COMMISSIONERS COURT

JAN 10 2022

Tabled

REQUEST FOR AGENDA PLACEMENT FORM

Submission Deadline - Tuesday, 12:00 PM before Court Dates

SUBMITTED BY:David Disheroon **TODAY'S DATE: 01/03/2022**

DEPARTMENT: **Public Works**

SIGNATURE OF DEPARTMENT HEAD: _____

REQUESTED AGENDA DATE: **01/10/2022**

SPECIFIC AGENDA WORDING: Consideration of Construction Plans for Mansfield RV Park to be located at 12601 East FM 917, in Precinct #3- Public Works Department

PERSON(S) TO PRESENT ITEM: **David Disheroon**

SUPPORT MATERIAL: (Must enclose supporting documentation)

TIME: **10 minutes**

(Anticipated number of minutes needed to discuss item)

ACTION ITEM: X
WORKSHOP _____
CONSENT: _____
EXECUTIVE: _____

STAFF NOTICE:

COUNTY ATTORNEY: _____ **IT DEPARTMENT:** _____
AUDITOR: _____ **PURCHASING DEPARTMENT:** _____
PERSONNEL: _____ **PUBLIC WORKS:** X
BUDGET COORDINATOR: **OTHER:** _____

*************This Section to be Completed by County Judge's Office*************

ASSIGNED AGENDA DATE: _____

REQUEST RECEIVED BY COUNTY JUDGE'S OFFICE _____

COURT MEMBER APPROVAL _____ Date _____

CIVIL CONSTRUCTION SITEWORK PLANS FOR

12601 E. FM 917 R.V. PARK

CITY OF ALVARADO, JOHNSON COUNTY, TEXAS
M. D. DICKEY SUVEY, ABSTRACT NO. 195

PROJECT DIRECTORY

ELECTRIC
UNITED COOPERATIVE SERVICES
2601 S. BURLESON BLVD
ALVARADO, TEXAS 76097
CONTACT: PHIL SILVA
PH. 817-556-4070

OWNER:
MATT ST. CLAIR
12601 E FM917, ALVARADO, TEXAS
PH. 214-580-6500

GAS
SOUTHWESTERN GAS PIPELINE, INC.
DEVON
PH. 1-800-214-2154

JOHNSON COUNTY SPECIAL UTILITY DISTRICT
2849 S. HWY 171
CLEBURNE, TEXAS 76033
CONTACT: NAN BISE
PH. 817-760-5200

TELEPHONE/CABLE
AT&T
1116 HOUSTON STREE. #1410
FORT WORTH, TEXAS 76102
CONTACT: KIDDER OWENS
PH. 817-338-6822

JOHNSON COUNTY
PUBLIC WORKS
1 NORTH MAIN STREET
SUITE 305
CLEBURNE, TEXAS 76033
CONTACT: DAVID DISHEROON
PH. 817-7556-6380

VICINITY MAP
NOT TO SCALE

AUGUST, 2021

CONSTRUCTION PLANS

NOTE:
REFER TO BECCA GRASSL PLANS FOR SEPTIC SEWER DESIGN. LAYOUT ON THESE PLANS ARE FOR REFERENCE ONLY.

Texas 811

No	DATE	REVISION	APPROV
1.			
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Winkelmann & Associates, Inc.

STATE OF TEXAS
LICENSED
PROFESSIONAL ENGINEER
9.30.2021

COVER SHEET
12601 E FM 917
ALVARADO, TX 76135

C-01.00

GENERAL PAVING NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS AND SPECIFICATIONS. WHERE COUNTY DETAILS ARE UNAVAILABLE OR UNCLEAR, STATE SPECIFICATIONS SHALL APPLY, AND STATE SPECIFICATIONS SHALL TAKE PRECEDENCE IN STATE RIGHT-OF-WAY(S).
2. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLAN, AT LEAST 48 HOURS PRIOR TO ANY WORK IN A COUNTY STREET. TRAFFIC CONTROL MEASURES SHALL CONFORM TO THE COUNTY AND STATE WORK ZONE TRAFFIC CONTROL MANUALS. TRAFFIC CONTROL MEASURES SHALL BE INSTALLED FOR ANY WORK ACTIVITY THAT TAKES PLACE ON OR ADJACENT TO ANY COUNTY STREET OR ROADWAY. THE COUNTY ENGINEER MAY REQUIRE THE TRAFFIC CONTROL PLAN TO BE DESIGNED AND SEALED BY AN ENGINEER LICENSED IN THE STATE.
3. CONTACT TRAFFIC ENGINEERING DIVISION AT LEAST 48 HOURS PRIOR TO WORK REQUIRING THE REMOVAL OR RELOCATION OF TRAFFIC SIGNS, TRAFFIC CONTROL EQUIPMENT OR OTHER TRAFFIC CONTROL APPURTENANCES.
4. CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES (SHOWN OR NOT SHOWN) WITHIN SCOPE OF CONSTRUCTION. IF ANY EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL REPLACE THEM AT HIS OWN EXPENSE.
5. THE CONTRACTOR SHALL SUBMIT A JOINT LAYOUT PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO THE START OF PAVEMENT CONSTRUCTION.
6. ALL JOINTS SHALL EXTEND THROUGH THE CURB.
7. MINIMUM LENGTH OF OFFSET JOINTS AT RADIUS POINTS IS 1.5 FEET.
8. ALL JOINTS, INCLUDING EXPANSION JOINTS WITH REMOVABLE TACK STRIPS, SHALL BE SEALED WITH JOINT SEALANT.
9. TRANSVERSE JOINTS MAY BE SKEWED OR ADJUSTED BY SHIFTING TO MEET MANHOLES, INLETS, OTHER STRUCTURES, ETC.
10. ALL REINFORCING STEEL, SHALL BE NEW DOMESTIC BILLET STEEL CONFORMING TO ASTM A-615, GRADE 50, AND SHALL BE SUPPORTED BY BAR CHAIRS.

SITE GRADING GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, SPECIFICATIONS, AND DETAILS. STATE SPECIFICATIONS SHALL TAKE PRECEDENCE IN STATE RIGHT-OF-WAY(S).
2. VEGETATION, DEBRIS, AND TOPSOIL CONTAINING ORGANIC MATERIALS SHOULD BE CLEARED AND GRUBBED FROM THE ENTIRE SITE (APPROX. DEPTH OF 8 INCHES) AT THE BEGINNING OF EARTHWORK.
3. REFERENCE CIVIL SPECIFICATIONS AND PLAN SHEETS FOR PAVEMENT SUBGRADE PREPARATION REQUIREMENTS. REFERENCE ARCHITECTURAL SPECIFICATIONS FOR BUILDING PAD PREPARATION.
4. PROPOSED CONTOURS AND SPOT ELEVATIONS SHOWN IN PAVED AREAS REFLECT TOP OF PAVEMENT SURFACE OR TOP OF CURB AT CURB LINE. THE LIMITS OF EARTHWORK IN PAVED AREAS IS THE BOTTOM OF PAVEMENT. PROPOSED CONTOURS SHOWN OUTSIDE PAVED AREAS ARE THE EXACT LIMITS OF GRADING.
5. THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO START OF EARTHWORK AND SHALL NOTIFY THE ARCHITECT AND ENGINEER OF ANY CONFLICTS DISCOVERED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES (SHOWN OR NOT SHOWN) WITHIN SCOPE OF CONSTRUCTION. IF ANY EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL REPLACE THEM AT HIS OWN EXPENSE.
6. THE CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL USE SILT FENCES (OR OTHER METHOD APPROVED BY THE COUNTY) AS REQUIRED TO PREVENT SILT AND CONSTRUCTION DEBRIS FROM FLOWING ONTO ADJACENT PROPERTIES. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL EROSION, CONSERVATION, AND SILTATION ORDINANCES. CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF PERMANENT DRAINAGE FACILITIES AND THE ESTABLISHMENT OF A STAND OF GRASS OR OTHER GROWTH TO PREVENT EROSION.
7. ROUGH GRADING UNDER PROPOSED PAVING AND ALL GENERAL SITE ROUGH GRADING SHALL BE BROUGHT TO WITHIN +/- 0.1 FOOT. ROUGH GRADING ELEVATIONS IN PAVED AREAS ARE TO BOTTOM OF PAVEMENT. SEE LANDSCAPE PLANS FOR ADDITIONAL GRADING ELEVATIONS IN LANDSCAPED AREAS.
8. FOR ALL WORK WITHIN STATE OR COUNTY RIGHT OF WAY, THE CONTRACTOR SHALL:
   A. NOTIFY THE STATE OR COUNTY A MINIMUM OF 2 WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION AND HAVE ALL NECESSARY PERMITS.
   B. NOT STORE MATERIAL, EXCESS DIRT OR EQUIPMENT ON THE SHOULDERS OF PAVEMENT OR IN MEDIAN STRIPS. THE PAVEMENT SHALL BE KEPT CLEAN, FREE OF ANY MUD OR EXCAVATION WASTE FROM TRUCKS OR OTHER EQUIPMENT. ON COMPLETION OF THE WORK, ALL DEBRIS AND EXCESS MATERIAL SHALL BE REMOVED FROM THE RIGHT OF WAY.
   C. PROVIDE ALL NECESSARY AND ADEQUATE SAFETY PRECAUTIONS SUCH AS SIGNS, FLAGMEN, LIGHTS, AND BARRICADES AS REQUIRED BY THE COUNTY AND IN ACCORDANCE WITH THE STATE MUTCD. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR AND HOLD HARMLESS THE STATE, THE COUNTY, AND THE OWNER FROM ANY CLAIMS FOR DAMAGE DONE TO EXISTING PRIVATE PROPERTY, PUBLIC UTILITIES, OR TO THE TRAVELING PUBLIC.
   D. POST NECESSARY BONDS AS REQUIRED BY THE COUNTY AND/OR THE STATE.
9. THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST. CONTRACTOR SHALL CONTROL DUST BY SPRINKLING WATER, OR BY OTHER MEANS APPROVED BY THE ARCHITECT, ENGINEER, AND THE OWNER, AT NO ADDITIONAL COST TO THE OWNER.
10. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ANY EXISTING STRUCTURES, FENCES, DEBRIS, OR TREES ON SITE, AND SHALL COORDINATE ALL REMOVAL WITH THE GENERAL CONTRACTOR. NO TREES OR OTHER ITEMS SHALL BE REMOVED WITHOUT THE APPROVAL OF THE ARCHITECT, ENGINEER, AND OWNER. ALL TREES NOT REMOVED SHALL BE GUARDED AND PRESERVED DURING CONSTRUCTION. IF DAMAGED, THE EXISTING TREE WILL BE REPLACED (EQUAL CALIPER) AT THE CONTRACTOR'S EXPENSE.
11. THE CONTRACTOR SHALL ESTABLISH VEGETATION ON ALL DISTURBED AREAS OF THE SITE. SUPPLY OF WATER AS NEEDED FOR VEGETATION GROWTH SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
12. ALL EXCAVATING IS UNCLASSIFIED AND SHALL INCLUDE ALL MATERIALS ENCOUNTERED. UNUSABLE EXCAVATED MATERIAL AND ALL WASTE RESULTING FROM SITE CLEARING AND GRUBBING SHALL BE DISPOSED OF OFF SITE BY THE GRADING CONTRACTOR AT HIS EXPENSE.
13. BEFORE ANY EARTHWORK IS DONE, THE CONTRACTOR SHALL STAKE OUT AND MARK THE LIMITS OF PAVEMENT AND OTHER ITEMS ESTABLISHED BY THE PLANS. THE CONTRACTOR SHALL PROTECT AND PRESERVE CONTROL POINTS AT ALL TIMES DURING THE COURSE OF THE PROJECT. THE GRADING CONTRACTOR SHALL PROVIDE ALL NECESSARY ENGINEERING AND SURVEYING FOR LINE AND GRADE CONTROL POINTS RELATED TO EARTHWORK.
14. THE CONTRACTOR SHALL SALVAGE AND PROTECT ALL EXISTING POWER POLES, SIGNS, MANHOLES, TELEPHONE RISERS, WATER VALVES, ETC. DURING ALL CONSTRUCTION PHASES.

NOTE: THE GENERAL NOTES APPLY TO ALL SHEETS.

WATER GENERAL NOTES

1. ALL CONSTRUCTION MATERIALS AND PROCEDURES SHALL ADHERE TO JOHNSON COUNTY SPECIAL UTILITY DISTRICT STANDARD DETAILS AND SPECIFICATIONS AND THE STATE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. ALL MATERIALS SHALL BE U.L. LISTED AND FACTORY MUTUAL APPROVED UNLESS DIRECTED OTHERWISE BY THE ARCHITECT, ENGINEER, OR THE JOHNSON COUNTY SPECIAL UTILITY DISTRICT.
2. THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND ARCHITECT IMMEDIATELY IF A CONFLICT IS DISCOVERED.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS SHOWN, COORDINATING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITY SERVICES ENTERING THE BUILDING AND/OR CROSSING OTHER UTILITIES.
4. THE SITE UTILITY CONTRACTOR SHALL PROVIDE ALL MATERIALS AND APPURTENANCES NECESSARY FOR COMPLETE INSTALLATION OF THE UTILITIES. ALL PIPE, STRUCTURES, AND FITTING INSPECTED BY THE JOHNSON COUNTY SPECIAL UTILITY DISTRICT WATER DEPARTMENT AND/OR CODE ENFORCEMENT INSPECTOR PRIOR TO BEING COVERED. THE INSPECTOR MUST ALSO BE PRESENT DURING DISINFECTION AND PRESSURE TESTING OF ALL MAINS.
5. ALL WATER MAINS ARE TO BE AS SHOWN ON THE DRAWINGS. WATER MAINS SHALL HAVE A MIN. COVER OF 42 INCHES FROM FINISHED GRADE TO TOP OF PIPE AND SHALL BE BEDDED AND BACKFILLED IN ACCORDANCE WITH JOHNSON COUNTY SPECIAL UTILITY DISTRICT STANDARD DETAILS. ALL FIRE HYDRANTS, BENDS AND PIPE ENDS SHALL BE BLOCKED WITH CONCRETE PER JOHNSON COUNTY SPECIAL UTILITY DISTRICT STANDARD DETAILS.
6. ALL WATER SERVICES 3 INCHES AND SMALLER SHALL BE TYPE 'K' COPPER.
7. ALL FIRE HYDRANTS SHALL BE PRIMED AND PAINTED WITH A MACHINE IMPLEMENT GRADE ENAMEL PAINT. THE HYDRANT BODY AND BONNET SHALL BE PAINTED IN ACCORDANCE JOHNSON COUNTY SPECIAL UTILITY DISTRICT STANDARDS.
8. ALL APPURTENANCES USED FOR FIRE PROTECTION SHALL CONFORM TO THE CURRENT JOHNSON COUNTY SPECIAL UTILITY DISTRICT FIRE DEPARTMENT STANDARDS AND SPECIFICATIONS.

10. FIRE SPRINKLER LINE SHALL BE SIZED AND INSTALLED BY A STATE LICENSED FIRE SPRINKLER CONTRACTOR.
11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE TRENCH SAFETY DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A TRENCH EXCAVATION PROTECTION PLAN PREPARED, SIGNED, AND SEALED BY A GEOTECHNICAL ENGINEER REGISTERED IN THE STATE, FOR ALL CONSTRUCTION IN EXCAVATIONS DEEPER THAN 5 FEET, PRIOR TO START OF CONSTRUCTION. SAID SAFETY PLAN SHALL CONFORM TO ALL APPLICABLE FEDERAL AND STATE LAWS REGARDING EXCAVATING AND TRENCHING OPERATIONS.
12. THE JOHNSON COUNTY SPECIAL UTILITY DISTRICT WILL INSPECT ALL "PUBLIC" CONSTRUCTION. THE CONTRACTOR'S BID PRICE SHALL INCLUDE ALL INSPECTION FEES.

No.	DATE	REVISION	APPROV
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Winkelmann & Associates, Inc.

9.30.2021

GENERAL NOTES

12601 E FM 917
ALVARADO, TX 76135

C-02.00

DRIVEWAY SECTION

PAD SECTION

ABBREVIATION LEGEND

PP	Power Pole	IRF	Iron Rod Found
GW	Guy Wire	IRS	Iron Rod Set
MH	Manhole	CIRS	Iron Rod Set w/ cap "WAI"
WV	Water Valve	CIRF	Iron Rod Found w/ cap
TP	Telephone Pedestal	XCS	"X" Cut in Concrete Set
WM	Water Meter	XCF	"X" Cut in Concrete Found
FH	Fire Hydrant	PKS	PK Nail Set
LP	Light Pole	PKF	PK Nail Found
IV	Irrigation Valve	SS	Sanitary Sewer
CO	Clean Out	SW	Storm Sewer
AC	Air Conditioner	TF	Transformer pad
TV	Cable Box	GM	Gas Meter
SB	Signal Box	GMK	Gas Marker
SP	Signal Pole	TSN	Traffic Sign
SN	Sign	UGC	Underground Cable Marker
CM	Control Monument	EB	Electric Box
		EM	Electric Meter

NOTICES TO CONTRACTOR

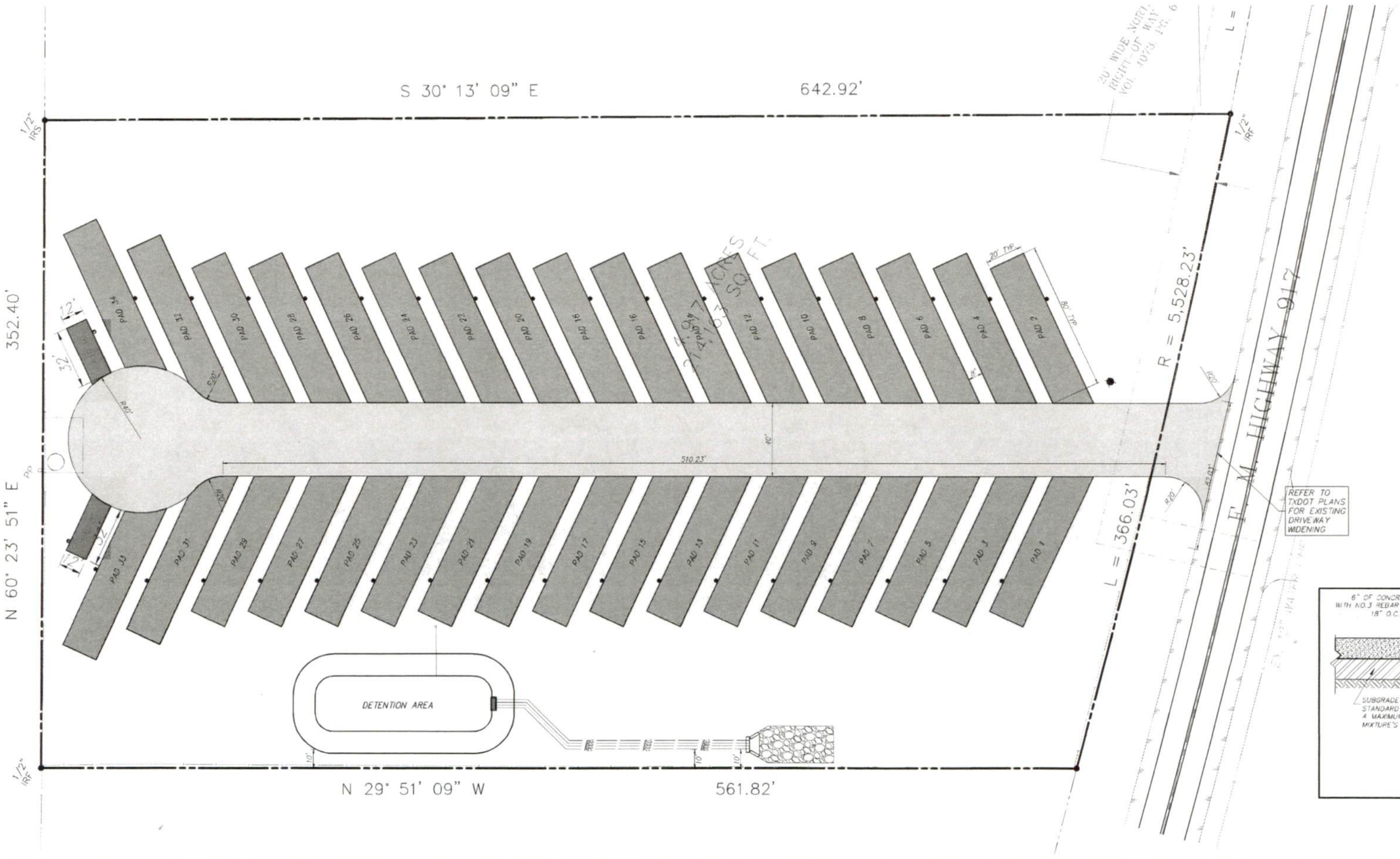
EXISTING UNDERGROUND/BURIED PUBLIC, PRIVATE, AND FRANCHISE UTILITIES/FACILITIES AFFECT THIS SITE, AND ARE DEPICTED ON THE PLANS PER THE BEST AVAILABLE INFORMATION AT THE TIME THE PLANS WERE PRODUCED. WINKELMANN & ASSOC., INC. SHALL NOT BE RESPONSIBLE FOR KNOWING THE EXACT LOCATION OF ALL FACILITIES OR DEPICTING EXACT LOCATIONS OF SAID FACILITIES ON THE PLANS BEYOND WHAT IS STATED ABOVE.

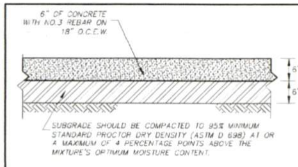
CONTRACTOR(S) SHALL CALL "811" A MINIMUM OF 48 HOURS PRIOR TO BEGINNING WORK ON THE SITE, AND SHALL NOT BEGIN ANY EXCAVATION OR DEMOLITION ACTIVITES UNTIL AFTER SAID FACILITIES HAVE BEEN MARKED AND/OR FLAGGED PER "811" OR THE FACILITY OWNERS.

CONTRACTOR(S) SHALL BE WHOLLY RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR TO SAID FACILITIES DUE TO WORK BEING DONE WITHOUT FOLLOWING THE PROCEDURES ABOVE.

SCALE: 1" = 30'

BEFORE YOU DIG Texas 811





PAVEMENT SECTION(*)

N.T.S.

*NOTE:
CLIENT PROVIDED PAVEMENT SECTION TO BE USED FOR THIS PROJECT.

CLIENT DID NOT PERFORM A GEOTECHNICAL STUDY.

No.	DATE	REVISION	APPROV.
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Winkelmann & Associates, Inc.
CONSULTING CIVIL ENGINEERS ■ SURVEYORS
6750 HILLCREST PLAZA DRIVE, SUITE 215
DALLAS, TEXAS 75230
(972) 490-7090
(972) 490-7099 FAX
Texas Engineers Registration No. 89
Texas Surveyors Registration No. 100866-00

THESE PLANS WERE PREPARED UNDER THE DIRECT SUPERVISION OF MARIA C. BONILLA-NICHOLLS, P.E. #100106. THESE ARE ISSUED FOR INTERIM REVIEW PURPOSES ONLY. THEY ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

9.30.2021

DIMENSION AND PAVING PLAN

12601 E FM 917
ALVARADO, TX 76135

24972.00

C-04.00

ABBREVIATION LEGEND

PP	Power Pole	IRF	Iron Rod Found
GW	Guy Wire	IRS	Iron Rod Set
MH	Manhole	CIRS	Iron Rod Set w/ cap "WAI"
WV	Water Valve	CIRF	Iron Rod Found w/ cap
TP	Telephone Pedestal	XCS	"X" Cut in Concrete Set
WM	Water Meter	XCF	"X" Cut in Concrete Found
FH	Fire Hydrant	PKS	PK Nail Set
LP	Light Pole	PKF	PK Nail Found
IV	Irrigation Valve	SS	Sanitary Sewer
CO	Clean Out	SW	Storm Sewer
AC	Air Conditioner	TF	Transformer pad
TV	Cable Box	GM	Gas Meter
SB	Signal Box	GMK	Gas Marker
SP	Signal Pole	TSN	Traffic Sign
SN	Sign	UGC	Underground Cable Marker
CM	Control Monument	EB	Electric Box
		EM	Electric Meter

NOTICES TO CONTRACTOR

EXISTING UNDERGROUND/BURIED PUBLIC, PRIVATE, AND FRANCHISE UTILITIES/FACILITIES AFFECT THIS SITE, AND ARE DEPICTED ON THE PLANS PER THE BEST AVAILABLE INFORMATION AT THE TIME THE PLANS WERE PRODUCED. WINKELMANN & ASSOC., INC. SHALL NOT BE RESPONSIBLE FOR KNOWING THE EXACT LOCATION OF ALL FACILITIES OR DEPICTING EXACT LOCATIONS OF SAID FACILITIES ON THE PLANS BEYOND WHAT IS STATED ABOVE.

CONTRACTOR(S) SHALL CALL "811" A MINIMUM OF 48 HOURS PRIOR TO BEGINNING WORK ON THE SITE, AND SHALL NOT BEGIN ANY EXCAVATION OR DEMOLITION ACTIVITES UNTIL AFTER SAID FACILITIES HAVE BEEN MARKED AND/OR FLAGGED PER "811" OR THE FACILITY OWNERS.

CONTRACTOR(S) SHALL BE WHOLLY RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR TO SAID FACILITIES DUE TO WORK BEING DONE WITHOUT FOLLOWING THE PROCEDURES ABOVE.

N E S W

0 30' 60'

SCALE: 1" = 30'

BEFORE YOU DIG Texas 811

LEGEND

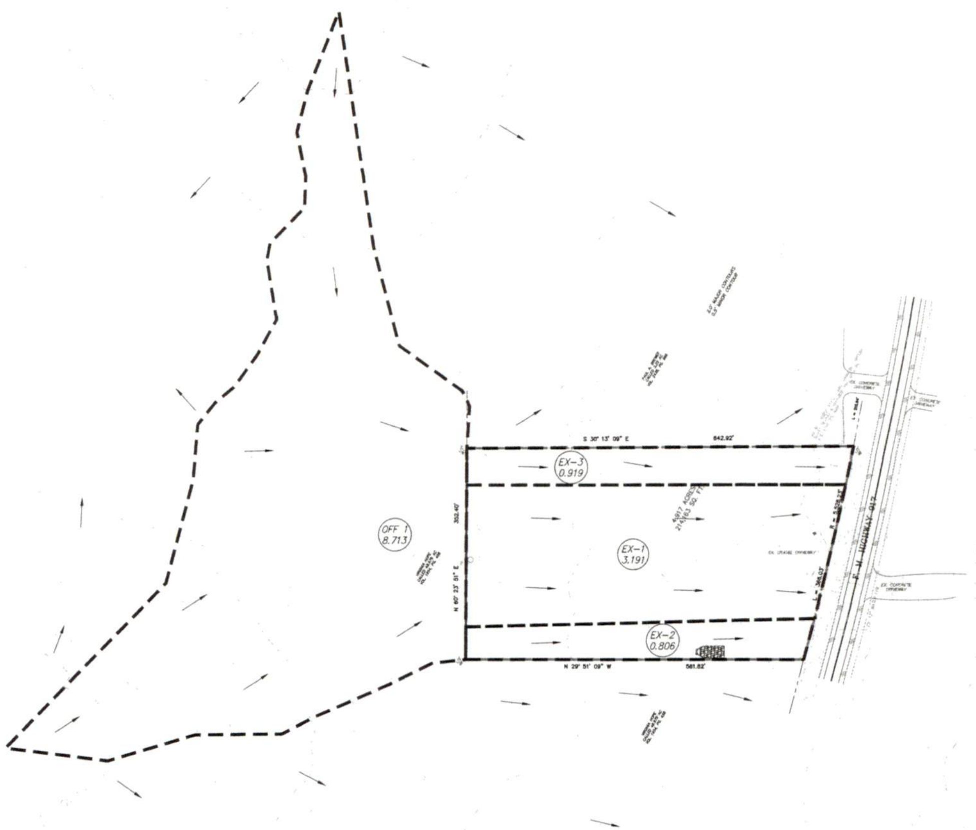
EXIST. CONTOURS

AREA NO.

ACREAGE

DRAINAGE AREA BOUNDARY

FLOW ARROW



EXISTING DRAINAGE FLOW CALCULATIONS										
I.D. NO.	AREA (AC.)	C	Tc (MIN)	5 - YEAR			100 - YEAR			COMMENTS
				Cf	I (IN/HR)	Q (CFS)	Cf	I (IN/HR)	Q (CFS)	
EX-1	3.191	0.45	15.0	1.00	4.83	6.94	1.00	7.93	11.38	
EX-2	0.806	0.30	15.0	1.00	4.83	1.17	1.00	7.93	1.92	
EX-3	0.919	0.30	15.0	1.00	4.83	1.33	1.00	7.93	2.19	
OFF-1	8.713	0.30	15.0	1.00	4.83	12.64	1.00	7.93	20.72	

No.	DATE	REVISION	APPROV.
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CONSULTING CIVIL ENGINEERS ■ SURVEYORS
6750 HILLCREST PLAZA DRIVE SUITE 215 DALLAS, TEXAS 75230
(972) 490-7090 (972) 490-7099 FAX
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STATE OF TEXAS LICENSED PROFESSIONAL ENGINEER

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9.30.2021

EXISTING DRAINAGE AREA MAP

12601 E FM 917
ALVARADO, TX 76135

C-06.00

NOTE:
1. INSTALL EROSION CONTROL MATTING ON ALL DETENTION AREAS AND HYDROMULCH ON ALL SLOPES AND BOTTOM

TEMPORARY IRRIGATION WILL BE REQUIRED TO ESTABLISH TURF IN ALL DISTURBED AREAS WITHOUT A PERMANENT IRRIGATION SYSTEM. HYDROMULCH & ESTABLISH TURN IN ALL DISTURBED AREAS AS IDENTIFIED ON GRADING AND EROSION CONTROL PLANS

1. ROUGH GRADE POND WITH THE START OF DIRTWORK CONSTRUCTION.
2. COMPLETE DIRTWORK, PER CONSTRUCTION SCHEDULE
3. START UTILITY AND DRAINAGE CONSTRUCTION
4. INSTALL THE OUTLET PIPE AND HEADWALLS WITH THE INITIAL PHASE OF UTILITY WORK
5. PUT ROCK CHECK DAM AROUND THE HEADWALL TO PREVENT SOIL EROSION LOSS THRU OUTLET PIPE.
6. IN THE EVENT IT BECOMES NECESSARY TO DE-WATER THE PONDS BETWEEN INITIAL GRADING AND OUTLET PIPE INSTALLATION, THE CONTRACTOR SHALL USE THE NECESSARY PUMPING EQUIPMENT TO DE-WATER THE SEDIMENT BASIN.

ABBREVIATION LEGEND

PP	Power Pole	IRF	Iron Rod Found
GW	Guy Wire	IRS	Iron Rod Set
MH	Manhole	CIRS	Iron Rod Set w/ cap "WAI"
WV	Water Valve	CIRF	Iron Rod Found w/ cap
TP	Telephone Pedestal	XCS	"X" Cut in Concrete Set
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AC	Air Conditioner	TF	Transformer pad
TV	Cable Box	GM	Gas Meter
SB	Signal Box	GMK	Gas Marker
SP	Signal Pole	TSN	Traffic Sign
SN	Sign	UGC	Underground Cable Marker
CM	Control Monument	EB	Electric Box
		EM	Electric Meter

NOTICES TO CONTRACTOR

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CONTRACTOR(S) SHALL CALL "811" A MINIMUM OF 48 HOURS PRIOR TO BEGINNING WORK ON THE SITE, AND SHALL NOT BEGIN ANY EXCAVATION OR DEMOLITION ACTIVITES UNTIL AFTER SAID FACILITIES HAVE BEEN MARKED AND/OR FLAGGED PER "811" OR THE FACILITY OWNERS.

CONTRACTOR(S) SHALL BE WHOLLY RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR TO SAID FACILITIES DUE TO WORK BEING DONE WITHOUT FOLLOWING THE PROCEDURES ABOVE.

DETENTION POND CALCULATIONS Table 1

Storm Event	Existing Flow Rate	iSWM Rainfall Data	
100 Year	9.15 cfs	e	0.78336
		b	113.822
		d	15

MIN	I-100YR	C*	TOTAL AREA (ac)	TOTAL CFS	TOTAL FLOW	OUTFLOW	STORAGE
5	10.89	0.33	5.10	18.58	5573	2745	2828
10	9.14	0.33	5.10	15.60	9358	5490	3868
15	7.93	0.33	5.10	13.52	12169	6862	5307
20	7.03	0.33	5.10	11.98	14380	8235	6145
30	5.77	0.33	5.10	9.84	17715	10980	6735
40	4.93	0.33	5.10	8.41	20184	13725	6460
50	4.33	0.33	5.10	7.38	22135	16470	5666
60	3.87	0.33	5.10	6.60	23746	19214	4531
120	2.44	0.33	5.10	4.16	29967	35684	-5717
180	1.83	0.33	5.10	3.12	33700	52153	-18453
360	1.10	0.33	5.10	1.87	40382	101562	-61180
720	0.65	0.33	5.10	1.10	47674	200379	-152706
1440	0.38	0.33	5.10	0.65	55845	398013	-342169
Detention Storage Required (cubic feet)						=	6,735
Detention Storage Required (acre feet)						=	0.15
100 Year Water Surface Elevation						=	668.48
Pond Elevation Including 1 ft Freeboard						=	669.48

N E S W

SCALE: 1" = 30'

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OUTLET STRUCTURE DETAILS

	STM Event 1	STM Event 2
	5 -YR STORM PEAK	100 -YR STORM PEAK
WTR Surface Elev.	667.80	668.48
Elevation Difference	1.80	0.68
$Q_{MAXALLOWABLE}$ (cfs)	5.281419427	9.149732338

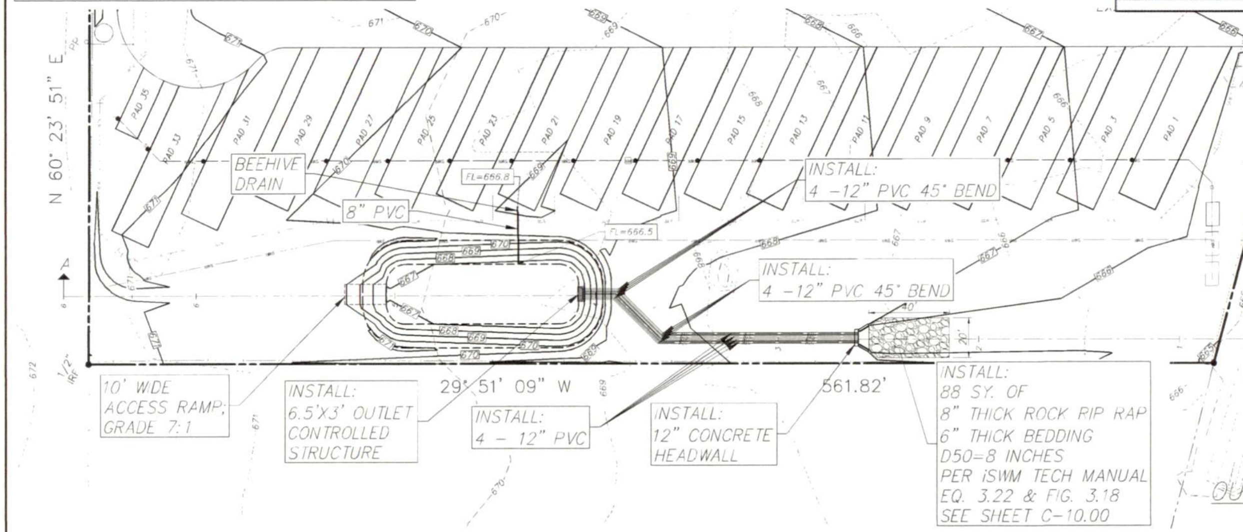
		STM Event 1		STM Event 2	
100 YR	$H_{effective}$ (ft)			H_{A2-WS2}	0.43
	Area (ft²)			A_2	0.90
5 YR	$H_{effective}$ (ft)	H_{A1-WS1}	1.55	H_{A1-WS2}	2.23
	Area (ft²)	A_1	0.88	A_1	0.88

SLOT OPENING DETAILS

	A1	A2
Area (ft²)	0.88	0.90
Width (ft)	1.76	1.79
Height (ft)	0.50	0.50

ORIFICE FLOW DISCHARGE RATE

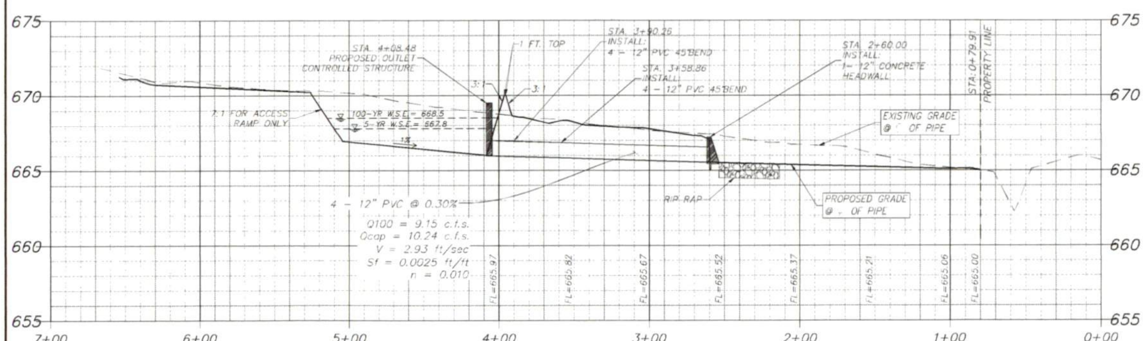
		STM Event 1		STM Event 2	
100 YR	Orifice Flow Discharge (cfs)			Q_{A2-WS2}	2.82
5 YR		Q_{A1-WS1}	5.28	Q_{A1-WS2}	6.33
	Q_{Total} (cfs)		5.28		9.15



Pond Storage

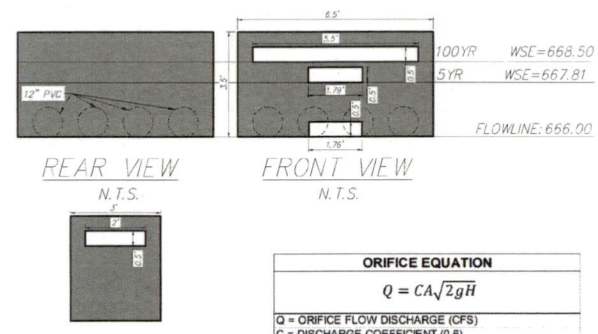
Elevation (ft)	Contour Area (sq-ft)	Storage (cu-ft)	Storage (ac-ft)
666.00	0.00	0.00	0.00
667	2,780.25	1390.13	0.03
668	3,838.70	4699.60	0.11
669	4,719.20	8978.55	0.21
670	5,666.30	14171.30	0.33

Storm Event	Q_{max}	WSE	STORAGE (cu-ft)	STORAGE (ac-ft)
100	9.15	668.48	6,735	0.15
5	5.28	667.80	4,033	0.09



SECTION A

OUTLET CONTROLLED STRUCTURE DETAILS



REAR VIEW
N.T.S.

FRONT VIEW
N.T.S.

LEFT & RIGHT SIDE VIEW
N.T.S.

ORIFICE EQUATION

$$Q = CA\sqrt{2gH}$$

Q = ORIFICE FLOW DISCHARGE (CFS)
C = DISCHARGE COEFFICIENT (0.6)
A = AREA (ft²)
g = ACCELERATION DUE TO GRAVITY (32.2 ft/s)
H = EFFECTIVE HEAD ON THE ORIFICE (ft)

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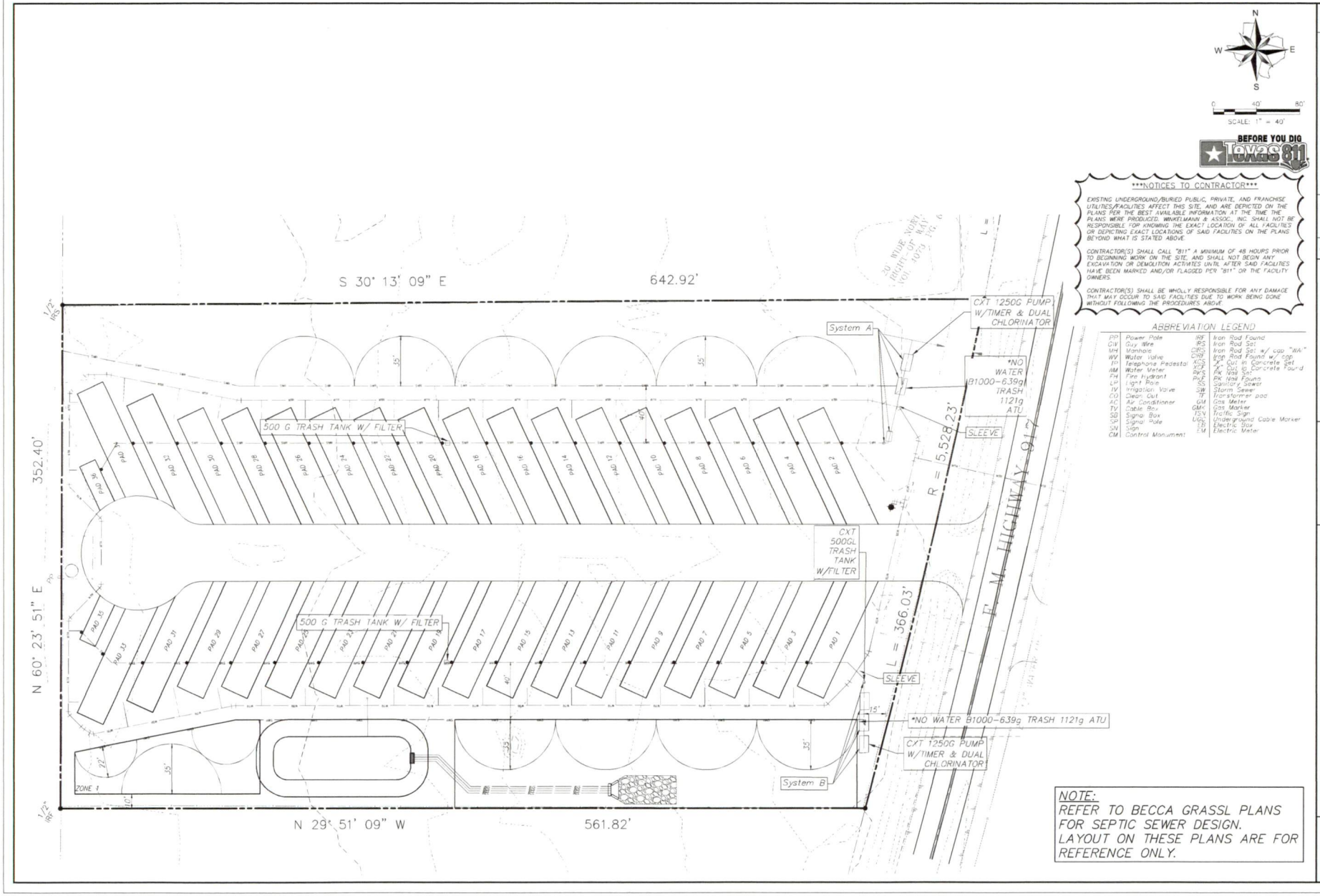
Winkelmann & Associates, Inc.
CONSULTING CIVIL ENGINEERS • SURVEYORS

STATE OF TEXAS LICENSED PROFESSIONAL ENGINEER
9.30.2021

DETENTION POND PLAN & PROFILE

12601 E FM 917
ALVARADO, TX 76135

C-07.00



BEFORE YOU DIG Texas 811

NOTICES TO CONTRACTOR

EXISTING UNDERGROUND/BURIED PUBLIC, PRIVATE, AND FRANCHISE UTILITIES/FACILITIES AFFECT THIS SITE, AND ARE DEPICTED ON THE PLANS PER THE BEST AVAILABLE INFORMATION AT THE TIME THE PLANS WERE PRODUCED. WINKELMANN & ASSOC., INC. SHALL NOT BE RESPONSIBLE FOR KNOWING THE EXACT LOCATION OF ALL FACILITIES OR DEPICTING EXACT LOCATIONS OF SAID FACILITIES ON THE PLANS BEYOND WHAT IS STATED ABOVE.

CONTRACTOR(S) SHALL CALL "811" A MINIMUM OF 48 HOURS PRIOR TO BEGINNING WORK ON THE SITE, AND SHALL NOT BEGIN ANY EXCAVATION OR DEMOLITION ACTIVITIES UNTIL AFTER SAID FACILITIES HAVE BEEN MARKED AND/OR FLAGGED PER "811" OR THE FACILITY OWNERS.

CONTRACTOR(S) SHALL BE WHOLLY RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR TO SAID FACILITIES DUE TO WORK BEING DONE WITHOUT FOLLOWING THE PROCEDURES ABOVE.

ABBREVIATION LEGEND

PP	Power Pole	IRF	Iron Rod Found
GW	Guy Wire	IRS	Iron Rod Set
MH	Manhole	IRFC	Iron Rod Set w/ cap "WA"
WV	Water Valve	CIRF	Iron Rod Found w/ cap
TP	Telephone Pedestal	XCS	X- Cut in Concrete Set
WM	Water Meter	XCF	X- Cut in Concrete Found
FH	Fire Hydrant	PKS	PK Nail Set
LP	Light Pole	PKF	PK Nail Found
IV	Irrigation Valve	SS	Sanitary Sewer
CO	Clean Out	SW	Storm Sewer
AC	Air Conditioner	TF	Transformer pad
TV	Cable Box	GM	Gas Meter
SB	Signal Box	GMK	Gas Marker
SP	Signal Pole	TSN	Traffic Sign
SN	Sign	UGC	Underground Cable Marker
CM	Control Monument	EB	Electric Box
		EM	Electric Meter

NOTE:
REFER TO BECCA GRASSL PLANS FOR SEPTIC SEWER DESIGN. LAYOUT ON THESE PLANS ARE FOR REFERENCE ONLY.

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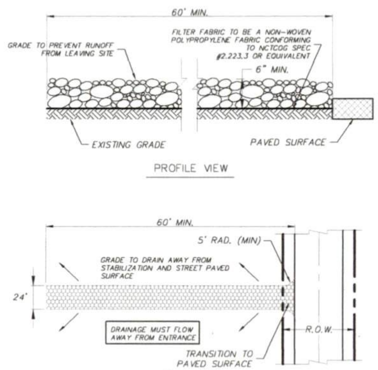
Winkelmann & Associates, Inc.

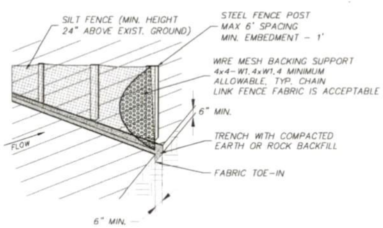
SEPTIC SEWER PLAN
12601 E FM 917
ALVARADO, TX 76135

C-08.02



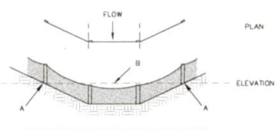
STABILIZED CONSTRUCTION ENTRANCE

N.T.S.



CONSTRUCTION OF
A FILTER BARRIER (SILT FENCE)

N.T.S.



PROPER PLACEMENT OF A FILTER BARRIER IN A DRAINAGE WAY

N.T.S.

EROSION CONTROL GENERAL NOTES

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
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 SHOULD BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE TO BE LAID IN THE GROUND AND BACKFILLED.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POSTS.
5. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN IT HAS SERVED ITS USEFULNESS, SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. SEDIMENT TRAPPED BY THIS PRACTICE SHALL BE DISPOSED OF IN AN APPROVED SITE IN A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES AND DISPOSED OF IN AN APPROVED SPOIL SITE OR AS IN NO. 7 ABOVE.
9. EROSION PROTECTION WILL BE DELETED OR ADDED PER THE CITY.
10. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL EROSION, CONSERVATION, AND SILTATION ORDINANCES. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF PERMANENT DRAINAGE FACILITIES AND THE ESTABLISHMENT OF A STAND OF GRASS OR OTHER GROWTH TO PREVENT EROSION.
11. ALL SEEDING AND FERTILIZATION OF DISTURBED AREAS WILL BE THE RESPONSIBILITY OF THE GRADING CONTRACTOR.

STANDARDS FOR SILT FENCE

DEFINITION

TEMPORARY BARRIER FENCE MADE OF BURLAP OR POLYPROPYLENE MATERIAL WHICH IS WATER PERMEABLE BUT WILL TRAP WATERBORNE SEDIMENT.

PURPOSE

TO INTERCEPT AND DETAIN WATERBORNE SEDIMENT FROM UNPROTECTED AREAS OF LIMITED EXTENT.

CONDITIONS WHERE PRACTICE APPLIES

SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHALL REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OR OTHER DRAINAGE WAY.

DESIGN CRITERIA

SILT FENCE IS CONSTRUCTED NEAR THE PERIMETER OF A DISTURBED SITE WITHIN THE DEVELOPING AREA. IT IS NOT TO BE CONSTRUCTED OUTSIDE THE PROPERTY LINES WITHOUT OBTAINING A LETTER OF PERMISSION FROM THE AFFECTED ADJACENT PROPERTY OWNERS.

A DESIGN IS NOT REQUIRED FOR THE INSTALLATION OF THE SILT FENCE. HOWEVER, THE FOLLOWING CRITERIA SHALL BE OBSERVED:

DRAINAGE AREA –	LESS THAN TWO ACRES
HEIGHT –	24 INCHES MINIMUM HEIGHT MEASURED FROM EXISTING OR GRADED GROUND.
MATERIAL –	BURLAP, POLYPROPYLENE FABRIC, OR NYLON REINFORCED WITH POLYESTER NETTING. THE MULLEN BURST STRENGTH SHALL BE GREATER THAN 150 PSI. THE EDGES SHALL BE TREATED TO RESIST UNRAVELING.
SUPPORT –	STEEL FENCE POSTS SPACED A MAXIMUM OF 6 FEET APART. WOVEN WIRE WILL BE USED TO SUPPORT THE MATERIAL.

OUTLET

SILT FENCE SHALL BE PLACED AND CONSTRUCTED IN SUCH A MANNER THAT RUNOFF FROM A DISTURBED SURFACE OR EXPOSED UPLAND AREA SHALL BE INTERCEPTED, SEDIMENT TRAPPED, AND THE SURFACE RUNOFF ALLOWED TO PERCOLATE THROUGH THE STRUCTURE. SILT FENCE SHALL BE PLACED IN SUCH A MANNER THAT SURFACE RUNOFF WHICH PURCOLATES THROUGH WILL FLOW ONTO AN UNDISTURBED STABILIZED AREA OR STABILIZED OUTLET.

STONE OVERFLOW STRUCTURE

1. USE ONLY OPEN GRADED ROCK 4–8 INCHES IN DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK 3–5 INCHES IN DIAMETER FOR OTHER CONDITIONS.
2. THE CHECK DAM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING A MAXIMUM OPENING OF 1 INCH AND MINIMUM WIRE SIZE OF 20 GAUGE AND SHALL BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP.
3. THE CHECK DAM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN EVENT AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE–THIRD OF THE HEIGHT OF THE CHECK DAM OR ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVE AND DISPOSED OF PROPERLY.
5. WHEN THE SITE IS COMPLETELY STABILIZED, THE CHECK DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROPRIATE MANNER.

STABILIZED CONSTRUCTION ENTRANCE

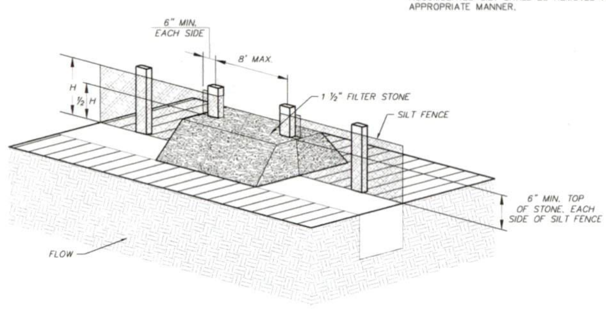
1. STONE SHALL BE 3 TO 5 INCH DIAMETER CRUSHED ROCK OR ACCEPTABLE CRUSHED PORTLAND CEMENT CONCRETE.
2. LENGTH SHALL BE SHOWN ON PLANS, WITH A MINIMUM LENGTH OF 30 FEET FOR LOTS WHICH ARE LESS THAN 150 FEET FROM EDGE OF PAVEMENT. THE MINIMUM DEPTH IN ALL OTHER CASES SHALL BE 60 FEET.
3. THE THICKNESS SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM, DITCH, OR WATERCOURSE USING APPROVED METHODS.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES, MUST BE REMOVED IMMEDIATELY.
7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

CHECK DAMS

1. USE ONLY OPEN GRADED ROCK 4–8 INCHES IN DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK 3–5 INCHES IN DIAMETER FOR OTHER CONDITIONS.
2. THE CHECK DAM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING A MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE SIZE OF 20 GAUGE AND SHALL BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP.
3. THE CHECK DAM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN EVENT AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE–THIRD OF THE HEIGHT OF THE CHECK DAM OR ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.
5. WHEN THE SITE IS COMPLETELY STABILIZED, THE CHECK DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROPRIATE MANNER.

EROSION CONTROL MATTING

1. STRIPS OF MATTING SHALL BE INSTALLED PARALLEL TO THE DIRECTION OF FLOW OVER THE SURFACE WHICH IS TO BE PROTECTED.
2. THE UP–CHANNEL END OF THE MATTING SHALL BE BURIED IN A TRENCH MEASURING 6 INCHES DEEP AND 6 INCHES WIDE FOR THE ENTIRE WIDTH OF THE END. THE SOIL SHALL BE BACKFILLED INTO THE TRENCH AND TAMPED FIRMLY. STAPLES SHALL BE PLACED EVERY 12 INCHES ALONG THE END OF THE MATTING.
3. EDGES OF ADJACENT STRIPS OF MATTING SHALL BE OVERLAPPED A MINIMUM OF 4 INCHES AND SHALL BE STAPLED EVERY 3 FEET ALONG THE OVERLAP.
4. WHEN JOINING STRIPS OF MATTING END TO END, A TRENCH SIMILAR TO THE ONE DUG AT THE BEGINNING OF THE ORIGINAL STRIP SHALL BE DUG WITH THE UP–CHANNEL END OF THE NEW STRIP BEING PLACED IN A LIKE MANNER IN THE TRENCH AS THE BEGINNING END OF THE ORIGINAL STRIP. THE END OF THE STRIP BEING FOLDED UNDER AT LEAST 12 INCHES. STAPLES SHALL BE INSTALLED AT 12 INCH INTERVALS ALONG THE WIDTH OF THE STRIP NOT MORE THAN 6 INCHES FROM THE TRENCH.
5. IN SITUATIONS WHERE ERODIBLE SOILS, STEEP SLOPES OR HIGH VELOCITY FLOWS ARE ENCOUNTERED, A FOLD OF THE MATTING SHALL BE INSERTED INTO A 6 INCH TRENCH AND TAMPED FIRMLY. STAPLES SHALL BE INSTALLED AT 12 INCH INTERVALS ALONG THE TRENCH.
6. STAPLES FOR ANCHORING SOIL STABILIZING MATERIALS SHALL BE MADE OF 10 GAUGE WIRE OR HEAVIER. THEY SHALL BE 6 TO 10 INCHES IN LENGTH, WITH THE LONGER STAPLES BEING USED IN LOOSE OR UNSTABLE SOILS. THERE SHALL BE ONE STAPLE FOR EACH FOUR (4) SQUARE FEET OF MATTING TO ASSURE PROPER BONDING BETWEEN THE SOIL AND THE MAT MATERIAL.



CHECK DAM

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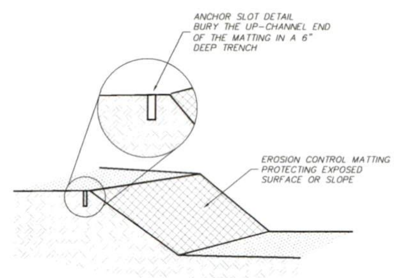

EROSION CONTROL MATTING

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Winkelmann & Associates, Inc.

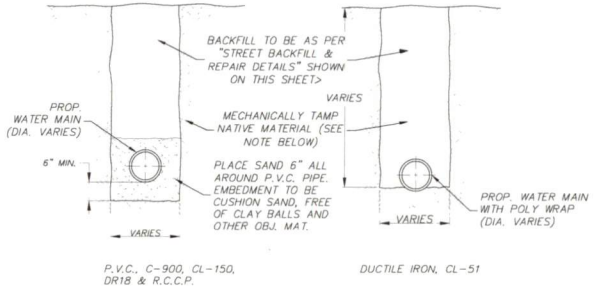
9.30.2021

EROSION CONTROL DETAILS

12601 E FM 917
ALVARADO, TX 76135

C-09.01

* MECHANICALLY TAMP NATIVE MATERIAL (6"ø CLODS OR SMALLER IN 6"–8" LIFTS) TO 95% OF THE MAXIMUM DRY DENSITY DETERMINED BY THE STD. PROCTOR TEST, ASTM D698 WITH MOISTURE CONTENT OF THE FILL AT THE TIME OF COMPACTION TO BE NEAR OPTIMUM OR 4% ABOVE PROCTOR OPTIMUM VALUE.



PIPE EMBEDMENT DETAIL (12" DIA. AND SMALLER)
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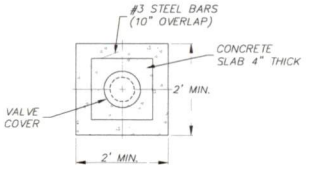

VIEW 'A-A'
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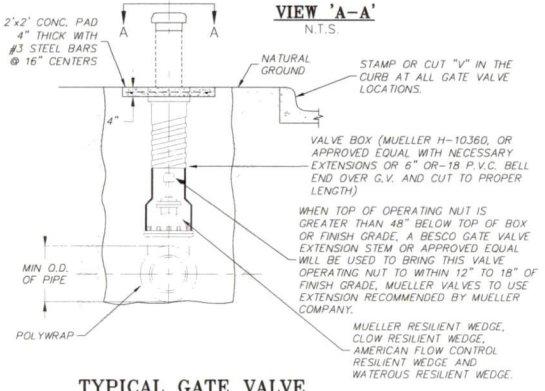

TYPICAL GATE VALVE SETTING AND BOX
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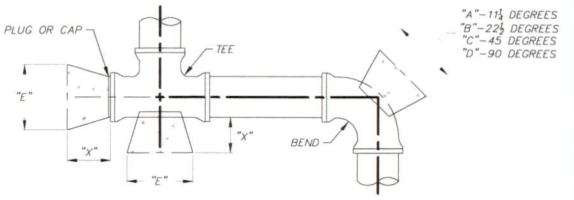

PIPE SIZE	X-* DIA. FT.	11 1/4 DEGREES		22 1/2 DEGREES		45 DEGREES		90 DEGREES		TEE & PLUG	
		"A"	MIN. AREA	"B"	MIN. AREA	"C"	MIN. AREA	"D"	MIN. AREA	"E"	MIN. AREA
4"	1.5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.00	1.00
6"	1.5	1.00	1.00	1.00	1.00	1.14	1.30	1.55	2.40	1.30	1.70
8"	1.5	1.00	1.00	1.08	1.18	1.52	2.31	2.07	4.27	1.74	3.02
10"	1.5	1.00	1.00	1.35	1.84	1.90	3.61	2.58	6.66	2.17	4.71
12"	1.5	1.00	1.33	1.63	2.65	1.86	5.19	3.10	9.60	2.61	6.79
14"	1.5	1.03	1.81	1.90	3.60	2.66	7.07	3.61	13.06	3.04	9.246
16"	2.0	1.18	2.36	2.17	4.71	3.04	9.23	4.13	17.06	3.47	12.06
18"	2.0	1.33	2.99	2.44	5.96	3.42	11.69	4.65	21.59	3.91	15.27
20"	2.0	1.48	3.70	2.71	7.35	3.80	14.43	5.16	26.86	4.34	18.85
21"	2.0	1.55	4.07	2.85	8.11	3.99	15.91	5.42	29.39	4.56	20.78
24"	2.0	1.77	5.32	3.25	10.59	4.56	20.77	6.20	38.39	5.21	27.14
27"	2.5	1.99	6.73	3.66	13.40	5.13	26.29	6.97	48.58	5.86	34.35
30"	2.5	2.22	8.31	4.07	16.55	5.70	32.46	7.74	59.98	6.51	42.41
33"	2.5	2.44	10.06	4.47	20.02	6.27	39.28	8.52	72.57	7.16	51.31
36"	2.5	2.66	11.97	4.88	23.83	6.84	46.74	9.29	86.37	7.81	61.07
39"	3.0	2.88	14.05	5.29	27.97	7.41	54.86	10.07	101.36	8.47	71.68
42"	3.0	3.10	16.30	5.69	32.43	7.98	63.62	10.85	117.56	9.12	83.13

DIMENSIONS OF CONCRETE FOR HORIZONTAL THRUST BLOCKING AT FITTINGS

HORIZONTAL THRUST BLOCK NOTES:

1. RETAINER GLANDS OR OTHER RESTRAINING DEVICES MAY BE REQUIRED AS NEEDED.
2. ALL CALCULATIONS ARE BASED ON A WATER LINE PRESSURE OF 150 p.s.i. AND AN ALLOWABLE SOIL BEARING VALUE OF 2,500 POUNDS PER SQUARE FOOT.
3. 2000 PSI. CONCRETE SHALL BE USED FOR ALL BLOCKING.
4. THE MINIMUM VERTICAL DIMENSIONS OF ALL BLOCKING SHALL BE 1.5 TIMES THE PIPE DIAMETER WITH AT LEAST 0.75 TIMES THE PIPE DIAMETER EXTENDING BOTH ABOVE AND BELOW THE PIPE CENTERLINE. THIS DIMENSION DETERMINES THE "X" DIMENSION FOR 11 1/4° BENDS.
5. FOR 22-1/2°, 45°, 90°, AND TEE AND PLUGS, THE VERTICAL DIMENSION SHALL BE EQUAL TO THE HORIZONTAL DIMENSION SHOWN TO PRODUCE THE REQUIRED MINIMUM AREA.
6. ALL MINIMUM AREAS ARE IN SQUARE FEET.

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Winkelmann & Associates, Inc.

THESE PLANS WERE PREPARED UNDER THE DIRECT SUPERVISION OF MARK C. WINKELMANN, P.E. ON 9.30.2021. THEY ARE NOT TO BE ISSUED OR ACCEPTED FOR FINAL PURPOSES UNLESS THEY ARE SIGNED AND SEALED FOR THE CONCEPTUAL PURPOSES USE THEY ARE INTENDED.

STATE OF TEXAS — LICENSED — PROFESSIONAL ENGINEER

9.30.2021

CIVIL DETAILS
12601 E FM 917
ALVARADO, TX 76135

C-10.01