OKLAHOMA FLOODPLAIN MANAGERS ASSOCIATION

STORMWATER MANAGEMENT: ADDRESSING STORMWATER RUNOFF ISSUES FROM CONSTRUCTION ACTIVITY

SEPTEMBER 24, 2025

KENNETH D. SCHWAB, P.E., S.E., CFM

MEGAN PASCO, P.E.

STORMWATER MANAGER'S RESPONSIBILITIES

Protect the Public

Protect the Profession

Protect the Organization

Protect Yourself

Protect the Boss

Protect the Public

Protect the Governing Body

STORMWATER REVIEW PROCESS

- HYDROLOGIC INVESTIGATIONS
- HYDRAULIC ANALYSES
- STORMWATER CONVEYANCE SYSTEMS
- DETENTION \ RETENTION FACILITIES
- EARTH CHANGE PERMITS
- STORMWATER POLLUTION PREVENTION PLANS
- CONSTRUCTION ACTIVITY INSPECTIONS
- FEMA REGULATORY FLOODPLAIN PROCESS
- USACE 404 PERMITTING PROCESS
- OWRB DAM SAFETY CONSTRUCTION PERMIT

CONSTRUCTION ACTIVITY IMPACTS

CITY OF BROKEN ARROW

ENGINEERING DESIGN CRITERIA MANUAL

ADOPTED BY CITY COUNCIL ON FEBRUARY 20, 2024

BROKEN ARROW CITY COUNCIL

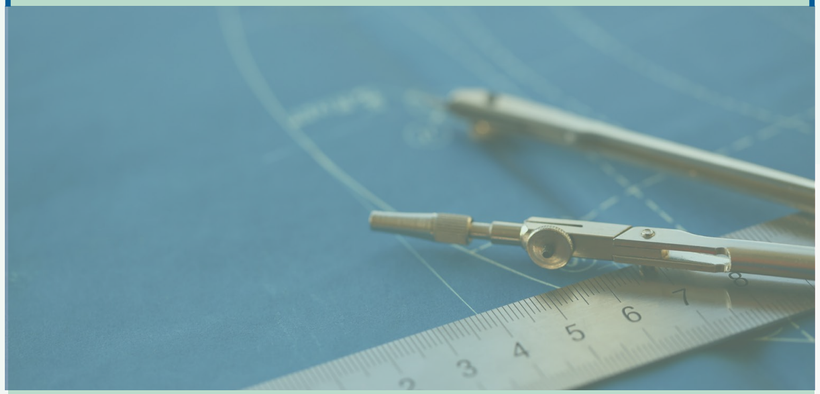
Debra Wimpee, Mayor
Christi Gillespie, Vice-Mayor
Johnnie Parks, Council Member
Lisa Ford, Council Member
Justin Green, Council Member

Michael Spurgeon, City Manager
Kenneth D. Schwab, P.E., S.E., CFM, Assistant City Manager - Operations

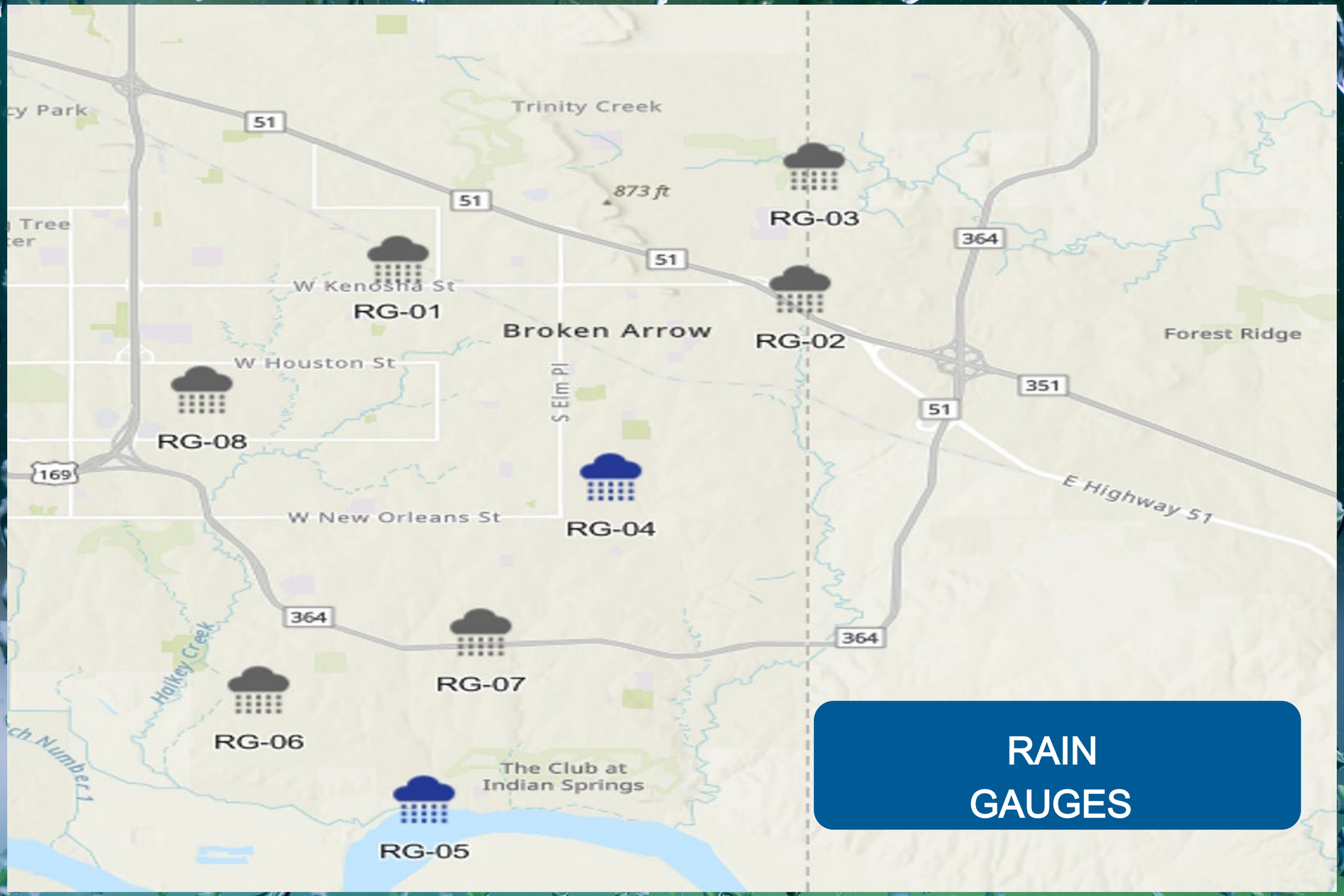
Pre - Developed vs.
Post - Developed

Upstream vs.
Downstream

Best Management
Practices



OFMA


Trinity Creek
873 ft
51
51
51
364
RG-03
RG-01
RG-02
W Kenosha St
Broken Arrow
Forest Ridge
W Houston St
S Elm Pl
351
51
RG-08
169
RG-04
E Highway 51
W New Orleans St
364
364
RG-07
Haikey Creek
RG-06
The Club at
Indian Springs
RG-05
RAIN
GAUGES

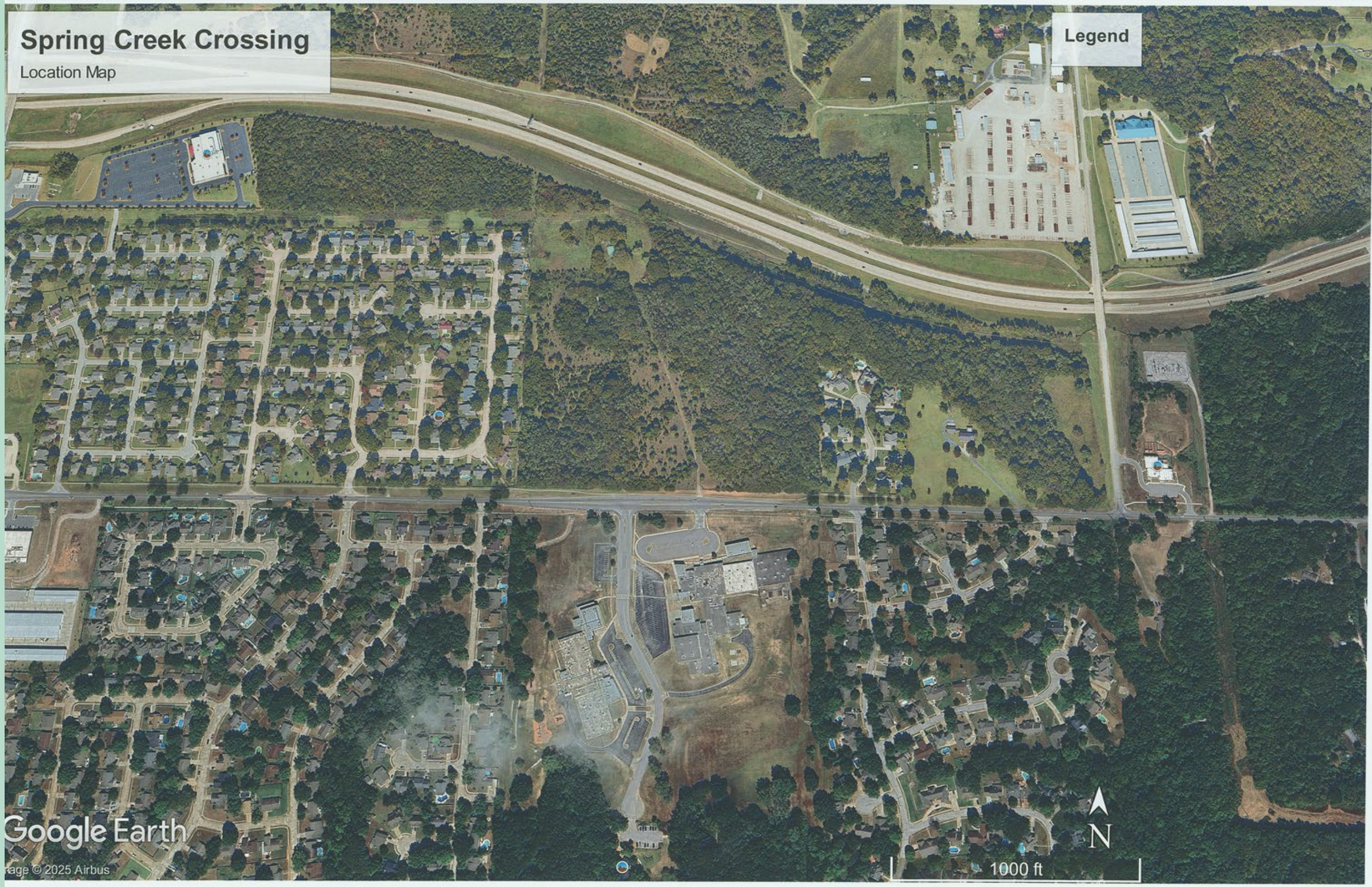
RAINFALL ANALYSIS

Summary	RG-04	RG-05	RG-07	Avg.	Max.
Total Rainfall	23.20	24.10	23.80	23.70	24.10
Total Days	64	64	64	64	64
No. Rain Events	31	34	33	32.7	34
Average Rainfall/Event	0.75	0.71	0.72	0.7	0.75
Max. 5-Min Rainfall	5.88	7.44	5.28	6.20	7.44
Max. 1-Hour Rainfall	1.73	1.78	1.68	1.73	1.78

CONSTRUCTION ACTIVITY IMPACTS

SPRING CREEK CROSSING

BROKEN ARROW



OVERALL PRELIMINARY PLAT
JUNE 27, 2024

Conceptual Utility Plan

PUD-001360-2024

Spring Creek Crossing

PART OF THE SOUTHEAST QUARTER (SE/4) OF
SECTION THIRTY-FIVE (35), TOWNSHIP EIGHTEEN (18) NORTH, RANGE FOURTEEN (14) EAST OF THE INDIAN MERIDIAN
A SUBDIVISION WITHIN THE CITY OF BROKEN ARROW, TULSA COUNTY, STATE OF OKLAHOMA

OWNER:
Tulsa L Dev., LLC
CONTACT: DEREK KENNEDY
EMAIL: DEREK.KENNEDY@RCH.COM
4058 North College
Suite 300 Box 9
Fayetteville, Arkansas 72703
Phone: (479) 455-9090

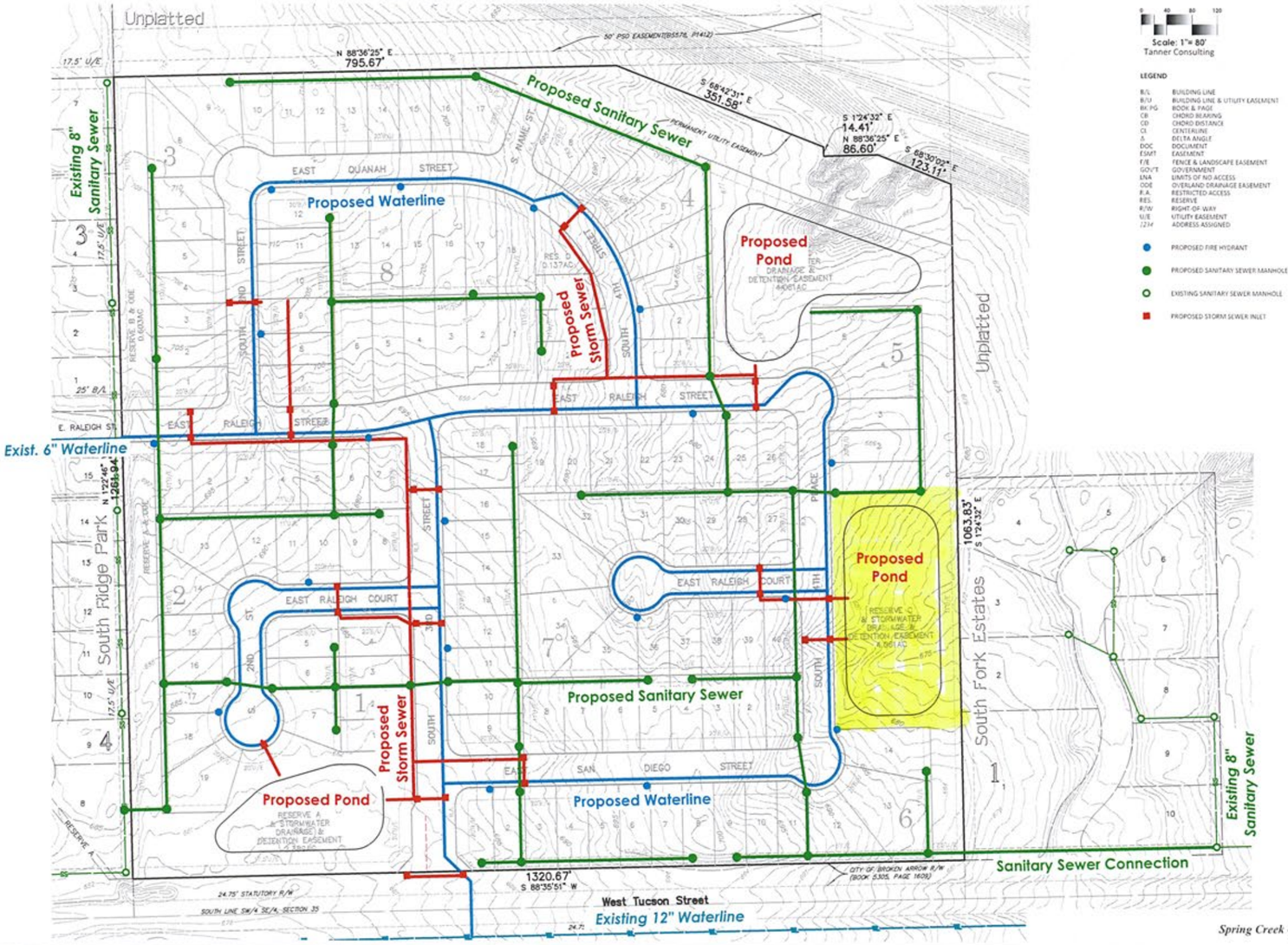
SURVEYOR/ENGINEER:
Tanner Consulting, L.L.C.
DAN E. TANNER, P.L.S. NO. 1435
OK CA NO. 2661, EXPIRES 6/30/2025
EMAIL: DAN@TANNERBAITSHOP.COM
5323 South Lewis Avenue
Tulsa, Oklahoma 74105
Phone: (918) 745-9929

Location Map
Scale: 1" = 2000
NORTH

SUBDIVISION CONTAINS:

ONE HUNDRED AND THIRTY-ONE (131) LOTS
IN EIGHT (8) BLOCKS
WITH FOUR (4) RESERVES

GROSS SUBDIVISION AREA: 36.991 ACRES



NORTH
Scale: 1"= 80'
Tanner Consulting

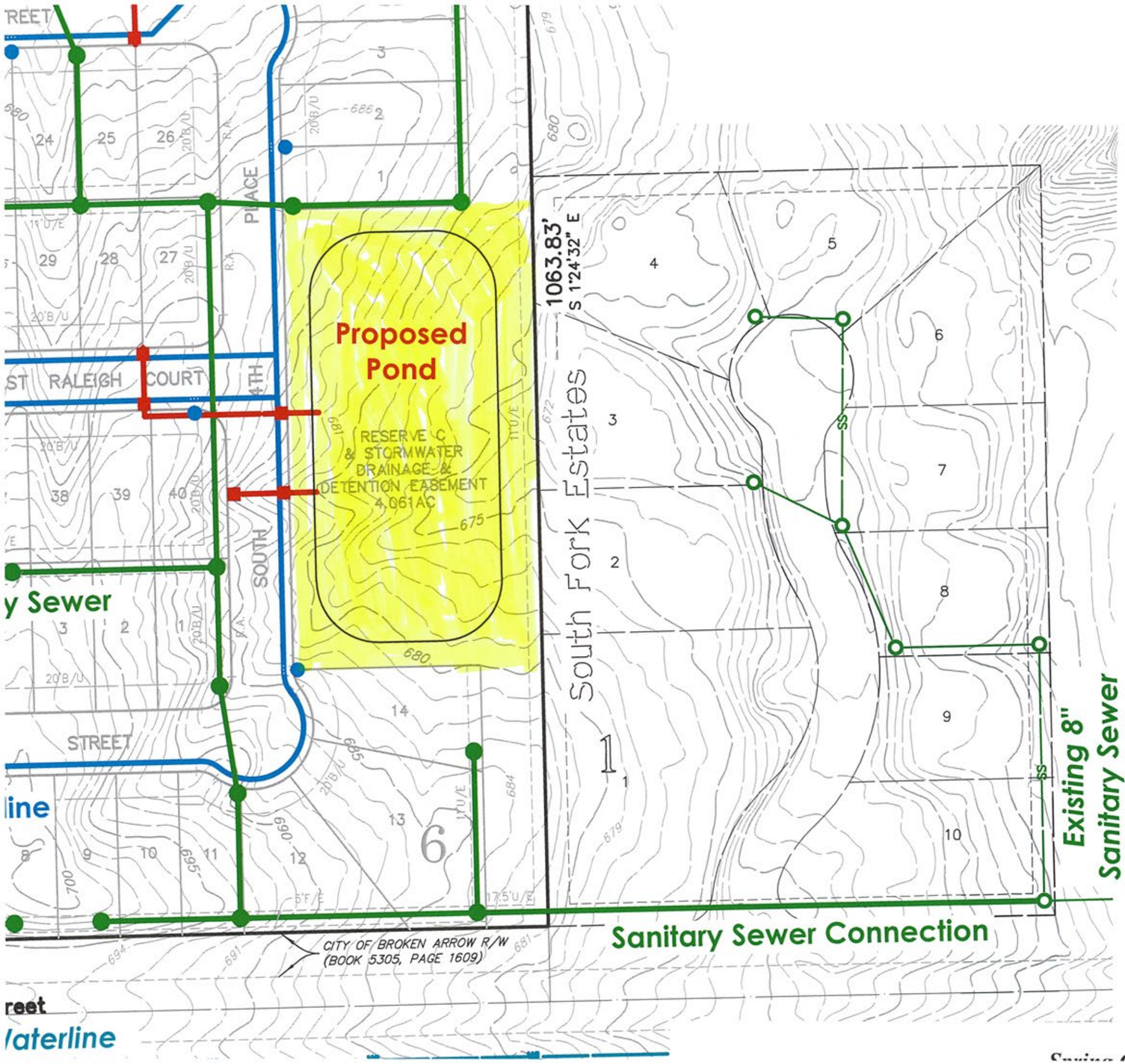
LEGEND

B/L	BUILDING LINE
B/U	BUILDING LINE & UTILITY EASEMENT
BK/PG	BOOK & PAGE
CB	CHORD BEARING
CD	CHORD DISTANCE
CL	CENTERLINE
Δ	DELTA ANGLE
DOC.	DOCUMENT
ESMT	EASEMENT
F/E	FENCE & LANDSCAPE EASEMENT
GOVT	GOVERNMENT
LNA	LIMITS OF NO ACCESS
ODE	OVERLAND DRAINAGE EASEMENT
R.A.	RESTRICTED ACCESS
RES.	RESERVE
R/W	RIGHT-OF-WAY
U/E	UTILITY EASEMENT
1234	ADDRESS ASSIGNED

- PROPOSED FIRE HYDRANT
- PROPOSED SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED STORM SEWER INLET

DATE OF PREPARATION: May 13, 2024

PRELIMINARY PLAT
JUNE 27, 2024
BLOW-UP DETAIL



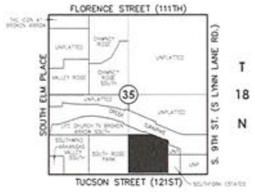
SET FOR APPROVAL
APRIL 15, 2025
ITEM 25-292
RE-SET JUNE 2, 2025

Conditional Final Plat

PUD-001360-2024

Spring Creek Crossing

PART OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER (SW/4 SE/4) OF SECTION THIRTY-FIVE (35), TOWNSHIP EIGHTEEN (18) NORTH, RANGE FOURTEEN (14) EAST OF THE INDIAN MERIDIAN, A SUBDIVISION WITHIN THE CITY OF BROKEN ARROW, TULSA COUNTY, STATE OF OKLAHOMA



Location Map
Scale: 1"= 2000'

NORTH

SUBDIVISION CONTAINS:

ONE HUNDRED AND THIRTY-TWO (132) LOTS IN SIX (6) BLOCKS WITH THREE (3) RESERVE AREAS

GROSS SUBDIVISION AREA: 36.991 ACRES

Benchmark #1

CHISELED X FOUND IN CONCRETE WALKING PATH, LOCATED ON THE SOUTH SIDE OF PROPERTY, APPROXIMATELY 501.92' WEST AND 38.79' SOUTH OF THE SOUTHEAST PROPERTY CORNER (367288.43N, 2623521.15E)

ELEVATION=693.37 (NAVD88)

Notes:

1. THIS PLAT MEETS THE OKLAHOMA MINIMUM STANDARDS FOR THE PRACTICE OF LAND SURVEYING AS ADOPTED BY THE OKLAHOMA STATE BOARD OF LICENSURE FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.
2. ALL PROPERTY CORNERS ARE FOUND OR SET 3/8" IRON REBAR WITH YELLOW CAP STAMPED "TANNER 1435" UNLESS OTHERWISE NOTED.
3. THE BEARINGS SHOWN HEREON ARE BASED UPON THE OKLAHOMA STATE PLANE COORDINATE SYSTEM, NORTH ZONE (3501), NORTH AMERICAN DATUM 1983 (NAD83); SAID BEARINGS ARE BASED LOCALLY UPON FIELD-OBSERVED TIES TO THE FOLLOWING MONUMENTS:

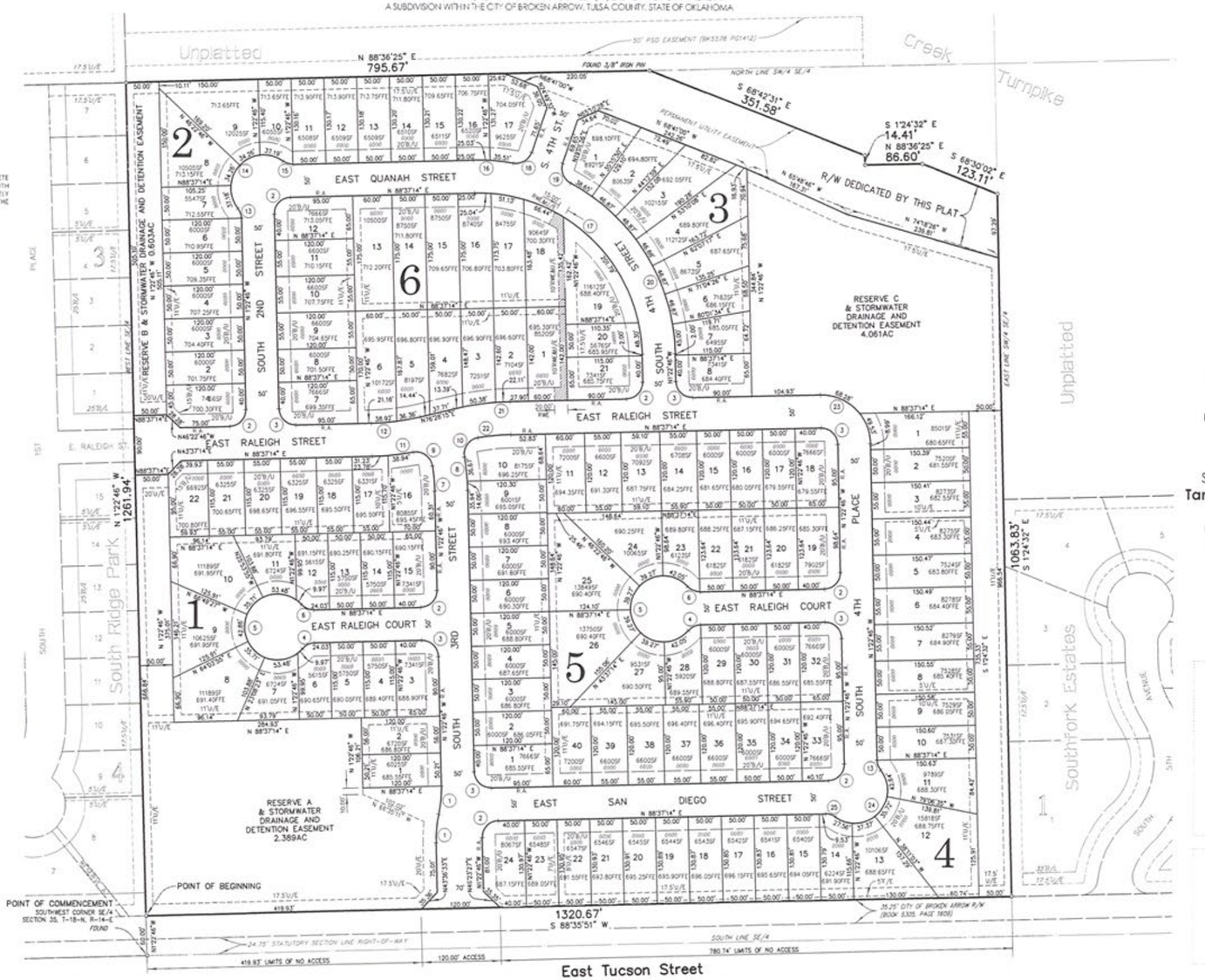
   (A) CHISELED X FOUND AT THE SOUTHWEST CORNER OF SECTION 35;

   (B) 3/8" IRON PIN FOUND AT THE SOUTHWEST CORNER OF THE SOUTHEAST QUARTER (SE/4) OF SECTION 35;

   THE BEARING BETWEEN SAID MONUMENTS BEING NORTH 88°35'58" EAST.
4. ADDRESSES SHOWN ON THIS PLAT WERE PROVIDED BY THE CITY OF BROKEN ARROW AND WERE ACCURATE AT THE TIME THE PLAT WAS FILED. ADDRESSES ARE SUBJECT TO CHANGE AND SHOULD NEVER BE RELIED ON IN PLACE OF THE LEGAL DESCRIPTION.
5. ACCESS AT THE TIME OF PLAT WAS PROVIDED BY EAST TUCSON STREET AND BY EAST RALEIGH STREET, BOTH BEING PUBLIC STREETS.
6. ACCESS IS RESTRICTED AND ADDITIONAL SETBACK AND OTHER CITY OF BROKEN ARROW ZONING ORDINANCE RESTRICTIONS APPLY TO LOTS WITH LOT LINES DESIGNATED "RESTRICTED ACCESS" OR "R.A." THIS NOTE IS IN REFERENCE AND SUBORDINATE TO A SIMILAR PROVISION IN THE RESTRICTIVE COVENANTS.
7. STORMWATER DETENTION ACCOMMODATIONS FOR THIS SITE ARE PROVIDED IN ACCORDANCE WITH FEE-IN-LIEU OF DETENTION DETERMINATION #DD-100523-65.
8. ALL LOTS REQUIRE BACKFLOW PREVENTION PER BROKEN ARROW CITY ORDINANCE.

Curve Table

CURVE	LENGTH(L)	RADIUS(R)	DELTA(Δ)	CHORDBRG(CB)	CHORD(D)(CD)
1	43.11'	185.00'	13°21'04"	N5°17'46"E	43.01'
2	39.27'	25.00'	90°00'00"	N43°37'14"E	35.36'
3	39.27'	25.00'	90°00'00"	N46°22'46"W	35.36'
4	21.09'	25.00'	48°11'23"	N64°31'33"E	20.41'
5	241.19'	50.00'	276°22'46"	N1°22'46"W	66.67'
6	21.09'	25.00'	48°11'23"	N67°17'04"W	20.41'
7	38.45'	275.00'	8°00'38"	N5°23'05"W	38.42'
8	50.73'	325.00'	8°56'36"	N5°51'04"W	50.68'
9	39.65'	25.00'	90°51'46"	N54°49'17"W	35.62'
10	39.64'	25.00'	90°51'20"	N35°06'18"E	35.62'
11	62.72'	405.00'	8°52'24"	N84°11'02"E	62.66'
12	75.26'	355.00'	12°09'00"	N82°32'44"E	75.14'
13	16.09'	25.00'	36°52'12"	N19°48'52"W	15.81'
14	142.89'	50.00'	163°44'23"	N43°37'14"E	98.99'
15	16.09'	25.00'	36°52'12"	N72°56'40"W	15.81'
16	60.54'	300.00'	11°33'43"	N85°35'54"W	60.44'
17	392.70'	250.00'	90°00'00"	N46°22'46"W	353.55'
18	35.41'	25.00'	81°09'00"	N59°36'27"E	32.52'
19	35.41'	25.00'	81°09'00"	N21°32'34"W	32.52'
20	318.03'	300.00'	60°44'18"	N31°44'55"W	303.34'
21	85.88'	405.00'	12°09'00"	N82°32'44"E	85.72'
22	50.11'	355.00'	8°05'16"	N84°34'36"E	50.07'
23	117.81'	75.00'	90°00'00"	N46°22'45"W	106.07'
24	143.29'	50.00'	164°11'35"	N43°50'50"E	99.05'
25	16.29'	25.00'	37°19'23"	N72°43'04"W	16.00'



Scale: 1"= 80'
Tanner Consulting

LEGEND

B/L	BUILDING LINE
B/U	BUILDING LINE & UTILITY EASEMENT
BK PG	BOOK & PAGE
CB	CHORD BEARING
CD	CHORD DISTANCE
CL	CENTERLINE
Δ	DELTA ANGLE
DOC	DOCUMENT
ESMT	EASEMENT
F/E	FENCE & LANDSCAPE EASEMENT
FFE	FINISHED FLOOR ELEVATION (MIN. RECOMMENDED)
GOV'T	GOVERNMENT
LNA	LIMITS OF NO ACCESS
ODE	OVERLAND DRAINAGE EASEMENT
R.A.	RESTRICTED ACCESS
RES.	RESERVE
RWE	RETAINING WALL EASEMENT
R/W	RIGHT-OF-WAY
U/E	UTILITY EASEMENT
1234	ADDRESS ASSIGNED
o	FOUND MONUMENT (SEE NOTE 2)
•	SET MONUMENT (SEE NOTE 2)

OWNER:
Tulsa L Dev., LLC
CONTACT: DEREK KENNEDY
EMAIL: DEREK.KENNEDY@RCH.COM
4058 North College
Suite 300 Box 9
Fayetteville, Arkansas 72703
Phone: (479) 455-9090

SURVEYOR/ENGINEER:
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DAN E. TANNER, P.L.S. NO. 1435
OK CA NO. 2661, EXPIRES 6/30/2025
EMAIL: DAN@TANNERBAITSHOP.COM
5323 South Lewis Avenue
Tulsa, Oklahoma 74105
Phone: (918) 745-9929

DATE OF PREPARATION: January 27, 2025

1ST SUBMITTAL OF ENGINEERING PLANS JULY 23, 2024

PUD-001360-2024

Spring Creek Crossing

PART OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER (SW/4 SE/4) OF SECTION THIRTY-FIVE (35) TOWNSHIP EIGHTEEN (18) NORTH, RANGE FOURTEEN (14) EAST OF THE INDIAN MERIDIAN
A SUBDIVISION WITHIN THE CITY OF BROKEN ARROW, TULSA COUNTY, STATE OF OKLAHOMA

General Notes

1. TOPOGRAPHIC INFORMATION SHOWN HEREIN WAS PROVIDED BY TANNER CONSULTING, LLC. AND SUPPLEMENTED BY USGS.
2. VERTICAL INFORMATION IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). HORIZONTAL INFORMATION IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83) (1993), OKLAHOMA STATE PLANE COORDINATE SYSTEM NORTH ZONE 3501, U.S. SURVEY FEET.
3. WHEREVER THE WORD "CITY" APPEARS HEREIN THE SAME SHALL CONCLUSIVELY BE DEEMED TO MEAN CITY OF BROKEN ARROW UNLESS THE CONTEXT CLEARLY DICTATES OTHERWISE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY WORK ORDERS AND PERMITS FROM THE CITY, INCLUDING PROVISION OF BONDS AND INSURANCE AS REQUIRED.
5. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING AND CONSTRUCTION DEPARTMENT AT LEAST 24 HOURS PRIOR TO START OF CONSTRUCTION.
6. ONE-TIME CONSTRUCTION STAKING SHALL BE PROVIDED BY THE OWNER. ANY RESTAKING WILL BE REQUESTED AND PAID FOR BY THE CONTRACTOR.
7. RIGHT-OF-WAY PERMIT IS REQUIRED FOR ALL WORK IN BROKEN ARROW RIGHT-OF-WAY. PLEASE CALL 918-259-7000 EXT 5414 FOR PERMIT INFORMATION.

Benchmark #1

IRON PIN FOUND AT THE SOUTHWEST CORNER OF THE SOUTHEAST QUARTER OF SECTION 35, T-18 N, R-14 E
(367234.91N, 2622706.18E)

ELEVATION=678.02 (NAVD88)

Benchmark #2

CHISELED X FOUND IN CONCRETE WALKING PATH, LOCATED ON THE SOUTH SIDE OF PROPERTY, APPROXIMATELY 503.93' WEST AND 38.79' SOUTH OF THE SOUTHEAST PROPERTY CORNER
(367288.43N, 2623521.15E)

ELEVATION=693.37 (NAVD88)

Contact List

TANNER CONSULTING, LLC
JUSTIN MORGAN
5323 SOUTH LEWIS AVE
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PHONE: (918) 745-9929

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DIRECTOR OF COMMUNITY DEVELOPMENT
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BROKEN ARROW, OK 74012
PHONE: (918) 259-2400

CITY OF BROKEN ARROW
CHARLIE BRIGHT
DIRECTOR OF ENGINEERING AND CONSTRUCTION
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BROKEN ARROW, OK 74012
PHONE: (918) 259-2400

CITY OF BROKEN ARROW
TIM ROBINS
DIRECTOR OF UTILITIES
220 SOUTH FIRST STREET
BROKEN ARROW, OK 74012
PHONE: (918) 259-2400

OKLAHOMA NATURAL GAS
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5848 EAST 15TH STREET
TULSA, OK 74112
PHONE: (918) 258-2331

AEP/PSO
STEVE WILLIAMS
212 EAST 6TH STREET
TULSA, OK 74102
PHONE: (918) 250-6249

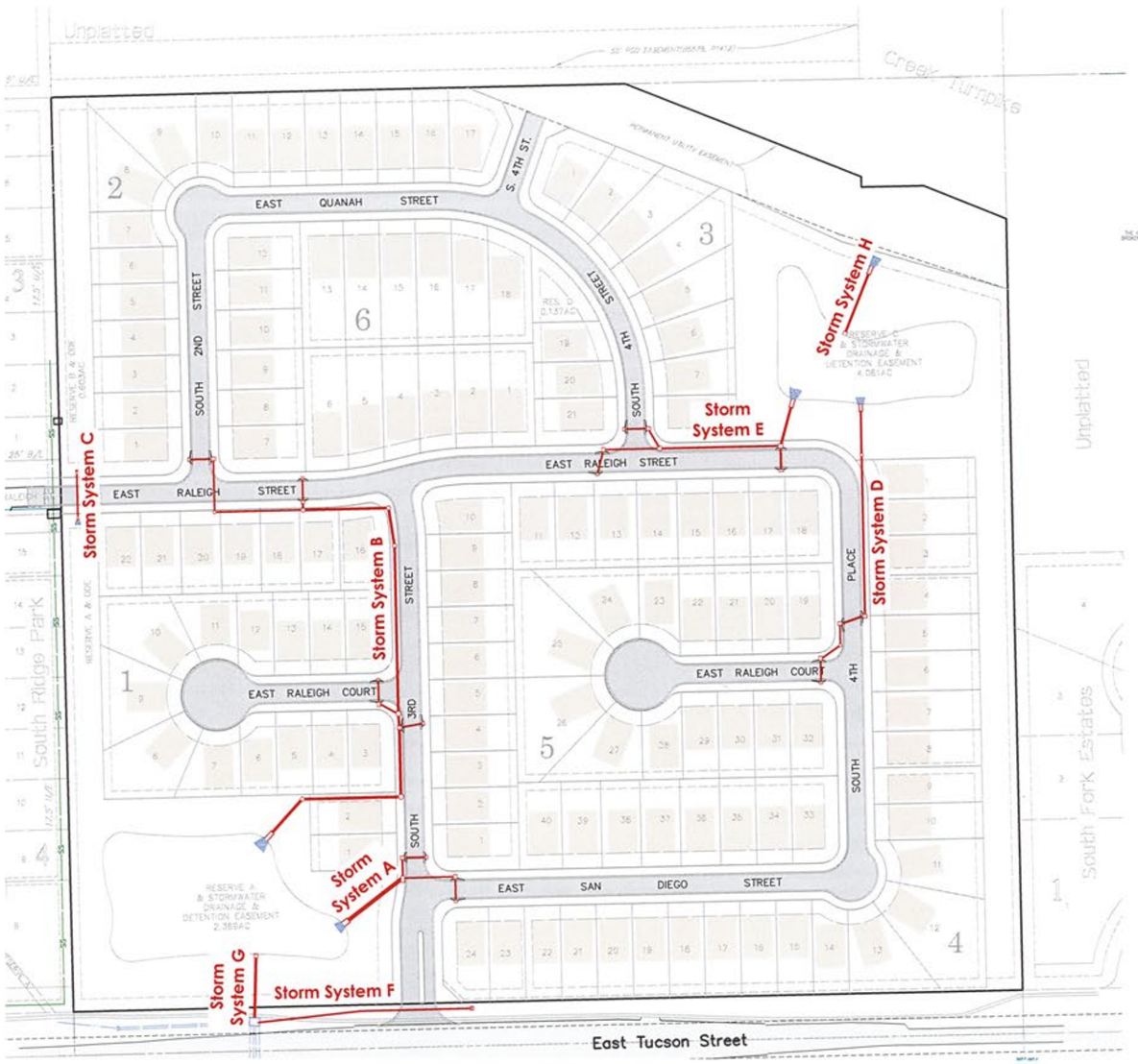
COX COMMUNICATIONS

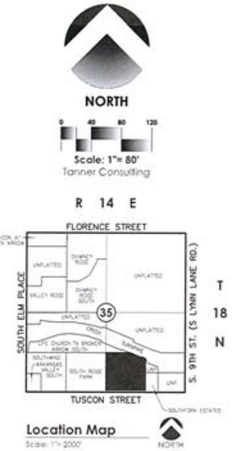
JARED RUTLEDGE
11811 EAST 51ST STREET
TULSA, OK 74145
PHONE: (918) 286-4644

WINDSTREAM COMMUNICATIONS
ANGELA RAHE
2300 SOUTH FIRST PLACE
BROKEN ARROW, OK 74012
PHONE: (918) 451-3427

Legend

BLDG	BUILDING	PVC	POLYVINYL CHLORIDE PIPE
BM	BENCHMARK	R	RADIUS
B/L	BUILDING LINE	RCP	REINFORCED CONCRETE PIPE
CHBS	CHISELED BOX, SET	RWE	RESTRICTED WATERLINE ESMT
CL	CENTERLINE	R/W	RIGHT-OF-WAY
CO	SEWER CLEAN-OUT	SD	STORM DRAIN
CONC	CONCRETE	SDES	STORM DRAIN END SECTION
COR	CORNER	SDHW	STORM DRAIN HEADWALL
CRL	CONSTRUCTION REFERENCE LINE	SDIN	STORM DRAIN INLET
EPED	ELECTRIC PEDESTAL	SDMH	STORM DRAIN MANHOLE
ESMT	EASEMENT	SF	SQUARE FEET
FH	FIRE HYDRANT	SS	SANITARY SEWER
FL	FLOWLINE	SSMH	SANITARY SEWER MANHOLE
FLT	FLOWLINE, THROAT	SY	SQUARE YARDS
FNC	FENCE	TC	TOP OF CURB
FND	FOUND	TG	TOP OF GRATE
G	GUTTER	TP	TOP OF PAVING
GUY	GUY ANCHOR	TPED	TELEPHONE PEDESTAL
HEP	HORIZONTAL ELLIPTICAL PIPE	TR	TOP OF RIM
IP	IRON PIN	WL	WATERLINE
IPF	IRON PIN, FOUND	WM	WATER METER
IPS	IRON PIN, SET	WMH	WATER MANHOLE
MAE	MUTUAL ACCESS ESMT	WV	WATER VALVE
OE	OVERHEAD ELECTRIC	UG	UNDERGROUND GAS LINE
PFE	PIN FLAG, ELECTRIC	UE	UNDERGROUND ELECTRIC
PFT	PIN FLAG, TELEPHONE	UT	UNDERGROUND TELEPHONE
PP	POWER POLE	U/E	UTILITY EASEMENT
PPD	POWER POLE WITH DIP	XFMR	TRANSFORMER





Location Map
Scale: 1"= 2000'

OWNER:
Tulsa L Dev., LLC
CONTACT: DEREK KENNEDY
EMAIL: DEREK.KENNEDY@RCH.COM
4058 North College
Suite 300 Box 9
Fayetteville, Arkansas 72703
Phone: (479) 455-9090

Storm Sewer Index

Justin P. Morgan 27985 7.23.2024
Tanner Consulting LLC
CIVIL ENGINEERING | LAND SURVEYING | LANDSCAPE ARCHITECTURE | PLANNING
5323 SOUTH LEWIS AVENUE
TULSA OKLAHOMA 74105-6539
OFFICE: 918.745.9929
www.tannerconsultingllc.com
CERTIFICATE OF AUTHORIZATION NO. OK CA 2661 EXP. 6/30/2025

BEFORE YOU DIG CALL OKIE

MILESTONE	DATE
1ST SUBMITTAL	07/23/24

PLOT DATE: 7/23/24

Submitted July 23, 2024

Routed for Review August 1, 2024

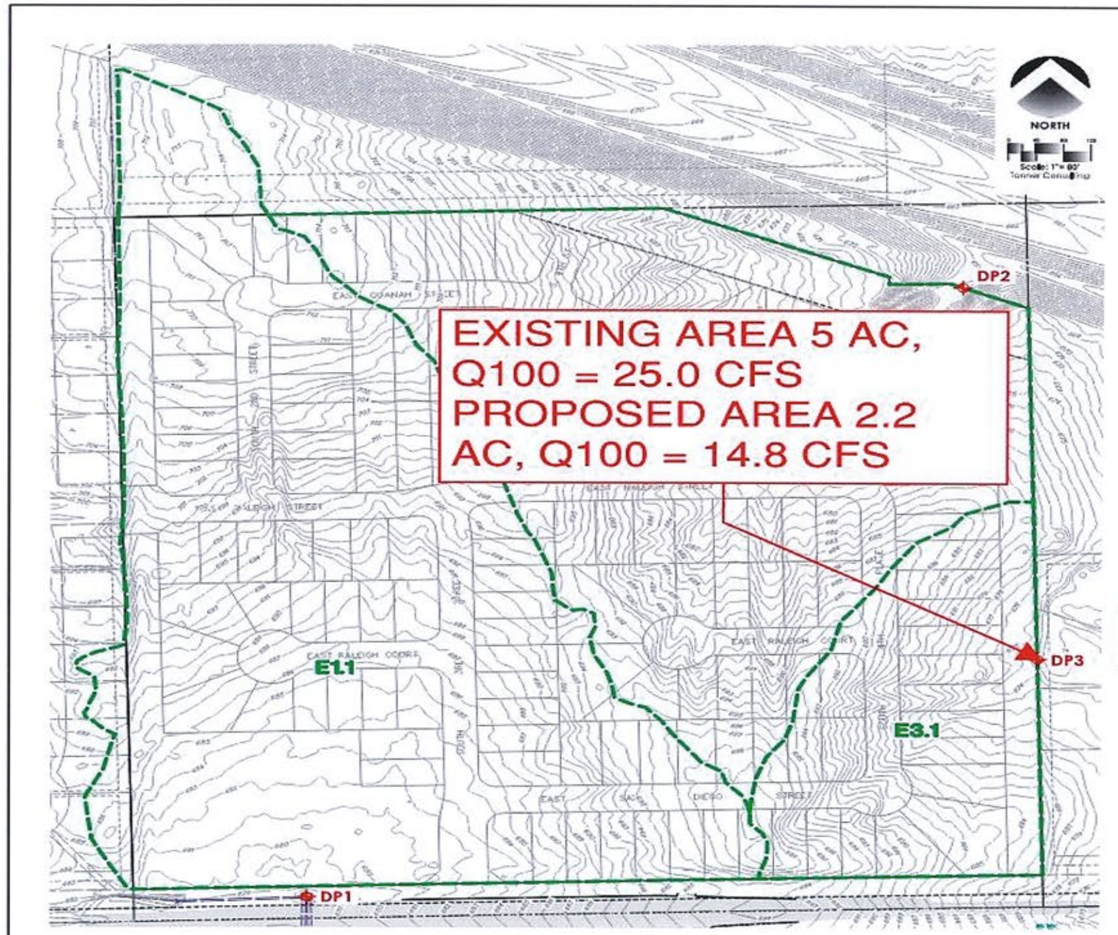
Spring Creek Crossing
Part of the SW/4 SE/4, Section 35, T-18-N R-14-E
Broken Arrow, Tulsa County Oklahoma

PROJECT: 23221
ISSUE DATE: 07/23/2024
PLAN SCALE (H): 1" = 80'
(V): N/A

Storm Sewer Cover Sheet

SD19
19 OF 47

DAC PRESENTATION
APRIL 28, 2025



Existing Curve Numbers

	TERRAIN & SOIL TYPE	AREA (FT2)	PERCENT OF TOTAL AREA	CURVE NUMBER
E1.1	1/4 ACRE SUBDIVISION, TYPE C	22726.06	2.7%	83
	FOREST, TYPE C	482142.83	58.3%	70
	GRASS, TYPE C	323194.68	39.0%	74
	COMPOSITE CN:			71.9
E2.1	FOREST, TYPE C	421928.32	67.4%	70
	FOREST, TYPE D	58317.07	9.3%	77
	GRASS, TYPE C	131941.58	21.1%	74
	GRASS, TYPE D	13846.02	2.2%	80
	COMPOSITE CN:			71.7
E3.1	FOREST, TYPE C	217327.45	98.9%	70
	FOREST, TYPE D	951.09	0.4%	77
	GRASS, TYPE C	1392.08	0.6%	74
	COMPOSITE CN:			70.1

Existing Lag

ELEMENT	TC (MIN)	LAG (MIN)
E1.1	57.77	34.66
E2.1	36.57	21.94
E3.1	17.63	10.58

Legend
A — EXISTING DRAINAGE AREA LABEL
EXISTING DRAINAGE AREA LIMITS

Existing Overland Flow

	TERRAIN TYPE	MANNING'S N FOR OVERLAND FLOW	TOP ELEVATION (FT)	BOTTOM ELEVATION (FT)	LENGTH (FT)	SLOPE (FT/FT)	TC (MIN)
E1.1	WOODS	0.400	696.79	685.18	100.0	0.02	22.6
E2.1	GRASS	0.240	681.02	677.65	100.0	0.05	11.2
E3.1	PAVED	0.050	666.11	665.39	48.8	0.01	1.0

Existing Sheet Flow

	REACH LENGTH (FT)	TOP ELEVATION (FT)	BOTTOM ELEVATION (FT)	SLOPE (%)	TERRAIN TYPE	VELOCITY (FT/S)	COMPONENT TC (MIN)	TOTAL TC (MIN)
E1.1	713.01	706.00	683	1.0	FOREST	0.76	31.32	38.77
	708.00	677.00	1173	2.6	GRASSED WATERWAY	2.62	7.45	
E2.1	668.47	681.00	395	4.4	FOREST	0.53	12.44	15.95
	681.00	654.00	678	4.0	GRASSED WATERWAY	5.27	3.51	
E3.1	694.66	686.00	89	9.7	FOREST	0.78	1.89	3.63
	686.00	672.70	356	4.0	GRASSED WATERWAY	3.21	1.74	

SOUTH FORK ESTATES

Legend
E1.1 — DRAINAGE AREA (SCHEMATIC)
1 — DESIGN POINT (SCHEMATIC)

A HEC-HMS Model Schematic

CALCULATIONS BASED ON THE SCS METHOD.
SEE HYDROLOGY REPORT FOR MORE DETAILS.

CITY OF BROKEN ARROW
NO EXCEPTIONS TAKEN

Austin P. Morgan 29005 OKLAHOMA
4/24/2025

Tanner Consulting LLC

CALL OKIE

1ST SUBMITTAL	07/22/24
2ND SUBMITTAL	01/06/25
3RD SUBMITTAL	01/09/25
PLOT DATE: 1/09/25	

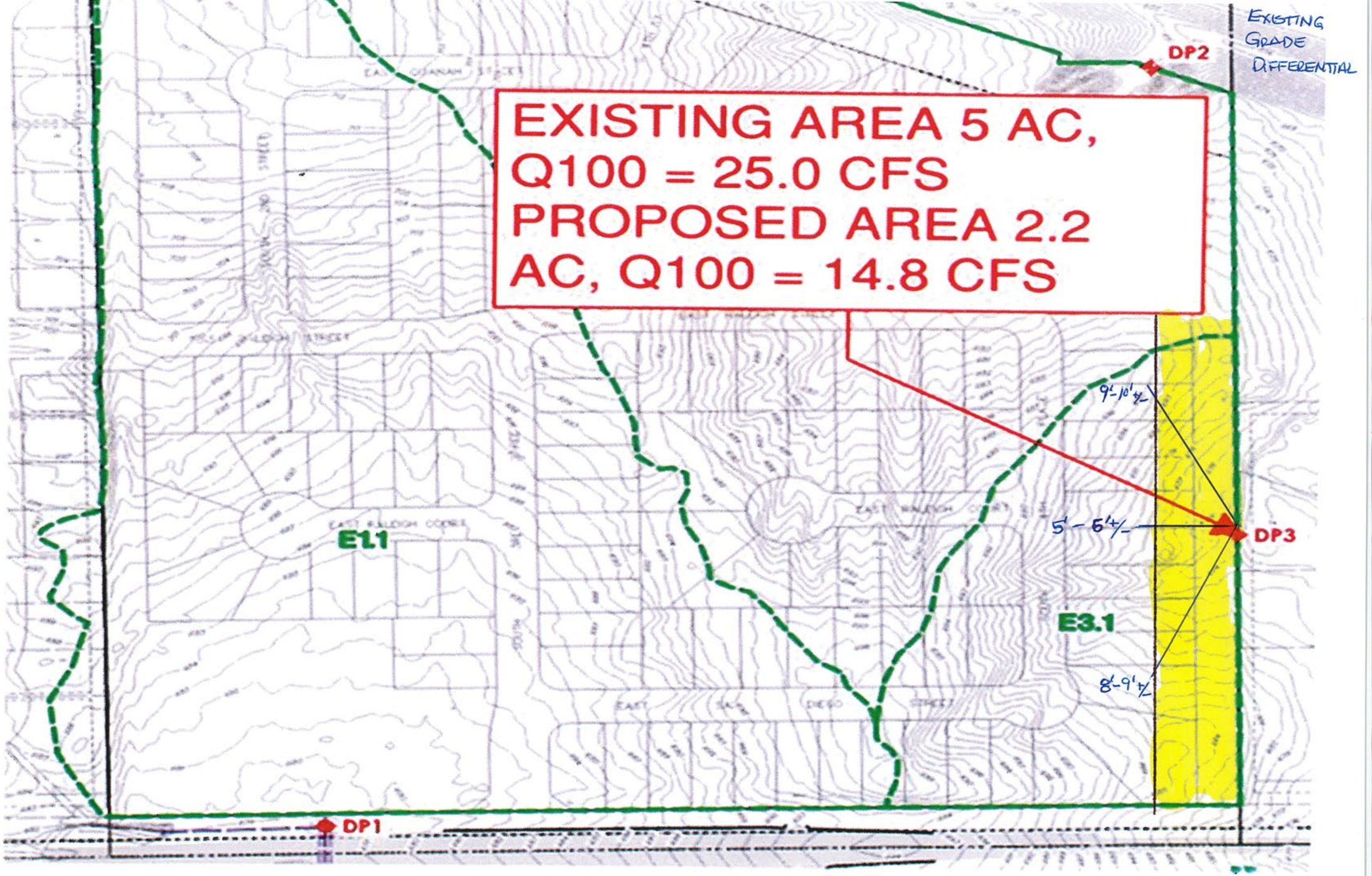
Received
January 9, 2025

Spring Creek Crossing
Part of the SW/4 SE/4, Section 35, T-18-N R-14-E
Broken Arrow, Tulsa County Oklahoma

PROJECT: 23221
ISSUE DATE: 01/09/2025
PLAN SCALE: (H) 1"=80'
(V) N/A

Existing Drainage Area Hydrology

SD20
20 OF 48

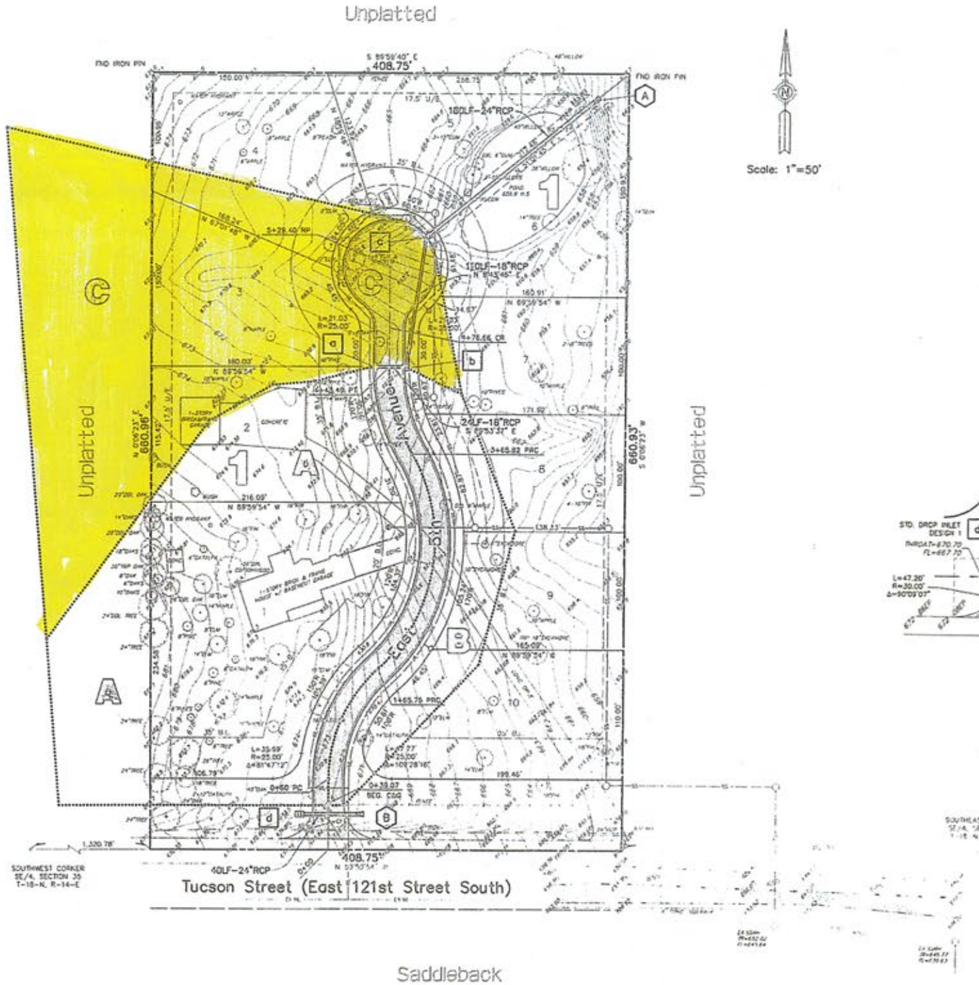

EXISTING AREA 5 AC,
Q100 = 25.0 CFS
PROPOSED AREA 2.2
AC, Q100 = 14.8 CFS
DP1
DP2
DP3
E1.1
E3.1
EXISTING GRADE DIFFERENTIAL
9'-10'+/-
5'-5'+/-
8'-9'+/-

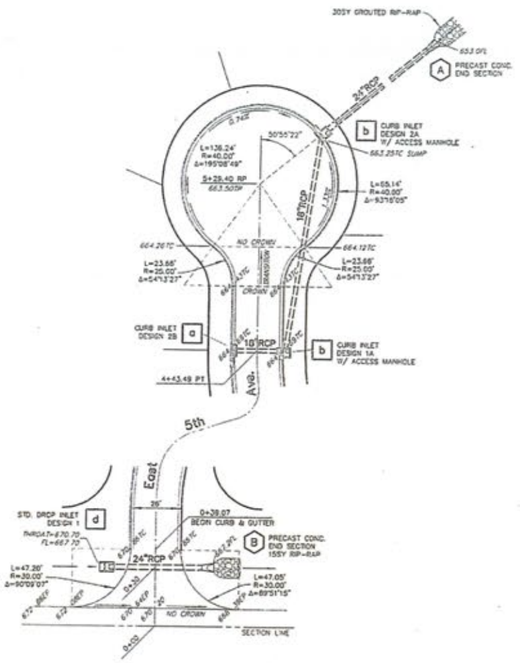
CONSTRUCTION ACTIVITY IMPACTS

SOUTH FORK

BROKEN ARROW

DRAINAGE PLAN
1992





Intersection and Storm Sewer Alignment Details

SCALE: 1"=30'

Drainage Summary Table

AREA LABEL	AREA (ACRES)	REACH LENGTH (FT)	'C'	AVG. SLOPE (%)	VELOCITY (FPS)	TC (MIN)	I15 (IN/HR)	Q15 (CFS)	Q15S (CFS)	Q15 CURB DEPTH (FT)	Q15 INLET (CFS)	Q15 BYPASS (CFS)	I100 (IN/HR)	Q100 (CFS)	Q100S (CFS)	Q100 CURB DEPTH (FT)	AVG. % SLOPE AT INLET	Q100 INLET (CFS)	Q100 BYPASS (CFS)	INLET DESIGN
A	2.08	460	0.55	3.7	1.4	5.5	7.7	8.72	8.73	0.39	7.18	1.54	10.2	11.56	11.56	0.43	0.8	8.40	3.16	2B
B	0.57	410	0.70	1.5	0.9	7.6	7.1	2.83	2.83	0.26	2.83	0.00	9.5	3.83	3.83	0.29	0.8	3.83	0.00	1A
C	1.87	420	0.55	4.2	1.5	4.7	7.9	8.13	8.67	0.40	3.67	0.00	10.7	11.01	14.17	0.45	SUMP	14.17	0.00	2A

EXISTING UNDERGROUND LINES HAVE BEEN SHOWN TO THE EXTENT KNOWN AND PLANS HAVE BEEN SENT TO THE EFFECTED UTILITY OWNERS FOR VERIFICATION OF EXISTING LINES. BEFORE YOU DIG, CONTACT OKIE 1-800-522-6543

A T & T COMPANY
UNITED ARTIST CABLE
OKLAHOMA NATURAL GAS COMPANY
SOUTHWESTERN BELL TELEPHONE COMPANY
PUBLIC SERVICE COMPANY OF OKLAHOMA

ALL CONSTRUCTION TO BE IN STRICT ACCORDANCE WITH CURRENT CITY OF BROKEN ARROW PUBLIC WORKS DEPARTMENT SPECIFICATIONS.

South Fork Estates

City of Broken Arrow, Oklahoma

PLANS AND ESTIMATES PREPARED BY: ROBERT DAVID SANDERS, P.E.
1203 S. ASPEN • BROKEN ARROW, OKLAHOMA 74012 • (918)355-1105

REVISIONS	BY	DATE

PLAN SCALE: 1"= 50'

DRAINAGE AREA, PAVING AND STORM SEWER PLAN

APPROVED

PROFILE SCALE: HORIZONTAL NA, VERTICAL NA

RECOMMENDED: DEVELOPMENT SERVICES

RECOMMENDED: ENGINEERING SERVICES

PUBLIC WORKS DIRECTOR

FILE: DRAINAGE

DATE:

ATLAS PAGE NO. 00

SHEET 3 OF 4 SHEETS

PLAT
1992

General Notes

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY WORK ORDERS AND PERMITS FROM THE CITY OF BROKEN ARROW, INCLUDING PROVISION OF BONDS AND INSURANCE AS REQUIRED.

2. THE CONTRACTOR SHALL RE-SEED ALL AREAS DISTURBED DURING CONSTRUCTION AND CONTRACTOR SHALL BE RESPONSIBLE FOR SEEDED AREAS UNTIL GROWTH IS ESTABLISHED TO A UNIFORM HEIGHT OF TWO(2) INCHES.

3. ONE-TIME CONSTRUCTION STAKING SHALL BE PROVIDED BY THE OWNER. ANY RESTAKING WILL BE REQUESTED AND PAID FOR BY THE CONTRACTOR.

4. TOPOGRAPHIC INFORMATION SHOWN HEREIN WAS OBTAINED BY A.C. HALL AND ASSOCIATES SURVEYING, INC.

5. ALL STREET CROSSINGS SHALL BE RECOMPACTED TO 95% STANDARD PROCTOR DENSITY. BACKFILL SHALL BE SAND TO 6" ABOVE TOP OF PIPE OR CONDUIT, THEN LIMESTONE SCREENINGS TO THE TOP OF TRENCH.

6. CONTRACTOR SHALL PROVIDE WATER AS REQUIRED TO OBTAIN SPECIFIED COMPACTION.

7. PIPE BACKFILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES, AND COMPACTED BY VIBRATORY PLATE OR OTHER METHOD APPROVED BY THE ENGINEER.

8. TESTING SHALL BE PROVIDED BY THE OWNER. ANY FAILING TESTS SHALL BE RETESTED AT THE CONTRACTOR'S EXPENSE FOLLOWING CORRECTIVE ACTIONS.

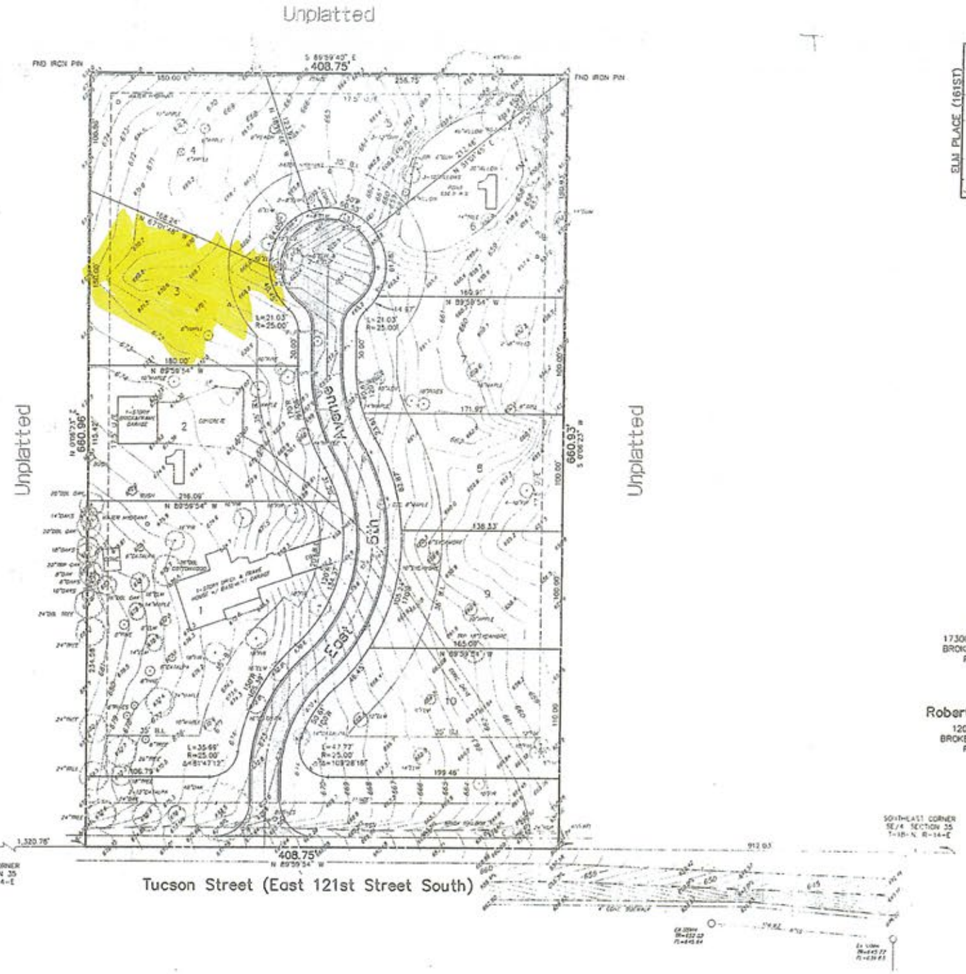
9. PAVING SUBGRADE SHALL BE RESTORED TO PROPER GRADE (±0.1 FT) AND DENSITY AFTER PIPE IS BACKFILLED.

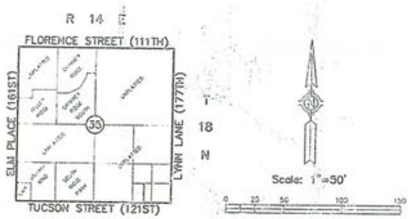
10. PAVING CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF UNACCEPTABLE SUBGRADE AT ALL UTILITY, CABLE OR CONDUIT CROSSINGS.

11. PAVING CONTRACTOR SHALL INSPECT SUBGRADE PRIOR TO COMMENCING WORK, AND, SHALL REPAIR AREAS WHERE GRADE VARIES MORE THAN 0.1 FEET, WHERE DENSITY IS LESS THAN 95% STANDARD PROCTOR OR WHERE SUBGRADE DRAINAGE IS INADEQUATE. AT THE UNIT PRICE BID FOR FINE GRADING IN THE PROPOSAL, SUBGRADE MODIFICATIONS, WHERE REQUIRED, SHALL NOT COMMENCE UNTIL SUBGRADE REPAIRS HAVE BEEN ACCEPTED BY THE ENGINEER.

12. PAVING SHALL CONFORM TO O.D.O.T. SPECIFICATIONS AND TO DESIGN STANDARDS OF THE CITY OF BROKEN ARROW.

13. ALL STORM SEWER PIPE SHALL BE REINFORCED CONCRETE PIPE CONFORMING TO ASTM C-76 CLASS III, WALL "B", UNLESS OTHERWISE NOTED. OMNI-FLEX JOINTS SHALL BE REQUIRED ON ALL REINFORCED CONCRETE PIPE.





Location Map
SCALE: 1"=2000'

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THE FOLLOWING STANDARD DRAWINGS FROM THE CITY OF BROKEN ARROW DEPARTMENT OF ENGINEERING WILL BE REQUIRED:
PAVEMENT STANDARDS ASPHALT CONCRETE
STANDARD STORM SEWER INLETS (REINF.CONC. & MASONRY)
STANDARD INLET WITH ACCESS MANHOLE BACK OF CURB
STANDARD CAST IRON CURB
STANDARD STORM SEWER GRATE AND FRAME
STANDARD CASTINGS
STANDARD MASONRY MANHOLE AND JUNCTION BOX

OWNER:
Olga McKenzie
17300 EAST 121ST STREET SOUTH
BROKEN ARROW, OKLAHOMA 74011
PHONE: (918) 455-6874

DEVELOPER:
Tony Geraci
6717 S. YALE AVE., SUITE 200
TULSA, OKLAHOMA 74136
PHONE: (918) 496-3636

ENGINEER:
Robert David Sanders, P.E.
1205 SOUTH REDBUD AVENUE
BROKEN ARROW, OKLAHOMA 74012
PHONE: (918) 258-9100

SURVEYOR:
A.C. Hall & Associates
102 NORTH ELM, SUITE A
BROKEN ARROW, OKLAHOMA 74012
PHONE: (918) 258-3737

I HEREBY CERTIFY THAT I AM FAMILIAR WITH THE ADOPTED ORDINANCES AND REGULATIONS OF THE CITY OF BROKEN ARROW GOVERNING DRAINAGE, DETENTION AND EARTH CHANGE; THAT THESE PLANS HAVE BEEN PREPARED UNDER MY DIRECT SUPERVISION; THE ABOVE AND FOREGOING DRAINAGE PLANS COMPLY WITH ALL GOVERNING ORDINANCES AND THE ADOPTED STANDARDS OF THE CITY OF BROKEN ARROW PERTAINING TO DRAINAGE, DETENTION AND EARTH CHANGE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

South Fork Estates

A PART OF THE S/2 OF THE SE/4 OF THE SE/4 OF SECTION 35, TOWNSHIP 18 NORTH, RANGE 14 EAST
AN ADDITION TO THE CITY OF BROKEN ARROW, TULSA COUNTY, OKLAHOMA

EXISTING UNDERGROUND LINES HAVE BEEN SHOWN TO THE EXTENT KNOWN AND PLANS HAVE BEEN SENT TO THE EFFECTED UTILITY OWNERS FOR VERIFICATION OF EXISTING LINES. BEFORE YOU DIG, CONTACT OKIE: 1-800-522-6543.

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REVISIONS	BY	DATE

South Fork Estates
City of Broken Arrow, Oklahoma
PLANS AND ESTIMATE PREPARED BY: ROBERT DAVID SANDERS, P.E.
1205 S. REDBUD • BROKEN ARROW, OKLAHOMA 74012 • (918)258-9100

PLAN SCALE 1"= 50'	COVER SHEET	APPROVED
PROFILE SCALE HORIZONTAL NA VERTICAL NA	RECOMMENDED DEVELOPMENT SERVICES	PUBLIC WORKS DIRECTOR
	RECOMMENDED ENGINEERING SERVICES	
FILE DRAWING		DATE:
ATLAS PAGE NO: 00		SHEET 1 OF 4 SHEETS

GRADING
1992

Temporary Erosion Control

SMALL GRAINS SUCH AS OATS, RYE, WHEAT, SUDANS AND SORGHUMS ARE THE MOST FEASIBLE TEMPORARY VEGETATION TO CONTROL EROSION. THE PRACTICE IS EFFECTIVE FOR AREAS WHERE THE SOIL IS LEFT EXPOSED FOR A PERIOD OF 6 TO 12 MONTHS. THE TIME PERIOD MAY BE SHORTER DURING PERIODS OF EROSIVE RAINFALL.

1. PRIOR TO SEEDING, NEEDED EROSION CONTROL PRACTICES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, BERMS, DIKES, STRAW BALES, ETC., SHALL BE INSTALLED.
2. TEMPORARY VEGETATIVE PRACTICE IS USUALLY APPLIED PRIOR TO THE COMPLETION OF FINAL GRADING OF THE SITE.
3. IF THE AREA TO BE SEEDED HAS BEEN RECENTLY LOOSENED TO THE EXTENT THAT AN ADEQUATE SEEDBED EXISTS, NO ADDITIONAL TREATMENT IS REQUIRED. HOWEVER IF THE AREA TO BE SEEDED IS PACKED, CRUSTED, AND/OR HARD, THE TOP LAYER OF SOIL SHALL BE LOOSENED BY DISCING OR OTHER SUITABLE MEANS.
4. FERTILIZER SHALL BE APPLIED AT A RATE OF 600 POUNDS PER ACRE OR 15 POUNDS PER 1000 SQUARE FOOT USING 10-20-10 OR EQUAL.
5. SOILS KNOWN TO BE HIGHLY ACIDIC SHALL BE LIME TREATED.
6. SEEDING OPTIONS ARE AS FOLLOWS:

PLANT	QUANTITY PER ACRE	QUANTITY PER 1000 S.F.	PLANTING DATE	DEPTH
ANNUAL	40 LBS	0.90 LBS	08/15 TO 11/30	1/4 IN.
ELBON RYE	2 BU.	3.00 LBS	08/15 TO 11/30	2 IN.
WHEAT	2 BU.	3.00 LBS	08/15 TO 11/30	2 IN.
OATS	3 BU.	2.50 LBS	08/15 TO 11/30	2 IN.
SORGHUM	60 LBS	1.40 LBS	03/01 TO 09/15	2 IN.
SUDAN	40 LBS	0.90 LBS	04/01 TO 09/15	2 IN.

7. SEEDS SHALL BE DRILLED UNIFORMLY.
8. SEEDING IMPLEMENTS SHOULD BE USED AT RIGHT ANGLES TO THE GENERAL SLOPE TO MINIMIZE EROSION.
9. 1 TO 3 MONTHS AFTER PLANTING, THE SEEDED SITE SHALL BE TOP DRESSED WITH 8 POUNDS PER 1000 SQUARE FEET OR 350 POUNDS PER ACRE OF 33-0-0.
10. AREAS WHICH DO NOT DEVELOP A SUFFICIENT COVER SHALL BE REPLANTED.
11. THE SEEDED AREA SHALL BE WATERED WHEN FEASIBLE AND NEEDED.

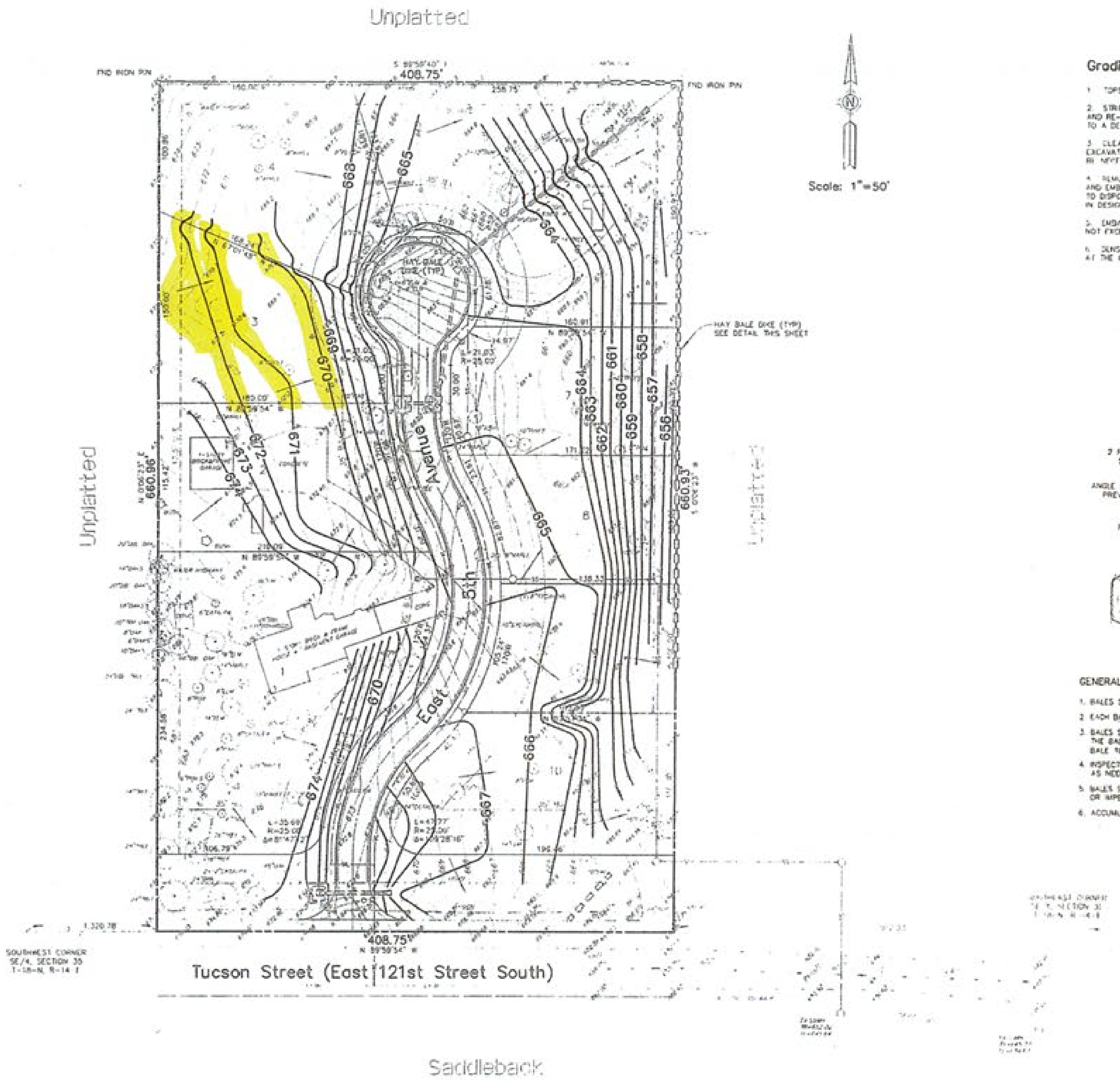
Permanent Erosion Control

BERMUDA GRASS, KENTUCKY 31, TALL FESCUE AND WEEPING LOVEGRASS ARE SOME OF THE TYPES OF PERMANENT VEGETATION THAT MAY BE EFFECTIVELY USED TO CONTROL EROSION.

1. PRIOR TO SEEDING, NEEDED EROSION CONTROL PRACTICES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, BERMS, DIKES, STRAW BALES, ETC., SHALL BE INSTALLED.
2. THE SUBGRADE SHALL BE LOOSENED EVENLY TO A DEPTH OF 2 TO 3 INCHES AND 10-20-10 FERTILIZER (10 POUNDS PER 1000 SQUARE FOOT OR 450 POUNDS PER ACRE) SHALL BE MIXED WITH THE LOOSENED SURFACE SOIL BY DISCING OR OTHER SUITABLE MEANS.
3. SOILS KNOWN TO BE HIGHLY ACIDIC SHALL BE LIME TREATED.
4. SEEDING OPTIONS ARE AS FOLLOWS:

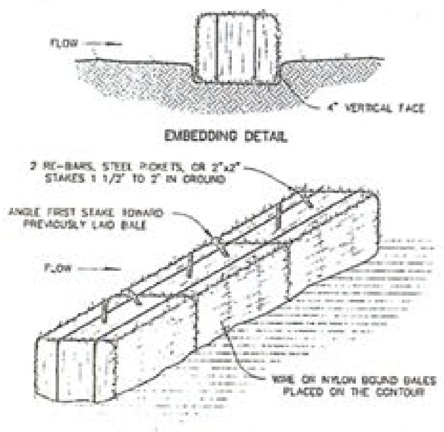
PLANT	QUANTITY PER ACRE	QUANTITY PER 1000 S.F.	PLANTING DATE	DEPTH
BERMUDA	10 LBS	0.25 LBS	04/01 TO 08/15	1/2 IN.
FESCUE	40 LBS	0.90 LBS	08/01 TO 11/01	1/2 IN.
LOVEGRASS	40 LBS	0.90 LBS	04/01 TO 06/30	1/2 IN.

5. SEEDS SHALL BE DRILLED UNIFORMLY.
6. SEEDING IMPLEMENTS SHOULD BE USED AT RIGHT ANGLES TO THE GENERAL SLOPE TO MINIMIZE EROSION.
7. MULCH SHALL BE USED WHERE NEEDED.
8. THE AREA SHALL BE WATERED DAILY OR AS OFTEN AS NECESSARY TO MAINTAIN ADEQUATE SOIL MOISTURE UNTIL THE PLANTS GROW 1/2 TO 1 INCH.



Grading Notes

1. TOPSOIL SHALL BE STRIPPED TO A DEPTH WHERE SOIL IS FREE OF ROOTS AND VEGETATION.
2. STRIPPINGS SHALL BE STOCKPILED OR WINDROWED ON SITE IN AREAS DESIGNATED BY OWNER, AND RE-SPREAD AS DIRECTED BY OWNER AFTER GRADING IS COMPLETE. TOPSOIL SHALL BE SPREAD TO A DEPTH NOT EXCEEDING 6 INCHES.
3. CLEARING AND TREE REMOVAL WILL BE PERFORMED AS PART OF THE UNIT PRICE FOR EXCAVATION AND EMBANKMENT, AND SHALL INCLUDE GRUBBING ROOTS AND VEGETATION AS MAY BE NECESSARY.
4. REMOVAL OF MUCK FROM PONDS SHALL BE INCLUDED IN CONTRACTOR'S BID FOR EXCAVATION AND EMBANKMENT. MATERIAL MAY BE SPREAD AND DRIED IN AREAS DESIGNATED BY OWNER PRIOR TO DISPOSAL OFFSITE. AT THE DISCRETION OF OWNER, MATERIAL MAY BE RE-SPREAD AS TOPSOIL IN DESIGNATED AREAS.
5. EMBANKMENT BENEATH HOUSE PADS OR FOR PAVING SUBGRADE SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES AND COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
6. DENSITY TESTING WILL BE PROVIDED BY THE OWNER. ANY FAILING TEST SHALL BE RE-TESTED AT THE CONTRACTOR'S EXPENSE UNTIL PASSING TESTS ARE OBTAINED.



GENERAL NOTES:

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF FOUR INCHES, WHERE POSSIBLE.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED BY CONTRACTOR.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES.

(A) Hay Bale Dike
SCALE: NONE

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City of Broken Arrow, Oklahoma

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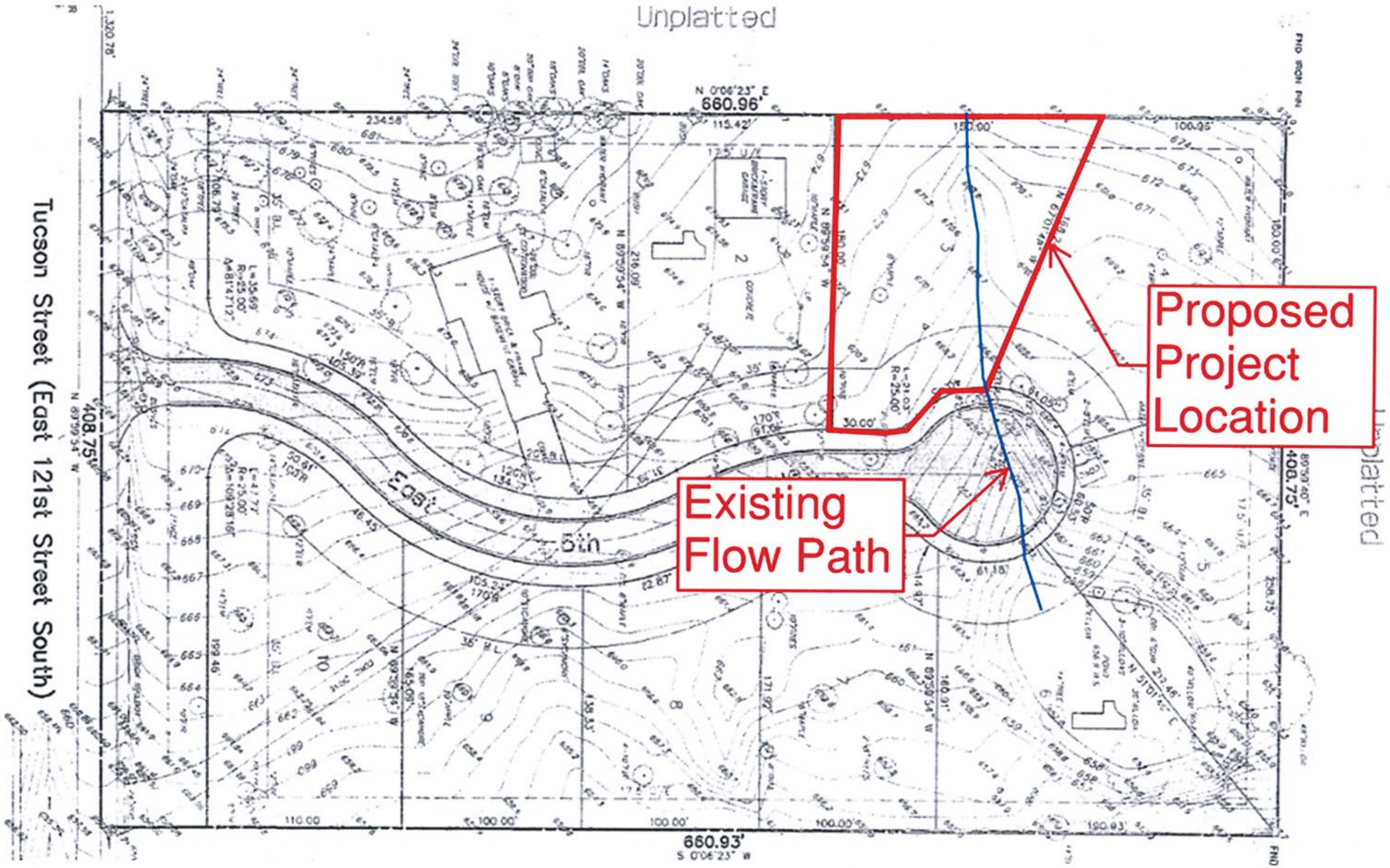
REVISIONS	BY	DATE

PLAN SCALE: 1"= 50'
GRADING AND EROSION CONTROL PLAN
PROFILE SCALE: HORIZONTAL NA, VERTICAL NA
RECOMMENDED: DEVELOPMENT SERVICES
RECOMMENDED: DEPUTY DIRECTOR, ENGINEERING SERVICES
APPROVED: PUBLIC WORKS DIRECTOR
FILE: DRAWING: DATE:
ATLAS PAGE NO: 00
SHEET 2 OF 4 SHEETS

DAC PRESENTATION
APRIL 28, 2025



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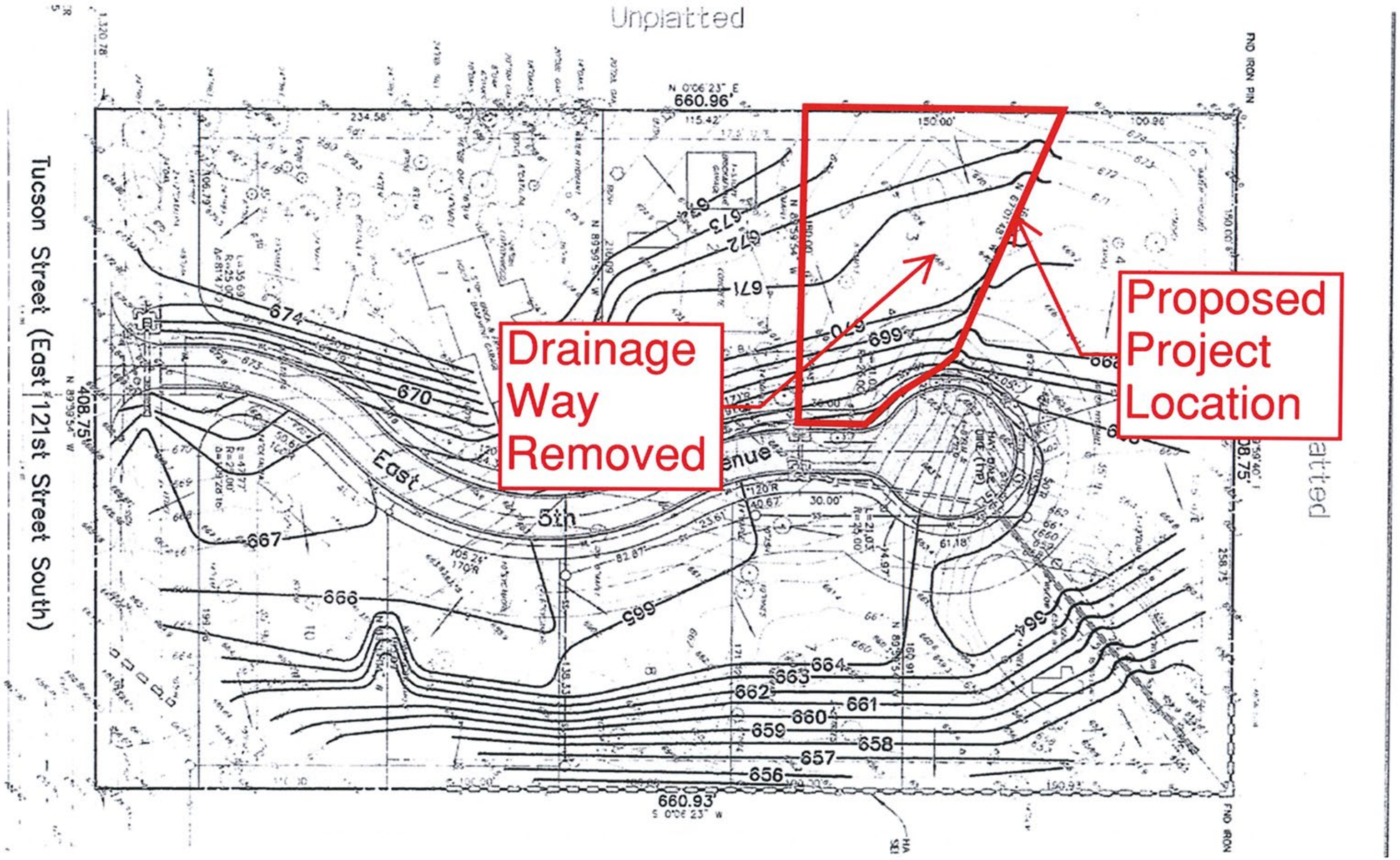
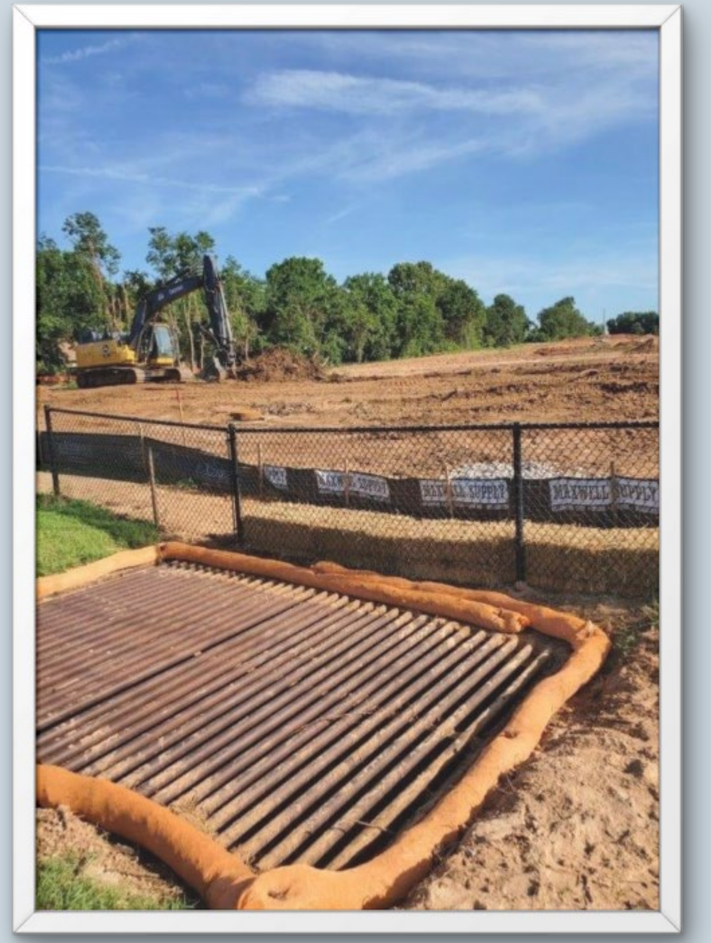



Spring Creek Crossing
Proposed Project Location
24" RCP
18" RCP
6300
6304
6305
6308
6309
6313
6400
6401
S 5th St
S 5th St
Southfork Estates Subdivision

ONSITE EROSION CONTROL PROTECTION



ONSITE EROSION CONTROL PROTECTION

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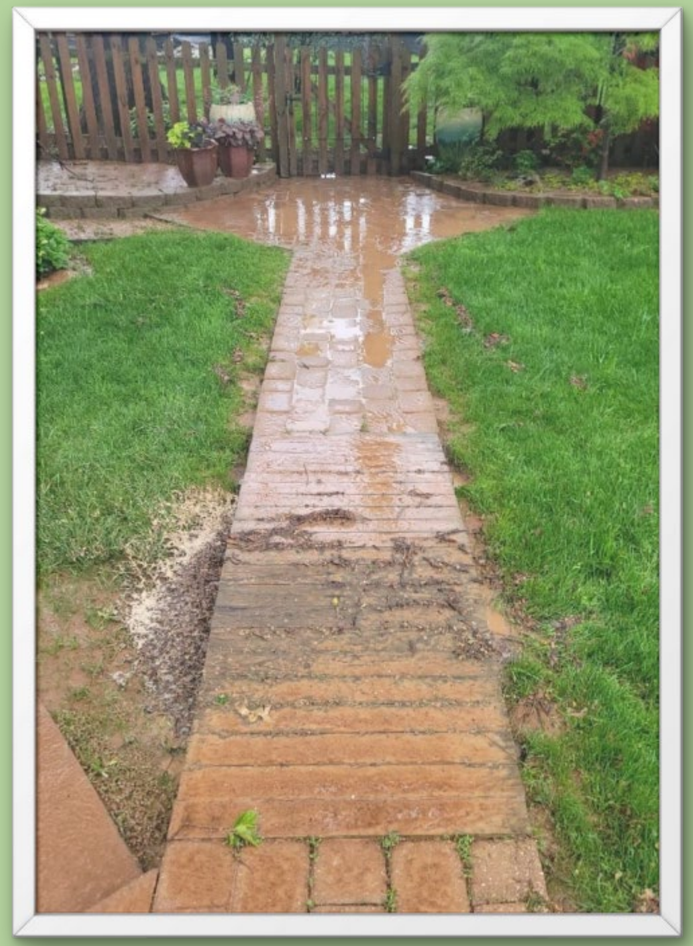
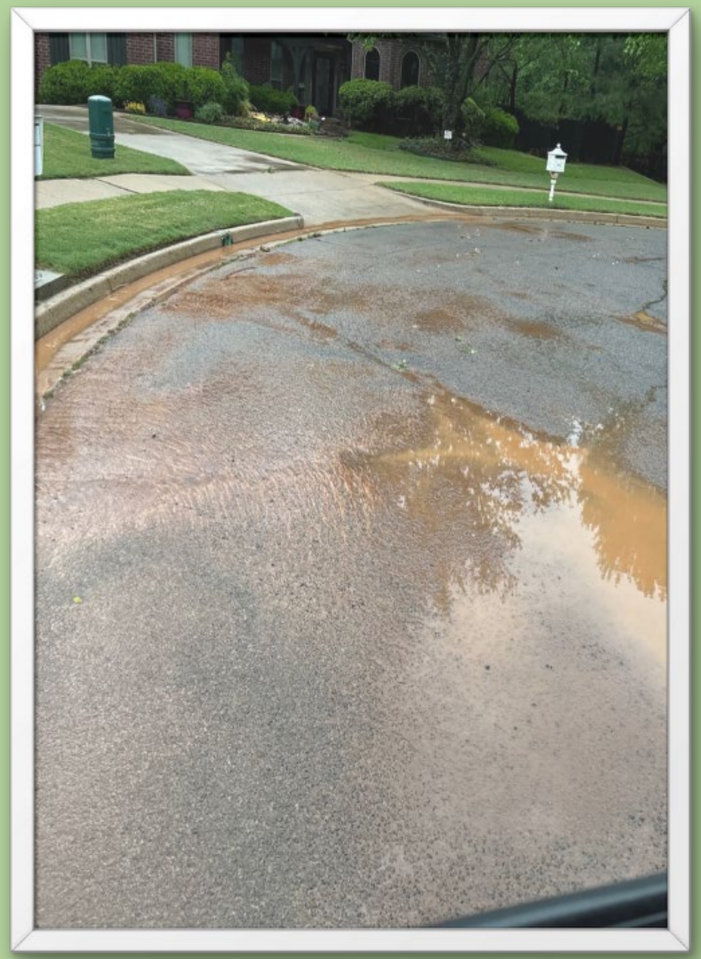
DOWNSTREAM EFFECTS OF SIGNIFICANT RAIN EVENTS





DOWNSTREAM EFFECTS OF SIGNIFICANT RAIN EVENTS

DOWNSTREAM EFFECTS OF SIGNIFICANT RAIN EVENTS

SCS Method for Drainage Area 3.1

	Area Information			Flow Rates (CFS)					
	Area (acres)	Curve Number	Lag Time (min)	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Existing Condition	5.048	55.1	10.58	**1.0**	**4.2**	**7.0**	**9.9**	**12.5**	**15.7**
Interim Condition	2.160	86.0	2.06	**7.7**	**11.4**	**13.5**	**16.1**	**18.2**	**20.2**
Final Condition	2.160	58.7	8.61	**0.9**	**2.6**	**4.0**	**5.5**	**6.8**	**8.3**

Rational Method for Drainage Area 3.1

	Area Information			Peak Flowrate (CFS)					
	Area (acres)	'C' Value	Time of Concentration (min)	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Existing Condition	5.048	0.20	17.63	**4.01**	**4.71**	**5.23**	**6.01**	**6.62**	**7.23**
Interim Condition	2.160	0.85	3.44	**10.83**	**12.66**	**14.03**	**16.07**	**17.68**	**19.28**
Final Condition	2.160	0.25	8.27	**2.84**	**3.32**	**3.68**	**4.22**	**4.64**	**5.06**
				Calculated Intensity (in/hr)					
			Existing Condition	*3.968*	*4.664*	*5.182*	*5.950*	*6.555*	*7.160*
			Interim Condition	*5.900*	*6.896*	*7.641*	*8.753*	*9.629*	*10.500*
			Final Condition	*5.264*	*6.154*	*6.820*	*7.815*	*8.597*	*9.376*

OFMA

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WHY HAVE THESE DISCUSSIONS?

- WE NEED BETTER SOLUTIONS!
- WE NEED TO WORK TOGETHER!!
- WE SHOULDN’T OVERREACT!!!

CONSTRUCTION ACTIVITY POTENTIAL STRATEGIES

Professional Contracts

Limitation of Clearing Activities

Temporary Sedimentation Basins

Temporary Detention Ponds

Interim Condition Runoff Analyses

More Thoughtful Construction Sequencing

Temporary \ Permanent Buffers

STORMWATER MANAGER'S RESPONSIBILITIES

Protect the Public

Protect the Profession

Protect the Organization

Protect Yourself

Protect the Boss

Protect the Public

Protect the Governing Body

QUESTIONS AND ANSWERS