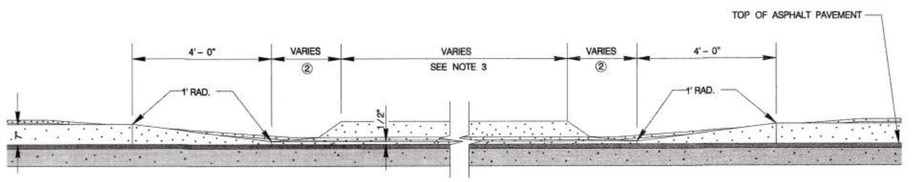
ON COMPACTED SUBGRADE
ITEM 307.1



② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

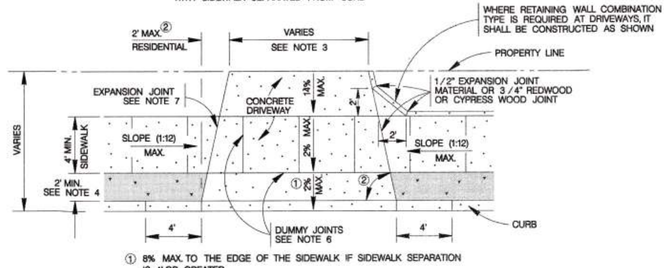
WITH SIDEWALK ABUTTING CURB



② RESIDENTIAL : 2' MAXIMUM; COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK SEPARATED FROM CURB

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

_____% SUBMITTAL	PROJECT NO.:_____	DATE:_____
DRWN. BY: V. VASQUEZ	DSGN. BY:_____	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF____

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/20/2018
FIRM REGISTRATION F–4951

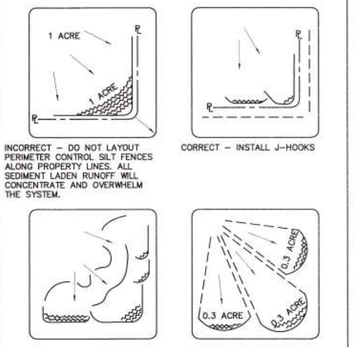
Rev.	Description	Date	Drawn
0			
1			
2			
3			
4			
5			
6			

PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD., SUITE 280, AUSTIN, TX 78759 | TEL 512.238.8402 | FAX 512.258.8095

Project : BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title : GENERAL DETAILS

PROJECT 30434



INCORRECT – DO NOT LAYOUT PERIMETER CONTROL SILT FENCES ALONG PROPERTY LINES. ALL SEDIMENT LADEN RUNOFF WILL CONCENTRATE AND OVERWHELM THE SYSTEM.

CORRECT – INSTALL J-HOOKS

DISCREET SEGMENTS OF SILT FENCE, INSTALLED WITH J-HOOKS OR 'SMILES' WILL BE MUCH MORE EFFECTIVE.

SILT FENCE PLACEMENT
FOR PERIMETER CONTROL

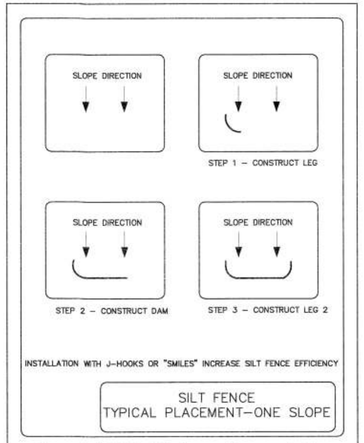
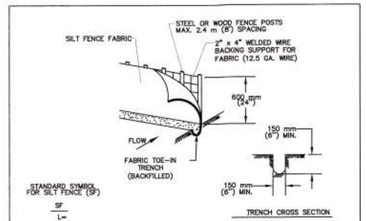
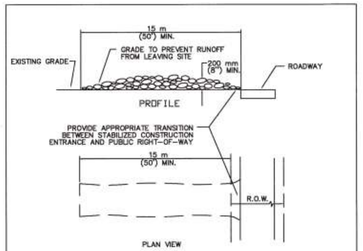


Figure 1.4.5.G.3 Silt Fence Placement for Perimeter Control



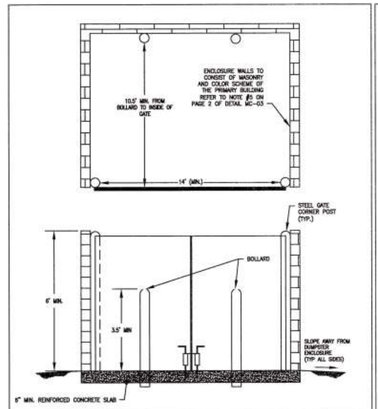
1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 Inches) DEPTH, USE STEEL POSTS.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 Inches) DEEP AND 150 mm (6 Inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE , WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 Inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	SILT FENCE
RECORD COPY SIGNED BY MORGAN BYARS 09/01/2011 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. STANDARD NO. 642S-1



NOTES:
1. STONE SIZE: 75–125 mm (3–5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

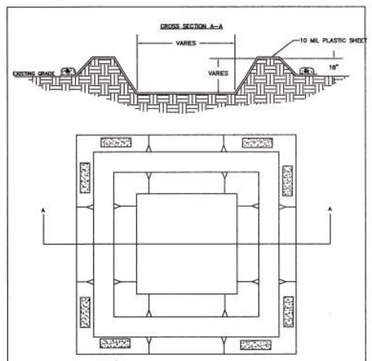
CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	STABILIZED CONSTRUCTION ENTRANCE
RECORD COPY SIGNED BY J. PATRICK MURPHY 5/23/00 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. STANDARD NO. 641S-1



REVISIONS			DUMPSTER ENCLOSURE (PLAN VIEW AND FRONT VIEW) PAGE 1 OF 2 CONSTRUCTION STANDARDS AND DETAILS	DWG. # MC-03 MC-03.DWG
10/2015	DF	BV		
DATE	APPROVED	DRAWN		
SCALE: N.T.S.				

NOTES:
1. DUMPSTER ENCLOSURE SHALL BE LOCATED ON THE SIDE OR REAR OF THE BUILDING AND SCREENED FROM GROUND LEVEL PUBLIC VIEW.
2. DUMPSTER ENCLOSURE MUST BE LOCATED AT LEAST 50' AWAY FROM RESIDENTIAL ZONING DISTRICTS OR LAND USES, WITH THE EXCEPTION OF MULTI-FAMILY-ZONED PROPERTY.
3. DUMPSTER ENCLOSURE MAY ENCROACH NO MORE THAN 10' INTO THE SIDE OR REAR SETBACK, BUT AT NO TIME MAY THEY ENCROACH INTO THE FRONT SETBACK OR WITHIN A SETBACK ADJACENT TO SINGLE FAMILY.
4. DUMPSTER BINS SHALL BE LOCATED ON A MINIMUM 6" REINFORCED CONCRETE SLAB.
5. DUMPSTER BINS SHALL BE SCREENED ON FOUR SIDES, USING AN ENCLOSURE THAT SCREENS THE BINS FROM VIEW AT THE PROPERTY LINES. SCREENING SHALL BE A MINIMUM OF 6' IN HEIGHT AND AS TALL AS THE CONTAINER, AND SHALL BE COMPOSED OF:
   a. MASONRY (BRICK, STONE, STUCCO, REINFORCED CONCRETE, OR OTHER SIMILAR MASONRY MATERIALS) AND COLOR SCHEMES CONSISTENT WITH THE PRIMARY BUILDING.
   b. A MINIMUM OF TWO (2) CONCRETE FILLED 6" STEEL BOLLARDS ADJACENT TO THE REAR WALL TO EXTEND A MINIMUM OF 18" BELOW GRADE.
6. DUMPSTER ENCLOSURES SHALL HAVE SPRING LOADED STEEL GATES WITH HINGES AND FASTENERS TO KEEP THEM CLOSED. GATES ON THE ENCLOSURE SHALL BE HINGED ON THE OUTSIDE OF EACH CORNER POST TO ALLOW THE GATES TO OPEN A MINIMUM OF 110 DEGREES, WHEN IN USE. TIEBACKS SHALL BE USED TO SECURE THE STEEL GATES IN THE OPEN POSITION.
7. THE INGRESS, EGRESS, AND APPROACH SHALL CONFORM TO FIRE LANE REQUIREMENTS.
8. SCREENING SHALL BE MAINTAINED BY THE OWNER AT ALL TIMES.
9. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 3000 PSI.

REVISIONS			DUMPSTER ENCLOSURE (NOTES) PAGE 2 OF 2 CONSTRUCTION STANDARDS AND DETAILS	DWG. # MC-03 MC-03.DWG
10/2015	DF	BV		
DATE	APPROVED	DRAWN		
SCALE: N.T.S.				



NOTES:
1. SET LENGTH AND WIDTH AS NECESSARY TO PROVIDE ADEQUATE SPACE FOR WASHOUT ACTIVITIES.
2. IF RESTRICTED BY DEPTH DUE TO BELOW GRADE APPURTENANCES, PLACE EARTHEN BERMS AT GRADE.
3. USE EXCAVATED MATERIAL TO CREATE EARTHEN BERMS SURROUNDING THE AREA TO BE DESIGNATED AS A CONCRETE WASHOUT.
4. PLACE 10MIL OR GREATER PLASTIC SHEETING.
5. SECURE SHEETING ON OUTSIDE OF BERM AREA USING SAND BAGS OR ROCK EQUIVALENT.

ISSUE DATE: MAY 2015			CONCRETE WASHOUT CONSTRUCTION STANDARDS AND DETAILS	DWG. # EC-11 EC-11.DWG
REVISIONS				
05/04/15	DF	BV		
DATE	APPROVED	DRAWN		
SCALE: N.T.S.				

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/20/2018
FIRM REGISTRATION F-4951

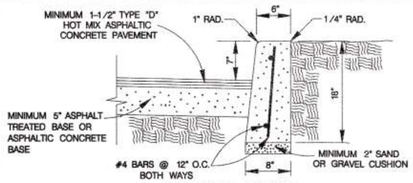
PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
1270 RESEARCH BLVD, SUITE 380, AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.8095

0	5	4	3	2	1	0	Rev.	Description	Date	Drawn

Project :
BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

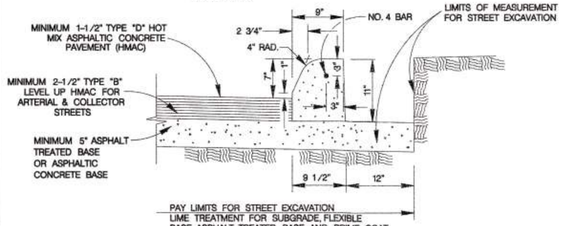
Title :
GENERAL DETAILS

PROJECT 30434



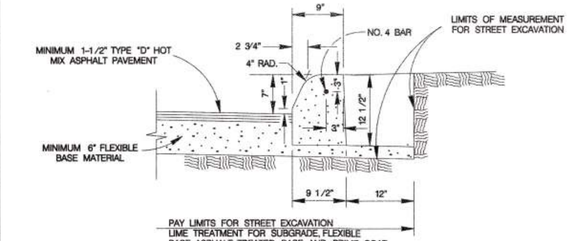
HEADER CURB

ITEM 500 ON SAND OR GRAVEL
SCALE : 1"=2'



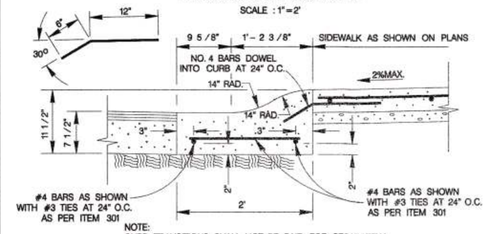
CONCRETE CURB

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



CONCRETE CURB

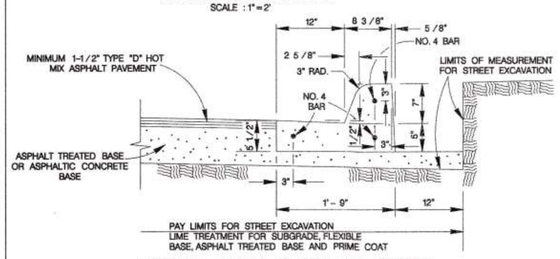
ITEM 500 ON FLEXIBLE BASE MATERIAL
SCALE : 1"=2'



NOTE:
CURB TRANSITIONS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN ITEM 500 CONCRETE CURBING

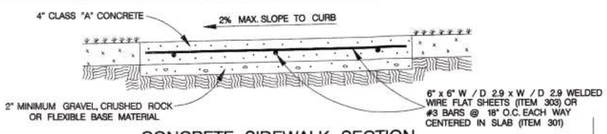
MOUNTABLE CURB

ITEM 500 ON COMPACTED SUBGRADE
SCALE : 1"=2'



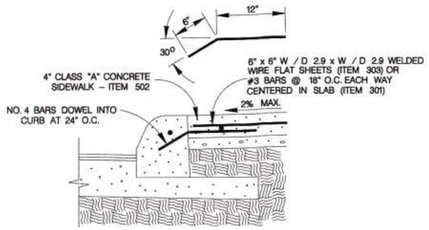
TYPICAL CURB & GUTTER DETAIL

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



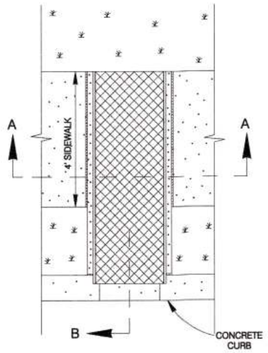
CONCRETE SIDEWALK SECTION

ITEM 502
SCALE : 1"=2'



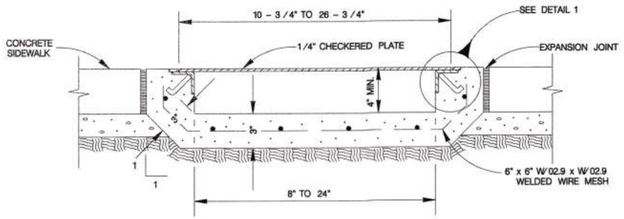
CONCRETE SIDEWALK ABUTTING CURB SECTION

ITEM 502
SCALE : 1"=2'



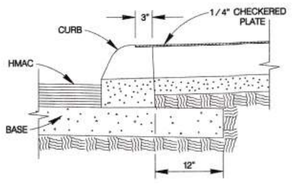
CONCRETE SIDEWALK DRAIN DETAIL

SCALE : 1"=4'



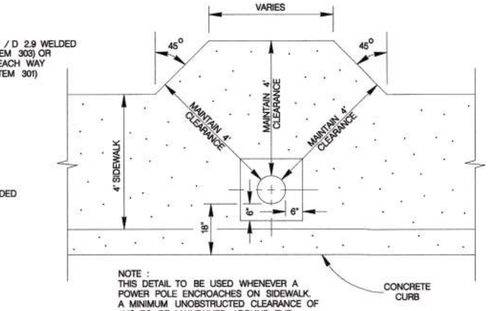
SECTION A–A

SCALE = 1 : 12



SECTION B

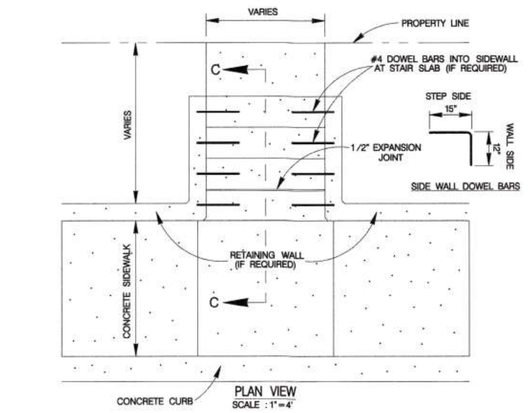
SCALE : 1"=2'



NOTE :
THIS DETAIL TO BE USED WHENEVER A POWER POLE ENCROACHES ON SIDEWALK. A MINIMUM UNOBSTRUCTED CLEARANCE OF 4' IS TO BE MAINTAINED AROUND THE POLE AT THE LOCATIONS.

CONCRETE SIDEWALK @ UTILITY POWER POLE DETAIL

SCALE : 1"=4'

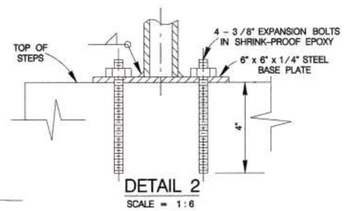


PLAN VIEW

SCALE : 1"=4'

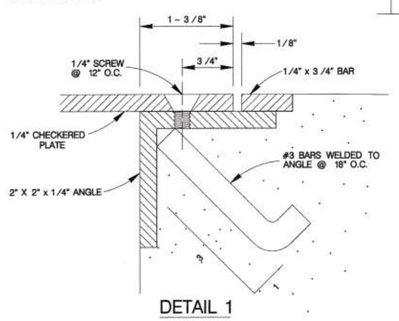
CONCRETE STEPS

ITEM 524



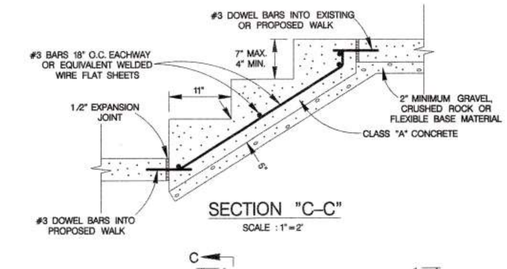
DETAIL 2

SCALE = 1 : 6



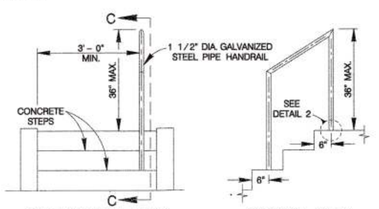
DETAIL 1

SCALE = 1 : 1



SECTION "C–C"

SCALE : 1"=2'



PIPE HANDRAIL DETAIL

PROFILE VIEW
SCALE : 1"=4'

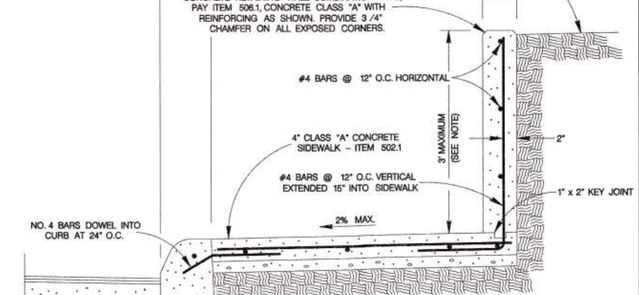
SECTION "D–D"

FRONT VIEW
SCALE : 1"=4'

NOTES :
1. PLACE STEPS TO CONFORM WITH PROPOSED PARKWAY GRADING.
2. 1-1/2" DIA. GALVANIZED STEEL PIPE HANDRAIL REQUIRED ON ONE SIDE OF THE STEPS WHEN 3 OR MORE RISERS ARE USED, OR AS DESIGNED BY ENGINEER. TO BE PAID UNDER ITEM 522

HANDRAIL FOR CONCRETE STEPS

ITEM 522



NOTE :
WALL HEIGHT TO BE SHOWN ON PLAN AT SPECIAL LOCATIONS WHERE COMBINATION RETAINING WALL IS REQUIRED

CONCRETE RETAINING WALL – COMBINATION TYPE

ITEM 506
SCALE : 1"=2'

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS I

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.

SHEET NO.: OF

PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD, SUITE 380-AUSTIN, TX 78759 | TEL 512.238.6422 | FAX 512.258.8056

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E., #82577 ON 04/30/2016
FIRM REGISTRATION F-4951

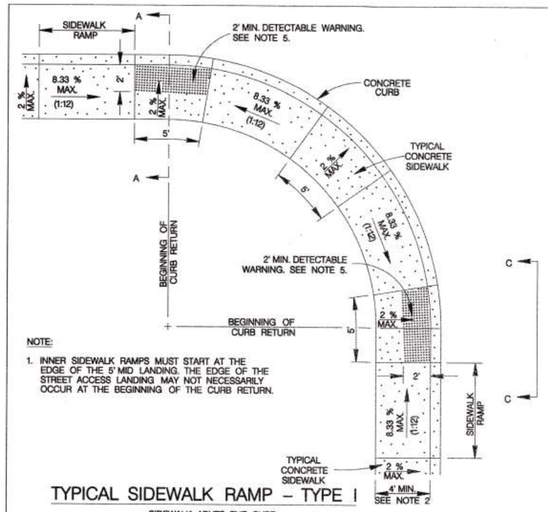
Rev.	Description	Date	Drawn
6			
5			
4			
3			
2			
1			
0			

Project : BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title : GENERAL DETAILS

PROJECT 30434

15 OF 25

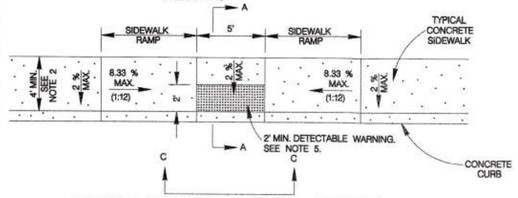


NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

TYPICAL SIDEWALK RAMP – TYPE I

SIDEWALK ABUTS THE CURB
SCALE : 1" = 10'

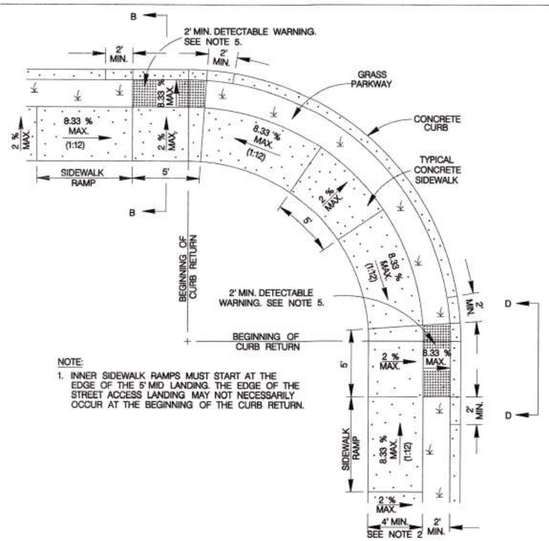


TYPICAL SIDEWALK RAMP – TYPE II

USED AT TEE INTERSECTIONS WHERE SIDEWALK ABUTS CURB
SCALE : 1" = 10'

GENERAL NOTES

1. WHEN POSSIBLE SIDEWALKS SHOULD BE PLACED NEXT TO THE PROPERTY LINE, ALLOWING A MINIMUM OF 1 FOOT BUFFER. DEVIATION OF THE PATHWAY FROM A STRAIGHT LINE IS ENCOURAGED TO AVOID TREES OR OTHER OBSTRUCTIONS.
2. FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
3. FOR OTHER THAN LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
4. SIDEWALK RAMP LENGTHS PRESENTED IN TABLE 1 ARE GUIDELINES ONLY. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE.
5. ALL CURB-RAMPS OR LANDINGS ABUTTING THE CROSSWALK SHALL HAVE A DETECTABLE WARNING 24 INCHES DEEP (IN THE DIRECTION OF PEDESTRIAN TRAVEL) AND EXTENDING THE FULL WIDTH OF THE CURB RAMP OR LANDING. THE DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES, ALIGNED IN A GRID PATTERN WITH A DIAMETER OF A NOMINAL 0.9 INCHES (23 MM), A HEIGHT OF NOMINAL 0.2 INCHES (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 INCHES (60 MM). THE DETECTABLE WARNING SURFACE SHALL BE A CAST-IN-PLACE TILE CONFORMING TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS OR PAVERS CONFORMING TO TXDOT STANDARD PED-05, PEDESTRIAN FACILITIES.
6. DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
7. SIDEWALK RAMP TYPE V SHALL BE USED ONLY WHERE THERE IS SIGNIFICANT RESTRICTION WITHIN THE PARKWAY TO CONSTRUCT TYPE I OR TYPE III RAMPS.
8. CONSTRUCTION OF ALL WHEELCHAIR RAMPS TO BE INCLUDED UNDER ITEMS "500 – CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER" AND / OR "502 – CONCRETE SIDEWALKS". RAMP SURFACE SHALL BE BRUSH FINISHED.
9. THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF WHEELCHAIR RAMPS TO BE SHOWN ON CONSTRUCTION PLANS. CITY CONSTRUCTION INSPECTOR CAN ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
10. SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.
11. WHEELCHAIR RAMP SHALL BE CONSTRUCTED WITH 4" CLASS "A" CONCRETE AND 2" MINIMUM GRAVEL, CRUSHED ROCK OR FLEXIBLE BASE MATERIAL.
12. REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6" x 6" – W2.9 x W2.9 WIRE MESH.
13. SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY. ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS AND RESTING PLATFORMS TO BE CONSTRUCTED IN ACCORDANCE WITH ADA AND TAS STANDARDS.
14. SIDEWALK CROSS GRADE SHALL HAVE A MAXIMUM SLOPE OF 2%. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
15. THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES SHALL BE LESS THAN 11%. THE CHANGE OF GRADE SHALL BE DEFINED AS THE ALGEBRAIC DIFFERENCE OF THE ADJACENT SURFACE SLOPES. IN THE CASE OF A STREET ACCESS RAMP DESIGNED AT THE 8.33% MAXIMUM SLOPE, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN 2.67% (I.E. 8.33–(–2.67) = 11). IN ADDITION, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN OR EQUAL TO 5%.
16. IF THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES IS GREATER THAN OR EQUAL TO 11%, A LEVELING STRIP, 2 FEET IN LENGTH, SHALL BE PROVIDED TO TRANSITION THE ADJACENT SURFACES.
17. ADA COMPLIANCE IN ALTERATIONS INCLUDE ONLY THAT WORK WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT.

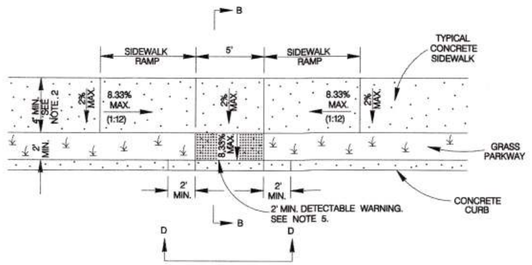


NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

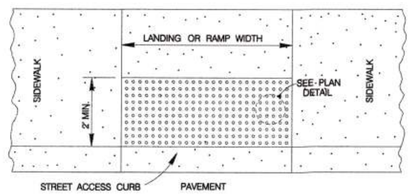
TYPICAL SIDEWALK RAMP – TYPE III

SIDEWALK SEPARATED FROM CURB
SCALE : 1" = 10'



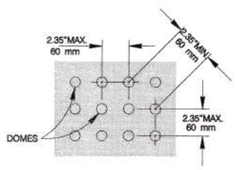
TYPICAL SIDEWALK RAMP – TYPE IV

USED AT TEE INTERSECTIONS WHERE SIDEWALK IS SEPARATED FROM CURB
SCALE : 1" = 10'



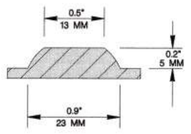
DETECTABLE WARNING SURFACE

SCALE : 1" = 4'



PLAN DETAIL

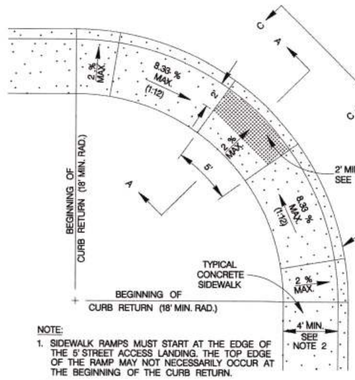
NO SCALE



DOME SECTION

NO SCALE

NOTE:
STAMPED CONCRETE TRUNCATED DOMES WILL NOT BE ALLOWED TO BE USED FOR DETECTABLE WARNING ON WHEELCHAIR RAMPS. CONTRACTOR MUST SUBMIT TRUNCATED DOME INFORMATION THAT IS TO BE USED ON WHEELCHAIR RAMPS TO THE PROJECT MANAGER FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INSTALLATION.

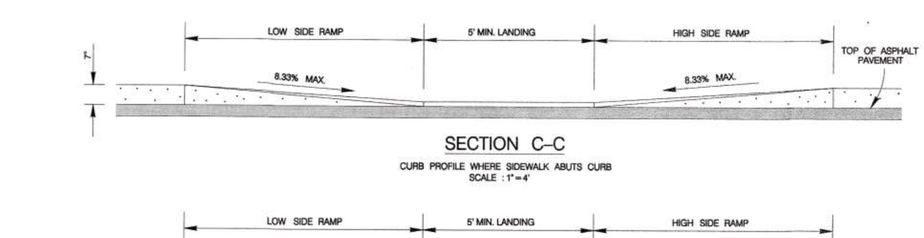


NOTE:

1. SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' STREET ACCESS LANDING. THE TOP EDGE OF THE RAMP MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.
2. TYPE V RAMPS MUST HAVE 18' MIN. RADIUS.

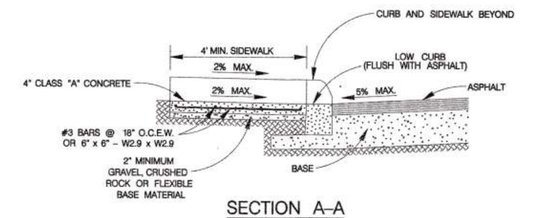
TYPICAL SIDEWALK RAMP – TYPE V

SIDEWALK ABUTS CURB
SCALE : 1" = 10'



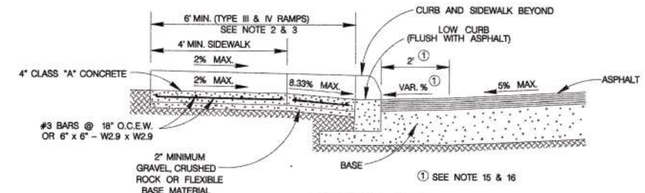
SIDEWALK PASSING SPACE

SCALE : 1" = 10'



SECTION A–A

SCALE : 1" = 4'

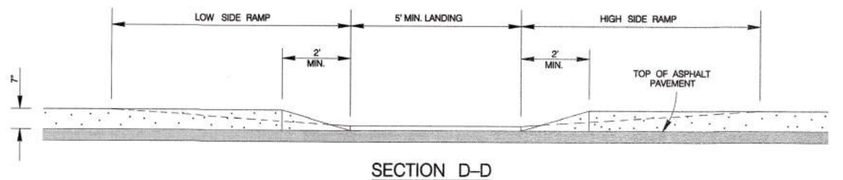


SECTION B–B

SCALE : 1" = 4'

SECTION C–C

CURB PROFILE WHERE SIDEWALK ABUTS CURB
SCALE : 1" = 4'



SECTION D–D

CURB PROFILE WHERE SIDEWALK IS SEPARATED FROM CURB
SCALE : 1" = 4'

TABLE 1 (SEE NOTE 4)		
GUTTER SLOPE	SIDEWALK RAMP LENGTH (1:12)	
	LOW SIDE	HIGH SIDE
1%	5'–6"	7'–2"
2%	5'–0"	8'–4"
3%	4'–6"	10'–0"
4%	4'–2"	12'–6"
5%	3'–10"	16'–8"

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

WHEELCHAIR RAMP STANDARDS

____% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.
		SHEET NO.: OF

STATE OF TEXAS
MIRZA TAHIR BAIG
82577
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIRZA TAHIR BAIG, P.E. #82577 ON 04/20/2018
FIRM REGISTRATION F–4951

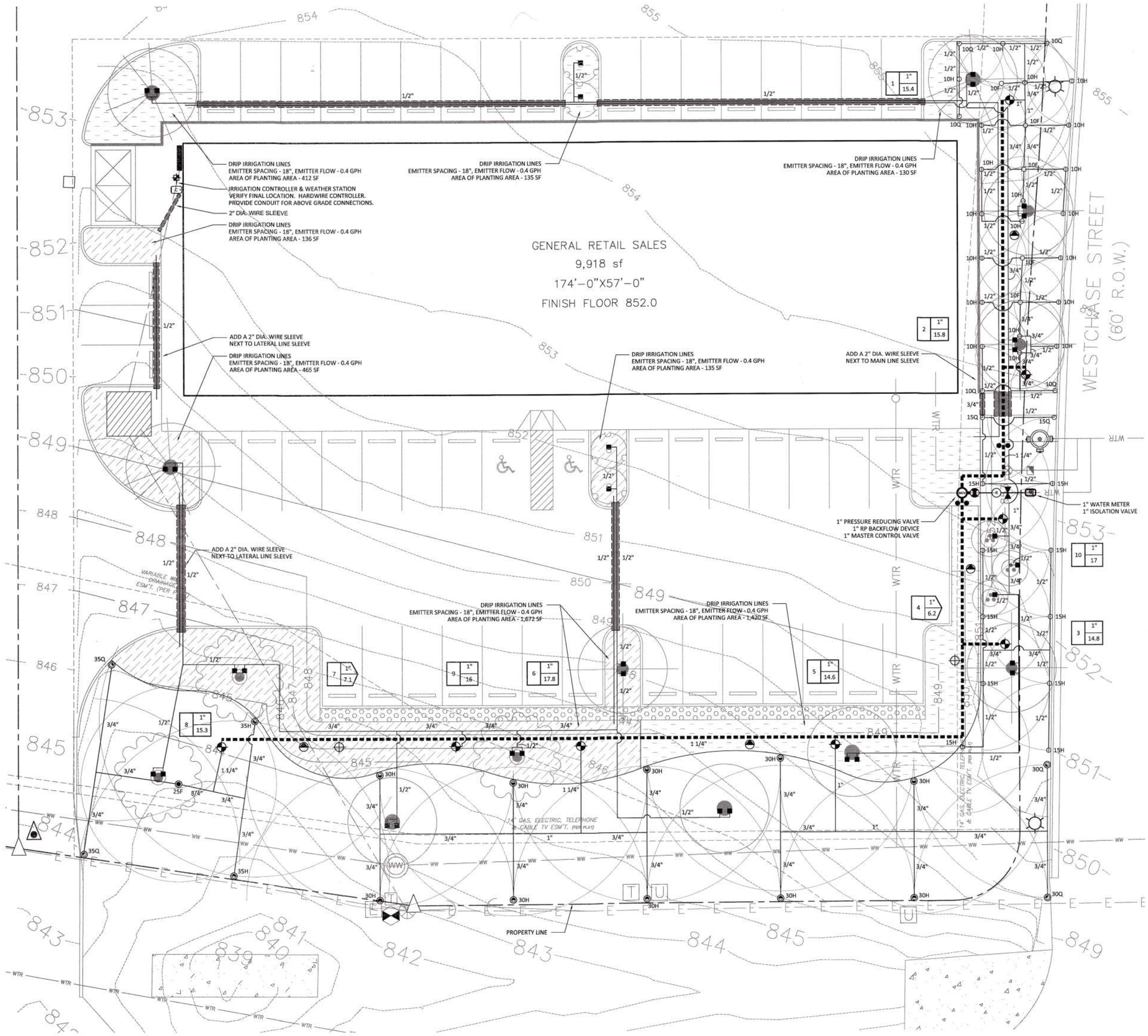
Rev	Description	Date	Drawn
0			
1			
2			
3			
4			
5			
6			

PROFESSIONAL STRUCIVIL ENGINEERS, INC.
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
12710 RESEARCH BLVD, SUITE 350, AUSTIN, TX 78759 | TEL 512.238.8422 | FAX 512.258.8206

Project: BANDERA RETAIL CENTER
7706 BANDERA ROAD, SAN ANTONIO, TEXAS

Title: GENERAL DETAILS

PROJECT 30434



HYDRAULIC LOSS CHART

MOST CRITICAL ZONE - ZONE 6 (ROTOR)	17.8 GPM
STATIC WATER PRESSURE AVAILABLE**	100 PSI
SPRINKLER HEAD PRESSURE REQUIREMENT	45 PSI
IRRIGATION PIPE LOSS	1.6 PSI
1" REMOTE CONTROL VALVE LOSS	2.9 PSI
1 1/4" MAINLINE LOSS	2.1 PSI
1" MASTER VALVE LOSS	1.8 PSI
1" BACKFLOW PREVENTER LOSS	12 PSI
1" WATER METER LOSS	1.8 PSI
1 1/2" TYPE K COPPER SERVICE LINE LOSS	5.8 PSI
ELEVATION GAIN	-3.0 PSI
TOTAL SYSTEM PRESSURE LOSS	25.0 PSI
DESIGN PRESSURE (HEAD PRESSURE + TOTAL LOSS)	70 PSI

**PROVIDE PRESSURE REDUCING VALVE & SET AT 70 PSI OR AS NEEDED FOR SYSTEM FUNCTION.

GENERAL NOTES:
1. COORDINATE ALL IRRIGATION WORK WITH PLANTING OPERATIONS.
2. REFER TO CIVIL PLANS FOR GRADING INFORMATION & FINAL GRADES.
3. IRRIGATION EQUIPMENT SHALL NOT BE INSTALLED IN BANDERA ROAD (TXDOT) R.O.W.

I, Iris Puh (TX Licensed Irrigator #12060), do certify that the irrigation plans conform to the irrigation design & equipment standards set out in subsections 35-510 (j) & 35-511 (c) (6) of the City of San Antonio Unified Development Code.

IRRIGATION INSTALLATION SHALL FOLLOW ALL STATE OF TEXAS REGULATIONS INCLUDING: THE TEXAS OCCUPATIONS CODE CH 1903; TEXAS WATER CODE CH 37; TEXAS ADMINISTRATIVE CODE TITLE 30 CHAPTER 344 - LANDSCAPE IRRIGATION; TEXAS ADMINISTRATIVE CODE TITLE 30 CHAPTER 30 - OCCUPATIONAL LICENSES & REGISTRATIONS; CONTACT THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), PO BOX 13087, AUSTIN, TX 78711 (WWW.TCEQ.TEXAS.GOV). IN ADDITION, FOLLOW ALL LOCAL IRRIGATION REQUIREMENTS IF MORE STRINGENT THAN STATE REGULATIONS.

NORTH

5 0 10 20 FEET

A IRRIGATION PLAN

SCALE: 1" = 10'-0"

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

PLACE MATRIX DESIGN OFFICE LLC
PO BOX 41107 - AUSTIN, TX 78704
TEL. 512.599.4095
info@placematrixdesign.com

SEAL

STATE OF TEXAS
IRIS S. PUH
12060
LICENSED IRRIGATOR
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER

7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
DRAWN BY: ISP
CHECKED BY: ISP

ISSUE DATE
04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

IRRIGATION PLAN

SHEET NUMBER

17

IRRIGATION NOTES:

1. THESE NOTES SHALL BE USED IN ASSOCIATION WITH SPECIFICATION SECTION 32 84 00 ON IRRIGATION & THE DRAWING DETAILS.
2. PERFORM ALL WORK IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES, AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER SUCH WORK AND PROVIDE FOR ALL INSPECTIONS AND PERMITS REQUIRED BY FEDERAL, STATE, SAN ANTONIO WATER SYSTEM, AND LOCAL AUTHORITIES IN SUPPLY, TRANSPORTATION, AND INSTALLATION OF MATERIALS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF ALL UNDERGROUND UTILITY LINES (TELEPHONE, GAS, WATER, SEWER, ELECTRICAL, PIPELINES, COMMUNICATION, CABLE, ETC.) AND ANY EASEMENTS PRIOR TO START OF ANY IRRIGATION WORK. CONTACT TEXAS 811 AT LEAST 48 HOURS PRIOR TO START OF ALL WORK.
4. CONTRACTOR SHALL REFER ALSO TO THE CIVIL / MEP PLANS FOR ALL PROPOSED SITE UTILITY & SITE GRADING WORK INFORMATION.
5. CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS SHOWN ON THE PLANS. IF A SITE CONFLICT IS PRESENT, THEN THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING ANY SITE IRRIGATION WORK.
6. ALL SITE GRADING & HARD SURFACE PAVING ADJACENT TO PLANTING AREAS, INCLUDING CONCRETE WALKS & ROAD WORK, MUST BE COMPLETED PRIOR TO START OF ANY IRRIGATION WORK. CONTRACTOR WILL BE RESPONSIBLE FOR ADJUSTING ELEVATIONS OF IRRIGATION EQUIPMENT IF INSTALLED AT IMPROPER ELEVATIONS.
7. CONTRACTOR SHALL COORDINATE ALL IRRIGATION INSTALLATION WORK WITH OTHER TRADES TO PREVENT ANY WORK CONFLICTS.
8. CONTRACTOR SHALL FOLLOW ALL TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) REGULATIONS FOR IRRIGATION WORK. A LICENSED IRRIGATOR OR LICENSED IRRIGATION TECHNICIAN MUST BE PRESENT AT THE PROJECT SITE TO OVERSEE ALL IRRIGATION INSTALLATION WORK.
9. VERIFY ON SITE STATIC WATER PRESSURE. IF PRESSURE IS LESS THAN THE DESIGN PRESSURE, NOTIFY THE LANDSCAPE ARCHITECT BEFORE CONTINUING WORK. IF PRESSURE IS SIGNIFICANTLY HIGHER THAN THE DESIGN PRESSURE, THEN INSTALL A PRESSURE REDUCING VALVE SPECIFIED FOR THE SYSTEM.
10. IRRIGATION WORK
    - A. ALL IRRIGATION EQUIPMENT FURNISHED SHALL BE NEW & PER THE SPECIFICATION REQUIREMENTS OF THIS PROJECT. EQUIPMENT SUBSTITUTIONS ARE NOT ALLOWED UNLESS APPROVED IN WRITING.
    - B. ALL IRRIGATION EQUIPMENT SHALL BE INSTALLED WITHIN THE PROPERTY LINES, UNLESS HEADS ARE SHOWN IN THE R.O.W.
    - C. IRRIGATION SYSTEM LAYOUT IS DIAGRAMMATIC ONLY. MINOR ADJUSTMENTS TO ACCOMMODATE ACTUAL SITE CONDITIONS MAY BE NECESSARY. ADJUST HEAD & PIPING LOCATIONS TO FOLLOW THE INTENT OF THE DESIGN.
    - D. MAJOR DEVIATIONS FROM THE DESIGN LAYOUT IS NOT PERMITTED. IF INSTALLATION AREA DIMENSIONS DEVIATE FROM LAYOUT SHOWN ON THE DRAWINGS & THE IRRIGATION DESIGN NEEDS TO BE SIGNIFICANTLY ALTERED, THEN CONTACT THE LANDSCAPE ARCHITECT FOR DIRECTION. IF CONTRACTOR PROCEEDS WITHOUT GIVING NOTIFICATION, THEN THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY REVISIONS MADE TO THE DESIGN.
    - E. HEAD SPACING SHALL NOT EXCEED THE MANUFACTURER'S PUBLISHED RADIUS. ALL IRRIGATION PVC PIPE SHALL BE PROGRESSIVE SIZED SO THAT VELOCITY THROUGH PIPE DOES NOT EXCEED 5 FT/SEC. IF MODIFICATIONS TO THE PIPING DESIGN ARE NEEDED, THEN THE FOLLOWING GUIDELINES SHALL BE USED FOR CLASS 200 PIPE:
      1/2" PIPE (CLASS 315) - UP TO 5 GPM; 1 1/4" PIPE - 16.1 TO 26 GPM
      3/4" PIPE - 5.1 TO 10 GPM; 1 1/2" PIPE - 26.1 TO 35 GPM
      1" PIPE - 10.1 TO 16 GPM; 2" PIPE - 35.1 TO 55 GPM
    - F. ALL IRRIGATION SLEEVES SHALL BE SCHEDULE 40 PVC PIPE AT 2 TIMES THE DIAMETER OF THE IRRIGATION PIPE TO BE SLEEVED OR A MIN. OF A 4" DIAMETER PIPE, WHICHEVER IS GREATER. EXTEND SLEEVES 24" BEYOND PAVEMENT OR WALL WIDTH ON BOTH SIDES.
    - G. ALL SPRINKLER HEADS SHALL BE INSTALLED A MIN. OF 6" AWAY FROM ALL PAVEMENT, CURBS, OR STRUCTURES. INSTALL SPRINKLER HEADS A MIN. OF 12" AWAY FROM A BUILDING EDGE.
    - H. IRRIGATION TRENCH DEPTHS: 12" MIN. FOR LATERAL LINES, 18" MIN. FOR MAIN LINES, 24" MIN. FOR PIPING UNDER TRAFFIC LOADS, & 4" OR 6" FOR DRIP LINES.
    - I. ALL THREADED PIPE & FITTINGS SHALL BE SCHEDULE 80 PVC.
    - J. FOR ALL PVC PIPE & FITTINGS INSTALLED, USE PURPLE PRIMER PRIOR TO SOLVENT WELDING.
    - K. INSTALL DRAIN GRAVEL IN ALL VALVE BOXES & ELSEWHERE AS CALLED OUT ON THE DRAWINGS & SPECIFICATIONS.
    - L. QUICK COUPLING VALVES SHALL BE INSTALLED IN RECTANGULAR VALVE BOXES WITH PURPLE LIDS & WITH BALL VALVES ON THE UPSTREAM SIDE.
    - M. CONTROL WIRES SHALL BE 14 AWG MIN. SOLID COPPER WIRE, UL APPROVED FOR DIRECT BURIAL, UF TYPE, & WITH 4/64" INSULATION. USE WATERPROOF CONNECTORS AT ALL ELECTRICAL SPLICES & CONNECTIONS - WADE WC-14, 3M DBRY-6, OR RAINBIRD DBRY.
    - N. ADJUST SPRINKLER SYSTEM TO PREVENT OVERSPRAY ONTO ADJACENT PAVEMENT OR STRUCTURES. ABOVE GROUND SPRAY EQUIPMENT IS NOT ALLOWED IN PLANTING AREAS 5 FT OR LESS IN WIDTH DIMENSION.
    - O. CONTRACTOR SHALL COORDINATE IRRIGATION LINES OR EQUIPMENT TO ACCOMMODATE PLANT MATERIAL INSTALLATION. ADJUST SPRINKLER HEADS TO PROVIDE FULL COVERAGE TO ALL LANDSCAPE AREAS.
    - P. VERIFY FINAL LOCATION OF IRRIGATION CONTROLLER WITH OWNER. GENERAL CONTRACTOR SHALL PROVIDE POWER TO CONTROLLER LOCATION. IRRIGATION CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING HARDWIRING OF THE CONTROLLER.
    - Q. A PERMANENT STICKER WITH IRRIGATION CONTRACTOR'S NAME, LICENSE NUMBER, COMPANY NAME, TELEPHONE NUMBER, & WARRANTY PERIOD DATES SHALL BE MOUNTED ON THE IRRIGATION CONTROLLER.
    - R. INSTALL WEATHER SENSOR IN A LOCATION THAT IS OPEN TO RAINFALL AND AWAY FROM THE SPRINKLER SPRAY PATTERN.
11. IRRIGATION SYSTEM TESTING
    - A. BACKFLOW PREVENTION DEVICE MUST BE TESTED & CERTIFIED BY A CERTIFIED BACKFLOW TESTER. SUBMIT TEST RESULTS TO THE LOCAL WATER PURVEYOR & OWNER WITHIN 10 BUSINESS DAYS OF TESTING.
    - B. HYDROSTATIC TESTING OF ALL MAIN LINES & LATERAL LINES ARE REQUIRED. REFER TO THE SPECIFICATIONS FOR PROCEDURES.
    - C. ALL VALVE BOX LIDS SHALL BE INSTALLED TO THE PROPER ELEVATIONS.
    - D. ENSURE IRRIGATION SYSTEM PROVIDES 100% COVERAGE OF ALL LANDSCAPE AREAS. ADJUST SYSTEM AS NECESSARY.
12. IRRIGATION SYSTEM WARRANTY
    - A. CONTRACTOR SHALL GUARANTEE THE IRRIGATION SYSTEM AGAINST ALL DEFECTS OF WORKMANSHIP & MATERIALS FOR A PERIOD OF 1 YEAR FROM DATE OF FINAL ACCEPTANCE.
    - B. CONTRACTOR SHALL GUARANTEE ALL BACKFILL AREAS OF TRENCHES FOR A PERIOD OF 1 YEAR FROM DATE OF FINAL ACCEPTANCE.
13. CONTRACTOR SHALL AT ALL TIMES PROTECT NEW WORK FROM DAMAGE & THEFT & REPLACE ALL DAMAGED OR STOLEN MATERIALS AT OWN EXPENSE. CONTRACTOR SHALL PROTECT THE OWNER'S PROPERTY SUCH AS BUILDINGS, UTILITIES, PAVEMENT, TREES, PLANTINGS, ETC. FROM DAMAGE OR LOSS. ALL DAMAGES TO OWNER'S PROPERTY CAUSED BY INSTALLATION WORK SHALL BE REPAIRED AT CONTRACTOR'S COST & TO THE OWNER'S SATISFACTION.
14. CONTRACTOR SHALL REMOVE ALL TRASH & DEBRIS GENERATED DURING CONSTRUCTION. ADJACENT SURFACES SUCH AS ROADS, PAVEMENTS, BUILDING, WALLS, FENCES, ETC. SHALL BE CLEANED OFF IF SOILED BY DIRT OR DEBRIS.
15. REFER TO THE SPECIFICATIONS FOR ALL CLOSEOUT DOCUMENTS & MATERIALS REQUIRED.

IRRIGATION SCHEDULE

SYMBOL	DESCRIPTION	PRODUCT	REMARKS
IRRIGATION SPRINKLERS			
◉◉◉	ROTOR HEAD - 6" POP-UP	RAINBIRD 5006-PLUS-SAM BODY RAINBIRD 5000 SERIES MPR NOZZLES, FIXED ARC, F,H,Q	USE RADIUS & PATTERN SHOWN ON PLANS. EX. 25H = 25' RADIUS, HALF CIRCLE NOZZLE
○○○	TURF SPRAY HEAD - 4" POP-UP	RAINBIRD 1804-SAM-PRS SPRAY BODY RAINBIRD MPR NOZZLES, FIXED ARC, F,H,Q	USE RADIUS & PATTERN SHOWN ON PLANS. EX. 15F = 15' RADIUS, FULL CIRCLE NOZZLE
	TREE BUBBLERS - 4" POP-UP	RAINBIRD 1804 SPRAY BODY WITH 1404 BUBBLER NOZZLE FULL CIRCLE, UMBRELLA PATTERN - 1 GPM	INSTALL 2 BUBBLERS FOR LARGE CANOPY TREES & 1 FOR SMALL TREES. INSTALL BUBBLERS ON THE HIGH SIDE OF A SLOPE.
DRIP EQUIPMENT			
	DRIPLINES - PLANTING BEDS	NETAFIM - TECHLINE CV - TLCV4-1810 EMITTER SPACING - 18", EMITTER FLOW RATE - .40 GPH	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	DRIP ZONE FUNCTION INDICATOR	RAINBIRD DRIP SYSTEM OPERATION INDICATOR KIT - MODEL # OPERIND	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS IN A LOCATION FURTHEST FROM ZONE VALVE.
	SUPPLY OR EXHAUST HEADER LINES	CLASS 200 PVC PIPE OR MAY USE 17 MM DRIPLINE BLANK TUBING IF ZONE GPM IS < 5.	SIZE CLASS 200 PIPE TO WHERE FLOW DOES NOT EXCEED 5 FEET PER SEC.
	DRIP REMOTE CONTROL VALVES	NETAFIM - LOW VOLUME CONTROL ZONE KITS WITH VALVES .25 GPM TO 4.4 GPM USE LVCZS80SF10075-1F (1" VALVE) 4.5 GPM TO 10 GPM USE LVCZSF10075-HFHP (1" VALVE)	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
IRRIGATION EQUIPMENT			
	IRRIGATION SLEEVES	ASTM D1785, PVC 1120, SCHEDULE 40 PIPE	SLEEVE SIZE SHALL BE 2 SIZES LARGER THAN THE SIZE OF THE IRRIGATION PIPE(S) TO BE SLEEVED AT THE SLEEVE LOCATION & 4" DIA. MINIMUM.
1"	LATERAL LINES	ASTM D2241, PVC 1120 OR 1220, SDR 21, CLASS 200 PIPE OR ASTM D2241, PVC 1120 OR 1220, SDR 13.5, CLASS 315 PIPE	USE SIZE SHOWN ON PLANS. 1/2" PIPE - CLASS 315 PIPE; 3/4" & GREATER PIPE - CLASS 200 PIPE
	MAIN LINES	ASTM D2241, PVC 1120, SDR 21, CLASS 200 PIPE	USE SIZE SHOWN ON PLANS.
	REMOTE CONTROL VALVES	RAINBIRD PEB SERIES REMOTE CONTROL VALVES	USE SIZE SHOWN ON PLANS. INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	BALL VALVES	SPEARS MANUFACTURING TRUE UNION BALL VALVE - TU 2000	SIZE TO MAIN LINE. INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	QUICK COUPLING VALVES	RAINBIRD 44-NP (1" INLET W/ PURPLE LOCKING COVER) 44-K (VALVE KEY), SH-2 (HOSE SWIVELS), 2049 COVER KEY	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
MCV	MASTER CONTROL VALVE	IRRITROL 700 -1 (NORMALLY OPEN), 700 SERIES ULTRAFLOW	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	RP BACKFLOW PREVENTION DEVICE	1" ZURN WILKINS 975XLU REDUCED PRESSURE PRINCIPLE ASSEMBLY WITH UNION BALL VALVES	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	BACKFLOW ENCLOSURE	GORILLA CAGE - GORILLA MANUFACTURING 281-705-9701	SELECT PROPER SIZE FOR BACKFLOW DEVICE, GREEN COLOR
	BACKFLOW FREEZE PROTECTION BLANKET	INSULATION POUCH - DEKORRA PRODUCTS 1-888-635-8585	SELECT PROPER SIZE FOR BACKFLOW DEVICE, GREEN COLOR
R	PRESSURE REDUCING VALVE	1" ZURN WILKINS 500 XL-SC PRESSURE REDUCING VALVE WITH SEALED CAGE BELL HOUSING & STAINLESS STEEL SCREW	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
	ISOLATION GATE VALVE	1" NIBCO T-113 BRONZE GATE VALVE	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
W	WATER METER	BY OTHERS. REFER TO CIVIL PLANS.	COORDINATE WITH GENERAL CONTRACTOR.
C	IRRIGATION CONTROLLER	WEATHERMATIC - SL1600	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS. VERIFY FINAL LOCATION WITH OWNER.
	WEATHER STATION	WEATHERMATIC WIRELESS WEATHER STATION MODEL - SLW5	INSTALL PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS. INSTALL SENSOR AWAY FROM SPRINKLER SPRAY PATTERN.

ZONE NUMBER — 10 — 1 1/2" VALVE SIZE / 30.0 ZONE GPM

ZONE NUMBER (DRIP ZONES) — 12 — 1" VALVE SIZE / 3.0 ZONE GPM

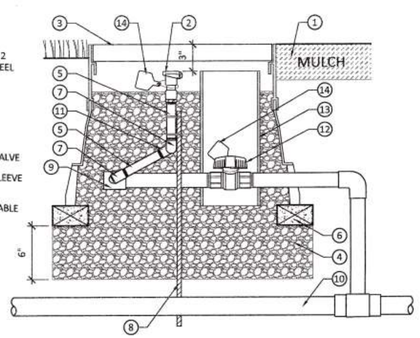
* CONTRACTOR SHALL REFER ALSO TO PROJECT SPECIFICATIONS.

IRRIGATION WATERING SCHEDULE

	ZONE NUMBER			1	2	3	4	5	6	7	8	9	10	
	ZONE TYPE			TURF SPRAY	TURF SPRAY	TURF SPRAY	DRIP	TURF ROTOR	TURF ROTOR	DRIP	TURF ROTOR	TREE BUBBL	TREE BUBBL	
	PRECIPITATION RATE (IN/HR)			1.52	1.88	1.58	.30	.62	.62	.30	.60	3.85	3.85	TOTAL RUN TIME (HR/WK)
MONTH ET	ADJUST ET	ADJUST %												
JANUARY 2.42	1.45	33%	WATER (IN/WK)	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33	
			TIME (MIN/WK)	13	11	13	66	32	32	66	33	6	6	4.63
FEBRUARY 2.90	1.74	40%	WATER (IN/WK)	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	
			TIME (MIN/WK)	18	14	17	87	43	43	87	44	7	7	6.12
MARCH 4.42	2.65	60%	WATER (IN/WK)	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	
			TIME (MIN/WK)	24	20	23	120	58	58	120	60	10	10	8.38
APRIL 5.47	3.28	75%	WATER (IN/WK)	.77	.77	.77	.77	.77	.77	.77	.77	.77	.77	
			TIME (MIN/WK)	31	25	30	154	75	75	154	77	12	12	10.75
MAY 6.47	3.88	88%	WATER (IN/WK)	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	
			TIME (MIN/WK)	35	28	34	176	85	85	176	88	14	14	12.25
JUNE 6.97	4.18	95%	WATER (IN/WK)	.98	.98	.98	.98	.98	.98	.98	.98	.98	.98	
			TIME (MIN/WK)	39	32	38	196	95	95	196	98	16	16	13.68
JULY 7.31	4.39	100%	WATER (IN/WK)	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	
			TIME (MIN/WK)	40	32	38	199	96	96	199	100	16	16	13.87
AUGUST 6.99	4.19	95%	WATER (IN/WK)	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	
			TIME (MIN/WK)	38	31	36	190	92	92	190	95	15	15	13.23
SEPTEMBER 5.64	3.38	77%	WATER (IN/WK)	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79	
			TIME (MIN/WK)	32	26	30	158	77	77	158	79	13	13	11.05
OCTOBER 4.44	2.66	61%	WATER (IN/WK)	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	
			TIME (MIN/WK)	24	20	23	121	59	59	121	61	10	10	8.47
NOVEMBER 2.85	1.71	39%	WATER (IN/WK)	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	
			TIME (MIN/WK)	16	13	16	80	39	39	80	40	7	7	5.62
DECEMBER 2.36	1.42	32%	WATER (IN/WK)	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	
			TIME (MIN/WK)	13	11	13	64	31	31	64	32	5	5	4.48

NOTES:
1. REFER TO THE LOCAL CITY ORDINANCE FOR ALLOWABLE NUMBER OF WATERING DAYS.
2. TO MINIMIZE RUNOFF, DIVIDE WATERING TIME & USE MULTIPLE CYCLES.
3. IRRIGATION WATERING SCHEDULE IS PROVIDED TO THE CONTRACTOR/OWNER AS A REFERENCE ONLY TO WATER ESTABLISHED PLANT MATERIAL. CONTRACTOR/OWNER IS RESPONSIBLE FOR FIELD OBSERVING & ADJUSTING SCHEDULE AS REQUIRED FOR PLANT ESTABLISHMENT & LONG TERM PLANT WATER NEEDS.

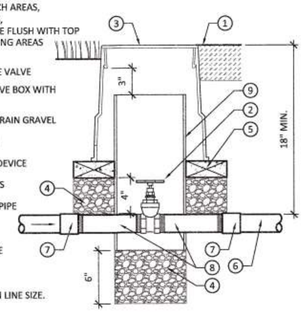
1. FINISH GRADE AT VALVE BOX: 1/2" AT HYDROMULCH AREAS, 1 1/2" AT SOD AREAS, TOP OF MULCH TO BE FLUSH WITH TOP OF LID AT PLANTING AREAS
2. QUICK COUPLING VALVE RAINBIRD-44-NP, 1" INLET, PURPLE LOCKING COVER REQUIRED
3. JUMBO VALVE BOX & EXTENSION WITH LOCKING PURPLE LID
4. 3/4" DIA. WASHED DRAIN GRAVEL
5. 1" DIA. SCH 80 PVC NIPPLE, LENGTH AS REQUIRED
6. BRICK SUPPORTS (4)
7. 1" DIA. SCH 80 PVC STREET ELL
8. #4 REBAR, 24" LENGTH MIN. SECURE TO QUICK COUPLER AT 2 LOCATIONS WITH STAINLESS STEEL TIES.
9. 1" DIA. SCH 80 PVC TEE OR ELL
10. PVC MAIN LINE PIPE
11. 1" DIA. SCH 80 PVC ELL
12. 1" SPEARS TRUE-UNION BALL VALVE
13. 6" DIA. SCH 40 PVC VERTICAL SLEEVE
14. WEATHERPROOF TAG WITH FOLLOWING NOTE: "NON-POTABLE WATER-DO NOT DRINK."



E QUICK COUPLING VALVE
SCALE: NONE

1. FINISH GRADE AT VALVE BOX: 1/2" AT HYDROMULCH AREAS, 1 1/2" AT SOD AREAS, TOP OF MULCH TO BE FLUSH WITH TOP OF LID AT PLANTING AREAS
2. GATE VALVE NIBCO T-113 BRONZE VALVE
3. 10" DIA. ROUND VALVE BOX WITH LID & EXTENSION
4. 3/4" DIA. WASHED DRAIN GRAVEL
5. BRICK SUPPORTS (3)
6. PIPE TO BACKFLOW DEVICE
7. THREADED ADAPTERS
8. 6" LONG THREADED PIPE
9. 8" DIA. SCH 40 PVC VERTICAL SLEEVE, NOTCHED TO FIT PIPE

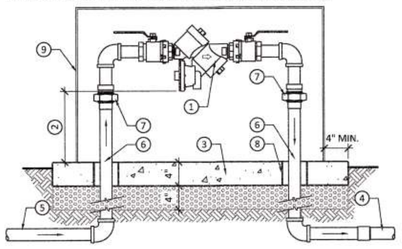
NOTE: SIZE GATE VALVE TO MAIN LINE SIZE.



A ISOLATION GATE VALVE
SCALE: NONE

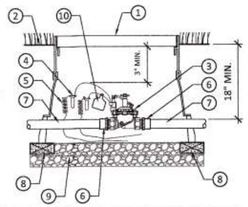
1. REDUCED PRESSURE PRINCIPLE BACKFLOW DEVICE - ZURN WILKINS 975XLU WITH 2 UNION BALL VALVES
2. 12" MIN. & 30" MAX. ABOVE GRADE
3. CONCRETE PAD ON 4" AGGREGATE BASE COMPACTED TO 95% O.D.
4. IRRIGATION MAIN LINE
5. COPPER PIPE FROM WATER METER
6. TYPE K COPPER PIPE & FITTINGS. MUST COMPLY WITH LOCAL CODES.
7. PROVIDE COPPER UNION
8. 4" DIA. MIN. SCH 40 PVC SLEEVE (TYP.)
9. ENCLOSURE & RP FREEZE PROTECTION BLANKET

1. INSTALL BACKFLOW PREVENTER TO MEET ALL LOCAL CODES & TCEQ STANDARDS.
2. PERFORM BACKFLOW TEST BY A CERTIFIED TESTER AFTER INSTALLATION.



B RP BACKFLOW PREVENTER
SCALE: NONE

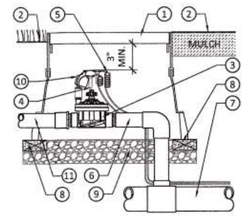
1. VALVE BOX WITH EXTENSION & LID
2. FINISH GRADE
3. MASTER CONTROL VALVE - IRRITROL 700 SERIES
4. WATERPROOF CONNECTORS (2) WADE WC-14, 3M DBRY-6, OR RAINBIRD DBRY
5. 24" LENGTH MIN. COILED WIRE
6. PVC SCH 80 MALE ADAPTER
7. PVC MAIN LINE PIPE
8. BRICK SUPPORTS (4 TOTAL)
9. 4" DEPTH MIN. 3/4" WASHED DRAIN GRAVEL
10. VALVE ID TAG



FINISH GRADE AT TOP OF VALVE BOX LID: 1/2" IN HYDROMULCH AREAS, 1 1/2" IN SOD AREAS, FLUSH WITH TOP OF MULCH IN PLANTING AREAS

C MASTER CONTROL VALVE
SCALE: NONE

1. VALVE BOX WITH LID & VALVE BOX EXTENSION AS REQUIRED
2. FINISH GRADE AT VALVE BOX
3. REMOTE CONTROL VALVE RAINBIRD PEB SERIES
4. WATERPROOF CONNECTORS (2) WADE WC-14, 3M DBRY-6, OR RAINBIRD DBRY
5. 24" LENGTH MIN. COILED WIRE
6. SCH 80 PVC T.O.E. NIPPLE
7. PVC MAIN LINE PIPE & FITTINGS
8. BRICK SUPPORTS (4)
9. 4" DEPTH MIN. 3/4" DIA. WASHED DRAIN GRAVEL
10. VALVE ID TAG
11. LATERAL LINE & FITTINGS



FINISH GRADE AT TOP OF VALVE BOX LID: 1/2" IN HYDROMULCH AREAS, 1 1/2" IN SOD AREAS, FLUSH WITH TOP OF MULCH IN PLANTING AREAS

D REMOTE CONTROL VALVE
SCALE: NONE

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TEL. 512.599.4095
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SEAL
STATE OF TEXAS · IRIS S. PUH · 12060 · LICENSED IRRIGATOR
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
DRAWN BY: ISP
CHECKED BY: ISP

ISSUE DATE
04-16-2018

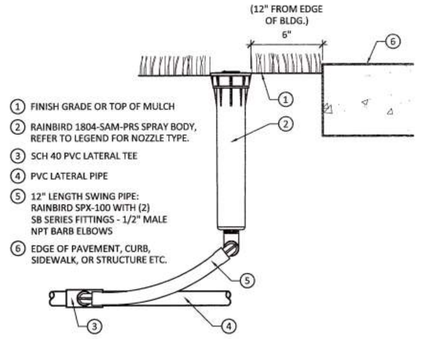
REVISIONS

NUM	DATE	DESCRIPTION

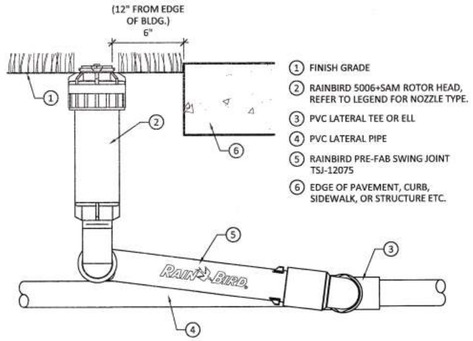
SHEET TITLE

IRRIGATION DETAILS

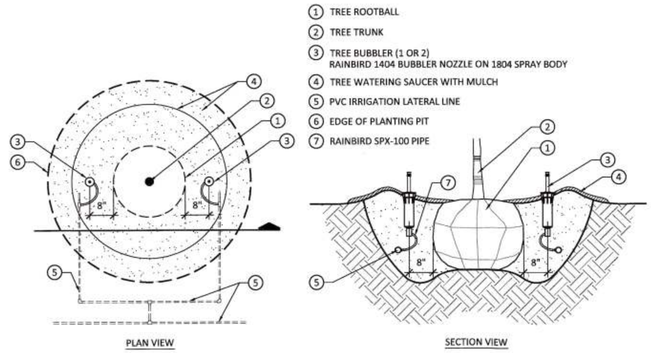
SHEET NUMBER
18



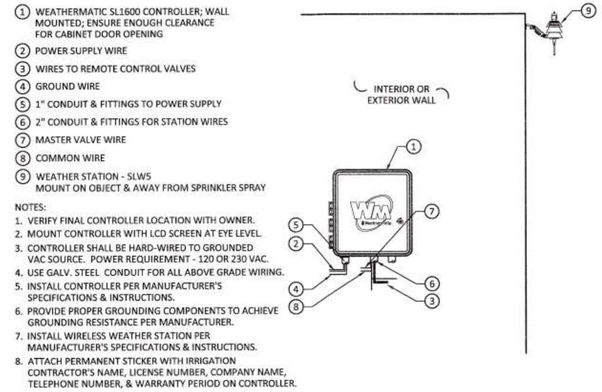
A SPRAY HEAD (TYP.)
SCALE: NONE



B ROTOR HEAD (TYP.)
SCALE: NONE



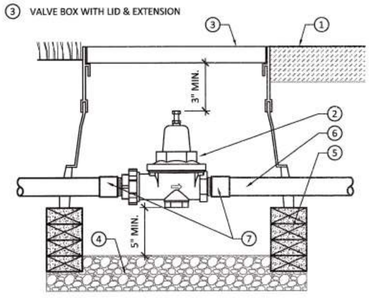
C TREE BUBBLERS
SCALE: NONE



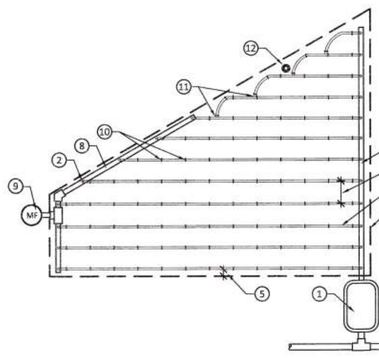
NOTES:
1. VERIFY FINAL CONTROLLER LOCATION WITH OWNER.
2. MOUNT CONTROLLER WITH LCD SCREEN AT EYE LEVEL.
3. CONTROLLER SHALL BE HARD-WIRED TO GROUNDED VAC SOURCE. POWER REQUIREMENT - 120 OR 230 VAC.
4. USE GALV. STEEL CONDUIT FOR ALL ABOVE GRADE WIRING.
5. INSTALL CONTROLLER PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
6. PROVIDE PROPER GROUNDING COMPONENTS TO ACHIEVE GROUNDING RESISTANCE PER MANUFACTURER.
7. INSTALL WIRELESS WEATHER STATION PER MANUFACTURER'S SPECIFICATIONS & INSTRUCTIONS.
8. ATTACH PERMANENT STICKER WITH IRRIGATION CONTRACTOR'S NAME, LICENSE NUMBER, COMPANY NAME, TELEPHONE NUMBER, & WARRANTY PERIOD ON CONTROLLER.

D IRRIGATION CONTROLLER & WEATHER SENSOR
SCALE: NONE

1 FINISH GRADE AT VALVE BOX: 1/2" AT HYDROMULCH AREAS, 1 1/2" AT SOD AREAS, TOP OF MULCH TO BE FLUSH WITH TOP OF COVER AT PLANTING AREAS
2 PRESSURE REDUCING VALVE ZURN WILKINS 500XL-SC
3 VALVE BOX WITH LID & EXTENSION
4 3/4" DIA. WASHED DRAIN GRAVEL
5 BRICK SUPPORTS
6 WATER SUPPLY LINE
7 SCH 80 PVC MALE ADAPTER



E PRESSURE REDUCING VALVE
SCALE: NONE



NOTES:
1. RECOMMENDED MIN. FILTRATION: 120 MESH
2. PRESSURE AT FLUSH VALVE SHALL BE MIN. 21.8 PSI

F DRIP ZONE INSTALLATION - PLAN (TYP.)
SCALE: NONE

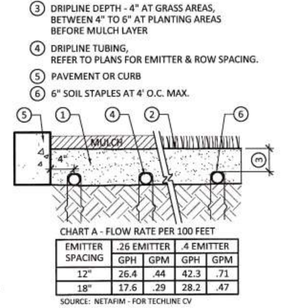


CHART A - FLOW RATE PER 100 FEET

EMITTER SPACING	.26 EMITTER		.4 EMITTER	
	GPH	GPM	GPH	GPM
12"	26.4	.44	42.3	.71
18"	17.6	.29	28.2	.47

SOURCE: NETAFIM - FOR TECHLINE CV

CHART B - MAX. LENGTH OF A SINGLE LATERAL (FT)

EMITTER SPACING		12"		18"	
EMITTER FLOW (GPH)		.26	.4	.26	.4
INLET PRESSURE	20 PSI	331	242	468	344
	25 PSI	413	302	584	429
	35 PSI	518	380	737	540
	45PSI	594	436	845	620
	55 PSI	655	480	932	684
	60 PSI	681	500	969	713

SOURCE: NETAFIM - FOR TECHLINE CV

TYPICAL DRIPLINE INSTALLATION REQUIREMENTS:
1. ALL SUPPLY & EXHAUST HEADERS SHALL BE CLASS 200 PVC PIPE SIZED TO HANDLE ZONE FLOW GPM (CHART C).
2. IF ZONE FLOWS ARE LESS THAN 5 GPM, THEN BLANK 17 MM DRIPLINE TUBING MAY BE USED AS SUPPLY & EXHAUST HEADERS.
3. REFER TO CHART B FOR MAXIMUM LENGTH ALLOWED FOR A SINGLE LATERAL.
4. EACH DRIP ZONE SHALL HAVE A MANUAL FLUSH VALVE AND ZONE FUNCTION INDICATOR INSTALLED.
5. USE FITTINGS & TOOLS PROVIDED BY MANUFACTURER.
6. INSTALL 6" SOIL STAPLES EVERY 4 FT O.C. MAX. TO HOLD DOWN DRIPLINES.

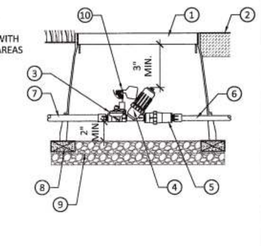
CHART C - SIZING OF HEADERS

CLASS 315 PVC PIPE	
1/2"	UP TO 5 GPM ZONE FLOW
CLASS 200 PVC PIPE	
3/4"	5.1 TO 10 GPM ZONE FLOW
1"	10.1 TO 17 GPM ZONE FLOW
1 1/4"	17.1 TO 27 GPM ZONE FLOW
1 1/2"	27.1 TO 35 GPM ZONE FLOW

*FLOW VELOCITY SHALL NOT EXCEED 5 FT / SEC

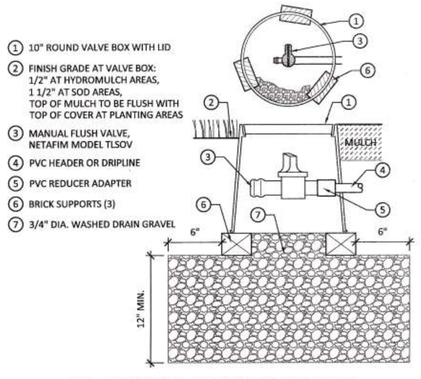
G DRIP ZONE INSTALLATION - SECTION (TYP.)
SCALE: NONE

1 VALVE BOX WITH LID & VALVE BOX EXTENSION AS REQUIRED
2 FINISH GRADE AT VALVE BOX: 1/2" AT HYDROMULCH AREAS, 1 1/2" AT SOD AREAS, TOP OF MULCH TO BE FLUSH WITH TOP OF COVER AT PLANTING AREAS
3 REMOTE CONTROL VALVE - NETAFIM CONTROL ZONE KIT
4 SCREEN FILTER
5 PRESSURE REDUCING VALVE
6 PVC LATERAL LINE
7 PVC MAIN LINE PIPE
8 BRICK SUPPORTS (4)
9 4" DEPTH MIN. 3/4" DIA. WASHED DRAIN GRAVEL
10 VALVE ID TAG

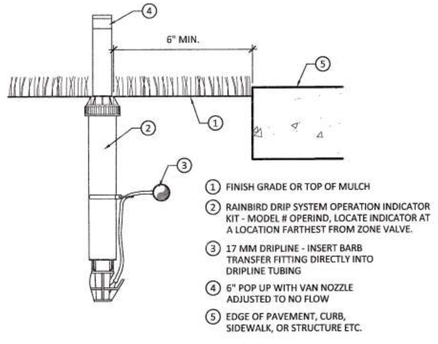


H DRIP CONTROL ZONE KIT
SCALE: NONE

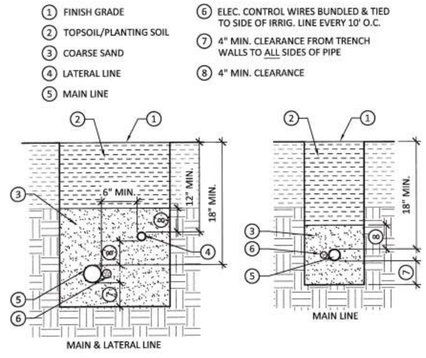
1 10" ROUND VALVE BOX WITH LID
2 FINISH GRADE AT VALVE BOX: 1/2" AT HYDROMULCH AREAS, 1 1/2" AT SOD AREAS, TOP OF MULCH TO BE FLUSH WITH TOP OF COVER AT PLANTING AREAS
3 MANUAL FLUSH VALVE, NETAFIM MODEL TLSOV
4 PVC HEADER OR DRIPLINE
5 PVC REDUCER ADAPTER
6 BRICK SUPPORTS (3)
7 3/4" DIA. WASHED DRAIN GRAVEL



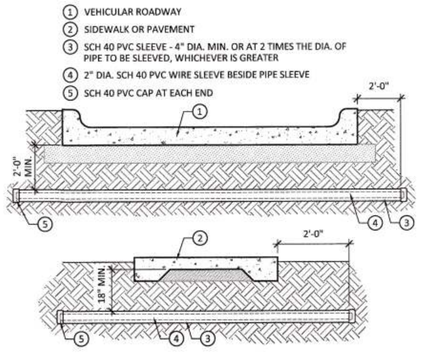
I DRIP ZONE - MANUAL FLUSH VALVE
SCALE: NONE



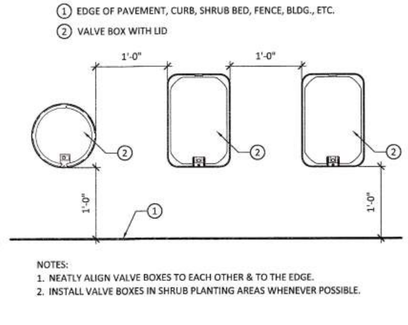
J DRIP ZONE - FUNCTION INDICATOR
SCALE: NONE



K IRRIGATION TRENCH (TYP.)
SCALE: NONE



L IRRIGATION SLEEVES (TYP.)
SCALE: NONE



NOTES:
1. NEATLY ALIGN VALVE BOXES TO EACH OTHER & TO THE EDGE.
2. INSTALL VALVE BOXES IN SHRUB PLANTING AREAS WHENEVER POSSIBLE.

M VALVE BOX LAYOUT (TYP.)
SCALE: NONE

PLACE MATRIX DESIGN OFFICE LLC
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SEAL
STATE OF TEXAS
IRIS S. PUH
12060
LICENSED IRRIGATOR
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
DRAWN BY: ISP
CHECKED BY: ISP

ISSUE DATE
04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

IRRIGATION DETAILS

SHEET NUMBER
19

COSA TREE CANOPY REQUIREMENT CALCULATIONS

A. TOTAL SITE AREA = 46,550 SF
25% OF SITE AREA = 11,637.50 SF

B. TREE CANOPY COVERAGE REQUIRED
CANOPY COVERAGE REQUIRED = 11,637.50 SF

C. NEW TREE CANOPY COVERAGE
LARGE TREE
3 X 1080 = 3,240 SF
MEDIUM - LARGE TREE
10 X 787.50 = 7,875 SF
SMALL TREE
3 X 247.50 = 742.50 SF
TOTAL NEW CANOPY COVERAGE PROVIDED = 11,857.50 SF

D. TOTAL TREE CANOPY COVERAGE
11,857.50 SF NEW TREES
TOTAL TREE CANOPY COVERAGE = 11,857.50 SF
25.50% TREE CANOPY COVERAGE PROVIDED

COSA LANDSCAPE ORDINANCE POINTS TABULATION

ELECTIVE REQUIREMENTS - 70 POINTS

A. PARKING LOT SHADING PERCENT SHADING - 25%	20 POINTS
B. SCREENING OF SURFACE PARKING	25 POINTS
C. STREET TREES - DENOTED BY ST BANDERA RD. - 224 LF X 75% / 50 = 4 TREES REQUIRED WESTCHASE ST. - 207 LF X 75% / 50 = 4 TREES REQUIRED	25 POINTS
TOTAL ELECTIVE POINTS	70 POINTS

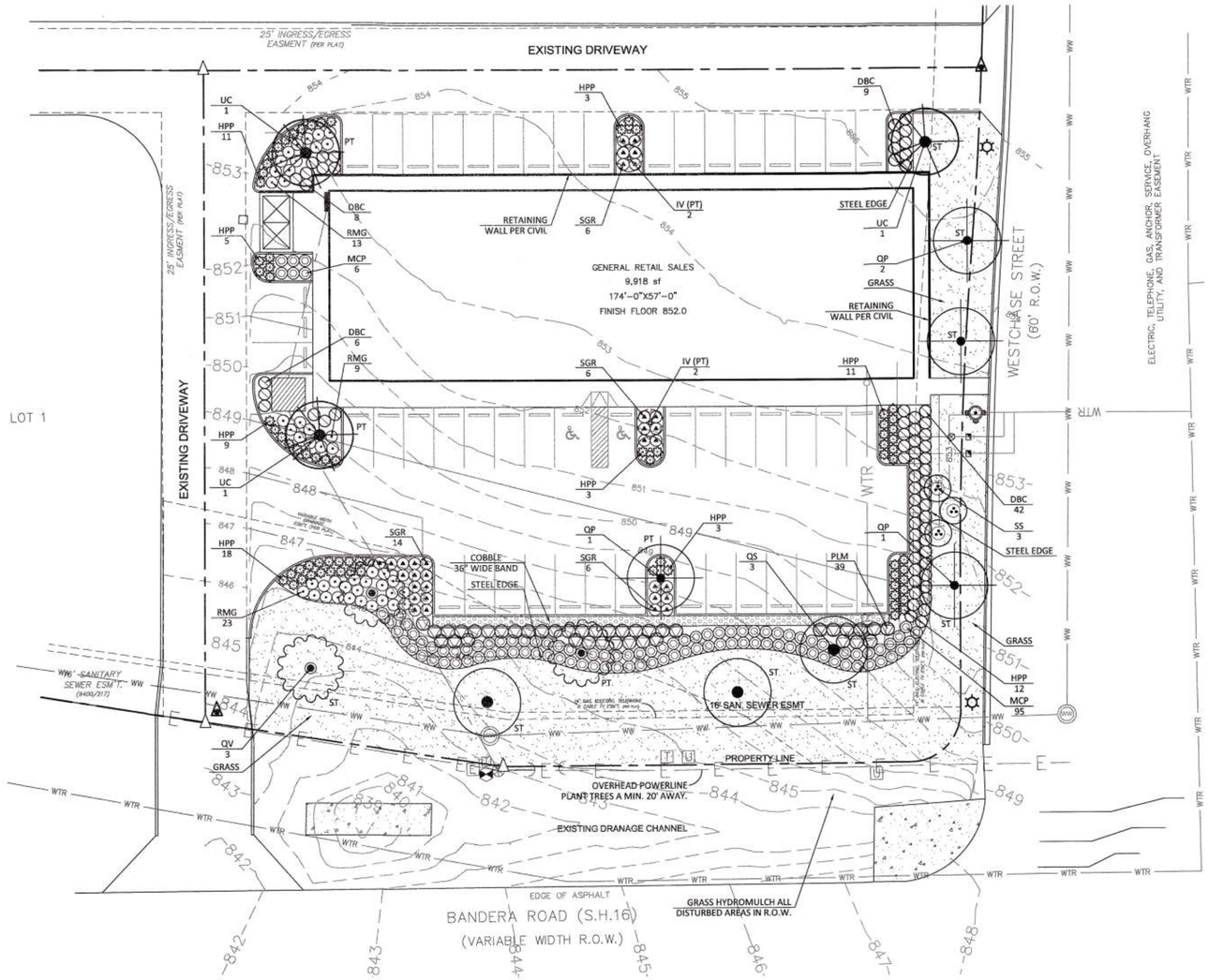
COSA PARKING LOT SHADING REQUIREMENT CALCULATIONS

A. TOTAL PARKING LOT AREA = 12,775 SF
PARKING LOT PERCENT SHADING = 25%
SHADE COVERAGE REQUIRED = 3,193.75 SF

B. MEDIUM-LARGE TREE - DENOTED ON PLAN BY PT
ISLAND OR PENINSULA TREE
656.25 SF X 3 TREE(S) = 1968.75 SF
WITHIN 12 FT. OF PARKING LOT
437.50 SF X 1 TREE(S) = 437.50 SF

C. SMALL TREE - DENOTED ON PLAN BY PT
ISLAND OR PENINSULA TREE
206.25 SF X 4 TREE(S) = 825 SF

TOTAL PARKING LOT SHADING = 3,231.25 SF
PERCENT OF PARKING LOT SHADING = 25%



A LANDSCAPE PLAN
SCALE: 1" = 20'-0"

10 0 20 40 FEET

NORTH

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

PLANT SCHEDULE

SYMBOL	KEY	QTY	BOTANICAL NAME COMMON NAME	SIZE	HEIGHT/ SPREAD	SPACING	REMARKS
CANOPY TREES							
	QP	4	*QUERCUS POLYMORPHA* MEXICAN WHITE OAK	3" CAL., 65 GAL	10' - 12' HT. 5' - 6' SPREAD	PER PLAN	CONTAINER GROWN, SINGLE TRUNK, MATCHED SPECIMEN
	QS	3	*QUERCUS SHUMARDII* SHUMARD RED OAK	3" CAL., 65 GAL	12' - 14' HT. 6' - 8' SPREAD	PER PLAN	CONTAINER GROWN, SINGLE TRUNK, MATCHED SPECIMEN
	QV	3	*QUERCUS VIRGINIANA* LIVE OAK	3" CAL., 65 GAL	12' - 14' HT. 6' - 8' SPREAD	PER PLAN	CONTAINER GROWN, SINGLE TRUNK, MATCHED SPECIMEN
	UC	3	*ULMUS CRASSIFOLIA* CEDAR ELM	3" CAL., 65 GAL	10' - 12' HT. 4' - 5' SPREAD	PER PLAN	CONTAINER GROWN, SINGLE TRUNK, MATCHED SPECIMEN
ORNAMENTAL / SMALL TREES							
	IV	4	*ILEX VOMITORIA* YAUPON HOLLY	30 GAL.	6' - 7' HT. 3' - 4' SPREAD	PER PLAN	CONTAINER GROWN, MULTI-TRUNK, MATCHED SPECIMEN, FEMALE TREE
	SS	3	*SOPHORA SECUNDIFLORA* TEXAS MOUNTAIN LAUREL	30 GAL.	6' HT. 3' - 4' SPREAD	PER PLAN	CONTAINER GROWN, MULTI-TRUNK, MATCHED SPECIMEN
SHRUBS, GROUNDCOVER, ORNAMENTAL GRASSES							
	DBC	65	*DIETES BICOLOR* FORTNIGHT LILY	3 GAL.	-	42" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
	HPP	75	*HESPERALOE PARVIFLORA 'PERPA'* BRAKELIGHTS RED YUCCA	1 GAL.	-	36" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
	MCP	101	*MUHLENBERGIA CAPILLARIS* GULF MUHLY GRASS	1 GAL.	-	42" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
	PLM	39	*PLUMBAGO AURICULATA* PLUMBAGO	3 GAL.	-	48" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
	RMG	45	*ROSA 'MARTHA GONZALES'* MARTHA GONZALES ROSE	3 GAL.	-	42" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
	SGR	32	*SALVIA GREGGII 'WHITE'* CHERRY SAGE	1 GAL.	-	42" O.C.	CONTAINER GROWN, MATCHED SPECIMEN, FULL
TURF GRASS							
	GRASS	-	*CYNODON DACTYLON* BERMUDA GRASS	-	-	-	HYDROSEED
COBBLE							
	COBBLE	-	GRANITE BAY - 6" - 12" DIA. AT 12" DEPTH MIN. SOURCE: KELLER MATERIAL - 210-967-1300	-	-	-	INSTALL FILTER FABRIC UNDER ROCK MATERIAL.

GENERAL NOTES:

1. REFER TO CIVIL PLANS FOR GRADING, DRAINAGE, & UTILITIES INFORMATION.
2. REFER TO CIVIL PLANS FOR RETAINING WALL INFORMATION.
3. REFER TO MEP PLANS FOR SITE LIGHTING & ELECTRICAL INFORMATION.
4. REFER TO THE IRRIGATION PLANS FOR SLEEVE LOCATIONS.
5. PROVIDE A 4" DEPTH MIN. OF TOPSOIL AT ALL NEW GRASS AREAS.

PLACE MATRIX DESIGN OFFICE LLC
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TEL: 512.524.9555
info@placematrixdesign.com

SEAL
REGISTERED LANDSCAPE ARCHITECT
IRIS S. PUH
2639
STATE OF TEXAS
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
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ISSUE DATE
04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

LANDSCAPE PLAN

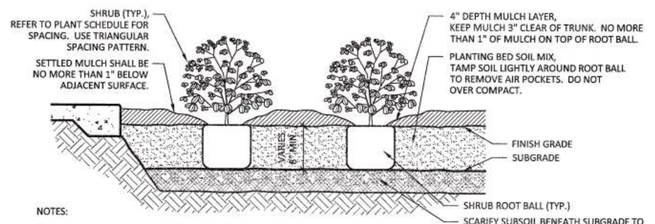
SHEET NUMBER
20

PLANTING NOTES:

1. THESE NOTES SHALL BE USED IN ASSOCIATION WITH SPECIFICATION SECTION 32 93 00 ON PLANTING & THE DRAWING DETAILS.
2. PERFORM ALL WORK IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES, AND REGULATIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER SUCH WORK AND PROVIDE FOR ALL INSPECTIONS AND PERMITS REQUIRED BY FEDERAL, STATE, AND LOCAL AUTHORITIES IN SUPPLY, TRANSPORTATION, AND INSTALLATION OF MATERIALS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF ALL EXISTING UNDERGROUND UTILITY LINES (TELEPHONE, GAS, WATER, ELECTRICAL, CABLE, TV, ETC.) AND ANY EASEMENTS OR AERIAL EASEMENTS PRIOR TO START OF ANY LANDSCAPE & SITE WORK. CONTACT TEXAS ONE CALL & OTHERS AT LEAST 48 HOURS PRIOR TO START OF ANY SITE WORK. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO EXISTING UTILITIES.
4. CONTRACTOR SHALL REFER ALSO TO THE CIVIL / MEP PLANS FOR ALL PROPOSED SITE UTILITY & SITE GRADING WORK INFORMATION.
5. CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS SHOWN ON THE PLANS. IF A SITE CONFLICT IS PRESENT, THEN THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING ANY SITE LANDSCAPE WORK.
6. ALL SITE GRADING, IRRIGATION INSTALLATION, & HARD SURFACE PAVING ADJACENT TO PLANTING AREAS, INCLUDING CONCRETE WALKS & ROAD WORK, MUST BE COMPLETED PRIOR TO START OF ANY PLANTING WORK ACTIVITY. CONTRACTOR WILL BE RESPONSIBLE FOR ADJUSTING ELEVATIONS OF NEW TREES & PLANTING BEDS IF INSTALLED AT IMPROPER ELEVATIONS.
7. CONTRACTOR SHALL COORDINATE ALL LANDSCAPE INSTALLATION WORK WITH OTHER TRADES TO PREVENT ANY WORK CONFLICTS.
8. TREE PLANTING
   A. ANY SUBSTITUTIONS TO TREE SPECIES OR SPECS. IN THE PLANT SCHEDULE WILL NOT BE PERMITTED UNLESS APPROVAL IS OBTAINED IN WRITING FROM THE LANDSCAPE ARCHITECT.
   B. FOR TREE PLANTING, REFER TO THE TREE PLANTING DETAILS & PLANTING SPECIFICATIONS.
   C. ENSURE PROPER DRAINAGE IN TREE PITS BY PERFORMING A DRAINAGE TEST. FILL PIT WITH WATER & ALLOW TO DRAIN TWICE IN SUCCESSION. IF PIT DOES NOT SUFFICIENTLY DRAIN WITHIN 24 HOURS, REFER TO THE SPECIFICATIONS FOR DIRECTION OR CONTACT THE LANDSCAPE ARCHITECT.
   D. STAKE TREES PER DRAWING DETAIL. TREE SUPPORT SYSTEMS SHALL BE REMOVED AFTER 1 YEAR IF TREE ROOT SYSTEM IS ESTABLISHED.
9. SHRUB PLANTING
   A. ANY SUBSTITUTIONS TO SHRUB SPECIES OR SPECS. IN THE PLANT SCHEDULE WILL NOT BE PERMITTED UNLESS APPROVAL IS OBTAINED IN WRITING FROM THE LANDSCAPE ARCHITECT.
   B. FOR SHRUB PLANTING, REFER TO THE SHRUB PLANTING DETAILS & PLANTING SPECIFICATIONS.
   C. FOR SHRUB PLANTING IN MASS PLANTING BEDS, EXCAVATE TO A MINIMUM DEPTH OF 8" FOR PLANTING SOIL PLUS A DEPTH OF 3" TO ACCOMMODATE THE MULCH LAYER. PRIOR TO PLACING PLANTING SOIL MIX, LOOSEN THE SUBGRADE TO A DEPTH OF 4 INCHES OR TO 6 INCHES IF SOIL IS COMPACTED.
   D. TEST ALL PLANTING BEDS TO ENSURE PROPER DRAINAGE. ALLOW TO DRAIN FOR 24 HOURS. IF BEDS DO NOT DRAIN SUFFICIENTLY, REFER TO THE SPECIFICATIONS FOR DIRECTION OR CONTACT THE LANDSCAPE ARCHITECT.
   E. PROVIDE PLANTING SOIL MIX & MULCH ACCORDING TO THE DRAWING DETAILS & SPECIFICATIONS. INSTALL SHRUBS IN MASS PLANTING BEDS WITH A TRIANGULAR SPACING PATTERN.
   F. CONTRACTOR IS RESPONSIBLE FOR FINE GRADING AT ALL PLANTING BEDS. PRIOR TO PLANTING, ENSURE THAT THE BEDS WITH NEW SOIL MIX ARE ESTABLISHED AT THE PROPER GRADES. REMOVE ALL DEBRIS, LUMPS, & ROCK. FINISH SURFACE SHALL BE SMOOTH, EVEN, & FREE OF DEPRESSIONS THAT CAN CAUSE WATER TO POND.
   G. FINISH SOIL SURFACE PLUS MULCH LAYER SHALL NOT BE LOWER THAN 1 INCH BELOW ALL PAVING OR CURB SURFACES AFTER SETTLEMENT.
10. MULCHING
    A. APPLY A 4" MIN. DEPTH OF HARDWOOD MULCH TO ALL PLANTING BEDS. APPLY A 4" MIN. DEPTH OF HARDWOOD MULCH TO ALL SOIL WATERING SAUCERS FOR TREES.
    B. DO NOT PLACE MULCH WITHIN 6" OF TREE TRUNKS & 3" OF SHRUB STEMS. AVOID PLACING SOIL OR MULCH ON TOP OF PLANT ROOT BALLS. ALLOW NO MORE THAN 1" DEPTH OF MULCH OVER THE TOP OF PLANT ROOT BALLS.
    C. FINISH SURFACE OF SETTLED MULCH SHALL BE NO MORE THAN 1" BELOW ADJACENT PAVEMENT OR CURB SURFACES & 1/2" BELOW TOP OF ANY LANDSCAPE EDGING.
11. SATISFACTORY FINE GRADING
    A. ENSURE THAT THE PROPER GRADES & ELEVATIONS AT ALL PLANTING AREAS ARE ESTABLISHED. REFER TO THE CIVIL GRADING PLANS FOR PROPER FINISH ELEVATIONS REQUIRED.
    B. ENSURE THAT POSITIVE SURFACE DRAINAGE AWAY FROM BUILDINGS & STRUCTURES IS ESTABLISHED.
12. PLANT MATERIAL WARRANTY & MAINTENANCE PERIOD
    A. WARRANTY PERIOD: ALL PLANT MATERIAL, RELATED MATERIALS, & WORK SHALL BE GUARANTEED & WARRANTED FOR A PERIOD OF 12 MONTHS AFTER THE DATE OF FINAL COMPLETION.
    B. MAINTENANCE PERIOD: ALL PLANT MATERIAL & RELATED WORK SHALL BE MAINTAINED FOR A PERIOD OF 90 DAYS AFTER THE DATE OF FINAL COMPLETION.
    C. ALL PLANTING & ASSOCIATED WORK SHALL BE MAINTAINED IN A HEALTHY OR GOOD CONDITION. DURING THIS TIME PERIOD, ANY PLANTS DETERMINED TO BE DEAD OR DYING SHALL BE REMOVED & REPLACED.
13. ALL DISTURBED AREAS CAUSED BY GRADING OR CONSTRUCTION ACTIVITIES BOTH ON & OFF PROPERTY SHALL BE GRASS HYDROMULCHED.
14. CONTRACTOR SHALL AT ALL TIMES PROTECT NEW WORK FROM DAMAGE & THEFT & REPLACE ALL DAMAGED OR STOLEN MATERIALS AT OWN EXPENSE. CONTRACTOR SHALL PROTECT THE OWNER'S PROPERTY SUCH AS BUILDINGS, UTILITIES, PAVEMENT, TREES, PLANTINGS, ETC. FROM DAMAGE OR LOSS. ALL DAMAGES TO OWNER'S PROPERTY CAUSED BY INSTALLATION WORK SHALL BE REPAIRED AT CONTRACTOR'S COST & TO THE OWNER'S SATISFACTION.
15. CONTRACTOR SHALL REMOVE ALL TRASH & DEBRIS GENERATED DURING CONSTRUCTION. ADJACENT SURFACES SUCH AS ROADS, PAVEMENTS, BUILDING, WALLS, FENCES, ETC. SHALL BE CLEANED OFF IF SOILED BY DIRT, DEBRIS, OR GRASS OPERATIONS.

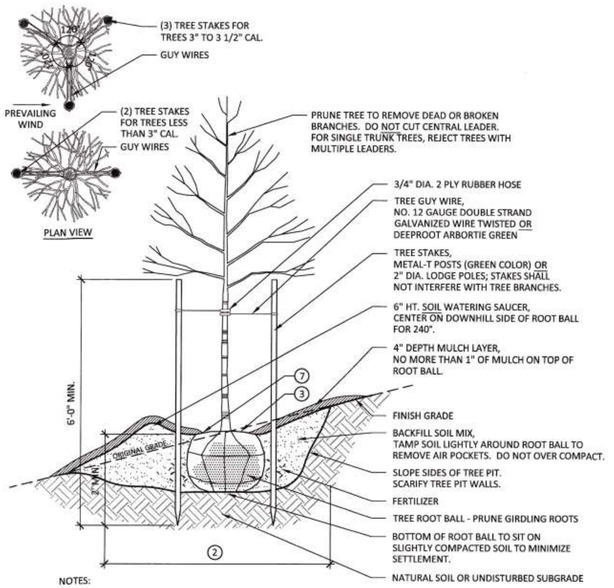
GRASS WORK NOTES:

1. THESE NOTES SHALL BE USED IN ASSOCIATION WITH SPECIFICATION SECTION 32 92 00 ON TURF & GRASSES.
2. REFER TO ITEMS 2 THRU 5 OF THE PLANTING NOTES FOR GENERAL REQUIREMENTS.
3. ALL SITE GRADING, IRRIGATION INSTALLATION, & HARD SURFACE PAVING ADJACENT TO PLANTING AREAS, INCLUDING CONCRETE WALKS & ROAD WORK, MUST BE COMPLETED PRIOR TO START OF ANY GRASS WORK. CONTRACTOR WILL BE RESPONSIBLE FOR FINE GRADING OF NEW GRASS AREAS TO THE PROPER GRADES. IMPROPER ELEVATIONS SHALL BE CORRECTED AT OWN COST.
4. CONTRACTOR SHALL COORDINATE ALL GRASS WORK WITH OTHER TRADES TO PREVENT ANY WORK CONFLICTS.
5. GRASS HYDROSEED (HYDROMULCH)
   A. ALL GRASS SEED SHALL BE FRESH, CLEAN, DRY, NEW CROP SEED WITH MIN. 85% PURITY, MIN. 90% GERMINATION, & NOT MORE THAN 0.5% WEED SEED.
   B. GRASS SEED SHALL BE DELIVERED IN UNDAMAGED, UNOPENED CONTAINERS & BE DRY & FREE OF MOLD.
   C. GRASS SEED MIX:
      BERMUDA GRASS (Cynodon dactylon) SEED
      APPLICATION RATE: 2 LBS. PER 1,000 SF
      WINTER MIX (FROM SEPTEMBER 15 TO MARCH 1):
      BERMUDA GRASS (Cynodon dactylon) SEED
      APPLICATION RATE: 2 LBS. PER 1,000 SF
      ANNUAL RYE (Lolium multiflorum) GRASS SEED
      APPLICATION RATE: 6 LBS. PER 1,000 SF
   D. FIBER MULCH:
      CELLULOSE FIBER MULCH - MINIMUM 2,000 LB / ACRE
6. GRASS HYDROSEED WORK
   A. ALL AREAS TO RECEIVE GRASS WORK SHALL HAVE A 4" DEPTH MIN. LAYER OF TOPSOIL PLACED OVER SUBGRADE. INSTALL TOPSOIL TO 1/2" BELOW TOP OF PAVEMENT, CURBS, OR METAL EDGER. LOOSEN SUBGRADE TO 4" OR TO 6" IF SOIL IS COMPACTED, PRIOR TO SPREADING TOPSOIL.
   B. CONTRACTOR IS RESPONSIBLE FOR FINE GRADING AT ALL GRASS AREAS. PRIOR TO GRASS WORK, REMOVE ALL DEBRIS, LUMPS, & ROCK GREATER THAN 1 INCH IN DIAMETER. FINISHED SURFACE SHALL BE SMOOTH, EVEN, & FREE OF DEPRESSIONS THAT CAN CAUSE WATER TO POND. REFER TO THE CIVIL GRADING PLANS FOR FINAL GRADES REQUIRED. ENSURE THAT POSITIVE SURFACE DRAINAGE AWAY FROM BUILDINGS & STRUCTURES IS ESTABLISHED.
   C. APPLY HYDROSEED SLURRY UNIFORMLY TO ALL AREAS TO BE SEEDED. REMOVE OVER-SPRAYED SLURRY MIX FROM ADJACENT PLANTS & STRUCTURES.
   D. FOLLOWING GERMINATION OF THE SEED, AREAS LACKING GERMINATION LARGER THAN 8" X 8" MUST BE RE-SEEDED.
7. MAINTENANCE
   A. MAINTENANCE OF SEEDED AREAS SHALL BEGIN UPON COMPLETION OF SEEDING OPERATION & CONTINUE UNTIL FULL GRASS ESTABLISHMENT.
   B. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, MOWING, TRIMMING, EDGING, FERTILIZING, RE-SEEDING, & PERFORMING OTHER OPERATIONS AS REQUIRED TO ESTABLISH HEALTHY, VIABLE TURF.
8. GRASS WORK MAINTENANCE PERIOD
   A. MAINTENANCE PERIOD: ALL GRASS WORK SHALL BE MAINTAINED FOR A PERIOD OF 90 DAYS AFTER THE DATE OF FINAL COMPLETION. GRASS SHALL BE MAINTAINED IN A HEALTHY CONDITION. DURING THIS TIME PERIOD, ANY GRASS AREAS DETERMINED TO BE BARE, DEAD, OR DYING SHALL BE REMOVED & RE-SEEDED.
   B. FOR ALL SEEDED GRASS AREAS, ESTABLISHMENT BY THE END OF THE MAINTENANCE PERIOD IS DEFINED AS A HEALTHY, UNIFORM STAND OF GRASS, FREE OF WEED GROWTH & SURFACE IRREGULARITIES, WITH COVERAGE EXCEEDING 90% OVER ANY 10 SF & BARE SPOTS NOT EXCEEDING 5" X 5". IF GRASS IS NOT CONSIDERED ESTABLISHED, THEN THE MAINTENANCE PERIOD SHALL BE EXTENDED UNTIL FULL ESTABLISHMENT. BARE SPOTS SHALL BE RE-SEEDED WHERE NECESSARY.



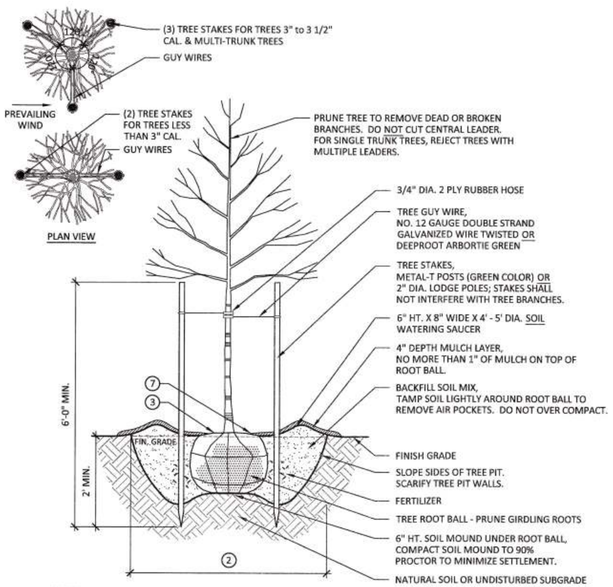
NOTES:
1. FOR PLANTING BED PLANTING, REFER ALSO TO THE PLANTING SPECIFICATIONS.
2. PLANTING DEPTH: TOP OF ROOT BALL SHOULD BE FLUSH OR NO MORE THAN 2" ABOVE FINISH GRADE.
3. BACKFILL SOIL MIX: APPROVED PLANTING BED SOIL MIX PER SPECIFICATIONS.
4. MULCH: APPROVED UNTREATED HARDWOOD MULCH PER SPECIFICATIONS.
5. REMOVE ALL NURSERY TAGS & RIBBONS.
6. TEST ALL PLANTING AREAS FOR PROPER DRAINAGE. REFER TO PLANTING SPECIFICATIONS.

B MASS PLANTING BED
SCALE: NONE



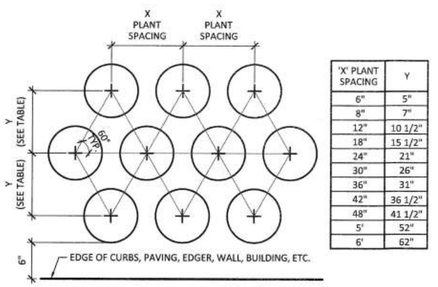
NOTES:
1. FOR TREE PLANTING, REFER ALSO TO THE PLANTING SPECIFICATIONS.
2. PIT SIZE: EXCAVATE CIRCULAR PIT WITH TAPERED SIDES. EXCAVATE MIN. 3X ROOT BALL WIDTH AT SURFACE & TAPER DOWN TO 2X ROOT BALL WIDTH AT BOTTOM.
3. TOP OF ROOT BALL & ROOT FLARE SHOULD BE FLUSH OR NO HIGHER THAN 2" ABOVE FINISH GRADE.
4. BACKFILL SOIL MIX: 6 PARTS NATIVE SOIL FROM EXCAVATED PIT OR IMPORTED TOPSOIL, 2 PARTS COMPOST, 1 PART COARSE SAND.
5. FERTILIZER: DAVEY ARBOR GREEN PRO 30-10-7 PACKETS. APPLY PER MANUFACTURER'S DIRECTIONS.
6. MULCH: APPROVED UNTREATED HARDWOOD MULCH PER SPECIFICATIONS.
7. KEEP MULCH 6" MIN. CLEAR FROM THE TREE TRUNK & ROOT FLARE AREA.
8. TEST ALL TREE PITS FOR PROPER DRAINAGE. REFER TO PLANTING SPECIFICATIONS.
9. REMOVE NURSERY BAMBOO POLE STAKES UNLESS CENTRAL LEADER NEEDS TO BE HELD ERECT. REMOVE ALL NURSERY TAGS & TREE RIBBONS.

C TREE PLANTING ON SLOPE
SCALE: NONE



NOTES:
1. FOR TREE PLANTING, REFER ALSO TO THE PLANTING SPECIFICATIONS.
2. PIT SIZE: EXCAVATE CIRCULAR PIT WITH TAPERED SIDES. EXCAVATE MIN. 3X ROOT BALL WIDTH AT SURFACE & TAPER DOWN TO 2X ROOT BALL WIDTH AT BOTTOM.
3. TOP OF ROOT BALL & ROOT FLARE SHOULD BE FLUSH OR NO HIGHER THAN 2" ABOVE FINISH GRADE.
4. BACKFILL SOIL MIX: 6 PARTS NATIVE SOIL FROM EXCAVATED PIT OR IMPORTED TOPSOIL, 2 PARTS COMPOST, 1 PART COARSE SAND.
5. FERTILIZER: DAVEY ARBOR GREEN PRO 30-10-7 PACKETS. APPLY PER MANUFACTURER'S DIRECTIONS.
6. MULCH: APPROVED UNTREATED HARDWOOD MULCH PER SPECIFICATIONS.
7. KEEP MULCH 6" MIN. CLEAR FROM THE TREE TRUNK & ROOT FLARE AREA.
8. TEST ALL TREE PITS FOR PROPER DRAINAGE. REFER TO PLANTING SPECIFICATIONS.
9. REMOVE NURSERY BAMBOO POLE STAKES UNLESS CENTRAL LEADER NEEDS TO BE HELD ERECT. REMOVE ALL NURSERY TAGS & TREE RIBBONS.

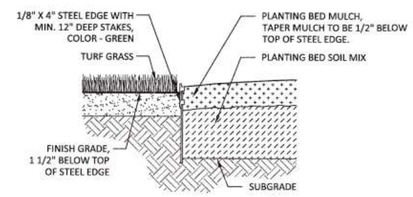
A TREE PLANTING
SCALE: NONE



'X' PLANT SPACING	Y
6"	5"
8"	7"
12"	10 1/2"
18"	15 1/2"
24"	21"
30"	26"
36"	31"
42"	36 1/2"
48"	41 1/2"
5'	52"
6'	62"

TRIANGULAR PLANT SPACING
REFER TO PLANT SCHEDULE FOR 'X' PLANT SPACING.

D PLANT SPACING
SCALE: NONE



1. ACCEPTABLE STEEL EDGE MANUFACTURERS:
   COLMET - 1.800.829.8225
   1/8" X 4" ITEM #1011
   J.D. RUSSELL CO. - 1.800.888.6872
   1/8" X 4" DURAEDGE

E STEEL EDGE
SCALE: NONE

PLACE MATRIX DESIGN OFFICE LLC
PO BOX 41107 - AUSTIN, TX 78704
TEL: 512.599.4095
info@placematrixdesign.com

SEAL
IRIS S. PINN 2639 REGISTERED LANDSCAPE ARCHITECT STATE OF TEXAS
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
DRAWN BY: ISP
CHECKED BY: ISP

ISSUE DATE
04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

LANDSCAPE DETAILS

SHEET NUMBER
21

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY
A. Work includes all services, labor, materials, transportation, and equipment necessary to perform the work shown on the drawings and as specified in the specifications.
B. Section Includes:
1. Piping.
2. Pipe sleeving.
3. Manual valves.
4. Automatic control valves.
5. Sprinklers.
6. Controllers and wiring.
7. Quick coupling valves.
8. Backflow preventers and testing.
9. Valve boxes.
10. Trenching and backfill work.
11. Drip irrigation and accessories.
12. Pressure reducing valve.
C. Related Sections
1. Section 32 92 00 Turf and Grasses
2. Section 32 93 00 Planting

1.3 REFERENCES
A. ASTM B32 - Standard Specification for Solder Metal.
B. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
C. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Schedules 40, 80, and 120.
D. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
E. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
F. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
G. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
H. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
I. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings

1.4 DEFINITIONS
A. Design Pressure: The pressure that is required for an emission device to operate properly. Design pressure is calculated by adding the operating pressure necessary at an emission device to the total of all pressure losses accumulated from an emission device to the water source.
B. Full Head Coverage (Head to Head Spacing): Head layout to achieve 100% irrigation coverage. Maximum spacing of heads shall not exceed manufacturer's published radius.
C. Lateral Piping: Downstream from control valves to sprinklers and specialties. Piping is under pressure during flow.
D. Low Voltage: As defined in NFPA 70E for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
E. Main Line Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water distribution system pressure.

1.5 PERFORMANCE REQUIREMENTS
A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
B. Location of Sprinklers and Specialties: Design location is diagrammatic. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain design intent and 100 percent irrigation coverage of areas indicated.

1.6 SUBMITTALS
A. Water Pressure: Verification of on-site static water pressure on company letter head.
B. Contractor Certification: Copy of Texas Irrigator's License issued by the TCEQ.
C. Product Data: Submit Manufacturer's catalog sheets or technical literature of all materials specified before work begins (at least 8 weeks). Mark or highlight in color which product is to be used. Submit two (2) hard copies or provide in an electronic format. At a minimum, submit the following:
1. Isolation Gate (Shut-off) Valve
2. Backflow Preventer, Enclosure, Freeze Blanket
3. Master Control Valve
4. Irrigation Controller and Weather Sensor
5. Remote Control Valves and Waterproof Connectors
6. Quick Coupling Valves
7. Spray Heads, Nozzles, Check Valves
8. Swing Joints
9. Drip Equipment and Accessories
10. Ball Valves
11. Valve Boxes (for each type of equipment)
12. Pipe, Pipe Fittings, and Sleeves
13. Pipe Cement
14. Wire and Wire Splice Kits
15. Pressure reducing valve
D. After a submittal has been approved, substitutions will not be allowed except by written consent of Landscape Architect.

1.7 CLOSEOUT SUBMITTALS
A. Irrigation Installation Certification Letter - copy of letter submitted to City inspector
B. Record Drawings
1. The Contractor shall have on site at all times a full size set of Irrigation Plans to mark actual locations of all equipment and sleeves and any deviations from the drawings. Locate equipment in relationship to permanent features such as buildings, curbs, sidewalks, driveways, fences, etc. Provide dimensions as necessary.
a. Provide GPS coordinates of all remote control valves, quick coupling valves, water meter, backflow device, shut-off valve, irrigation controller, all sensors, and splice box locations.
2. Neatly record the information on the plans on a daily basis. Record also approved substitutions and change order items.
3. Label the remote control valves and transfer the corresponding numbers to the Record Drawings.
4. Once installation is complete, Contractor shall neatly transfer all information to a clean, full size set of plans for submission to the Owner.
5. Zone Map: The coverage area of each irrigation zone shall be color coded and identified to the corresponding valve and its location. Provide this zone map as a reduced copy (half size). The plan must be laminated and mounted inside the irrigation controller for maintenance personnel.
C. Operation and Maintenance Manuals
1. Provide instructions for operation and maintenance of irrigation system and controls, seasonal activation and shutdown, and manufacturer's manuals.
a. Provide Owner with an annual maintenance checklist.
2. Provide a seasonal irrigation watering schedule and budget for irrigation system.
a. Include duration and frequency each irrigation zone will run per week and the resulting precipitation rate to be expected.
D. Extra Materials
1. Furnish extra components to the Owner:
a. Two sprinkler heads of each type and size. Four nozzles of each type.
b. Two wrenches for each type head core and for removing and installing each type head.
c. One extra remote control valve of each size.
d. One quick coupling key with 1 hose swivel of proper size for every 4 quick coupling valves installed or min. of one.

1.8 QUALITY ASSURANCE
A. Installer Qualifications:
1. Company specializing in performing the work of this section with minimum 5 years of experience in similar size and scope of work.
2. Current licensed irrigator of the State of Texas. Per TCEQ and state requirements, a licensed irrigator or licensed irrigation technician must be present at the site to oversee all irrigation installation work.
3. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.

1.9 REGULATORY REQUIREMENTS
A. All work shall conform to applicable local codes, ordinances, or regulations for system installation and materials. Regulatory bodies include but are not limited to the following:
1. Irrigation in Texas is regulated by the Texas Commission on Environmental Quality (TCEQ), MC-178, P.O. BOX 130897, Austin, TX 78711-3087. TCEQ's website is: www.tceq.state.tx.us.
2. TCEQ - Landscape Irrigator's Rule Compilation
Title 30 Texas Administrative Code Chapter 344 Landscape Irrigation - Subchapters A, B, C, D, E, F, G, H
3. City Development Codes, SAWS Requirements, and City Plumbing Codes
4. Uniform Plumbing Code
5. National Sanitation Foundation (NSF) and American Society for Testing and Materials (ASTM)
B. Contractor shall obtain the proper permits and pay all required fees as it pertains to work in this section. Arrange for any required inspections by local authorities during the course of construction.
C. Submit to Owner certificates of inspections required by governmental authorities.
D. Products Requiring Electrical Connections: Listed and classified by Underwriters laboratories, Inc. as suitable for the purpose specified and indicated.
E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70E, by a qualified testing agency, and marked for intended location and application.

1.10 DELIVERY, STORAGE, AND HANDLING
A. Irrigation equipment and materials shall be delivered in unopened and undamaged containers with the proper labeling.
B. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
C. Plastic piping shall be stored and protected from direct sunlight. Support to prevent sagging and bending. Damaged or dented pipes and fittings shall not be used.

1.11 PROJECT CONDITIONS
A. Utilities
1. Call Texas 811 at least 48 hours prior to work for utility locates where necessary. Refer also to the civil, MEP, and other project Drawings for the locations of various utilities on the project site as a general guide, but without guarantee to accuracy. Use also visual cues such as utility markers for information. Proceed with care during trenching or excavation operations around marked utilities.
2. Contractor shall notify the Owner, of utilities found during excavation work that are not shown on the plans or any unexpected sub-surface conditions, and ask for direction.
3. Refer to the civil, MEP, and other project Drawings for the locations of various new utilities on the project site and coordinate with other trades when necessary.
B. Verification of Static Water Pressure
1. Contractor shall verify static water pressure prior to the start of any work. If static pressure is less than the design pressure, contact the Landscape Architect for direction before continuing any work.
2. If static pressure exceeds design pressure by 15%, then a pressure reducing valve shall be installed. Provide product indicated on the plans.
3. Work shall not proceed as designed if pressure problems exist. Contractor assumes full responsibility and cost for all necessary revisions due to failure to give such notification.
C. Water for Testing
1. The Owner shall furnish all water necessary for testing, flushing, and general operation until final acceptance.
D. Coordinate all irrigation work with site backfilling, landscape grading, and delivery of plant material.
E. The Contractor shall at all times protect new work from damage and theft and replace all damaged or stolen parts at own expense. The Contractor shall protect the Owner's property, such as buildings, utilities, pavement, trees, plantings, etc., from damage or loss. All damages to Owner's property caused by irrigation installation work shall be repaired at Contractor's cost and to the Owner's satisfaction.

1.12 WARRANTY AND GUARANTEE
A. Contractor shall guarantee the irrigation system against all defects of workmanship and materials for a period of one (1) year following the date of Final Acceptance of work by the Owner.
B. Contractor shall also guarantee all backfill areas of trenches for a period of one (1) year following the date of Final Acceptance of work by the Owner.
C. Should any operational deficiencies be noted during the guarantee period, which is determined to be caused by defective workmanship or materials, then the Contractor shall make corrections or replacements at no additional cost to the Owner and to the Owner's satisfaction.
1. Backfill areas which have settled shall be repaired. This shall include any adjustments to piping, valves, sprinkler heads, etc. when deemed necessary.
2. Sprinkler head and valve box cover elevations shall be raised or lowered to the proper grades in order to accommodate settlement.
3. Ensure full irrigation coverage throughout the guarantee period. Contractor shall make any necessary adjustments to maintain proper coverage.
4. Replace or repair any damaged plants, paving, or other improvements while making irrigation adjustments or correction work.

1.13 PROGRESS MEETINGS
A. Contractor shall attend progress meetings as requested by the Owner.

PART 2 - PRODUCTS

2.1 GENERAL
A. Refer to the irrigation Drawings for materials specified for work. Any substitutions must be submitted and approved prior to start of any work.
B. All materials furnished shall be new and without flaws or defects. Materials shall be standard products of manufacturers regularly engaged in the production of such materials, and shall be the manufacturers' latest standard design that complies with the specification requirements.

2.2 PIPES, TUBES, AND FITTINGS
A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes. Substitution of smaller pipes is not permitted. Larger sizes may be used if acceptable to the Landscape Architect.
B. PVC Pipe
1. New pipe continuously and permanently marked with the manufacturer's name or trademark, pipe size, class or schedule, type, working pressure at 73 degrees F, National Sanitation Foundation (NSF) rating, and commercial standard designation CS 256-63.
2. Main Line Piping
a. ASTM D2241, PVC, 1120, Class 200, SDR 21
3. Lateral Piping
a. 3/4 inch and greater - ASTM D2241, PVC, 1120 or 1220, Class 200, SDR 21
b. 1/2 inch - ASTM D2241, PVC, 1120 or 1220, Class 315, SDR 13.5
4. PVC Permanent Riser
a. Threaded gray Schedule 80 PVC pipe
5. PVC Sleeving
a. Pipe Sleeve: All irrigation sleeving shall be ASTM D1785 Schedule 40 PVC pipe. Sleeves shall be two (2) times larger than the pipe to be sleeved and no less than 4 inches in diameter.
b. Wire Sleeve: Use 2 inch diameter ASTM D1785 Schedule 40 PVC pipe.
C. Metal Pipe
1. Brass Pipe
a. 85% red brass, IPS standard weight 125 pounds
2. Galvanized Pipe
a. ASTM A53
b. Metal Conduit: Conduit for Controller Power, Above Grade Wires, and Weather Sensor - Use 1 inch diameter minimum galvanized steel tube.
3. Copper Tube
a. Hard Copper Tube - ASTM B88 Type K; drawn temper (for above grade piping)
D. Fittings and Connections
1. PVC Fittings and Connections
a. Socket fittings shall be ASTM D2466, Schedule 40 when joining PVC to PVC and ASTM D2467, Schedule 80 when joining PVC to metal.
b. All threaded PVC connections shall be ASTM D2464, Schedule 80.
c. Swing Joints shall be product indicated on Drawings. Acceptable equal are by Marlex and Lasco Fittings, Inc.
d. When connection is plastic to metal, male adapters shall be used. The male adapter shall be hand tightened, plus one turn with strap wrench. Connection shall be made using Teflon tape.
2. Galvanized Steel Pipe: ANSI B16.3 galvanized malleable-iron screwed fittings.
3. Copper Tube Fittings:
a. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings.
b. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
4. Brass Pipe Fittings: 85% red brass, IPS standard weight 125 pounds

2.3 JOINING MATERIALS
A. Solvent Cements for Joining PVC Piping: Shall conform to ASTM D2564. Include compatible colored primer according to ASTM F656.
1. Solvent cement shall be by Weld-On Adhesives, Inc. or T. Christy Enterprises.
2. Primer shall be a colored primer (purple) such as Weld-On P-68 by Weld-On Adhesives, Inc. or Purple Primer by T. Christy Enterprises.
B. Teflon Tape: Use Teflon tape for all threaded connections.
C. Solder Filler Metals: ASTM B32, lead-free alloys. Include water-flushable flux according to ASTM B813.

2.4 VALVES
A. Manual Valves
1. Bronze Gate Valves: Provide Nibco product indicated on Drawings.
2. Plastic Ball Valves at main line, quick coupling valves: Provide Spears True-Union ball valves (235 psi @ 73 Deg. F), gray color by Spears Manufacturing.
B. Backflow Preventers
1. The backflow prevention device must be approved by the American Society of Sanitary Engineers; or the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California; or the Uniform Plumbing Code; or any other laboratory that has equivalent capabilities for both the laboratory and field evaluation of backflow prevention assemblies.
2. Provide Zurn Wilkins product indicated on Drawings.
3. Backflow Enclosure: Shall be vandal and weather resistant, lockable, and able to be completely removed to access backflow device. Provide product indicated on Drawings - Gorilla Cage - Gorilla Manufacturing, Spring, TX (281-705-9701). Select appropriate size, green color.
4. Backflow Freeze Protection Blanket: Provide product indicated on Drawings - Dekorra Products, Rio, WI (1-888-635-8585). Select appropriate size, green color, R13 insulation factor.
C. Pressure Reducing Valves: Provide Zurn Wilkins product indicated on Drawings.

2.5 AUTOMATIC CONTROL VALVES
A. Master Control Valve
1. Provide Irritrol - 700 Series product indicated on Drawings.
B. Remote Control Valves
1. Provide Rain Bird PEB Series product indicated on Drawings.

2.6 SPRINKLERS
A. Pop-Up Spray Sprinklers and Rotors
1. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure. Each type of sprinkler head shall be of the same manufacturer.
2. Provide Rain Bird product with check valve indicated on Drawings.

2.7 QUICK COUPLERS
A. Provide Rain Bird product indicated on Drawings.
B. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, purple rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key. Install swing joints. Valve box lids must be purple.
1. Locking-Top Option: Vandal-resistant locking feature.
2. Install a ball valve upstream of quick coupling valve.

2.8 DRIP IRRIGATION SPECIALTIES
A. Dripline shall be continuous self-cleaning, recycled content, pressure compensating dripline with built-in check valve. The low volume dripline shall have integral and evenly spaced pressure compensating check valve emitters welded to the inside of the tubing.
1. Provide Netafim dripline product indicated on Drawings.
B. Control Valves, Filters, Pressure Regulators, Manual Flush Valves: Provide products indicated on Drawings.
C. Fittings: Provide products supplied by manufacturer of dripline.
D. Dripline Supply and Exhaust Headers: Class 200 PVC pipe.
E. Soil Staples - 6 inch length: Provide product supplied by manufacturer of dripline or comparable product.

2.9 CONTROLLERS
A. Provide Rain Bird product and mounting type indicated on Drawings.
B. Rain/Freeze sensor: Provide product indicated on Drawings.

2.10 CONTROL WIRES
A. Wires shall be solid copper wire, UL approved for direct burial in ground, UF type, with 4/64" insulation, and a minimum 14 AWG.
B. Waterproof Wire Connectors: Use Wade Connectors, Inc. - WC-14, 3M DBR/Y-6 Splice Kit, or Rainbird DBRY Wire Connectors.
C. Provide a valve box where wire splicing and additional wire storage runs are required.

2.11 VALVE BOXES
A. Valve boxes shall be constructed of plastic material made of fibrous inorganic, temperature resistant components.
B. Valve box size shall allow for adequate clearance to service equipment. Allow for a minimum of 3 inches of clearance from top of equipment and wires to bottom of lid.
C. Remote Control and Master Valves: Provide rectangular valve boxes with lockable lids and valve box extensions as required. Lid color shall be green.
D. Gate Valves, Ball Valves, and Wire Splices: Provide 10 inch round valve boxes with lockable lids and valve box extensions as required. Lid color shall be green.
E. Quick Coupling Valves: Provide rectangular valve boxes with lockable lids and valve box extensions as required. Lid color shall be purple.
F. Acceptable manufacturers include:
1. Highland Products (Armor) - Irrigation Turf Boxes
2. NDS - Pro Series Plus

2.12 ACCESSORIES
A. Fill material: Fill shall be imported material or excavated material that is free from 1/2 inch diameter or larger rock, organic material, and foreign debris.
B. Sand Fill: Sand encasement for all pipe, control wire, and electrical conduit shall be mortar sand.
C. Drain Gravel: 3/4 inch diameter clean, washed drain gravel.
D. Valve ID Tags: T. Christy Enterprises - Christy's Blank White Standard ID Tags; Purple ID tags at quick coupling valves
E. Filter Fabric: Dewitt 4 oz Filter Fabric - FF4OZ or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION
A. Contractor shall visit the project site to verify locations of all existing and proposed utilities through Texas 811 utility locates, visual inspection, and the use of project engineering drawings. Exercise care when excavating or trenching near utility lines. Contractor will be responsible for all damages to utility lines caused by neglect.
B. Should unknown utility lines or other obstructions be found during excavation, notify the Owner before proceeding with work. If work proceeds without contacting the Owner, the Contractor shall be held liable for any and all damages.
C. Verify site grades and proceed with work only if conditions are satisfactory.
D. Verify that required utilities are available, in proper location, and ready for use.

3.2 PREPARATION
A. Coordinate irrigation work with other site contractors to avoid installation conflicts.
B. Verify on site static water pressure. If pressure is less than or 15% greater than the design pressure, notify the Landscape Architect before continuing work.
C. Irrigation system layout shown on the drawings is diagrammatic only. Make minor adjustments to accommodate actual site conditions. Route piping to avoid trees, plants, and structures and locate sprinkler heads to obtain complete coverage.
D. Do not proceed with installation work as shown on the drawings if it is obvious in the field that major obstructions, grade differences, modified area dimensions exist, or discrepancies in equipment usage exist, that may have not been known during the time of design. Contact the Landscape Architect for direction. If notification is not made, then the Contractor shall assume full responsibility for installed work and shall be responsible for making any necessary revisions and bear all costs for doing such revisions.
E. All materials used for construction shall be protected from weather and damage, during transit and while in storage at the project site.
F. Layout and stake locations of system components. Obtain approval of layout prior to excavation work.
G. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.
H. Per TCEQ and state requirements, a licensed irrigator or licensed irrigation technician must be present at the site to oversee all irrigation installation work.

3.3 SLEEVES
A. Provide sleeves at new walkways, concrete and asphalt pavement, and elsewhere as required and shown on the drawings. If sleeves are to be provided by others, then coordinate locations with the General Contractor.
1. Provide PVC sleeves 18 inches minimum below paving materials and 24 inches minimum under roadways.
2. Sized equal to twice the diameter of the pipe or combination of pipes enclosed within the sleeve, but no less than 4 inches in diameter. Wire only sleeves can be 2" diameter in size.
3. Pipe in sleeves with joints shall be bell end only.
4. Extend sleeve 24 inches beyond edge of pavement at both ends and cap.
5. Mark end of all sleeves with a 1/4 inch diameter by 1 1/2 inch long brass stove bolt in concrete above end of sleeve.
6. Dimensioned locations of all sleeves are to be shown on Record Drawings.
B. Existing walks or other paved surfaces where sleeves have not been provided:
1. Bore beneath pavement. Wet boring is not allowed.
2. If boring is not possible, then cut existing pavement to install sleeve. Saw cut pavement smoothly to straight lines 8 inches wider than trench (4 inches each side of trench).
a. Excavate trench to required depth and width.
b. Remove cut out pavement and excavated material from the site.
c. Backfill with flowable fill to bottom of existing aggregate base. Install and compact aggregate base to match the depth of the existing base.
d. Repair or replace pavement cuts with equivalent materials and finishes to be flush with adjacent surface.
e. In concrete paved areas, repairs shall be reinforced to match existing concrete pavement and doweled to the adjacent slab in a manner acceptable to the Owner. All repairs shall also match existing pavement finishes.

3.4 TRENCHING
A. Trench Size
1. Trenches shall be excavated to a sufficient width and depth to allow for the proper handling and installation of pipe and fittings. Trenches shall be wide enough to allow a minimum of 6 inches between parallel pipes and 4 inches of sand bed on all sides of pipe.
2. Minimum Cover Over Top of Piping:
a. Main Line Piping and Quick Coupling Valve Piping: 18 inches
b. Lateral Piping: 12 inches
c. Outlet Piping: 12 inches
d. Control Wiring: 18 inches
e. Piping Under Traffic Loads: 24 inches
f. Control Wiring Under Traffic Loads: 24 inches
g. Driplines: 4 to 6 inches
B. Trench to accommodate grade changes.
C. Trenching Within Tree Drip Lines
1. Machine trenching is not permitted within the drip line of any existing trees.
2. Use hand trenching or bore under the root system. When possible, route piping around existing trees.
3. Tree roots that need to be cut shall not be greater than 3/4 inch in diameter. Cuts must be clean without frayed ends.
D. Maintain trenches free of debris, material, or obstructions that may damage pipe.
E. No open trenches or partially backfilled trenches shall be left overnight. If trenches need to be left open for inspection purposes, then cover with plywood or secure the area with proper fencing.

3.5 INSTALLATION
A. Install pipes, valves, controls, and outlets in accordance with manufacturer's instructions and Drawing details. Install all equipment within the property lines, unless equipment is designed to be in the street ROW.
B. Pipe
1. All irrigation PVC pipe installed shall follow progressive pipe sizing requirements so water flow velocity through pipe will not exceed 5 feet/second.
2. Install PVC piping in dry weather when temperature is above 40 Deg. F. Clean interior of pipe thoroughly and remove all dirt or foreign matter before lowering pipe into trench and keep clean during operation by plugs or other method. Replace any pipe that is found to be defective.
3. Lay PVC pipe on 4 inch level sand subbase, uniformly sloped without humps or depressions.
4. Lay all pipe with material designations pointing up to accommodate visual verification.
5. Long runs of PVC pipe shall be slightly snaked in the trench to allow for thermal expansion and contraction.
6. All sprinkler lines in a common trench shall have a minimum clearance of 6 inches from each other when parallel. Install no more than two lines in a common trench. All lateral and other connections to the main line shall be made to the side of the main line. No connections to the top of the main line shall be allowed.
7. All off-sets shall be made with fittings. All plastic to plastic joints shall be solvent weld joints or slip seal joints.
8. Plastic PVC pipe shall be cut with PVC pipe cutters or hacksaws in a manner to ensure a square cut. Burrs at cut ends shall be removed (ream ends) prior to installation.
9. Sprinkler Pipe Through Structures
a. At penetrations, through walls, etc., core drill for pipe sleeve size as required.
b. At exterior face, leave a perimeter slot approximately 1/2 inch wide by 3/4 inch deep.
c. Fill this slot with backer rod and an acceptable elastomeric sealant.
d. Repair any below grade waterproofing disturbed by this work and make penetration watertight.
C. Joints for PVC Pipes
1. Solvent Welded Joints
a. Use solvents and methods by pipe manufacturer.
b. Clean all pipe ends and fittings with a clean, dry cloth. Apply purple colored primer with a dauber and allow to dry. Do not use an excessive amount.
c. A uniform coat of solvent shall be applied with a dauber to the outside of the pipe first and then to the inside of the fitting. Insert pipe firmly into the fitting and twist one quarter of a turn. Hold position for a few seconds. Wipe off any solvent residual from the joint with a rag.
d. Cure all joints a minimum of 1 hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.
2. Threaded Joints
a. Use Teflon tape on all threaded PVC fittings.
b. Use only a strap type friction wrench. Do not use metal jawed wrench.
c. Use male adapters at plastic to metal connections. The male adapter shall be hand tightened, plus 1 turn with a strap wrench. Joint compound shall be Teflon tape.
D. Sprinkler Heads
1. All water lines shall be thoroughly flushed out before the sprinkler heads are installed.
2. Install heads per manufacturer's specifications and to the proper elevations. Refer to the Drawings for products specified.
3. Locate heads a minimum of 6 inches away from adjacent pavement, curb, sidewalk, etc. and a minimum of 12 inches from building surfaces.
4. Head spacing shall be as per Drawings. If adjustments are necessary, head spacing shall not exceed the manufacturer's published radius.
5. Provide flexible swing joint risers or pre-fabricated swing joints at all sprinkler heads. Pre-fabricated swing joint risers shall be Schedule 80 rated.
6. Check for uniformity of coverage and adjust nozzles to obtain the proper spray radius and arc to prevent overspray onto adjacent pavement and structures.
7. No sprinkler heads are allowed to be installed in a planting area that is less than 4 feet in width dimension.
8. All sprinkler heads on slopes shall have factory installed check valves to prevent head puddling.
E. Driplines
1. Install driplines per manufacturer's specifications and instructions. Refer also to Drawing details for installation guidelines.
2. Layout dripline tubing a minimum of 1 hour prior to installation. The driplines shall be laid out as straight as possible to allow for added flexibility of pipe and ease of installation.
3. Install driplines 4 inches away from edge of planting bed area or pavement.
4. Bury dripline 4 inches below finish grade in turf areas and 4 to 6 inches below finish soil grade in planting areas before mulch placement.
5. Install 6 inch length soil staples every 4 feet maximum along dripline and before and after all turns.
F. Remote Control Valves
1. Install remote control valves in suitable sized valve boxes and group together where practical. Install one valve per valve box and use valve box extensions when necessary. Remote control valves shall be placed adjacent to main lines.
a. Place 4 bricks under box for support.
b. Install 4 inch depth minimum drain gravel under box for drainage.
c. Attach ID tags to solenoid wires to identify station.
d. Allow a minimum clearance of 3 inches from top of equipment and wires to bottom of valve lid.
2. Place boxes a minimum of 12 inches from edge of pavement, curb, fence, planting bed, structures, etc. Neatly align boxes with separation between boxes to be 12 inches.
3. Top of valve boxes shall be flush with top of mulch layer in planting beds. At turf areas, top of valve boxes shall be set 1/2 inch above finish grade at hydromulch or seeded areas and 1 1/2 inches above finish grade at sodded areas. Place valve boxes in planting areas whenever possible.
G. Master Control Valve
1. Refer to the Drawings for product specified and location. Refer to Drawing details and remote control valve section of this specification for installation guidelines.
2. The master control valve must be installed on the discharge side of the backflow prevention assembly.
H. Quick Coupling Valves
1. Refer to the Drawings for product specified and locations. Refer also to Drawing details for installation guidelines.
2. Install quick coupling valve on a swing joint assembly in a rectangular valve box. Fill box with drain gravel up to 6 inches below top of lid and to 6 inch depth under box. Use 4 bricks to support box.
a. A ball valve must be installed upstream of the quick coupling valve.
b. Color of valve box lid must be purple.
c. Attach a purple valve ID tag stating "Non-Potable, Not Safe for Drinking" to valve.
3. Locate quick coupling valves for easy access. Top of valve boxes shall be flush with top of mulch layer in planting beds. At turf areas, top of valve boxes shall be set 1/2 inch above finish grade at hydromulch or seeded areas and 1 1/2 inches above finish grade at sodded areas.
I. Automatic Controller
1. General Contractor shall provide a power connection (120 VAC) to the controller location. Coordinate and confirm final controller location with Owner. Hardwiring from the power source to the controller shall be coordinated by the Contractor and performed by a licensed electrician. Hardwire controller to power source in accordance with all codes and requirements. Provide an emergency disconnect located within 6 feet of the controller. Contractor shall test controller per manufacturer's instructions.
2. Connect remote control valves to controller in a sequence to correspond with station setting beginning with stations 1, 2, 3, etc.
3. Metal conduit for power source, control wires, and communication wire to weather sensor shall be 1 inch diameter minimum galvanized steel tube.
4. Provide grounding protection per manufacturer's instructions for controller.
5. Test the controller by setting seasonal run times for each station and other programmable features to ensure proper functioning of controller.
6. Weather Sensor: Contractor shall install weather sensor per manufacturer's instructions. Place weather sensor in a location that is open to rainfall and away from sprinkler spray pattern.
7. A permanent sticker which contains the irrigator's name, license number, company name, telephone number, and the dates of the warranty period shall be affixed to the automatic controller installed by Contractor. Type the information or use permanent ink.

PLACE MATRIX
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SEAL

STATE OF TEXAS
IRIS S. PUH
12060
LICENSED IRRIGATOR
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.

PROJECT NUMBER: 201803

DRAWN BY: ISP

CHECKED BY: ISP

ISSUE DATE

04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

SPECIFICATIONS

SHEET NUMBER

22

J. Control Wires
1. Install control wires with irrigation mains and laterals in common trenches wherever possible. Lay wire adjacent to pipe in trench. Snake wires in trench to allow for thermal expansion and contraction of wires.
   a. When more than one wire is in the trench, tape wires together at 10 foot intervals with 3/4 inch black electrician tape.
   b. Tie all wires to main line at every 10 foot intervals using nylon Ty-Rap (Thomas & Betts) cable ties.
   c. Provide 12 inch length wire expansion loop at 100 foot intervals.
2. Provide control wire connections at remote control valves with waterproof connectors.
3. Line splices will only be allowed on wire runs of more than 500 hundred feet. Splice each connection with separate wire connectors. Place all splices in a 10 inch round valve box with green lids.
4. Provide wire slack (expansion coil) by coiling 24 inches of control wire at each remote control valve connection and wire splice locations. Coil by wrapping wire around a 1/2 inch section of pipe.
5. Use a minimum 14 AWG control wires of a solid color from the controller to each valve and a minimum 14 AWG white common wire.
6. Extra Wires: Install wires for future use in a valve box at the furthest locations(s) on the site. Provide 6 feet length of extra wire in valve box.

K. Backflow Preventer
1. Install specified backflow prevention device and associated pipe and fittings to water supply per manufacturer's instructions, Drawing detail, and local codes.
2. Ensure proper ground clearances are achieved.
3. Backflow preventer must be tested and certified by a certified backflow tester. Submit test results to the local water purveyor and Owner within 10 business days of testing.

L. Isolation Gate Valve
1. Refer to the Drawings for product specified and location. Refer also to Drawing details for installation guidelines.
2. Install gate valve in a 10 inch round valve box. Provide 6 inch depth drain gravel under box and use 3 bricks to support box.

3.6 FIELD QUALITY CONTROL AND TESTING OF SYSTEM

A. Hydrostatic Test of Main Lines
1. Prior to backfilling, test system for pressure and water leakage at main line piping and gate valves. Perform hydrostatic tests when solvent welded PVC joints have cured at main lines. Do not install lateral lines.
2. Test system to maintain 130 psi pressure for a minimum of 4 hours. Purge air from piping before testing.
3. System is acceptable if no water leakage or loss of pressure greater than 5 psi occurs during test period. Repair sections that do not pass and retest until system passes.
4. Contractor shall provide the proper pump and equipment necessary to perform test.

B. Flushing of System
1. After lateral piping and risers are in place, but prior to the installation of irrigation heads, a full head of water shall be used to flush out the system.

C. Hydrostatic Test of Lateral Lines
1. After the system is thoroughly flushed, the risers shall be capped off and the system pressure tested. Ensure that the solvent welded PVC joints have cured.
2. Test system to maintain 100 psi pressure for a minimum of 2 hours. Purge air from piping before testing.
3. System is acceptable if no water leakage or loss of pressure greater than 5 psi occurs during test period. Repair sections that do not pass and retest until system passes.
4. Testing of the system shall be performed after completion of each section or completion of the entire system.

3.7 BACKFILLING

A. Prior to backfilling, contact the Landscape Architect for approval of a representative section of work. Any work that is backfilled without inspection shall be uncovered when requested.
B. After installation, testing, and approval of piping and controls, place a 4 inch sand cover over and around all pipes in trench.
C. Place excavated material or imported backfill material in level 6 inch loose layers and tamp each layer to compact it to the density of the adjacent undisturbed soil or to 90% standard density. Use also water injection to help settle backfill. Backfill material must be free of rock and other unsuitable materials to prevent damage to pipe.
D. Fill top of trench with planting soil mix specified in the Planting specifications to the proper depth and finish grade.

3.8 ADJUSTING

A. Adjust controller system settings to achieve time cycles required.
B. Adjust head types for full water coverage, proper alignment, and direction of throw. Elevation of heads shall be flush with, but not more than 1/2 inch above finish grade.
C. Adjust nozzles to prevent overthrow onto pavement and structures.
D. Adjust remote control valves for proper flow rates at rated operating pressure required for each zone.

3.9 CLEAN UP

A. During the course of construction, Contractor shall keep work areas clean at all times.
B. Perform cleanup work upon completion of all irrigation installation and prior to Substantial Completion inspection.
1. Haul off all excavated materials, debris, excess equipment, and trash.
C. Repair any damages caused to site, structures, lawn areas, or plant material during installation work.

3.10 PROJECT INSPECTION AND FINAL ACCEPTANCE

A. The Contractor shall request a Substantial Completion review from the Owner once the irrigation installation is sufficiently complete. During the Substantial Completion review, a punch list will be generated by the Landscape Architect. Once the punch list items are completed, Contractor shall request a Final Acceptance inspection.
1. All punch list items must be completed before final inspection is requested. If Landscape Architect is required to make additional trips for inspections beyond Final Acceptance inspection, then the Contractor will be invoiced for such visits.

B. After Final Acceptance, Contractor shall submit all closeout items listed in this specification section to the Owner.
C. Contractor shall be prepared to train Owner's maintenance personnel in the proper operation of the irrigation system, as required.
D. The Contractor shall be responsible for programming the controller with the proper water application rates and timer cycling. Contractor shall also instruct the Landscape Contractor on the operation and programming of the controller and continue this assistance during the entire warranty period.

END OF SECTION

STATE OF TEXAS
IRIS S. PUH
12060
LICENSED IRRIGATOR
04-16-2018

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Work includes all services, labor, materials, transportation, and equipment necessary to perform the work shown on the drawings and as specified in the specifications.
B. Section Includes:
1. Hydroseeding.
2. Turfgrass Renovation.
C. Related Sections (include but are not limited to):
1. Section 32 84 00 Irrigation
2. Section 32 93 00 Planting
3. Civil Plans - on grading, drainage, excavation, backfilling

1.3 REFERENCES

A. American National Standards Institute, Inc. (ANSI)
ANSI A300 (Part 10) – Integrated Pest Management (IPM)
B. US Composting Council – Reston, VA (301-897-2715) - www.compostingcouncil.org
C. Howard Garrett, John Ferguson, & Mike Amaranthus. Organic Management for the Professional. 2012. Austin: University of Texas Press.

1.4 DEFINITIONS

A. Amendment: Material added to topsoil to produce planting soil mix. Amendments are classified as general soil amendments, fertilizers, biological, and pH amendments.
B. Compaction: A loss of soil aggregates, destroyed aeration pore spaces, crushed or collapsed pore spaces, and extensive resorting and packing of soil particles.
C. Compost: Well decomposed, stable organic material as defined by the US Composting Council.
D. Fine Grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes or other suitable devices.
E. Finish Grade: Elevation of finished surface of planting soil after fine grading.
F. Planting Soil: Existing native surface topsoil, imported topsoil, or manufactured topsoil that has been modified with soil amendments to produce a soil mixture best for plant growth.
G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
H. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 SUBMITTALS

A. Qualification Data for Installer.
B. Product Data: Submit Manufacturer's catalog sheets, samples, product certificates, labels, or technical literature of all materials specified before work begins (at least 8 weeks). Mark or highlight in color which product is to be used. Submit two (2) hard copies or provide in an electronic format. At a minimum, submit to the Landscape Architect the following:
1. Topsoil Sample - 1 gallon plastic bag & supplier info.
2. Compost Sample - 1 gallon plastic bag & name and address of compost facility
3. Topsoil Mix with Compost from a Bulk Supplier Sample (if used) - 1 gallon plastic bag & supplier info. & data sheet
4. Grass Seed or Mix Certificates: From seed vendor for each grass seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
5. Fiber Mulch for Hydroseeding Work
6. Fertilizer (if used)
7. Pesticides and Herbicides (with applicator's state license when required)
C. Soil and Compost Analysis: Submit testing results of topsoil and compost, or if used, topsoil mix with compost by a bulk supplier.
D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of grass during a calendar year.
E. After a submittal has been approved, substitutions will not be allowed except by written consent of Landscape Architect.

1.6 QUALITY ASSURANCE

A. Installer Qualifications
1. Company specializing in performing the work of this section with minimum 5 years of experience in similar size and scope of work.
2. Professional Membership: Installer shall be a member in good standing of the American Nursery and Landscape Association or have other horticultural qualifications.
3. Commercial Pesticide/Herbicide Applicator: Current state license.
   a. Application of regulated pesticides or herbicides shall be performed by a person maintaining a current state license. Submit copies of all chemical applicator licenses.
4. Installer shall have an experienced full-time supervisor on Project Site at all times when work is in progress. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.

B. Seed Certificates: Provide certificates of inspection.
C. Soil Testing/Analysis: Required testing, analysis, and inspection shall be at the Contractor's expense.
1. Unless otherwise provided, the Contractor shall engage an independent accredited testing agency, experienced in the testing of agricultural soils and acceptable to the Landscape Architect, to perform soil testing and analysis.
   a. Submit samples to Texas Plant and Soil Lab (TPS Lab), Edinburg TX or equal.
2. Testing and Analysis Requirements for Topsoil:
   a. Particle size analysis (percent dry weight) and USDA soil texture analysis.
   b. Determine pH and percent organic content by oven dried weight.
   c. Nutrient levels by parts per million including: nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium, sulfate-sulfur (SO $_4$S), and nitrate-nitrogen (NO_3-N).
   d. Nutrient test shall include the testing laboratory's recommendations for supplemental additions required to bring pH, organic content, and nutrient content to satisfactory levels for optimal turfgrass planting conditions. Request also a soil amendment recommendation stating the amount of compost required to bring soil organic matter to a minimum of between 3% to 5% dry weight.
   e. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
   f. Cation Exchange Capacity (CEC),
3. Testing and Analysis Requirements for Prepared Soil Mix with Compost from a Bulk Supplier (if used instead of topsoil amended with compost):
   a. In addition to items above under topsoil, testing shall also include moisture content, C:N ratio, and a Solvita test (compost maturity test).

D. Compost Testing/Analysis: Required testing, analysis, and inspection shall be at the Contractor's expense.
1. Contractor shall engage an independent accredited testing agency, using Test Methods for the Examination of Composting and Compost (TMECC), to perform compost testing and analysis.
   a. Submit samples to Texas Plant and Soil Lab (TPS Lab), Edinburg TX or equal.

2. Testing and Analysis Requirements for Compost:
   a. Determine pH value.
   b. Soluble salt concentration (electrical conductivity) - dS/m (mmhos/cm).
   c. Moisture content - percent, wet weight basis.
   d. Organic matter content - percent, dry weight basis.
   e. Particle size - percent passing a 3/4 inch screen or smaller - dry weight basis.
   f. Stability carbon dioxide evolution rate - mg CO_2-C per g OM per day.
   g. Solvita test (compost maturity test).
   h. Carbon to nitrogen (C:N) ratio.
   i. Physical contaminants (inerts) - percent, dry weight basis.
   j. Chemical Contaminants - mg/kg (ppm).
   k. Biological contaminants - MPN per gram per dry weight

E. Testing/Analysis of Topsoil or Compost Provided by Bulk Supplier
1. Topsoil or compost testing is not required if recent statements of analysis are available from the bulk supplier. Submit supplier's analysis results for bulk material. If supplier analysis is not available or inadequate, then submit samples to a testing agency for analysis.

F. If topsoil or compost fails to meet the specifications listed in Part 2, obtain other sources of material, retest and resubmit until accepted by the Landscape Architect.

1.7 REGULATORY REQUIREMENTS

A. All work shall conform to applicable local codes, ordinances, or regulations for installation and materials.
B. Contractor is responsible for acquiring all necessary city or local permits and for notifying the appropriate agencies for any required inspections.
C. Submit to Owner certificates of inspections required by governmental authorities.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaged Material
1. Materials shall be delivered in unopened and undamaged packages or containers with the proper labeling such as name and address of manufacturer, weight, certified analysis, and indication of compliance with state and Federal laws, if applicable. Materials shall be properly stored on site to prevent damage and deterioration.

B. Bulk Material
1. Protect all bulk stockpiles from wind, rain, and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust, and debris that may be detrimental to plants or soil drainage. Cover stockpiles with filter fabric at the end of each workday.

1.9 PROJECT CONDITIONS

A. Utilities
1. Call Texas 811 at least 48 hours prior to work for utility locates where necessary. Refer also to the civil, MEP, and other project Drawings for the locations of various utilities on the project site as a general guide, but without guarantee to accuracy. Use also visual cues such as utility markers for information. Proceed with care during excavation operations around marked utilities.
2. Contractor shall notify the Owner, of utilities found during excavation work that are not shown on the plans or any unexpected sub-surface conditions, and ask for direction.
3. Refer to the civil, MEP, and other project Drawings for the locations of various new utilities on the project site and coordinate with other trades when necessary.

B. Coordinate all grass work with landscape grading and delivery of plant material.
C. The Contractor shall at all times protect new work from damage and theft and replace all damaged or stolen materials at own expense. The Contractor shall protect the Owner's property, such as buildings, utilities, pavement, trees, plantings, etc., from damage or loss. All damages to Owner's property caused by grass installation work shall be repaired at Contractor's cost and to the Owner's satisfaction.

1.10 MAINTENANCE PERIOD

A. Contractor shall maintain all grass work for a period of 90 days following the date of Final Completion of work.
B. Should any deficiencies be noted during the maintenance period, then the Contractor shall make corrections at no additional cost to the Owner and to the Owner's satisfaction.
C. Refer to maintenance requirements and items per Part 3.
D. When work is accepted in parts, the maintenance period shall extend from each of the partial Final Completion acceptances to the terminal date of the last maintenance period. Thus, the maintenance period shall terminate at one time.

1.11 PROGRESS MEETINGS

A. Contractor shall attend progress meetings as requested by the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer also to the Drawings for materials specified for work. Any substitutions must be submitted and approved prior to start of any work.
B. All materials furnished shall be new and without defects. Materials shall be standard products of manufacturers or suppliers regularly engaged in the production of such materials and comply with the specification requirements.

2.2 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with Association of Official Seed Analysts (AOSA) "Rules for Testing Seeds" for purity and germination tolerances.
1. Seed shall be standard grade seed of the most recent season's crop, with minimum 85% purity, minimum 90% germination, and not more than 0.5% weed seed. Seed shall be dry and free of mold.
2. Provide seed in containers clearly labeled to show seed name, lot number, net weight, percentage weed seed content, and guaranteed percentage of purity and germination.
3. Provide state certified Bermuda grass (Cynodon dactylon) seed.
   a. Warm Season Application Rate (March 2 to September 14):
      Apply seed at 2 pounds per 1,000 SF.
   b. Cool Season Application Rate (September 15 to March 1):
      Apply Bermuda seed at 2 pounds per 1,000 SF.
      Apply annual rye grass seed (Lolium multiflorum) at 6 pounds per 1,000 SF.
4. Overseeding with Warm Season Grass
   a. If warm season grass seed is not seeded with cool season grass, then warm season grass is to be overseeded during the spring.
   b. Mow rye grass closely and allow to burn out.
   c. Once rye grass has burned out, lightly scarify soil and overseed with specified warm season grass.

2.3 TOPSOIL

A. Topsoil shall be a sandy loam or loam soil as defined by the USDA Soil Conservation Service, Soil Classification System, and shall have the following analysis:

Soil Textural Class	% of Total Weight
Sand (0.05-2.0 mm dia.)	15 to 67
Silt (0.002-0.05 mm dia.)	10 to 50
Clay (less than 0.002 mm dia.)	5 to 50

1. Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 1 inch in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth.
2. 100% shall pass through a 3/8 inch (9.5 mm) screen.
3. Topsoil shall not contain weed seeds in quantities that cause noticeable weed growth in the final planting areas.
4. Topsoil shall have a pH range of 5.5 to 7.0.
5. Soluble salt level: Less than 6 mmhos/cm.

B. Amending Topsoil with Compost to Improve Soil Quality:
1. Topsoil shall be amended with compost at a rate based on the soil analysis results to improve soil organic matter to a level suitable for grass establishment.
2. Topsoil percent organic matter with amendments (by dry weight) shall be between 3% and 5%.

2.4 PLANTING SOIL MIX BY BULK SUPPLIER

A. Contractor may also use prepared soil mix by a bulk supplier.
1. Soil mix shall consist of sandy loam topsoil with organic amendments such as compost. Final tested organic matter content shall be between 3% and 5% (by dry weight).
2. Acceptable suppliers and products or approved equal:
   a. Simple Soil - Gardenville, San Antonio, TX (210-651-6115)
   b. New Earth, San Antonio, TX (210-661-5180)

2.5 ORGANIC SOIL AMENDMENTS

A. Compost: Shall be blended and ground leaf, wood, and other plant based material, composted for a minimum of 9 months and at temperatures sufficient to break down all woody fibers, seeds, and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant based materials designed to produce Compost high in fungal material.
1. Compost shall be commercially prepared compost that meets US Compost Council STA/TMECC criteria.
2. Compost shall comply with the following:
   a. pH: 6 - 8.5
   b. Soil salt (electric conductivity): Maximum 10 dS/m (mmhos/cm).
   c. Moisture content percent, wet weight basis: 30% - 60%.
   d. Organic matter content, dry weight basis: 30% - 65%.
   e. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smaller.
   f. Stability carbon dioxide evolution rate: mg CO_2-C per g OM per day < 8.
   g. Solvita maturity test: > 6.
   h. Carbon to nitrogen ratio shall be between 25:1 and 30:1.
   i. Physical contaminants (inerts), percent, dry weight basis: <1%.
   j. Chemical contaminants, mg/kg (ppm): Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels.
   k. Biological contaminants, select pathogens, fecal coliform bacteria, or salmonella: Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels.
3. Muddy compost is not acceptable for use.

B. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

2.6 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural limestone containing a minimum of 80% calcium carbonate equivalent, by weight. Class: T, with a minimum 99% passing through No. 8 (2.36 mm) sieve and a minimum 75% passing through No. 60 (0.25 mm) sieve. Form: Finely ground dolomitic limestone. Rate of lime shall be based upon soil test report.
B. Sulfur: Granular, biodegradable, and containing a minimum of 90% sulfur.
C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20% iron and 10% sulfur.
D. Agricultural Gypsum: Minimum 90% calcium sulfate, finely ground with 90% passing through No. 50 (0.30-mm) sieve.
E. Aluminum Sulfate: Commercial grade, unadulterated.
F. Sand: Clean, washed, natural angular grains, free of toxic materials. Coarse concrete sand, complying to ASTM C33 Fine Aggregate, with a Fines Modulus Index between 2.8 and 3.2.

2.7 MULCH FOR HYDROSEEDING (HYDROMULCHING)

A. Hydraulic Mulch: Biodegradable, dyed-wood (green) for easy visual identification during application, cellulose fiber mulch; non-toxic and free of plant growth or germination inhibitors; with a maximum moisture content of 15% and a pH range of 4.5 to 6.5.
B. Acceptable suppliers and products or approved equal:
1. Cellulose Fiber Mulch
   a. Terra-Mulch Cellulose - Profile Products (1-800-508-8681)
   b. Conwed Fibers Cellulose - Profile Products (1-800-508-8681)

2.8 FERTILIZERS

A. Amending topsoil with compost to improve soil organic matter and quality reduces or eliminates the need for the use of fertilizers. Therefore, apply fertilizer at time of planting only if required by the soil test results.
1. Apply Nitrogen (N), Phosphorus (P) and Potassium (K) in amounts recommended in the soil test results. Apply all fertilizer per manufacturer's instructions.
B. Fertilizer shall be delivered in undamaged, unopened containers or packaging showing the manufacturer's name, address, product weight, and guaranteed analysis.
C. Fertilizer shall be uniform in composition, dry, and free flowing. Any loose fertilizer that has caked or becomes unsuitable for use shall be removed from the project site and properly disposed of.
D. Fertilizers
1. Organic Fertilizer: Fertilizer derived from natural sources. Preference is given to using organic based fertilizers.
2. Commercial Fertilizer: Commercial grade complete granular or pelleted fertilizer of neutral character, consisting of fast and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorus, and potassium.
3. Slow Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water in-soluble nitrogen, phosphorus, and potassium.
4. Submit product information if used.

2.9 WEED, INSECT, AND DISEASE CONTROL

A. General: Preference is given to using non-toxic methods for control. Utilize integrated pest management (IPM) practices by using physical, mechanical, and biological controls first before using chemical treatments. Limit the use of chemicals and use targeted chemical controls as a last resort. Use of organic based products is encouraged.
1. Pesticides, herbicides, fungicides, or any other chemical compounds used shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application.
B. Weed Control:
1. Pre-Emergent Herbicide: Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer. Submit product for approval if used.
2. Post-Emergent Herbicide: Effective for controlling weed growth that has already germinated.
   a. First use manual methods to move weeds.
   b. Spot treat weeds with a vinegar formula: 1 gallon full strength 10%-20% vinegar, 2 oz. orange oil, 1 teaspoon liquid soap
   c. As a last resort, use approved herbicides.
3. Spot treat with vinegar or fatty-acid based organic products. Acceptable suppliers and products or approved equal:
   a. Burnout - Bonide Products, Inc., Oriskany, NY (315-736-8231)
   b. Scythe - Gowan Co., Yuma AZ, (1-800-883-1844)
   c. Weed and Grass Killer - Safer Brand, St. Ulitz, PA (1-855-7-Organic)
   d. Weed Killer - Avenger Organics, Buford, GA (678-546-5009)

C. Insect Control:
1. Do not use regulated pesticides unless authorized in writing by authorities having jurisdiction. Use a licensed and authorized applicator if a regulated pesticide specifies so. Most organic based products do not require a licensed applicator.
2. Submit product information if used.
3. Refer also to Howard Garrett's Dirt Doctor website (www.dirtdoctor.com) for an organic control solution for a specific pest.

D. Disease Control:
1. Submit product information if used.

2.10 WATER

A. Water source shall be potable water from the city main.
B. All irrigation installation work in turfgrass areas must be complete before planting begins.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Call Texas 811 for utility locates where necessary before work. Contractor shall visit the project site to verify locations of all existing and proposed utilities through visual inspection and the use of engineering drawings. Exercise care when excavating near utility lines. Contractor will be responsible for all damages to utility lines caused by neglect.
B. Should unknown utility lines or other obstructions be found during excavation, notify the Owner before proceeding with work. If work proceeds without contacting the Owner, the Contractor shall be held liable for any and all damages.
C. Verify site grades and proceed with work only if conditions are satisfactory.
D. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, or acid has been deposited in soil within a planting area.
2. If soil contamination is present within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
E. All site grading, irrigation installation, and hard surface paving adjacent to grass areas, including concrete walks and road work, must be completed prior to start of grass work.

3.2 PREPARATION OF GRASS WORK AREAS

A. Coordinate work with other site contractors to avoid installation conflicts.
B. Do not proceed with installation work as shown on the drawings if it is obvious in the field that major obstructions, grade differences, and modified area dimensions exist that may have not been known during the time of design. Contact the Landscape Architect for direction. If notification is not made, then the Contractor shall assume full responsibility for any revisions made to the design.
C. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, and plantings from damage caused by grass planting operations and installation.
1. Protect adjacent and adjoining areas from hydromulch slurry overspray.
D. Install erosion control measures (SWPPP) to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
E. All materials used for construction shall be protected from weather and damage, during transit and while in storage at the project site.

3.3 PREPARATION OF SUBGRADE

A. Subgrade shall be examined to ensure that rough grading and all other subsurface work in grass areas are done prior to spreading topsoil.
B. Subgrade shall be brought to true and uniform grade, and shall be cleared of stones greater than 1 inch, sticks, and other extraneous material.
C. Subgrade shall be loosened or scarified to a minimum depth of 4 inches prior to spreading topsoil to allow bonding of soils. In areas where vehicles or equipment have compacted soil, scarified subgrade to a minimum depth of 6 inches.

3.4 PLACEMENT OF PLANTING SOIL

A. Topsoil Amended with Compost: Compost shall be pre-blended with topsoil prior to placement. Refer to soil testing lab results for amount of compost needed to amend topsoil to proper organic matter content.
1. Place 4 inches of topsoil with compost over exposed subgrade. Incorporate some of the soil into the top 3 inches of scarified subgrade material to avoid stratified layers. Spread soil in a uniform layer, to a thickness, which will compact to the depth required to bring final grass surfaces to the required elevation. Unless otherwise indicated, minimum depth of topsoil shall be 4 inches after compaction.
B. Topsoil shall not be spread unless it is followed immediately, within 24 hours, with grass work operations. If topsoil is spread and left unplanted for an extended period of time, it shall be cultivated to loosen soil prior to start of grass work.
C. Topsoil shall not be placed when subgrade or topsoil material are excessively wet, or excessively dry. If topsoil is dry, water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 APPLYING STARTER FERTILIZER OR SOIL AMENDMENTS

A. After topsoil placement, apply pre-plant fertilizer or other amendments, if required by soil testing, at the recommended application rate per the soil testing lab.
B. The required amounts of pre-plant fertilizer or amendments shall be spread over the entire area to be planted and mixed thoroughly into the upper 4 inches of topsoil and lightly watered.
C. To minimize potential nutrient leaching to groundwater, starter fertilizer shall not be applied within 48 hours of a potential rain event.

3.6 FINE GRADING

A. Fine grade topsoil surface with a drag or rake. Grade planting areas to a smooth, uniform surface with loose, uniformly fine texture. Final surface of topsoil immediately before planting shall be within plus or minus 1/2 inch of required finish elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Rolling with a light roller is acceptable, if the surface is scarified afterward.
1. At edges adjacent to curbs, paved areas, etc., finish grade shall be 1/2 inch below adjacent hard surface for hydroseed areas.
2. Ensure positive surface drainage, or flow as per Drawings, and positive flow away from buildings and structures is established.
3. Stones, roots, and other debris greater than 1 inch in any dimension, and which are visible at the surface, shall be removed and the resulting holes filled with topsoil, leaving a uniform planar surface.

B. In the event of settlement, the Contractor shall re-adjust the work to required finished grade.

3.7 HYDROSEEDING (HYDROMULCHING)

A. At edges adjacent to curbs, paved areas, etc., ensure that finish grade is 1/2 inch below adjacent hard surfaces prior to hydroseeding.
B. Hydroseeding shall be done with a commercial machine designed for the hydraulic application of seed mix in a slurry. Mix specified seed and fiber mulch in sufficient water in the tank of the machine. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. The slurry shall be thoroughly and constantly agitated, so the materials are uniformly mixed and suspended in the water at all times until tank is emptied.
C. Fiber mulch application rate used shall conform to the manufacturer's labels for the materials used in the slurry and at a minimum of 2,000 pounds per acre. Spray or apply slurry uniformly to all areas to be seeded. Avoid spraying onto adjacent plants or structures. Remove any over-sprayed slurry mix from adjacent plants and structures.
D. Contractor shall hydroseed all areas disturbed by construction activities whether in or outside of property limits.
E. Following germination of the seed, areas lacking germination larger than 8 inches by 8 inches must be reseeded.
F. During the first two to three weeks or until uniform grass growth, water daily or more frequently, as necessary, to maintain moist soil to a minimum depth of 2 inches. Watering shall not cause erosion or displacement of hydromulch.

3.8 TURFGRASS RENOVATION

A. All soil areas on and off property limits or in the R.O.W. disturbed by construction operations, whether indicated or not on the Drawings, shall be grass hydromulched.
1. Renovate turfgrass damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
2. Reestablish turfgrass where settlement or washouts occurred or where minor regrading occurred.
B. Removal of Contaminated Soils: Topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, shall be removed and replace with new topsoil.
C. Soil Preparation: Till the stripped, bare, or compacted areas thoroughly to a soil depth of 6 inches. Install new topsoil, where necessary, to fill low spots and to meet proper finish grades.
1. Till 1 inch depth of compost into top 4 inches of existing native topsoil.
2. Fine grade soil areas to a uniform surface and ensure positive drainage is achieved.
D. Apply hydromulch to all disturbed areas as required for new turfgrass.
E. Water newly hydromulched areas and keep moist until new turfgrass is established.

3.9 CLEAN UP

A. During the course of construction, Contractor shall keep work areas clean at all times.
B. Perform cleanup work upon completion of grass work installation and prior to Substantial Completion inspection.
1. Haul off all excavated materials, debris, excess soil material, and trash.
2. Sweep or wash off all pavement and roadways. Remove over-sprayed hydroseed material from surfaces.
C. Repair any damages caused to site, structures, or plant material during installation work.
D. Remove any erosion control (SWPPP) measures installed after grass has established.

3.10 PROJECT INSPECTION

A. The Contractor shall request a Substantial Completion review from the Owner once grass work is sufficiently complete. During the Substantial Completion review, a punch list will be generated by the Landscape Architect. Once the punch list items are completed, Contractor shall request a Final Completion inspection.

PLACE MATRIX
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SEAL

REGISTERED LANDSCAPE ARCHITECT
IRIS S. PUH
2639
STATE OF TEXAS
02-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.

PROJECT NUMBER: 201803

DRAWN BY: ISP

CHECKED BY: ISP

ISSUE DATE

04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE

SPECIFICATIONS

SHEET NUMBER

23

3.11 LAWN MAINTENANCE
- A. Maintenance of seeded areas shall begin upon completion of seeding operation and shall continue until full grass establishment and Final Acceptance.
- B. Maintain and establish grass by watering, fertilizing, weeding, mowing, trimming, edging, replanting, and performing other operations as required to establish healthy, viable turf.
- C. Watering
  1. Water the grass as required in order to maintain adequate moisture in the upper 4 inches of soil, which is necessary for the promotion of deep root growth.
- D. Mowing
  1. Wait until grass is firmly rooted and securely in place before mowing for the first time.
  2. Mow all turfgrass to a height of 2 inches. Mow turfgrass as soon as top growth is tall enough to cut by removing no more than 1/3 of grass leaf growth. Repeat mowing to maintain height appropriate for species without cutting more than 1/3 of grass height. Do not mow when grass is wet.
- E. Application of Fertilizer and Amendments
  1. Fertilizer and conditioners shall be applied according to Turfgrass Best Management Practices. Apply fertilizer no sooner than 8 weeks after work.
  2. Fertilizer and supplemental conditioners shall be applied according to the type, rate, and timing recommended by the soil test reports from a qualified soil-testing laboratory or per the fertilizer manufacturer's recommendations, and in accordance with applicable industry standards.
  3. For bidding purposes, fertilizer composition shall be 3-1-2 or 4-1-2. Apply no more than 1 lb. of nitrogen per 1,000 sf per application or 3 lbs. total of nitrogen per 1,000 sf per year.
  4. Fertilizer is typically applied 2 to 3 times per year. Typical application dates are March, June, and October. Apply fertilizer per manufacturer's instructions.
- F. Herbicide and Pesticide Application
  1. Application of any chemicals to the grass areas shall be kept to a minimum to control pest and weed growth. Use manual method of weed removal or spot treat with organic products such as vinegar whenever possible.
  2. If chemical products are used, apply chemical products according to requirements of authorities having jurisdiction and manufacturer's written recommendations.
- G. Roll, regrade, and replant bare or eroded areas to produce uniformly smooth grass surface. Provide materials and installation the same as those used in the original installation.
  1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and grass damaged or lost in areas of subsidence.
- H. Maintenance Data: Recommended procedures to be established by Owner for maintenance of all grass work during a calendar year. Submit at end of maintenance period.

3.12 FINAL ACCEPTANCE
- A. Once the required maintenance period expires, the work will be review by the Owner or Landscape Architect for final acceptance. Contractor shall request a Final Acceptance inspection. The request shall be received at least 4 calendar days before the anticipated date for final observation.
- B. All grass areas will be accepted when in compliance with the following conditions:
  1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90% over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
- C. Use specified materials to re-establish grass that does not comply with requirements, and continue maintenance until satisfactory.
- D. Once Final Acceptance is given, the Owner will assume responsibility for maintenance work.
- E. Contractor shall provide Owner with maintenance instructions and watering schedule.

3.13 EXTENSION OF MAINTENANCE PERIOD
- A. The maintenance for all grass work shall be extended past the contracted Maintenance Period if grass is not considered established by that time.
- B. Contractor shall continue maintenance until grass is considered fully established to the Owner's satisfaction and at no additional cost to the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, apply to this Section.

1.2 SUMMARY
- A. Work includes all services, labor, materials, transportation, and equipment necessary to perform the work shown in the Drawings and as specified in the Specifications.
- B. Section Includes:
  1. All work, equipment, and materials required to install new planting and associated site improvements shown in the Drawings and Specifications.
- C. Related Sections (include but are not limited to):
  1. Section 32 84 00 Irrigation
  2. Section 32 92 00 Turf and Grasses
  3. Civil Plans and Specifications - on grading, drainage, excavation, backfilling

1.3 REFERENCES
- A. American National Standards Institute, Inc. (ANSI)
  1. ANSI Z80.1 - American Standard for Nursery Stock
  2. ANSI A300 (Part 1) - Pruning
  3. ANSI A300 (Part 10) - Integrated Pest Management (IPM)
- B. Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada.
- C. US Composting Council – Reston, VA (301-897-2715) - www.compostingcouncil.org
- D. International Society of Arboriculture (ISA) - Champaign, IL
- E. Howard Garrett, John Ferguson, & Mike Amaranthus. Organic Management for the Professional. 2012. Austin: University of Texas Press.

1.4 DEFINITIONS
- A. Amendment: Material added to topsoil to produce planting soil mix. Amendments are classified as general soil amendments, fertilizers, biological, and pH amendments.
- B. Compaction: A loss of soil aggregates, destroyed aeration pore spaces, crushed or collapsed pore spaces, and extensive resorting and packing of soil particles.
- C. Compost: Well decomposed, stable organic material as defined by the US Composting Council.
- D. Fine Grading: The final grading of the soil to achieve exact contours and positive drainage, often accomplished by hand rakes or drag rakes or other suitable devices.
- E. Finish Grade: Elevation of finished surface of planting soil after fine grading.
- F. Imported Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with organic soil amendments to produce topsoil or planting soil.
- G. Planting Soil: Existing native surface topsoil, imported topsoil, or manufactured topsoil that has been modified with soil amendments to produce a soil mixture best for plant growth.
- H. Root Flare: The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots, or the area of transition between the root system and the stem or trunk.
- I. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- J. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 SUBMITTALS
- A. Qualification Data for Installer.
- B. Product Data: Submit Manufacturer's catalog sheets, samples, product certificates, labels, or technical literature of all materials specified before work begins (at least 8 weeks). Mark or highlight in color which product is to be used. Submit two (2) hard copies or provide in an electronic format. At a minimum, submit the following:
  1. Topsoil Sample - 1 gallon plastic bag & supplier info. & data sheet
  2. Compost Sample - 1 gallon plastic bag & name and address of compost facility
  3. Planting Bed Soil Mix Sample - 1 gallon plastic bag & supplier info. & data sheet
  4. Mulch Sample - 1 gallon plastic bag & supplier info. & data sheet
  5. Plant Material - List nursery or tree farm source.
  6. Tree Staking Materials - Manufacturer data sheet
  7. Landscape Edging - Manufacturer data sheet
  8. Rock Material - List source & provide photos
  9. Fertilizer - Manufacturer data sheet
  10. Pesticides and Herbicides (with applicator's state license when required)
- C. Soil and Compost Analysis: Submit testing results of topsoil, compost, and planting bed soil mix.
- D. List of Plant Materials: Include species, plant size, and nursery source of material. Substitutions are not permitted unless approved by the Landscape Architect.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.
- F. After a submittal has been approved, substitutions will not be allowed except by written consent of Landscape Architect.

1.6 QUALITY ASSURANCE
- A. Installer Qualifications
  1. Company specializing in performing the work of this section with minimum 5 years of experience in similar size and scope of work.
  2. Professional Membership: Installer shall be a member in good standing of the American Nursery and Landscape Association or have other horticultural qualifications.
  3. Commercial Pesticide/Herbicide Applicator: Current state license.
     a. Application of regulated pesticides or herbicides shall be performed by a person maintaining a current state license. Submit copies of all chemical applicator licenses.
  4. Installer shall have an experienced full-time supervisor on project site at all times when work is in progress. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.
- B. Nursery Qualifications
  1. Nursery or tree farm specializing in the growing and cultivating of trees and plants with 10 years documented experience.
- C. Soil Testing/Analysis: Required testing, analysis, and inspection shall be at the Contractor's expense.
  1. Unless otherwise provided, the Contractor shall engage an independent accredited testing agency, experienced in the testing of agricultural soils and acceptable to the Landscape Architect, to perform soil testing and analysis.
     a. Submit samples to Texas Plant and Soil Lab (TPS Lab), Edinburg TX or equal.
  2. Submit for testing: Topsoil and planting bed soil mix.
  3. Testing and Analysis Requirements for Topsoil and Planting Bed Soil Mix:
     a. Particle size analysis (percent dry weight) and USDA soil texture analysis. Soil testing of planting bed soil mix shall also include USDA gradation (percentage) of gravel, coarse sand, medium sand, and fine sand in addition to silt and clay.
     b. Determine pH and percent organic content by oven dried weight.
     c. Nutrient levels by parts per million including: nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium, sulfate-sulfur (SO_4S), and nitrate-nitrogen (NO_3-N).
     d. Nutrient test shall include the testing laboratory's recommendations for supplemental additions required to bring pH, organic content, and nutrient content to satisfactory levels for optimal planting conditions.
     e. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
     f. Cation Exchange Capacity (CEC).
- D. Compost Testing/Analysis: Required testing, analysis, and inspection shall be at the Contractor's expense.
  1. Contractor shall engage an independent accredited testing agency, using Test Methods for the Examination of Composting and Compost (TMECC), to perform compost testing and analysis.
     a. Submit samples to Texas Plant and Soil Lab (TPS Lab), Edinburg TX or equal.

  2. Testing and Analysis Requirements for Compost:
     a. Determine pH value.
     b. Soluble salt concentration (electrical conductivity) - dS/m (mmhos/cm).
     c. Moisture content - percent, wet weight basis.
     d. Organic matter content - percent, dry weight basis.
     e. Particle size - percent passing a 3/4 inch screen or smaller - dry weight basis.
     f. Stability carbon dioxide evolution rate - mg CO_2-C per g OM per day.
     g. Solvita test (compost maturity test).
     h. Carbon to nitrogen (C:N) ratio.
     i. Physical contaminants (inerts) - percent, dry weight basis.
     j. Chemical Contaminants - mg/kg (ppm).
     k. Biological contaminants - MPN per gram per dry weight
- E. Testing/Analysis of Topsoil, Planting Bed Soil Mix, or Compost Provided by Bulk Supplier
  1. Soil or compost testing is not required if recent statements of analysis are available from the bulk supplier. Submit supplier's analysis results for bulk material. If supplier analysis is not available or inadequate, then submit samples to a testing agency for analysis.
- F. If soils or compost fail to meet the specifications listed in Part 2, obtain other sources of material, retest and resubmit until accepted by the Landscape Architect.
- G. Plant Material
  1. The Contractor shall provide nursery grown, quality plants complying with applicable requirements in ANSI Z60.1.
  2. The Landscape Architect reserves the right to request photographs or video of plant material for the project. Photos or video must show the entire plant and with a measuring stick for height reference. Approving photos or videos of plants does not preclude the Landscape Architect's right to reject material at the project site before planting.
- H. Drainage Tests
  1. Test drainage of soils in planting beds and at each tree or shrub pit. Pits shall be excavated to the proper size and depth, filled with water, and observed to determine the length of time the soil takes to completely drain. If water does not drain within 24 hours, then refer to the section on drainage. Planting operations shall not proceed until drainage correction measures are in place.

1.7 REGULATORY REQUIREMENTS
- A. All work shall conform to applicable local codes, ordinances, or regulations for installation and materials.
- B. Contractor is responsible for acquiring all necessary city or local permits and for notifying the appropriate agencies for any required inspections.
- C. Submit to Owner certificates of inspections required by governmental authorities.

1.8 DELIVERY, STORAGE, AND HANDLING
- A. Packaged Material
  1. Materials shall be delivered in unopened and undamaged packages or containers with the proper labeling such as name and address of manufacturer, weight, certified analysis, and indication of compliance with state and Federal laws, if applicable. Materials shall be properly stored on site to prevent damage and deterioration.
- B. Bulk Material
  1. Protect all bulk stockpiles from wind, rain, and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust, and debris that may be detrimental to plants or soil drainage. Cover stockpiles with filter fabric at the end of each workday.
- C. Plant Material
  1. Handling of Plant Material
     a. Exercise care in handling plant materials to avoid damage or stress. Handle plant stock by root ball or container. Protect plant trunk, branches, and root systems from sun scald, drying, wind burn, and handling damage.
  2. Delivery of Plant Material
     a. Transport plants in open or closed vehicles and provide proper covering to protect plants from sun, drying winds, freezing, and other exposure. Do not bend or bind plants in a manner that will destroy their natural shape. Do not drop plants during delivery and handling.
     b. Schedule delivery of plants to minimize the amount of time stored on site. Deliver plants after preparation work for planting areas have been completed, and install immediately.
  3. Storage of Plant Material
     a. Plants that are delivered and not planted immediately shall be protected from the sun, inclement weather, and mechanical damage. Keep plants watered and root balls moist. Plants shall not be allowed to dry out or freeze. Apply anti-desiccant to trees and shrubs as needed to protect plant material.
     b. Extended storage of plant material at the project site or Contractor's yard is not permitted unless notification is given to the Landscape Architect and an approval is given. Both the duration and method of storage of plant materials shall be approved by the Landscape Architect. Any plant material that does not meet acceptable standards at time of planting will be rejected.

1.9 PROJECT CONDITIONS
- A. Utilities
  1. Call Texas 811 at least 48 hours prior to work for utility locates where necessary. Refer also to the civil, MEP, and other project Drawings for the locations of various utilities on the project site as a general guide, but without guarantee to accuracy. Use also visual cues such as utility markers for information. Proceed with care during trenching or excavation operations around marked utilities.
  2. Contractor shall notify the Owner, of utilities found during excavation work that are not shown on the plans or any unexpected sub-surface conditions, and ask for direction.
  3. Refer to the civil, MEP, and other project Drawings for the locations of various new utilities on the project site and coordinate with other trades when necessary.
- B. Coordinate all planting work with irrigation work, site grading, and delivery of plant material.
- C. The Contractor shall at all times protect new work from damage and theft and replace all damaged or stolen materials at own expense. The Contractor shall protect the Owner's property, such as buildings, utilities, pavement, trees, plantings, etc., from damage or loss. All damages to Owner's property caused by installation work shall be repaired at Contractor's cost and to the Owner's satisfaction.

1.10 WARRANTY
- A. Contractor shall guarantee and warranty all plant material, related materials or accessories, and workmanship for a period of 1 year from the date of Final Completion of work.
- B. Should any deficiencies be noted during this period, then the Contractor shall make corrections at no additional cost to the Owner and to the Owner's satisfaction.
  1. Plant material that is considered unhealthy, dead, or dying must be replaced. Replacement plants shall be of the same size and species as indicated on the Drawings. Replacement plants shall also be subject to a 1 year warranty.
  2. The Contractor is exempt from replacing plants, during the warranty period, that are stolen, lost or damaged due to occupancy of project, vandalism, or any natural disaster.
  3. Trees that are leaning and/or have blown over shall be reset to vertical or replaced.
  4. Any excessive settlement that occurs in planting areas shall be corrected.
- C. When work is accepted in parts, the warranty period shall extend from each of the partial Final Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods shall terminate at one time.

1.11 MAINTENANCE
- A. Begin maintenance immediately after plants are installed and continue until plantings are healthy and well established and to the end of the contracted maintenance period below.
  1. Maintenance Period for Trees: 3 months from date of Final Completion.
  2. Maintenance Period for Shrubs, Groundcover, Annuals, and all other Plants: 3 months from date of Final Completion.
- B. Refer to maintenance requirements and items per Part 3.

1.12 PROGRESS MEETINGS
- A. Contractor shall attend progress meetings as requested by the Owner.

PART 2 - PRODUCTS

2.1 GENERAL
- A. Refer also to the Drawings for materials specified for work. Any substitutions must be submitted and approved prior to start of any work.
- B. All materials furnished shall be new and without defects. Materials shall be standard products of manufacturers or suppliers regularly engaged in the production of such materials and comply with the specification requirements.

2.2 PLANT MATERIAL
- A. Plants shall meet the size, species, and type indicated on the Plant Schedule. Plants smaller than specified (size, height, and spread), plant species substitutions, and B&B plants will not be permitted unless the Landscape Architect gives written approval.
  1. Contractor shall verify plant quantities shown on the Drawings and Plant Schedule. If a quantity discrepancy exists, then contact the Landscape Architect for clarification. If the Contractor fails to make notification, then Contractor is responsible for providing plant quantities required to complete the design intent.
  2. All plant stock shall be nursery grown in accordance with good horticultural practices and grown in a similar climate as the project site. Provide container grown plants unless otherwise specified. Plant material form, size, and dimensions shall conform to minimum ANSI Z60.1 standards.
  3. Plants shall be healthy and vigorous, free of disease, insects and their eggs and larvae, and defects. Plants shall be free of physical damage such as scrapes, broken or split branches, large scars, bark abrasions, sunscalds, and other defects.
  4. Tree Trunks and Branches: Well-formed and sturdy with a straight, distinct leader when this is characteristic of species. Branching shall be plentiful and uniformly distributed to form a well-balanced plant.
     a. Trees with leaders that are damaged, crooked, or crossed will be rejected.
     b. Trees with multiple leaders will be rejected, unless form is typical for the species. Multiple leaders with narrow crotches will not be accepted. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.
     c. Tree trunks shall be relatively straight, vertical, and free of wounds that penetrate to the wood, sunburned areas, wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).
  5. Foliage: Dense foliage with healthy, vigorous leaves of normal size, shape, color, and texture for species. No chlorosis should be present.
  6. Root System: Plants shall have a well-developed fibrous root system. Plants grown in containers shall not be excessively root bound. Use sharp tools to remove from the top, sides, and bottom of the root ball all circling, descending, and matted roots.
- B. Rejection of Plant Material
  1. Upon arrival at the project site, all plant material shall be inspected by the Contractor for proper sizes and condition before accepting the load.
     a. Tree caliper measurements shall be taken 6 inches above the root flare for trees up to 4 inches in caliper size.
     b. If the tree caliper at 6 inches above the ground exceeds 4 inches, then caliper should be measured at 12 inches above the root flare.
     c. Dried out roots, large broken branches, broken root balls, torn bark, or improper plant sizes are conditions for rejection.
  2. Once delivery of plant material has been taken, Contractor shall protect all plant material and keep them adequately watered. Evidence of inadequate protection on project site, wilted or browning plants, or improper handling or storage shall be cause for rejection by the Landscape Architect.
  3. Once a plant has been rejected, it shall be removed from the project site and replaced with one of the required size and quality.

2.3 TOPSOIL
- A. Topsoil shall be a sandy loam soil as defined by the USDA Soil Conservation Service, Soil Classification System, and shall have the following analysis:

Soil Textural Class	% of Total Weight
Sand (0.05-2.0 mm dia.)	15 to 67
Silt (0.002-0.05 mm dia.)	10 to 50
Clay (less than 0.002 mm dia.)	5 to 50

  1. Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 1 inch in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth.
  2. 100% shall pass through a 3/8 inch (9.5 mm) screen.
  3. Topsoil shall not contain weed seeds in quantities that cause noticeable weed growth in the final planting areas.
  4. Topsoil shall have a pH range of 5.5 to 7.0.
  5. Soluble salt level: Less than 6 mmhos/cm.

2.4 ORGANIC SOIL AMENDMENTS
- A. Compost: Shall be blended and ground leaf, wood, and other plant based material, composted for a minimum of 9 months and at temperatures sufficient to break down all woody fibers, seeds, and leaf structures, free of toxic material at levels that are harmful to plants or humans. Source material shall be yard waste trimmings blended with other plant based materials designed to produce compost high in fungal material.
  1. Compost shall be commercially prepared compost that meets US Compost Council STA/TMECC criteria.
  2. Compost shall comply with the following:
     a. pH: 6 - 8.5
     b. Soil salt (electric conductivity): Maximum 10 dS/m (mmhos/cm).
     c. Moisture content percent, wet weight basis: 30% - 60%.
     d. Organic matter content, dry weight basis: 30% - 65%.
     e. Particle size, dry weight basis: 98% pass through 3/4 inch screen or smaller.
     f. Stability carbon dioxide evolution rate: mg CO_2-C per g OM per day < 8.
     g. Solvita maturity test: > 6.
     h. Carbon to nitrogen ratio between 25:1 and 30:1.
     i. Physical contaminants (inerts), percent, dry weight basis: <1%.
     j. Chemical contaminants, mg/kg (ppm): Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels.
     k. Biological contaminants, select pathogens, fecal coliform bacteria, or salmonella: Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels.
  3. Muddy compost is not acceptable for use.
- B. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

2.5 INORGANIC SOIL AMENDMENTS
- A. Lime: ASTM C602, agricultural limestone containing a minimum of 80% calcium carbonate equivalent, by weight. Class: T, with a minimum 99% passing through No. 8 (2.36 mm) sieve and a minimum 75% passing through No. 60 (0.25 mm) sieve. Form: Finely ground dolomitic limestone. Rate of lime shall be based upon soil test report.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90% sulfur.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20% iron and 10% sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Agricultural Gypsum: Minimum 90% calcium sulfate, finely ground with 90% passing through No. 50 (0.30-mm) sieve.
- F. Sand: Clean, washed, natural angular grains, free of toxic materials. Coarse concrete sand, complying to ASTM C33 Fine Aggregate, with a Fines Modulus Index between 2.8 and 3.2.

2.6 PLANTING SOIL
- A. Planting soil shall be a mix of topsoil, coarse sand, and compost to produce a soil mix suitable for planting operations. The mix proportions will vary according to plant material planted and as indicated below.
  1. Mix the coarse sand and compost first and then add to the topsoil. Do not over mix.
- B. Planting Soil for Trees Planted in Pits
  1. Final tested organic matter content shall be between 3% and 5% (by dry weight).
  2. Soil Mix Ratio (by moist volume): Native soil removed from pit or imported topsoil - 6 Parts; Organic Compost - 2 Parts; Coarse Sand - 1 part
- C. Planting Soil for Planting Beds
  1. Final tested organic matter content shall be between 5% and 8% (by dry weight).
  2. Soil Mix Ratio (by moist volume): Topsoil - 3 Parts; Organic Compost - 2 Parts; Coarse Sand - 1 part
  3. Contractor may also use prepared soil mix by a bulk supplier.
     a. Soil mix shall consist of sandy loam topsoil with organic amendments such as compost. Final tested organic matter content shall be between 5% and 8% (by dry weight).
     b. Acceptable suppliers and products or approved equal:
        1) Lawn & Garden Mix - Gardenville, San Antonio, TX (210-651-6115)
        2) 4 Way Mix - New Earth, San Antonio, TX (210-661-5180)
  4. At the time of soil placement, add fertilizer or soil amendments, only if required, to the planting soil at rates recommended by the soil test results.

2.7 FERTILIZERS
- A. Organic Fertilizer: Fertilizer derived from natural sources. Preference is given to using organic based fertilizers.
- B. Commercial Fertilizer: Commercial grade complete granular or pelleted fertilizer of neutral character, consisting of fast and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorus, and potassium.
- C. Slow Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water in-soluble nitrogen, phosphorus, and potassium.
- D. Fertilizer shall be delivered in undamaged, unopened containers or packaging showing the manufacturer's name, address, product weight, and guaranteed analysis.
  1. Fertilizer shall be uniform in composition, dry, and free flowing. Any loose fertilizer that has caked or becomes unsuitable for use shall be removed from the project site and properly disposed.
  2. Apply all fertilizer per manufacturer's recommendations and instructions.
- E. Planting Beds: Granular or pelleted slow-release fertilizer.
  1. In planting beds, apply fertilizer at time of planting only if required by soil test results. Apply Nitrogen (N), Phosphorus (P) and Potassium (K) in amounts recommended in soil test results from an approved soil testing agency.
  2. For bidding purposes, fertilizer composition shall be 8-2-4 applied at 6 lbs. per 1,000 sf.
  3. Preference is given to using organic based fertilizers by Ladybug Brand, Microlife, or Sustane. Provide product inrormation.
- F. Trees: Dry, loose slow releasing fertilizer.
  1. Arbor Green PRO 30-10-7 Fertilizer Packets - Davey Tree Expert Co., Kent, OH (1-866-967-9356) or approved equal.

2.8 ROOT STIMULATORS (IF USED)
- A. Acceptable suppliers and products or approved equal:
  1. Medina Soil Activator - Medina Agriculture Products, Hondo, TX (830-426-3011)
  2. Superthrive - Vitamin Institute, N. Hollywood, CA (1-800-441-9482)

2.9 MULCH
- A. Hardwood Mulch: Double shredded, 1/2 inch to 1 1/2 inch dia. in size, free of debris and growth or germination inhibiting ingredients.
- B. Acceptable suppliers and products or approved equal:
  1. Hardwood Mulch - Gardenville, San Antonio, TX (210-651-6115)
  2. Double Shredded Native Mulch - New Earth, San Antonio, TX (210-661-5180)

2.10 ANTI-DESICCANT
- A. Apply anti-desiccant to prevent plants from drying out only if necessary. Anti-desiccant shall be an emulsion specifically manufactured for plant protection which provides a protective film over plant surfaces, but is permeable enough to permit transpiration. Anti-desiccant shall be delivered in manufacturer's sealed containers and shall contain manufacturer's printed instructions for use. Take proper protective measures when applying the product.
- B. Acceptable suppliers and products or approved equal:
  1. Wilt-Pruf - Wilt-Pruf Products, Inc., Essex, CT (1-800-972-0726)
  2. Wilt Stop - Bonide Products, Inc., Oriskany, NY, (315-736-8231)

2.11 WEED, INSECT, AND DISEASE CONTROL
- A. Use integrated pest management (IPM) practices for control. Use regular monitoring to determine if and when control treatments are needed and use physical, mechanical, cultural, and biological means to keep pest numbers at an acceptable level. Use only more toxic treatments when it is determine that the pest will cause unacceptable damage. Choose a control method that will be the most effective as well as the least hazardous to non-target organisms and the natural environment.
- B. Preference is given to using non-toxic methods for control. Limit the use of chemical products. Use of organic based products and manual weeding are encouraged.
- C. Any chemical products used shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use regulated products unless a licensed and authorized applicator is present.
- D. Weed Control:
  1. Pre-Emergent Herbicide: Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer. Submit product for approval if used.
  2. Post-Emergent Herbicide: Effective for controlling weed growth that has already germinated.
     a. First use manual methods to remove weeds.
     b. Spot treat weeds with a vinegar formula: 1 gallon full strength 10%-20% vinegar, 2 oz. orange oil, 1 teaspoon liquid soap
     c. As a last resort, use approved herbicides.
  3. Acceptable suppliers and products or approved equal:
     a. Weed and Grass Killer - Safer Brand, St. Lititz, PA (1-855-7-Organic)
     b. Burnout - Bonide Products, Inc., Oriskany, NY, (315-736-8231)
     c. Scythe - Gowan Co., Yuma AZ, (1-800-883-1844)
     d. Weed Killer - Avenger Organics, Buford, GA (678-546-5009)
- E. Insect Control:
  1. Acceptable suppliers and products or approved equal:
     a. Earth-tone Insecticidal Soap - The Espoma Co., Millville, NJ (1-800-634-0603)
     b. Garlic Pepper Tea - Liquefy 2 bulbs of garlic and 2 habanero peppers in a blender 1/2 to 2/3 full of water. Strain the solids out and add water to make 1 gallon of concentrate. Use 1/4 cup of concentrate per 1 gallon of water.
     c. Insect Killing Soap - Safer Brand, St. Lititz, PA (1-855-7-Organic)
     d. Natural Bug & Insect Killer - Avenger Organics, Buford, GA (678-546-5009)
     e. Neem Pro or Neem Pro EC - RoT Organics, Sherman, TX (903-818-2017)
  2. Refer also to Howard Garrett's Dirt Doctor website (www.dirtdoctor.com) for an organic control solution for a specific pest.
- F. Disease Control:
  1. Provide product information if used.

2.12 WATER
- A. Water source shall be potable water from the city main.
- B. All irrigation installation work in planting areas must be complete before planting begins.

2.13 TREE STAKING MATERIALS
- A. Tree Stakes
  1. Metal T Posts (studded): Minimum 6 feet long, green painted finish or
  2. Wood Stakes: Lodge poles, 2 inch diameter, minimum 6 feet long, 1 end pointed.
- B. Fastening Trees to Stakes
  1. 12 gauge double strand galvanized steel wire (twisted) or
  2. Arbortie Green - Deeproot, San Francisco, CA (1-800-458-7668)
- C. Hose to Encase Wire: High quality, 2 ply reinforced rubber or plastic garden hose, 3/4 inch diameter, and cut to required length.

2.14 LANDSCAPE EDGING
- A. Steel: Standard commercial steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
  1. 1/8 inch X 4 inches; Green color; Powder coat finish; 12 inch min. stakes
  2. Acceptable Manufacturers and Products or approved equal:
     a. DURAEDGE - JD Russell Co., Farmersville, TX (1-800-888-6872)
     b. Commercial Edging No. 1011 - Colmet - Collier Metal Specialties, Garland, TX (1-800-829-8225)

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Call Texas 811 for utility locates where necessary before work. Contractor shall visit the project site to verify locations of all existing and proposed utilities through visual inspection and the use of engineering drawings. Exercise care when excavating near utility lines. Contractor will be responsible for all damages to utility lines caused by neglect.
- B. Should unknown utility lines or other obstructions be found during excavation, notify the Owner before proceeding with work. If work proceeds without contacting the Owner, the Contractor shall be held liable for any and all damages.
- C. Verify site grades and subgrade elevations and proceed with work only if conditions are satisfactory.

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SEAL

REGISTERED LANDSCAPE ARCHITECT · TRIS S. PUN · 2639 · STATE OF TEXAS
04-16-2018

PROJECT NAME

BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.

PROJECT NUMBER: 201803

DRAWN BY: ISP

CHECKED BY: ISP

ISSUE DATE

04-16-2018

REVISIONS

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SHEET TITLE

SPECIFICATIONS

SHEET NUMBER

24

D. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
   1. Verify that no foreign material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, or acid has been deposited in soil within a planting area.
   2. If soil contamination is present within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.
   3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels.
   4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
E. Do not install plant material when temperatures fall below 35 Deg. F or rise above 100 Deg. F. Do not install plant material when wind velocities exceed 30 mph.
F. All site grading, irrigation installation, and hard surface paving adjacent to planting areas, including concrete walks and road work, must be completed prior to start of planting work.

3.2 TREE PLANTING IN PITS
A. Pit Excavation: Stake individual tree locations. Excavate circular planting pits with tapered sides. Excavations with vertical sides are not acceptable. Excavate a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.
   1. Create a 6 inch soil mound compacted to 90% proctor in the center of the pit to support the root ball. Ensure that root ball will sit firmly on mound to minimize settling. Do not excavate deeper than depth required to allow the root ball (measured from the root flare to the bottom of the root ball) to sit on the mound.
   2. Scarify sides and bottom of planting pit sheared or smoothed during excavation.
B. Drainage: Prior to planting, test all pits for drainage. Fill pits with water and allow to drain twice in succession. If pits do not drain within 24 hours, then notify the Landscape Architect.
C. Planting: Carefully remove root ball from container without damaging root ball or plant. Set stock plumb and in center of planting pit with root flare at or no higher than 2 inches above adjacent finish grades. Verify proper finish grade elevations before planting.
   1. Before planting, verify that root flare is visible at top of root ball. Remove excess soil from root ball to expose root flare if necessary. Remove injured roots by cutting cleanly with a sharp tool.
D. Placing Planting Soil: Use planting soil specified in Part 2 for backfill in tree pits.
   1. Backfill around root ball in 6 inch lifts, tamp lightly to settle soil and eliminate voids and air pockets. Compact soil to between 75% to 80% proctor value. Do not over compact soil.
   2. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting pit. Once water has drained, continue backfilling until the planting soil is brought to proper grade level.
   3. Avoid placing planting soil on top of the root ball.
   4. Distribute fertilizer packet contents or tablets, during backfill process, evenly in planting pits per manufacturer's recommendations.
      a. Fertilizer Packets for Trees: Sprinkle packet contents into tree pit in rates per manufacturer's recommendations.
E. Soil Watering Saucers:
   1. Form a 6 inch high soil watering saucer around perimeter of plant pits of trees. Diameter of watering saucer shall be a minimum of 4 feet for ornamental trees and 5 feet for canopy trees.
   2. Tamp all soil saucers to reduce leaking and erosion.
F. Watering: Water all plants immediately after planting.
G. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope. The edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
H. If rock, hardpan, tree roots, or other obstructions are encountered during pit excavation, an alternate location for plant material can be selected upon approval by the Landscape Architect.

3.3 TREE PIT DRAINAGE
A. Do not proceed with tree planting until a drainage solution is in place for pits that do not drain.
B. Unless otherwise directed by the Landscape Architect, drainage mechanisms shall be installed to facilitate drainage in pits that do not drain.
   1. Drill a 3 feet deep and 6 inch diameter drainage pocket under the root ball location. Fill hole with 3/4 inch diameter washed drain gravel wrapped in filter fabric.
   2. Install 2 PVC stand pipes (1 for shrub pits) in each pit area. PVC pipe shall be 3 inch diameter Schedule 40 pipe with cap on top.
C. Cost of drainage installation and materials, for drainage issues encountered, shall be submitted to Owner as a change order and approved before continuing work.

3.4 TREE STAKING
A. When warranted, each tree shall be staked or stabilized immediately following planting and in accordance with ANSI A300 (Part 3) standards.
B. Trees less than 4 inches in caliper shall be staked.
   1. Trees 3 to 3 1/2 inches in caliper or multi-trunk trees - 3 stakes. Set stakes equally around tree.
   2. Trees less than 3 inches in caliper - 2 stakes. Set stakes opposite each other.
C. Secure tree to stakes with wire or approved tree tie. Twist galvanized wire to remove slack. Wire tension shall not be too tight. Tree shall stand plumb after staking.
D. Tree support systems shall be removed after one year if tree root system is established.

3.5 PLANTING BED AREA - WORK PREPARATION
A. Coordinate work with other site contractors to avoid installation conflicts.
B. Do not proceed with installation work as shown on the Drawings if it is obvious in the field that major obstructions, grade differences, and modified area dimensions exist that may have not been known during the time of design. Contact the Landscape Architect for direction. If notification is not made, then the Contractor shall assume full responsibility for any revisions made to the design.
C. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, and plantings from damage caused by new planting operations and installation.
D. Install erosion control measures (SWPPP), where necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
E. Layout of Planting Beds
   1. For mass planting beds within a larger grass area, outline bed areas with paint before excavating or planting.
F. All materials used for construction shall be protected from weather and damage, during transit and while in storage at the project site.

3.6 PLANTING BED AREA - SUBGRADE PREPARATION
A. Planting bed areas shall be examined to ensure that rough grading and all other subsurface work are done prior to start of subgrade preparation.
B. Subgrade shall be excavated to the proper elevation and have a uniform grade. Allow for required depth of mulch. Remove all stones greater than 1 inch, sticks, and other extraneous material from the subgrade.
C. Subgrade shall be loosened or scarified to a minimum depth of 4 inches, prior to spreading planting soil. In areas where vehicles or equipment have compacted soil, scarified subgrade to a minimum depth of 6 inches.
D. Perform a drainage test in each planting bed area. Dig two to three 12 inch diameter by 12 inch deep holes and fill with water and allow to drain. Fill hole with water again and time the percolation rate after one hour. Notify the Landscape Architect if percolation rate is less than 1/2 inch per hour or if area does not drain within 24 hours.

3.7 PLANTING BED AREA - PLACEMENT OF PLANTING SOIL
A. Use planting soil specified in Part 2 for planting bed areas. Spread planting soil to a minimum depth of 8 inches in two (2) lifts, but not less than required to meet finish grades after natural settlement. Place planting soil to an elevation to also allow for required depth of mulch. Incorporate some of the planting soil into 3 inches of scarified subgrade material to avoid stratified layers.
B. Do not spread if planting soil or subgrade is muddy, excessively wet, or frozen.
C. Remove any foreign substances from planting soil while spreading.
D. Compact each planting soil lift between 75% to 80% of Proctor density.
E. Once planting soil is placed, limit paths of traffic such as foot traffic to minimize soil compaction in planting areas.

3.8 PLANTING BED AREA - APPLICATION OF FERTILIZER OR OTHER AMENDMENTS
A. Apply fertilizer or other soil amendments only if the soil test results determine they are required.
B. Apply amendments after smooth raking of soil and prior to installation of plants.
C. Amendments shall be spread over the entire area to be planted and at the recommended application rate of the soil analysis and per manufacturer's recommendations.
D. Mix amendments thoroughly into the upper 4 inches of soil and lightly water.
E. To minimize potential nutrient leaching to groundwater, fertilizer shall not be applied during plant dormancy or within 48 hours of a potential rain event.

3.9 PLANTING BED AREA - FINE GRADING
A. Fine grade finish surface of all planting beds with a drag or rake. Grade planting areas to meet the grades shown on the Project Drawings. Anticipate settlement and depth of mulch conditions.
   1. Grade planting areas to a smooth, uniform surface with loose, uniformly fine texture. Final surface of soil shall be within plus or minus 1/2 inch of required finish elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Provide smooth, rounded transitions between slopes of different gradients and direction.
   2. Check that the finish surface plus mulch layer is no more than 1 inch below all paving or curb surfaces after settlement or as directed by the Drawings.
   3. Ensure positive surface drainage, or flow as per Drawings, and positive flow away from buildings and structures is established.
B. In the event of settlement, the Contractor shall re-adjust the work to required finished grade.

3.10 PLANTING BED AREA - PLANTING OF PLANTS
A. Excavate and set plants in an upright position to the proper elevation and partially backfill with planting soil. Tamp to remove air pockets and water to settle soil. Do not over compact. Plant root ball shall be flush or no more than 2 inches above desired grade.
   1. Plant spacing is per the Plant Schedule and plants shall be planted with a triangular spacing.

3.11 MULCHING
A. Mulch at Trees
   1. Provide mulch 4 inches in depth to cover soil watering saucers and tree pit areas. Do not place mulch within 6 inches of trunks. Install no more than 1 inch of mulch over the top of the root balls of all plants.
B. Mulch at Planting Bed Areas
   1. Apply a 4 inch minimum depth mulch layer throughout planting bed extending to bed limits indicated in Drawings. Do not place mulch within 3 inches of trunks or stems. Install no more than 1 inch of mulch over the top of the root balls of all plants.
   2. Finished surface of settled mulch shall be no more than 1 inch below adjacent pavement or curb surfaces and 1/2 inch below top of landscape edging of adjacent grassed areas. Mulch can be tapered down from 4 inches to 2 inches in depth when abutting pavement.
   3. A continuous, linear mulched area shall be formed if plants are closely spaced together in order to avoid grassed strips less than 2 feet wide or scallops of grass that are difficult to maintain.

3.12 LANDSCAPE EDGING
A. Install steel edging where indicated between turfgrass and planting areas and according to Drawing detail and manufacturer's written instructions.

3.13 LANDSCAPE MAINTENANCE
A. Maintenance of all plantings shall begin upon completion of planting operations and shall continue until contracted maintenance period ends. Maintain plantings as required to establish healthy, viable plants.
B. Maintenance items shall include, but are not limited to, the following:
   1. Weeding of planting areas to remove weeds, grass, and other undesirable vegetation. Use hand weeding whenever possible. Limit use of chemical herbicides.
   2. Mulch replacement in all planting beds and tree watering saucers.
   3. Maintaining and repairing tree staking systems. Tighten guy wires if necessary. Remove tree staking after 1 year unless otherwise instructed.
   4. Pruning and shaping of all plants. Remove dead or broken branches. Remove developing co-dominant leaders.
   5. Restoring watering saucers where necessary.
   6. Resetting trees to the proper grade and adjusting leaning trees back to a vertical position.
   7. Fertilizing: In March, June, and October, and at least 8 weeks after planting, apply fertilizer and other amendments as needed.
   8. Pest and Disease Control: Use IPM practices and the least invasive methods to control plant disease and insect outbreaks.
   9. Repairing landscape edging work where necessary.
   10. Replacing dead or dying plants.

C. Watering
   1. Water plants immediately after planting. If for any reason the irrigation system cannot run, hand water all plants by means of a hose or other method until irrigation system is in operation. Do not let plants wilt.
   2. Provide a proper ET based watering schedule to keep plants healthy and alive.
D. Soil Subsidence: Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch lost in areas of settling.
E. Pruning: Prune, thin, and shape woody materials according to standard professional horticultural and arboricultural practices and in accordance with ANSI A300 (Part 1) Pruning.
   1. Do not cut tree leaders. If multiple leaders are present, select the one that will best provide tree symmetry and remove the remainder. Trees with multiple leaders should have been rejected when delivered to the project site.
   2. Remove only injured, dying, or dead branches from trees and shrubs. Prune to retain plant's natural character. Do not over prune plants. Pruning shall be done with clean, sharp tools.
   3. Do not shear plant material. Allow plants to grow and develop their natural shape.
   4. Prune lower branches of canopy trees, if necessary, to provide a 4 foot clear trunk.
F. Pesticide and Herbicide Application
   1. All planting areas shall be kept reasonable weed free during the entire maintenance period.
   2. Application of any chemicals to control pest and weed growth in the planting areas shall be kept to a minimum. Use manual method or non-chemical products for weed removal whenever possible.
   3. Apply chemical products according to requirements of authorities having jurisdiction and to manufacturer's written recommendations. Use only licensed applicators for the type of chemicals to be used. Many organic based products do not require a licensed applicator.
   4. Coordinate chemical applications with Owner's operations and others in proximity to the work. Notify Owner before each application is performed.
G. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings without additional cost to the Owner.
H. Maintenance Data: Recommended procedures to be established by Owner for maintenance of all planting during a calendar year. Submit in written form at end of maintenance period.

3.14 MAINTENANCE BY OWNER DURING THE CONTRACTOR WARRANTY PERIOD
A. This condition applies when the Contractor is only contracted to provide maintenance for a period of less than the 1 year plant Warranty Period.
B. The Contractor shall make periodic site visits to observe the Owner's maintenance and alert the Owner of any problems associated with their maintenance and to request changes.
C. Notify the Owner in writing if maintenance, including watering, is not sufficient to maintain plants in a healthy condition. Describe maintenance deficiency and provide a solution. Notification must be made in a timely manner so that corrective action may be taken prior to the End of Warranty Acceptance date.
D. Failure of the Contractor to make site visits and notify the Owner of maintenance deficiencies shall not be used as grounds for voiding or modifying the provisions of the plant Warranty.

3.15 CLEAN UP
A. During the course of construction, Contractor shall keep work areas clean at all times.
B. Perform cleanup work upon completion of plant installation work and prior to Substantial Completion inspection.
   1. Haul off all excavated materials, debris, excess soil material, and trash.
   2. Sweep or wash off all pavement and roadways. Remove soil from all surfaces.
C. Repair all damages caused to project site, adjacent property, structures, irrigation system, or existing plant material during installation work. Fill in all tire ruts in planting areas.
D. Remove any erosion control (SWPPP) measures installed after grass has established.

3.16 PROJECT INSPECTION FOR SUBSTANTIAL AND FINAL COMPLETION
A. The Contractor shall request a Substantial Completion review from the Owner once work is sufficiently complete. During the Substantial Completion review, a punch list will be generated by the Landscape Architect. Once the punch list items are completed, Contractor shall request a Final Completion inspection.

3.17 FINAL ACCEPTANCE AFTER CONTRACTED MAINTENANCE PERIOD
A. Final acceptance will be given by the Owner or Landscape Architect once the contracted maintenance period expires.
B. All work must be in acceptable condition. If not, Contractor shall provide corrective measures to the Owner's satisfaction.
C. Once Final Acceptance is given, the Owner will assume maintenance of the project. Contractor shall provide Owner with the maintenance procedures for a calendar year in written format.

3.18 END OF 1 YEAR WARRANTY ACCEPTANCE
A. At the end of the Warranty period, the Owner or Landscape Architect shall observe all warranted work, upon written request of the Contractor. The request shall be received at least 4 calendar days before the anticipated date for observation.
B. Acceptance of End of Warranty will be given if it is determined that all requirements of the Contract Documents have been met.

END OF SECTION

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SEAL
REGISTERED LANDSCAPE ARCHITECT
IRIS S. PUN
2639
STATE OF TEXAS
04-16-2018

PROJECT NAME
BANDERA RETAIL CENTER
7706 BANDERA ROAD
SAN ANTONIO, TX 78238

PROJECT INFO.
PROJECT NUMBER: 201803
DRAWN BY: ISP
CHECKED BY: ISP

ISSUE DATE
04-16-2018

REVISIONS

NUM	DATE	DESCRIPTION

SHEET TITLE
SPECIFICATIONS

SHEET NUMBER
25

DEVELOPMENT SERVICES DEPARTMENT
CITY OF SAN ANTONIO
OCCUPANCY CLASSIFICATION M
TYPE OF CONSTRUCTION VB
SQUARE FOOTAGE 9,918
OCCUPANT LOAD 0 (EACH)

CITY OF SAN ANTONIO
DEVELOPMENT SERVICES DEPARTMENT
PLANS REVIEW DIVISION
REVIEWED FOR CODE COMPLIANCE

TRADE	PLANS EXAMINER	DATE	
BUILDING:	SM	11/9/18	COND. APPROVAL (AWNINGS) & REFER TO REDLINES.
FIRE:	®	9/19/18	
MECHANICAL:	[illegible]	9-18-18	
ELECTRICAL:	2020720335	9/18	
PLUMBING:	BRJ/D	9.18.18	PS 210.20 720133 See Comments Shell only.
TRAFFIC/SIDEWALK			
DRAINAGE:			
LANDSCAPE/IRRIGATION:			
TREE:		11/6/18	Rg Sh Work 736700
HEALTH:			
HISTORICAL:			
BAWB:			
DISABILITY:			

CITY OF SAN ANTONIO
DEVELOPMENT SERVICES DEPARTMENT
PLAN REVIEW DIVISION
REVIEWED FOR CODE COMPLIANCE
DATE: 11.9.18
BY: C.D