

SALT BRANCH OF PRYOR CREEK

REGIONAL STORMWATER DETENTION CONCEPT PLAN

and

UPDATED SALT BRANCH CREEK BACKWATER MODELING

SUMMARY REPORT

PREPARED BY

REV. W. B. SMITH, P.E. CFM
CITY OF PRYOR CREEK FLOODPLAIN ADMINISTRATOR

(MAY 2021)



Pryor Creek
OKLAHOMA



May 14, 2021

City of Pryor Creek
12 North Rowe Street
P.O. Box 1167
Pryor Creek, Oklahoma 74361

Attention: Mr. Larry Lees, Mayor

Reference: Salt Branch - Regional Stormwater Detention and Backwater Modeling Report

Gentlemen:

Enclosed herewith is a final report for the proposed concept of the Regional Stormwater Detention facilities on Salt Branch to Pryor Creek for the reduction of flows upstream of the State Highway 69 Bridge for development purposes.

Also included in the report are the results of the updated backwater modeling for Salt Branch as a result of the additional surveys and LIDAR data from Highway 69/Railroad Bridges to N. Maple Street Bridge.

If you have any questions relating to the modeling or concept, please contact our office.

SIGNED:

A handwritten signature in black ink, appearing to read "W.B. Smith", written over a horizontal line.

Rev. W.B. SMITH, P.E. CFM, FLOODPLAIN ADMINISTRATOR
Office Telephone: (918) 865-6977
Cell Phone: (918)- 625-2449

Cc: Mr. Steve Powell, City Engineer



12 North Rowe Street
P.O. Box 1167
Pryor Creek, Oklahoma 74361



Salt Branch of Pryor Creek
Regional Stormwater Detention Concept Plan
and
Updated Salt Branch Creek Backwater Modeling
(May 2021)

General:

The City of Pryor Creek's Floodplain Administrator and City Engineer have been studying and evaluating options for development upstream of the State Highway 69 Bridge on the Salt Branch of Pryor Creek for over a year's period of time. Various concepts have been considered and this report summarizes the current proposed concept. In addition, the current FEMA mapping and the backwater modeling that supports the current mapping on Salt Branch is outdated. The City authorized the securing of updated LIDAR 2-foot topography and field surveys of the Salt Branch Creek both upstream and downstream of the State Highway 69/Railroad bridges. This updated information has been used to revised the FEMA Current Effective HEC RAS Backwater model.

Hydrologic Modeling:

The City now has a new HEC HMS model for Salt Branch Creek to the confluence with Pryor Creek. The Drainage Area Map for the contributing drainage area is shown on Exhibit 1 in the Appendix. The flows from this new hydrology model were used, in conjunction with

A summary of flows is as follows, comparing the existing FEMA model flows (Regression Formulas) with the HEC HMS flows (Atlas 14) including the two Regional SWDs that are proposed to be constructed and identifying the HEC RAS (backwater model) river stations where these flows are used:

Confluence with Pryor Creek (HEC RAS River Sta. 450)

Storm Frequency	FEMA Model	HEC HMS Model	Difference
0.2% (500-Yr)	8625.3	8579.3	(46)
1% (100-Yr)	6164.1	5827.7	(336.4)
50-Yr	5300.9	4772.2	(528.7)
10-Yr	3457.1	2631.3	(825.8)
5-Yr	2428.0	1761.2	(666.8)
2-Yr	1013.3	616.4	(396.9)



US Hwy 69 (near middle of Hospital at Tributary Confluence) JCT 1 (Reduction by SWD N & SWD S and Increase by DA 2 and DA 4) (HEC RAS River Sta. 9775.2)

Storm Frequency	FEMA Model	HEC HMS Model	Difference
0.2% (500-Yr)	7403.7	7366.9	(36.8)
1% (100-Yr)	5281.3	4986.3	(295)
50-Yr	4527.3	4092.2	(435.1)
10-Yr	2951.4	2343.5	(607.9)
5-Yr	2069.9	1512.3	(557.6)
2-Yr	860.5	549.1	(311.4)

At Confluence with Tributary (at discharge of SWD N) JCT 2 (HEC RAS River Sta. 13260)

Storm Frequency	FEMA Model	HEC HMS Model	Difference
0.2% (500-Yr)	6273.7	31823	(3091.4)
1% (100-Yr)	4449.7	2230.2	(2219.5)
50-Yr	3794.2	1856.9	(1937.3)
10-Yr	2456.2	1077.9	(1378.3)
5-Yr			
2-Yr			

At Upstream End of Detailed FEMA Study JCT 4 (HEC RAS River Sta. 17870)

Storm Frequency	FEMA Model	HEC HMS Model	Difference
0.2% (500-Yr)	5082.9	5082.9	0
1% (100-Yr)	3601	3601	0
50-Yr	3088	3088	0
10-Yr	2308	2308	0
5-Yr			
2-Yr			

The first item to note is that there is a reduction in flows downstream of the proposed Regional SWDs. The reason there is not much of a change at the confluence is due to approximately 1152 acres of contributing drainage area that is not affected by the Regional SWDs. These acreages are downstream and contribute to the Salt Branch flows after the reduction at the SWDs.

Regional SWDs:

The two Regional Stormwater Detention facilities are proposed for construction. These two facilities are shown on Exhibits 3 and 4 in the Appendix.



On each SWD a concept has been laid out for regulation-size soccer fields for multi-use facilities of the stormwater detention facility area.

SWD N has a storage volume of approximately 90.7 acre-feet with the top of dike at Elev. 630 which about matches the natural ground on the north side, thus allowing the tributary flows from the north to divert flow into this SWD. The flowline of the stormwater detention facility is at Elev. 622.0 and uses a pair of 48-inch pipe and a stepped weir for overflows beginning at Elev. 626.0 to discharge reduced stormwater back into Salt Branch Creek. There is also a diversion weir in the main channel with a low flow 24-inch pipe to allow environmental discharge to continually flow in the creek between the regional stormwater detention facilities.

SWD S has a storage volume of approximately 151.086 acre-feet with the top of dike at Elev. 628.5 which also about matches the natural ground on the south side; thus, allowing the tributary from the south to flow into this SWD. The flowline of the stormwater detention facility is at Elev. 620.0 and uses a pair of 48-inch pipes and a stepped weir for overflows beginning at Elev. 625.0 to discharge reduced stormwater back into Salt Branch Creek.

As stated above, there will have to be some type of “restriction” placed between the two Regional SWDs to cause the flow of water in the Main Stem of the Channel to divert into each of the Regional SWDs. This diversion structure still remains to be hydraulically designed for construction. The flows for diversion in the model have been established.

Alternative Regional SWD Locations Evaluated:

The study considered other locations for additional regional stormwater detention facilities to mitigate the uncontrolled 1152 acres of contributing drainage areas downstream of the proposed Regional Stormwater Detention Facilities and upstream of State Highway 69.

Drainage Area 4: The study considered a location in Drainage Area 4 (Exhibit 5) to place a Regional SWD, as there may be a benefit similar to the reduction in flood height immediately downstream of the two proposed Regional SWDs. It was also considered to relocate SWD N, if there were to be City land on the north side of Clayton Road before the tributary flows into Salt Branch.

Drainage Area 2: The study also considered a location in Drainage Area 2 (Exhibit 6) to place a Regional SWD, that would be immediately upstream of the State Highway 69 Bridge to again reduced the flood height immediately upstream of the bridge by reducing the flows into the bridge.



Floodplain (Backwater) Modeling:

The Current Effective FEMA HEC-2 model was obtained from the FEMA Library and converted to a HEC RAS backwater model. Then this model was updated by adding cross sections between State Hwy 69 Bridge and the upstream side of the Regional SWDs. The printouts that are included in the Appendix show the reduction in the Base Flood Elevation (1% or 100-Yr) as well at the other flows included in the FEMA Flood Insurance Study (10-Yr, 50-Yr, and 0.2% or 500-Yr).

At the Confluence with Pryor Creek, the BFE is reduced less than 0.2 feet with the inclusion of the Regional Stormwater Detention Facilities. At the upstream side of State Hwy 69 Bridge the BFE is reduced by 0.3 feet. At the downstream side of the Hospital Site (RS 9190) the BFE is reduced by 0.3 feet. At the upstream side of the Hospital Site (RS 10421.7) the BFE is reduced by 0.3 feet. At the outlet to SWD S (RS 13260), the BFE is reduced 1.2 feet.

As discussed during periodic meetings, the issue of the location of the Regional SWDs is critical in relationship to the non-contributing Drainage Areas that interject flows downstream of the Regional SWDs that affect the Base Flood Elevation.

Summary of Floodplain Modeling:

The various alternative regional stormwater detention facilities were evaluated and modeled in the HEC RAS model, without much change in the BFE. After further detailed review of the model downstream of the State Highway 69 bridge, the existing flowline from approximately Maple Street to the railroad bridge adjacent to the State Highway 69 bridge had a strange slope. It was recommended to the City to perform some field surveys of the creek bottom and bank toes to verify the FEMA model.

In March 2021, Smith accompanied the surveyor as survey points were obtained between Maple Street and State Highway 69 Bridge along with some shots of the flowlines under Highway 69 Bridge and Railroad Bridge. Task 3C approval was received on May 4th for updating the base working drawing with all of the survey points and taking off new cross section data. The HEC RAS model was updated with the addition of thirty (30) new cross sections to replace three (3) cross sections in the Current Effective Model. The updated modeling also included the recently obtained LIDAR data and the survey creek data.

The following table provides a brief comparison summary of water surface elevations and floodplain widths for the Current Effective FEMA Floodplain as shown on FEMA Panel 40097C0235E with an effective date of September 16, 2011, with the proposed water surface elevations and floodplain widths for the proposed concept presented herewith at selected River Stas. from the HEC RAS Hydraulic Backwater model and the HEC HMS Hydrology Model:



River Sta. 450 is located at the confluence of Pryor Creek with Salt Branch Creek.
 River Sta. 8120 is located on the downstream side of the Union Pacific Railroad Bridge
 River Sta. 8343 is located on the upstream side of State Highway 69
 River Sta. 9775.2 is at Jct. 1 in the hydrology model approximately one-half way between Hwy 69 and the discharge of SWD S
 River Sta 13260 is at the discharge point of SWD N
 River Sta 17870 is the upstream end of the Detailed Study at HEC HMS Jct. 4

River Sta.	Current Effective BFE		Proposed BFE		Differences	
	Elevation	Top Width	Elevation	Top Width	Elevation	Top Width
450	606.72	506.02	606.17	463.90	(0.61)	(42.1)
8120	621.0	1064.98	619.46	785.38	(1.54)	(279.6)
8343	624.53	102	623.06	102	(1.47)	(0) ¹
9775.2	N/A	N/A	623.77	1289.05	N/A	N/A ²
13260	627.64	782.47	624.82	288.04	(2.82)	(494.4)
17870	632.92	596.68	631.23	429.34	(1.69)	(167.34)

¹ Within confines of bridge embankment ² No Cross Section at this River Sta. in Current Effective Model

As was expected, and as can be seen on the comparison profile plots, the profile of the natural stream is significantly different between the Current Effective FEMA model (probably the original 1978 model using USGS topo) and the updated model using the LIDAR and survey data. Included in Appendix are printouts of resulting flood elevations from the HEC RAS Models for the Current Effective FEMA model output data and the revised modeling for each of the 4 storm frequencies.

In the Appendix is also a HEC RAS Output Summary of the Current Effective FEMA floodplain and a comparison of the Current Effective Model and the Updated HEC RAS model with the new LIDAR topography, the downstream survey data and added cross sections, and the reduction of flows by the Regional SWD N and SWD S. At the upstream side of the State Highway 69 bridge, there is a reduction in the BFE of 1.47 feet and a narrowing of the 1% floodplain width by approximately 220 feet.

When comparing the pre- and post- construction of the Regional SWD N and SWD S and the inclusion of the downstream LIDAR and field survey, there is a slight drop upstream of Hwy 69 Bridge for the 1% (100-Yr) of 0.2 feet, but the reduction in flood elevation downstream of the railroad bridge of 0.67 feet really is the telling factor that the railroad/Hwy 69 bridges are the controlling factor for the upstream floodplain elevations and floodplain limits that the studies to date have been addressing through reduction of the flows with the on-site regional stormwater detention facilities.

All of the floodplain modeling data is based on the two regional stormwater detention facilities (SWD N and SWD S) being in place. Each component that has been included in this study to date has contributed to the reduction of the Base Flood Elevation and the narrowing of the Floodplain limits upstream of the State Highway 69 Bridges.



The ultimate resolution of the floodplain on the upstream side of the State Highway 59 bridges and the railroad bridge is a "widening" of the bridge openings. This would be a long-term issue of discussion and resolution with both the Oklahoma Department of Transportation and the Union Pacific Railroad.

Design and Estimates of Construction Costs:

Infrastructure Solutions Group, LLC, (ISG) acting as the City Engineer for the City of Pryor Creek, has been working with and coordinating the hydrologic and hydraulic modeling being performed by HISINC, LLC (Smith). As study results have been completed, those results have been forwarded to the City (Mayor Lees) and ISG (Steve Powell) for development of "design drawings" and estimates of probable construction costs.

Included in Appendix B, are the preliminary design drawings for both SWD N and SWD S based on the modeling provided to ISG. Final coordination of design will be pending the City's decision to proceed with final design and construction. Also included in Appendix B are the estimates of probable construction costs for each stormwater detention facility (earthwork cut and fill, inlet and outlet structures, and the diversion weirs located within the main channels.

Prior to construction of these facilities, there will be the following steps:

1. Finalize Design
2. Finalize hydraulic modeling based on final design
3. Prepare and Submit a Conditional Letter of Map Revision (CLOMR) to FEMA for a revision of the floodway. Since the reach between the State Highway 69 bridges and N 433 Road is designated as a Zone AE with Floodway, and the proposed changes will affect the floodway elevations and limits, a CLOMR is required to be submitted and approved by FEMA. Once the CLOMR has been approved by the City of Pryor Creek FPA, construction could proceed "at risk" of required changes by FEMA.

During and after construction the following steps are required:

4. Perform Construction of the two regional stormwater detention facilities and any necessary channel work (re-grading or widening) of the existing Salt Branch Creek channel
5. Upon completion of construction, a detailed survey (signed and sealed) of all changes to the existing floodplain area to be documented.
6. Update the CLOMR Modeling and Exhibits and prepare and file a Letter of Map Revision (LOMR) that will officially revise the FEMA Panel 40097C0235E with an effective date of September 16, 2011.



Conclusion and Recommendation:

To develop the lands on the upstream side of State Highway 69 the current floodplain is needed to be revised and reduced in elevation and width. The use of Regional Stormwater Detention Facilities to reduce flows and the updated modeling are the most current and effective methods of accomplishing these goals.

Long-term the ultimate solution is the "opening" of the restrictive bridge openings on the State Highway 69 and Union Pacific Railroad bridges, but this may take years to accomplish.

It is our recommendation for the City Council to proceed with these projects, if they are ultimately determined to be economically viable to the City of Pryor Creek.

Respectfully submitted,
City of Pryor Creek Floodplain Administrator

Rev. W. B. Smith, P.E. CFM



Preliminary Opinion of Probable Construction Cost

City of Pryor -

May 12, 2021

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Salt Branch Improvements - Phase I

Item	Description	Unit	Qty	Unit Price	Total Price
CHANNEL CLEAN UP ABOVE HWY 69					
1	Mobilization	LS	1	\$ 10,000.00	\$ 10,000.00
2	Clearing and Grubbing	ACRE	1.8	\$ 10,000.00	\$ 18,000.00
3	Erosion Control	ACRE	1.8	\$ 900.00	\$ 1,620.00
4	Disposal of Removed Debris(Burn pit & landfill)	LS	1	\$ 5,000.00	\$ 5,000.00
5	Final Clean up Grading	ACRE	1.8	\$ 1,000.00	\$ 1,800.00
6	Mulch Seeding	ACRE	3	\$ 750.00	\$ 2,250.00
7	Contingency	\$38,670.00		10%	\$ 3,867.00
10% Contingency					\$ 4,300.00
Construction Total					\$ 46,837.00
Engineering Fee					\$ 5,000.00
Resident Project Representative (2 MONTHS)					\$ 6,000.00
Survey					\$ 2,500.00
Total Project Cost					\$ 60,337.00



Preliminary Opinion of Probable Construction Cost

City of Pryor

May 12, 2021

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Salt Branch Improvements - Phase II

Item	Description	Unit	Qty	Unit Price	Total Price
CHANNEL WORK DWNSTRM HWY 69					
1	Mobilization	LS	1	\$ 10,000.00	\$ 10,000.00
2	ReChannelization	ACRE	1.5	\$ 10,000.00	\$ 15,000.00
3	Erosion Control	ACRE	1.5	\$ 900.00	\$ 1,350.00
4	Diposal of Removed Debris	LS	1	\$ 10,000.00	\$ 10,000.00
5	Final Clean up Grading	ACRE	2	\$ 1,000.00	\$ 2,000.00
6	Mulch Seeding	ACRE	2	\$ 750.00	\$ 1,500.00
7	Contingency			\$ 0.10	\$ 3,985.00
Construction Total					\$ 43,835.00
Engineering Fee					\$ 4,200.00
Resident Project Representative (1.5 MONTHS)					\$ 4,500.00
Total Project Cost					\$ 52,535.00



Preliminary Opinion of Probable Construction Cost

City of Pryor

May 12, 2021

Page 1 of 1

Salt Branch Improvements - Phase III

Item	Description	Unit	Qty	Unit Price	Total Price
REGIONAL DETENTION FACILITIES (Salt Branch N & S SWD)					
1	CLEARING AND GRUBBING	AC	48	\$ 3,000.00	\$ 144,000.00
2	EROSION CONTROL, IN PLACE	AC	2	\$ 5,000.00	\$ 10,000.00
3	EXCAVATION, STOCKPILE AND WASTE	CY	46,000	\$ 20.00	\$ 920,000.00
4	CONSTR. BERMS	CY	5,000	\$ 18.00	\$ 90,000.00
5	REINFORCED CONCRETE, IN PLACE	CY	250	\$ 125.00	\$ 31,250.00
6	OUTLET STRUCTURE, IN PLACE	CY	55	\$ 125.00	\$ 6,875.00
7	48 INCH HDPE DISCHARGE LINES, W HDWL.	LF	200	\$ 145.00	\$ 29,000.00
8	PILOT CHANNEL, CONC., IN PLACE	LF	540	\$ 105.00	\$ 56,700.00
9	MULCH SEED VEGETATIVE COVER	AC	48	\$ 750.00	\$ 36,000.00
10	RIP RAP ARMOR INLETS & PIPE OUTLET	TONS	200	\$ 35.00	\$ 7,000.00
11	ASPHALT ACCESS ROADWAY & RAMPS	SY	1500	\$ 18.00	\$ 27,000.00
12	CONTINGENCY		\$1,357,825	10%	\$ 135,782.50
Construction Total					\$ 1,493,607.50
Engineering Fee					\$ 118,000.00
Resident Project Representative (15 MONTHS)					\$ 36,000.00
Total Project Cost					\$ 1,647,607.50



Preliminary Opinion of Probable Construction Cost

City of Pryor

May 12, 2021

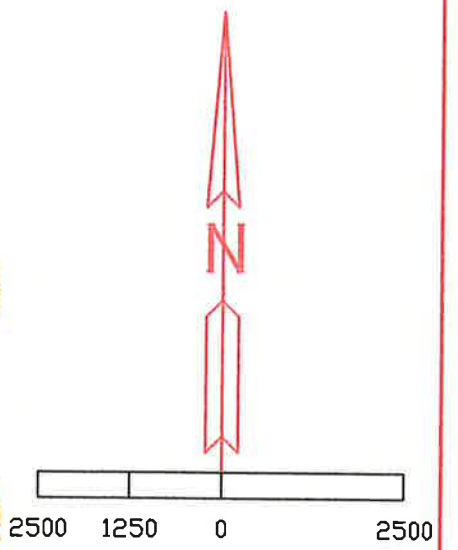
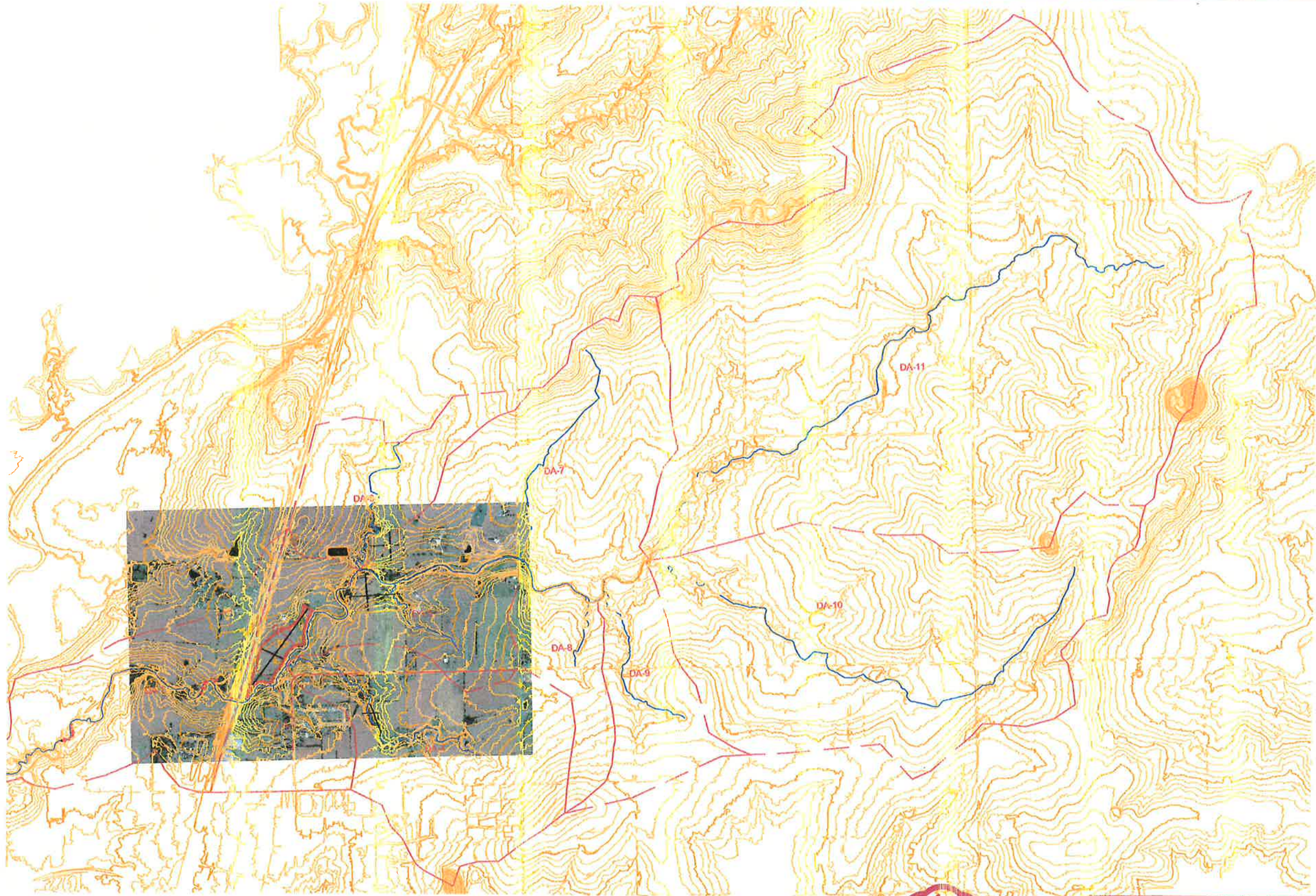
Page 1 of 1

Salt Branch Improvements - Phase IV (N. ELLIOTT ST. STORMWATER & S. Trib SWD &)

Item	Description	Unit	Qty	Unit Price	Total Price
N. Elliott St. Storm Sewer System					
1	36 inch HDPE, IN PLACE	LF	1000	\$ 125.00	\$ 125,000.00
2	24 INCH HDPE, INPLACE	LF	400	\$ 115.00	\$ 46,000.00
3	18 INCH HDPE, IN PLACE	LF	110	\$ 85.00	\$ 9,350.00
4	15 INCH HDPE, IN PLACE	LF	75	\$ 80.00	\$ 6,000.00
5	4' DIA. MH, IN PLACE	EA	6	\$ 3,000.00	\$ 18,000.00
6	DGDI W/ 2 HOODS, IN PLACE	EA	10	\$ 7,500.00	\$ 75,000.00
7	R&R PAVEMENT	SF	11,000	\$ 30.00	\$ 330,000.00
8	AGGREGATE BACKFILL	CY	1815	\$ 20.00	\$ 36,300.00
9	TRAFFIC CONTROL	LS	1	\$ 10,000.00	\$ 10,000.00
10	MOBILIZATION AND SURVEY	LS	1	\$ 15,000.00	\$ 15,000.00
11	MISC. COST ASSIGNED TO CITY (CITY SHARE)	LS	1	\$ 10,000.00	\$ 10,000.00
12	CONTINGENCY		\$ 680,650.00	10%	\$ 68,065.00
Construction Total					\$ 748,715.00
Engineering Fee (CITY SHARE ONLY 1/3)					\$ 85,000.00
Resident Project Representative					\$ 18,000.00
TOTAL S. ELLIOTT STREET STORM SEWER					\$ 851,715.00
S. TRIBUTARY DETENTION FACILITY (CITY SHARE ONLY)					
13	EXCAVATION, EMBANKMENT	CY	36,000	\$ 20.00	\$ 720,000.00
14	EXIT DITCH IMPROVEMENTS	AC	1.3	\$ 10,000.00	\$ 13,000.00
15	MISC. COSTS ASSIGNED TO CITY	LS	1	\$ 10,000.00	\$ 10,000.00
16	CONTINGENCY		\$ 743,000.00	10%	\$ 74,300.00
S. TRIBUTARY DETENTION FACILITY PROJECT COST					\$ 817,300.00
CITY SHARE OF S. TRIBUTARY DETENTION FACILITY					\$ 272,433.33

APPENDIX A
EXHIBITS

EXHIBIT 1 – DRAINAGE AREA MAP



- LEGEND**
- DRAINAGE AREAS
 - HEC HMS JCTS
 - CL CREEKS
 - STREETS



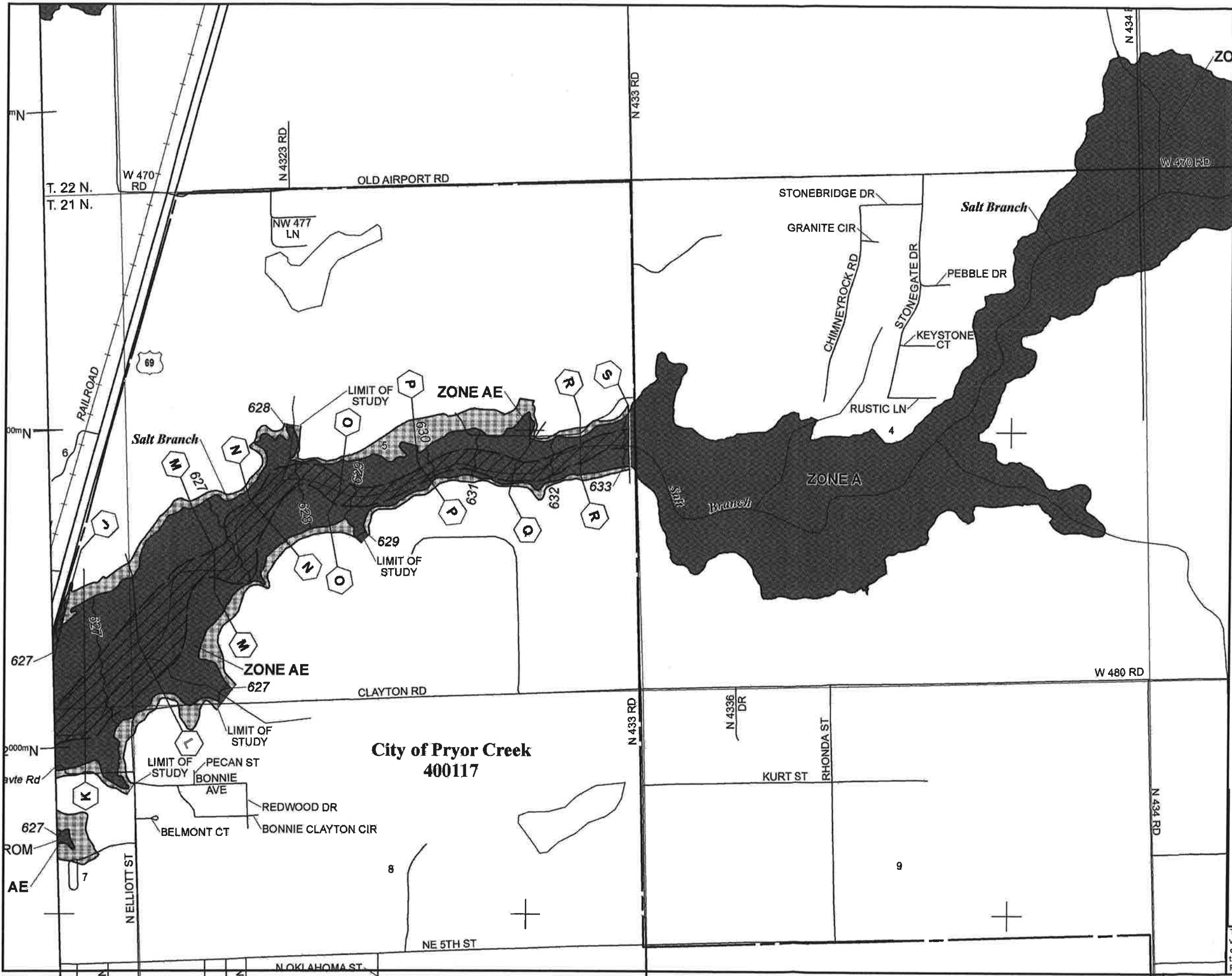
48 HOURS BEFORE YOU DIG...CALL DOKIE
 1-800-522-6543
 Oklahoma One-Call System, Inc.



*HydroSpace International Services
 Inter-National Consultancy, L.L.C.*

				SALT BRANCH CREEK STUDY CITY OF PRYOR CREEK			
				DRAINAGE AREA MAP SALT BRANCH CREEK WATERSHED NE PRYOR CREEK			
				SCALE	N.T.S.	DRAWING NUMBER	
DRAWN	WBS	FILE NAME	PLOT NUMBER				
DATE		PPM-19-632	1 OF				

EXHIBIT 2 – FEMA FIRM PANEL



ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235E

FIRM
FLOOD INSURANCE RATE MAP
MAYES COUNTY,
OKLAHOMA
AND INCORPORATED AREAS

PANEL 235 OF 500
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MAYES COUNTY	400486	0235	E
UNINCORPORATED AREAS	400117	0235	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
40097C0235E

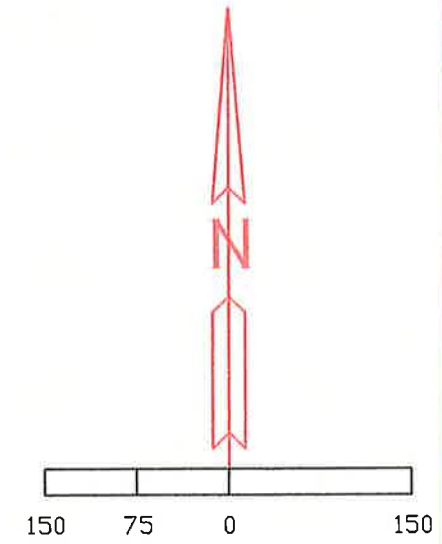
MAP REVISED
SEPTEMBER 16, 2011

Federal Emergency Management Agency

EXHIBIT 2

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program food maps check the FEMA Flood Map Store at www.msc.fema.gov

EXHIBIT 3 – REGIONAL SWD NORTH



- LEGEND**
- MAJOR CONTOURS
 - MINOR CONTOURS
 - CL CREEKS
 - STREETS
 - PROPOSED MULTI-PURPOSE RES.

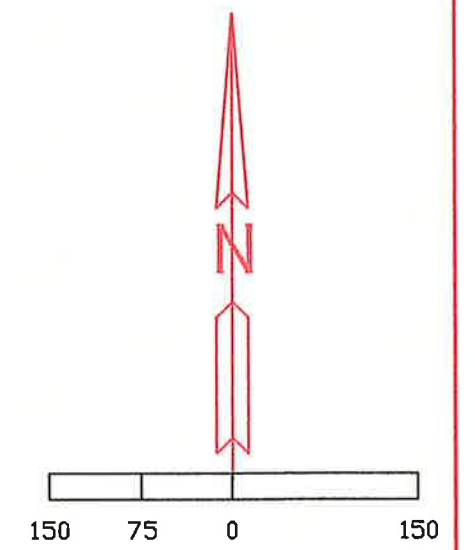
NOTES:

1. PRELIMINARY LAYOUT ONLY
2. STORAGE VOLUME = 90 AC-FT
3. ESTIMATED CUT = 225,000 CY
4. ESTIMATED FILL = 40,000 CY
5. OUTLET = 2 - 48-IN PIPES & OVERFLOW SPILLWAY

48 HOURS BEFORE YOU DIG...CALL ERKIE
 1-800-522-6543
 Oklahoma One-Call System, Inc.

Hydropanes International Services
 International Consulting, L.L.C.

				SALT BRANCH CREEK STUDY CITY OF PRYOR CREEK			
				REGIONAL SWD NORTH SALT BRANCH CREEK WATERSHED NE PRYOR CREEK			
SCALE		N.T.S.		REVISION NUMBER		EXHIBIT 3	
DRAWN		WRS		DATE			
DESIGNED				DATE		PROJECT NUMBER	
SUBMITTED				DATE		SHEET NUMBER	
APPROVED		WRS		DATE		3 OF 3	
DESCRIPTION		DATE		DATE		DATE	



- LEGEND**
- MAJOR CONTOURS
 - MINOR CONTOURS
 - CL CREEKS
 - STREETS
 - PROPOSED MULTI-PURPOSE RES.
 - CURRENT 1% FLOODPLAIN

NOTES:

1. PRELIMINARY LAYOUT ONLY
2. STORAGE VOLUME = 151 AC-FT
3. ESTIMATED CUT = 164,000 CY
4. ESTIMATED FILL = 40,000 CY
5. OUTLET = 2 - 48-IN PIPES & OVERFLOW SPILLWAY

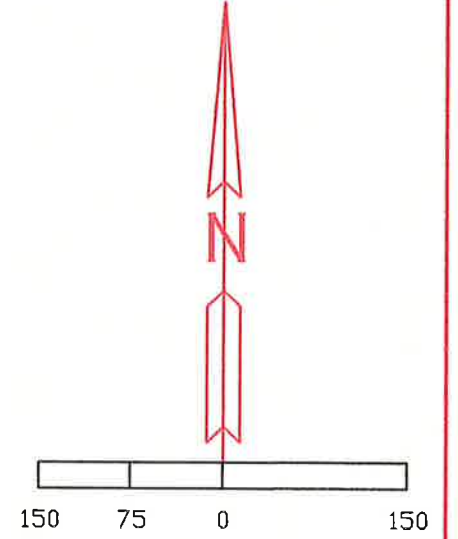
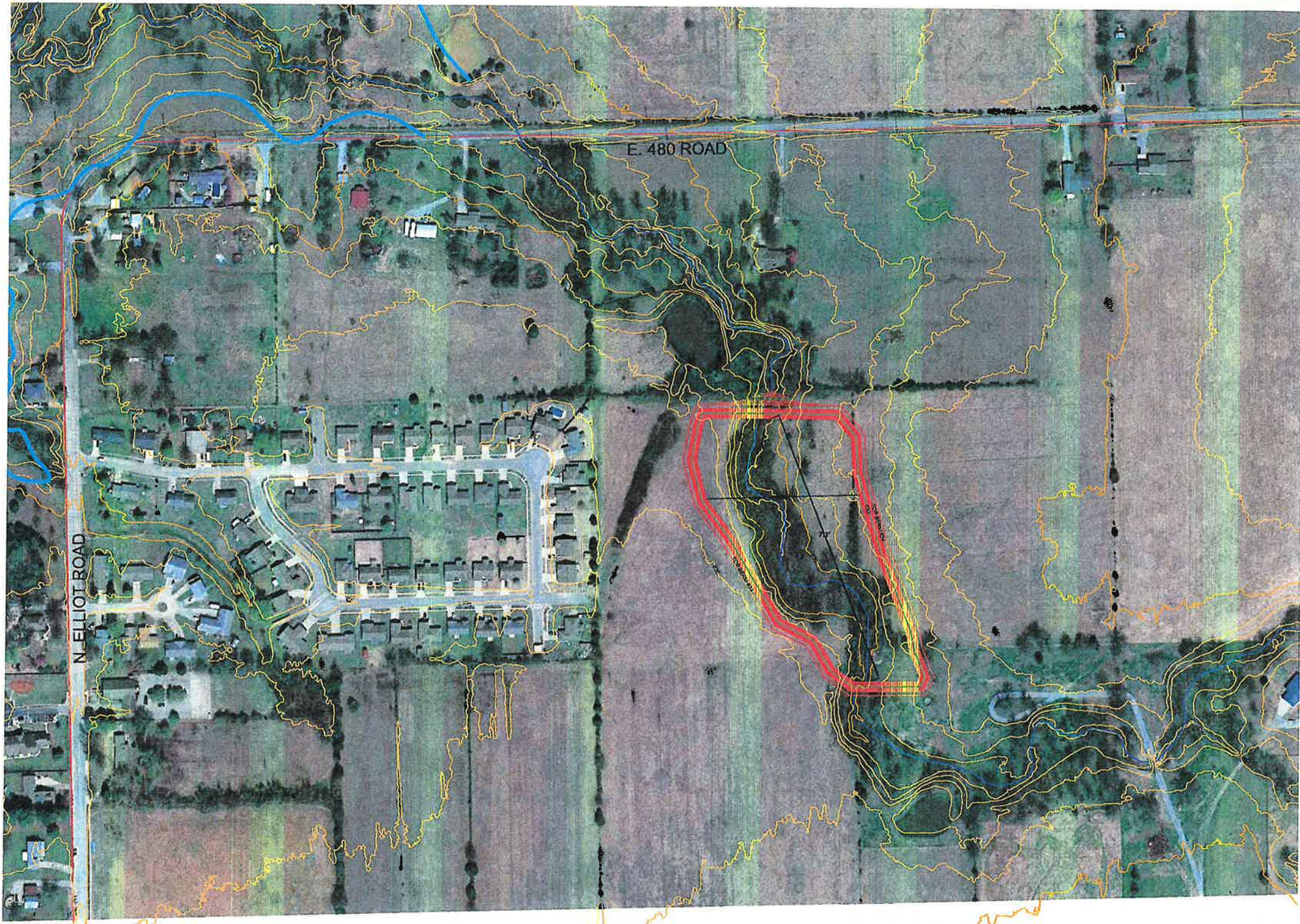

48 HOURS BEFORE YOU DIG, CALL 800-522-6543
 Oklahoma One-Call System, Inc.


 Hydrex International Services
 International Consultants, L.L.C.

				SALT BRANCH CREEK STUDY CITY OF PRYOR CREEK	
				REGIONAL SWD SOUTH SALT BRANCH CREEK WATERSHED NE PRYOR CREEK	
		SCALE	N.T.S.	DRAWN BY	
		DRAWN	WBS	EXHIBIT 4	
		CHECKED		FILE NO.	
		SUBMITTED		SHEET NUMBER	
		APPROVED	WBS	FPM-19-632	4 OF 4
NO.	DESCRIPTION	DRAWN	CHKD	APPROVED	WBS

EXHIBIT 4 – REGIONAL SWD SOUTH

EXHIBIT 5 – REGIONAL SWD DA 4



- LEGEND**
- MAJOR CONTOURS
 - MINOR CONTOURS
 - CL CREEKS
 - STREETS
 - PROPOSED MULTI-PURPOSE REG.
 - CURRENT 1% FLOODPLAIN

NOTES:

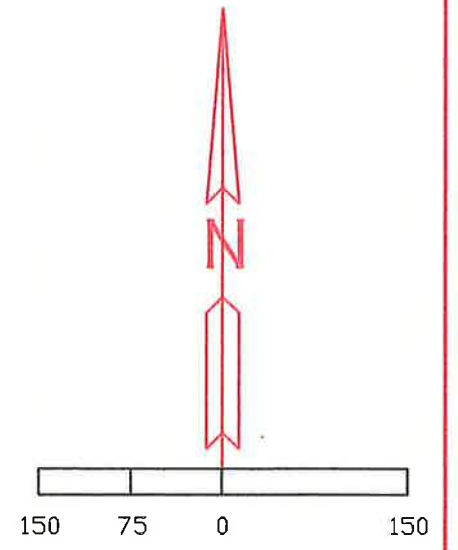
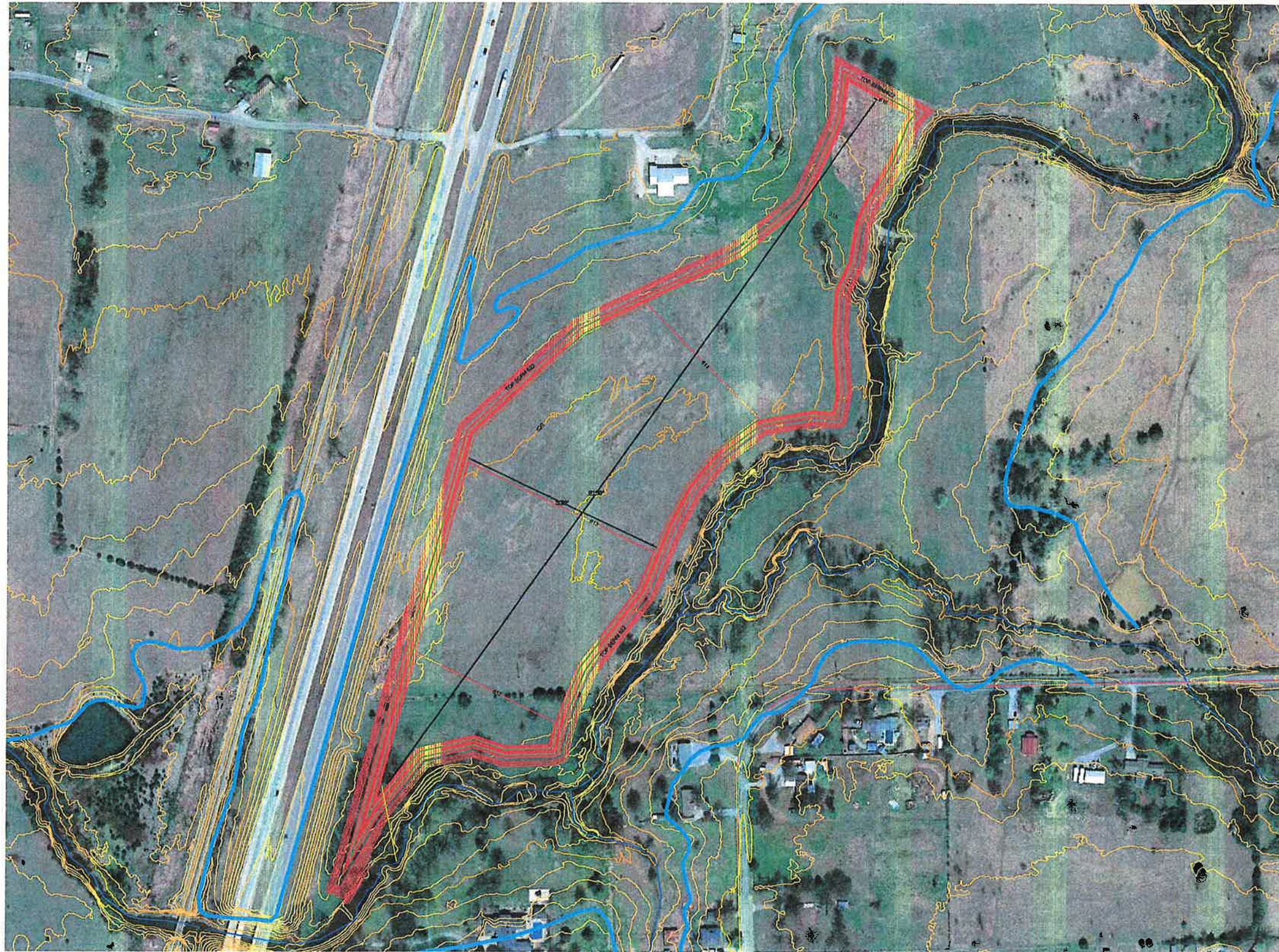
1. PRELIMINARY LAYOUT ONLY
2. STORAGE VOLUME = 44.5 AC-FT
3. ESTIMATED CUT = 90,000 CY
4. ESTIMATED FILL = 10,000 CY
5. OUTLET = 2 - 48-IN PIPES & OVERFLOW SPILLWAY


48 HOURS BEFORE YOU DIG...CALL OKIE
 1-800-522-6543
 Oklahoma One-Call System, Inc.


 Hydropower International Services
 International Consultants, L.L.C.

SALT BRANCH CREEK STUDY CITY OF PRYOR CREEK			
REGIONAL SWD DA 4 SALT BRANCH CREEK WATERSHED NE PRYOR CREEK			
SCALE	N.T.S.	EXHIBIT 5	
DRAWN	WBS	FILE NO.	5 OF 5
DESIGNED		FPM-19-632	
SUBMITTED			
APPROVED	WBS		

EXHIBIT 6 – REGIONAL SWD DA 5



LEGEND

- MAJOR CONTOURS
- MINOR CONTOURS
- CL CREEKS
- STREETS
- PROPOSED MULTI-PURPOSE REC.
- CURRENT 1% FLOODPLAIN

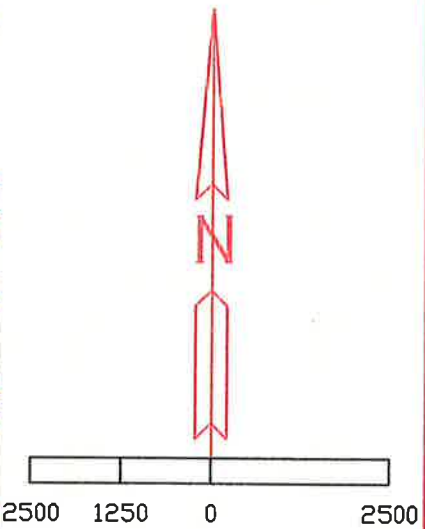
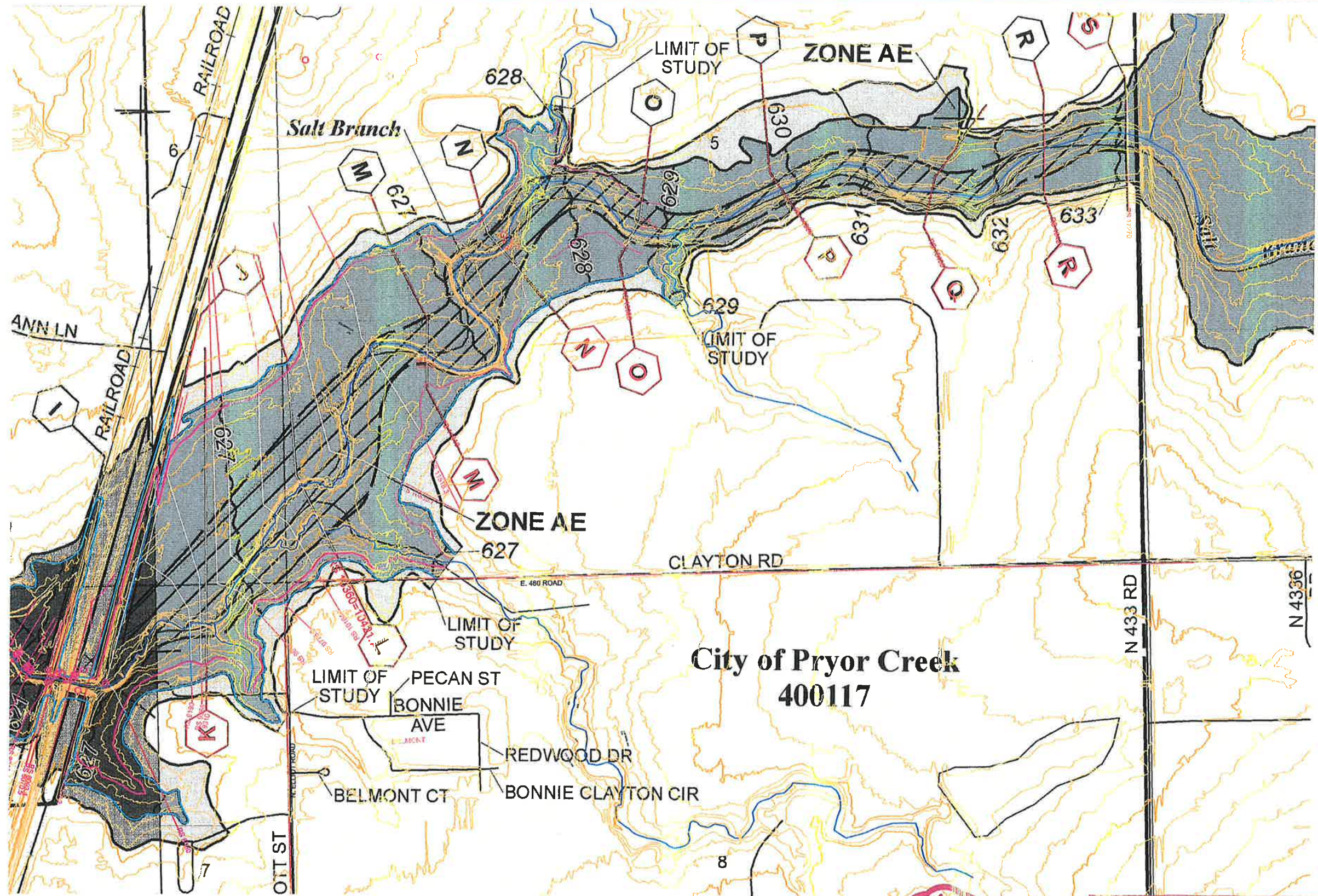
- NOTES:**
1. PRELIMINARY LAYOUT ONLY
 2. STORAGE VOLUME = 160 AC-FT
 3. ESTIMATED CUT = 258,000 CY
 4. ESTIMATED FILL = 30,000 CY
 5. OUTLET = 2 - 36-IN PIPES & OVERFLOW SPILLWAY


48 HOURS BEFORE YOU DIG...CALL 811
 1-800-522-6543
 Oklahoma One-Call System, Inc.


Hydrogeos International Services
Inter-National Consulting, L.L.C.

SALT BRANCH CREEK STUDY			
CITY OF PRYOR CREEK			
REGIONAL SWD DA 2			
SALT BRANCH CREEK WATERSHED			
NE PRYOR CREEK			
SCALE	N.T.S.	EXHIBIT 6	
DESIGNED	WBS	FILE NO.	SHEET NO.
DRAWN	WBS	FPM-19-632	5 OF
CHECKED	WBS		
APPROVED	WBS		

EXHIBIT 7
FLOODPLAIN MAPPING



- LEGEND**
- DRAINAGE AREAS
 - HEC HMS JCTS
 - CL CREEKS
 - STREETS

**City of Pryor Creek
400117**

48 HOURS BEFORE YOU DIG...CALL DICKIE
1-800-522-6543
Oklahoma One-Call System, Inc.



Hydro Power International Services
Inter-National Consulting, L.L.C.

SALT BRANCH CREEK STUDY CITY OF PRYOR CREEK			
FLOODPLAIN MAPPING SALT BRANCH CREEK WATERSHED NE PRYOR CREEK			
DATE	PLT.	SHEET NUMBER	
DRAWN	WBS	EXHIBIT 7	
CHECKED		DATE	SHEET NUMBER
DESIGNED		FPM--19-632	7 OF
APPROVED	WBS		

APPENDIX B

EXISTING CONDITIONS
HEC HMS MODELING INPUT DATA

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-1
Run Condition	Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	60.647		15.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	404.31 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	343.667		85.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area	404.315 Acres	0.6317 Square Miles
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Type of Ground (CN)

Type of Ground	Area	Ground Type	CN
Impervious Area "B"			
Impervious Area "C"		Residential	83
Impervious Area "C"		Building/Paving	98
Impervious Area "D"		Residential	87
Impervious Area "D"		Building/Paving	98
Pervious Area "B"			
Pervious Area "C"		Pasture	75
Pervious Area "C"		Woods	73
Pervious Area "D"		Pasture	83
Pervious Area "D"		Woods	79

Hydraulic Length (l)	1994.0	Feet
Upstream Elev.	595.00	Feet
Downstream Elev.	580.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.15	x	83	=	12.5
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.85	x	75	=	63.8
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					<u>76</u>

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$S = \frac{1000}{CN} - 10$$

$$L = \frac{1176.13}{1647.92}$$

$$S = \frac{1000}{76} - 10$$

$$L = \frac{0.71}{42.8}$$

Hrs. Minutes

$$S = 3.1234$$

$$T_c = 1.66 * L$$

$$T_c = 71.1 \text{ Minutes}$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

$$Y = 0.75\%$$

$$V = \text{ } \text{feet per second}$$

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-2
Run Condition	Existing

INPUT VALUES

			%	
Impervious Area "B"	0.000	Acres	0.0%	
Impervious Area "C"	4.885	Acres	5.0%	
Impervious Area "C"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	97.70 Total Area
Pervious Area "B"	0.000	Acres	0.0%	
Pervious Area "C"	92.816	Acres	95.0%	
Pervious Area "C"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	

Total Area	97.701 Acres	0.1527 Square Miles
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Type of Ground (CN)

	CN
Impervious Area "B"	
Impervious Area "C"	Residential 83
Impervious Area "C"	Building/Paving 98
Impervious Area "D"	Residential 87
Impervious Area "D"	Building/Paving 98
Pervious Area "B"	
Pervious Area "C"	Pasture 75
Pervious Area "C"	Woods 73
Pervious Area "D"	Pasture 83
Pervious Area "D"	Woods 79

Hydraulic Length (l)	2328.0	Feet
Upstream Elev.	630.00	Feet
Downstream Elev.	610.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.05	x	83	=	4.2
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.95	x	75	=	71.3
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					75

SCS Lag	L =	$\frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$	S =	$\frac{1000}{CN} - 10$
	L =	$\frac{1362.57}{1761.07}$	S =	$\frac{1000}{75} - 10$

L =	0.77 Hrs.	S =	3.2626
	46.4 Minutes		

T _c =	= 1.66 * L	Y =	$\frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$
T _c =	77.1 Minutes	Y =	0.86%

V = feet per second

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-3
Run Condition	Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	69.730		45.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	154.96 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	85.226		55.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area	154.956 Acres	0.2421 Square Miles
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Type of Ground (CN)

Type of Ground	Area (Acres)	CN
Impervious Area "B"		
Impervious Area "C"	Residential	83
Impervious Area "C"	Building/Paving	98
Impervious Area "D"	Residential	87
Impervious Area "D"	Building/Paving	98
Pervious Area "B"		
Pervious Area "C"	Pasture	75
Pervious Area "C"	Woods	73
Pervious Area "D"	Pasture	83
Pervious Area "D"	Woods	79

Hydraulic Length (l)	1278.0	Feet
Upstream Elev.	630.00	Feet
Downstream Elev.	610.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.45	x	83	=	37.4
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.55	x	75	=	41.3
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					<u>79</u>

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$S = \frac{1000}{CN} - 10$$

$$L = \frac{767.05}{2376.86}$$

$$S = \frac{1000}{79} - 10$$

$$L = \frac{0.32}{19.4} \text{ Hrs.}$$

$$S = 2.7226$$

$$T_c = 1.66 \cdot L$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

$$T_c = 32.1 \text{ Minutes}$$

$$Y = 1.56\%$$

$$V = \text{[] feet per second}$$

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-4
Run Condition	Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	175.780		35.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	502.23 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	326.449		65.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area	502.229 Acres	0.7847 Square Miles
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Type of Ground (CN)

Type of Ground	Area (Acres)	CN
Impervious Area "B"		
Impervious Area "C"	Residential	83
Impervious Area "C"	Building/Paving	98
Impervious Area "D"	Residential	87
Impervious Area "D"	Building/Paving	98
Pervious Area "B"		
Pervious Area "C"	Pasture	75
Pervious Area "C"	Woods	73
Pervious Area "D"	Pasture	83
Pervious Area "D"	Woods	79

Hydraulic Length (l)	3808.0	Feet
Upstream Elev.	640.00	Feet
Downstream Elev.	620.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.35	x	83	=	29.1
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.65	x	75	=	48.8
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =				=	78

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$S = \frac{1000}{CN} - 10$$

$$L = \frac{1882.15}{1376.96}$$

$$S = \frac{1000}{78} - 10$$

$$L = \frac{1.37}{82.0} \text{ Hrs.}$$

$$S = 2.8535$$

$$T_c = 1.66 \cdot L$$

$$T_c = 136.1 \text{ Minutes}$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

$$Y = 0.53\%$$

$$V = \text{[] feet per second}$$

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-5
Run Condition	Existing

INPUT VALUES

			%	
Impervious Area "B"	0.000	Acres	0.0%	
Impervious Area "C"	31.858	Acres	15.0%	
Impervious Area "C"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	212.15 Total Area
Pervious Area "B"	0.000	Acres	0.0%	
Pervious Area "C"	180.297	Acres	85.0%	
Pervious Area "C"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	

Total Area	212.154 Acres	0.3315 Square Miles
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Type of Ground (CN)

	CN
Impervious Area "B"	
Impervious Area "C"	Residential 83
Impervious Area "C"	Building/Paving 98
Impervious Area "D"	Residential 87
Impervious Area "D"	Building/Paving 98
Pervious Area "B"	
Pervious Area "C"	Pasture 75
Pervious Area "C"	Woods 73
Pervious Area "D"	Pasture 83
Pervious Area "D"	Woods 79

Hydraulic Length (l)	1743.0	Feet
Upstream Elev.	640.00	Feet
Downstream Elev.	626.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.15	x	83	=	12.5
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.85	x	75	=	63.7
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					76

SCS Lag	L =	$\frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$	S =	$\frac{1000}{CN} - 10$
	L =	$\frac{1056.08}{1702.82}$	S =	$\frac{1000}{76} - 10$

L =	$\frac{0.62}{37.2}$	Hrs.	S =	3.1231
		Minutes		

T _c =	=1.66*L	Y =	$\frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$
T _c =	61.8	Minutes	

Y = 0.80%

V = feet per second

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name: Salt Creek Tributary Study - City of Pryor
 Project No.:
 Drainage Basin: DA-6
 Run Condition: Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	19.024		8.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	237.80 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	218.772		92.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area: 237.796 Acres 0.3716 Square Miles

Type of Ground (CN)

Type of Ground	CN
Impervious Area "B"	
Impervious Area "C"	Residential 83
Impervious Area "C"	Building/Paving 98
Impervious Area "D"	Residential 87
Impervious Area "D"	Building/Paving 98
Pervious Area "B"	
Pervious Area "C"	Pasture 75
Pervious Area "C"	Woods 73
Pervious Area "D"	Pasture 83
Pervious Area "D"	Woods 79

Hydraulic Length (l): 2042.0 Feet
 Upstream Elev.: 640.00 Feet
 Downstream Elev.: 624.00 Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =		x		=	
	0.00		x	0	=	0.0
	0.08		x	83	=	6.6
	0.00		x	98	=	0.0
	0.00		x	87	=	0.0
	0.00		x	98	=	0.0
	0.00		x	0	=	0.0
	0.92		x	75	=	69.0
	0.00		x	73	=	0.0
	0.00		x	83	=	0.0
	0.00		x	79	=	0.0
	CN =				=	76

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$S = \frac{1000}{CN} - 10$$

$L = \frac{1218.43}{1681.84}$ $S = \frac{1000}{76} - 10$
 $L = \frac{0.72}{43.5}$ Hrs. $S = 3.2205$ Minutes

$T_c = 1.66 \cdot L$ $Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$
 $T_c = 72.2$ Minutes $Y = 0.78\%$

$V =$ [] feet per second

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name: Salt Creek Tributary Study - City of Pryor
 Project No.:
 Drainage Basin: DA-7
 Run Condition: Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	167.969		28.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	599.89 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	431.921		72.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area: 599.891 Acres 0.9373 Square Miles

Type of Ground (CN)

Type of Ground	Area	CN
Impervious Area "B"		
Impervious Area "C"	Residential	83
Impervious Area "C"	Building/Paving	98
Impervious Area "D"	Residential	87
Impervious Area "D"	Building/Paving	98
Pervious Area "B"		
Pervious Area "C"	Pasture	75
Pervious Area "C"	Woods	73
Pervious Area "D"	Pasture	83
Pervious Area "D"	Woods	79

Hydraulic Length (l): 2817.0 Feet
 Upstream Elev.: 650.00 Feet
 Downstream Elev.: 630.00 Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.28	x	83	=	23.2
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.72	x	75	=	54.0
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =				=	77

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}} \quad S = \frac{1000}{CN} - 10$$

$$L = \frac{1503.80}{1600.94} \quad S = \frac{1000}{77} - 10$$

$L = \frac{0.94}{56.4}$ Hrs. / Minutes $S = 2.9467$

$T_c = 1.66 \cdot L = 93.6$ Minutes $Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$

$Y = 0.71\%$

$V =$ [] feet per second

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-8
Run Condition	Existing

INPUT VALUES

		Acres	%	
Impervious Area "B"	0.000		0.0%	
Impervious Area "C"	23.571		15.0%	
Impervious Area "C"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	
Impervious Area "D"	0.000		0.0%	157.14 Total Area
Pervious Area "B"	0.000		0.0%	
Pervious Area "C"	133.568		85.0%	
Pervious Area "C"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	
Pervious Area "D"	0.000		0.0%	

Total Area	157.138 Acres	0.2455 Square Miles
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Type of Ground (CN)

Type of Ground	CN
Impervious Area "B"	
Impervious Area "C"	Residential 83
Impervious Area "C"	Building/Paving 98
Impervious Area "D"	Residential 87
Impervious Area "D"	Building/Paving 98
Pervious Area "B"	
Pervious Area "C"	Pasture 75
Pervious Area "C"	Woods 73
Pervious Area "D"	Pasture 83
Pervious Area "D"	Woods 79

Hydraulic Length (l)	1745.0 Feet
Upstream Elev.	650.00 Feet
Downstream Elev.	630.00 Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.15	x	83	=	12.5
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.85	x	75	=	63.8
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =				=	76

SCS Lag

$$L = \frac{i^{0.5}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$L = \frac{1057.09}{2034.09}$$

$$S = \frac{1000}{CN} - 10$$

$$S = \frac{1000}{76} - 10$$

$$L = \frac{0.52}{31.2} \text{ Hrs. / Minutes}$$

$$S = 3.1234$$

$$T_c = 1.66 \cdot L$$

$$T_c = 51.8 \text{ Minutes}$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

$$Y = 1.15\%$$

$$V = \text{ } \text{feet per second}$$

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name: Salt Creek Tributary Study - City of Pryor
 Project No.:
 Drainage Basin: DA-9
 Run Condition: Existing

INPUT VALUES

			%	
Impervious Area "B"	0.000	Acres	0.0%	
Impervious Area "C"	32.833	Acres	15.0%	
Impervious Area "C"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	218.88 Total Area
Pervious Area "B"	0.000	Acres	0.0%	
Pervious Area "C"	186.051	Acres	85.0%	
Pervious Area "C"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	

Total Area: 218,884 Acres 0.3420 Square Miles

Type of Ground (CN)

Type of Ground	Area	CN
Impervious Area "B"		
Impervious Area "C"	Residential	83
Impervious Area "C"	Building/Paving	98
Impervious Area "D"	Residential	87
Impervious Area "D"	Building/Paving	98
Pervious Area "B"		
Pervious Area "C"	Pasture	75
Pervious Area "C"	Woods	73
Pervious Area "D"	Pasture	83
Pervious Area "D"	Woods	79

Hydraulic Length (l): 1812.0 Feet
 Upstream Elev.: 650.00 Feet
 Downstream Elev.: 632.00 Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.15	x	83	=	12.5
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.85	x	75	=	63.8
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					76

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$L = \frac{1089.44}{1893.70}$$

L = 0.58 Hrs.
34.5 Minutes

$$S = \frac{1000}{CN} - 10$$

$$S = \frac{1000}{76} - 10$$

S = 3.1234

$$T_c = 1.66 * L$$

$$T_c = 57.3 \text{ Minutes}$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

Y = 0.99%

V = feet per second

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-10
Run Condition	Existing

INPUT VALUES

			%	
Impervious Area "B"	0.000	Acres	0.0%	
Impervious Area "C"	213.625	Acres	20.0%	
Impervious Area "C"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	1068.13 Total Area
Pervious Area "B"	0.000	Acres	0.0%	
Pervious Area "C"	854.500	Acres	80.0%	
Pervious Area "C"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	

Total Area	1068.125 Acres	1.6689 Square Miles
------------	----------------	---------------------

Type of Ground (CN)

Type of Ground	Area	CN
Impervious Area "B"		
Impervious Area "C"	Residential	83
Impervious Area "C"	Building/Paving	98
Impervious Area "D"	Residential	87
Impervious Area "D"	Building/Paving	98
Pervious Area "B"		
Pervious Area "C"	Pasture	75
Pervious Area "C"	Woods	73
Pervious Area "D"	Pasture	83
Pervious Area "D"	Woods	79

Hydraulic Length (l)	5717.0	Feet
Upstream Elev.	660.00	Feet
Downstream Elev.	632.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.20	x	83	=	16.6
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.80	x	75	=	60.0
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =					<u>77</u>

SCS Lag

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$$

$$S = \frac{1000}{CN} - 10$$

$$L = \frac{2699.70}{1329.68}$$

$$S = \frac{1000}{77} - 10$$

$$L = \frac{2.03 \text{ Hrs.}}{121.8 \text{ Minutes}}$$

$$S = 3.0548$$

$$T_c = 1.66 \cdot L = 202.2 \text{ Minutes}$$

$$Y = \frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$$

$$Y = 0.49\%$$

$$V = \text{[] feet per second}$$

Figure 8 - SCS Manual

Drainage Basin Conditions
SCS Methodology

Project Name	Salt Creek Tributary Study - City of Pryor
Project No.	
Drainage Basin	DA-11
Run Condition	Existing

INPUT VALUES

			%	
Impervious Area "B"	0.000	Acres	0.0%	
Impervious Area "C"	405.983	Acres	15.0%	
Impervious Area "C"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	
Impervious Area "D"	0.000	Acres	0.0%	2706.56 Total Area
Pervious Area "B"	0.000	Acres	0.0%	
Pervious Area "C"	2300.573	Acres	85.0%	
Pervious Area "C"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	
Pervious Area "D"	0.000	Acres	0.0%	

Total Area	2706.557 Acres	4.2290 Square Miles
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Type of Ground (CN)

	CN
Impervious Area "B"	
Impervious Area "C"	Residential 83
Impervious Area "C"	Building/Paving 98
Impervious Area "D"	Residential 87
Impervious Area "D"	Building/Paving 98
Pervious Area "B"	
Pervious Area "C"	Pasture 75
Pervious Area "C"	Woods 73
Pervious Area "D"	Pasture 83
Pervious Area "D"	Woods 79

Hydraulic Length (l)	9145.0	Feet
Upstream Elev.	660.00	Feet
Downstream Elev.	632.00	Feet

SCS METHOD CALCULATIONS

SCS Curve No.	CN =	0.00	x	0	=	0.0
		0.15	x	83	=	12.5
		0.00	x	98	=	0.0
		0.00	x	87	=	0.0
		0.00	x	98	=	0.0
		0.00	x	0	=	0.0
		0.85	x	75	=	63.8
		0.00	x	73	=	0.0
		0.00	x	83	=	0.0
		0.00	x	79	=	0.0
	CN =				=	76

SCS Lag	L =	$\frac{l^{0.8}(S+1)^{0.7}}{1900(Y)^{0.5}}$	S =	$\frac{1000}{CN} - 10$
	L =	$\frac{3977.62}{1051.33}$	S =	$\frac{1000}{76} - 10$

L =	3.78	Hrs.	S =	3.1234
	227.0	Minutes		

T _c =	=1.66*L	Y =	$\frac{\text{Upstream Elev.} - \text{Downstream Elev.}}{\text{Hydraulic Length}}$
T _c =	376.8	Minutes	

Y = 0.31%

V = feet per second

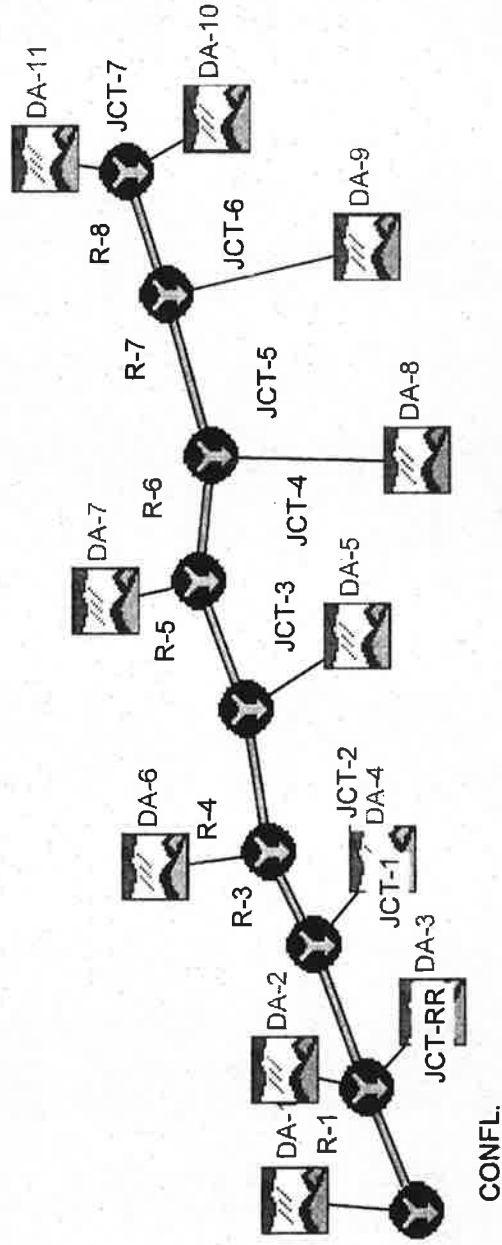
Figure 8 - SCS Manual

HEC HMS SCHEMATICS

HEC-HMS

Project: SALT CREEK STUDY

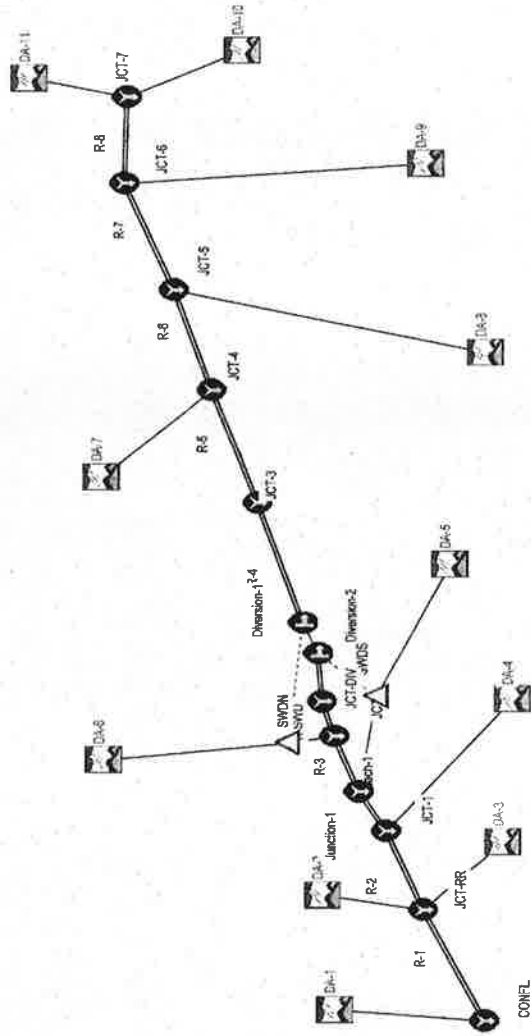
Basin Model: Existing



HEC-HMS

Project: SALT CREEK STUDY

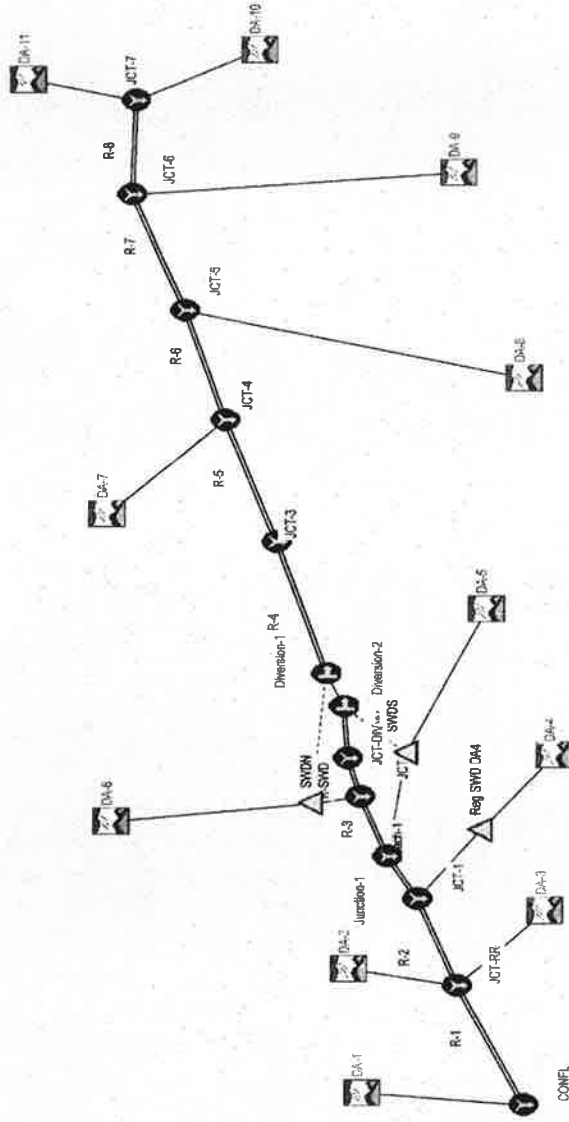
Basin Model: Regional SWD



HEC-HMS

Project: SALT CREEK STUDY

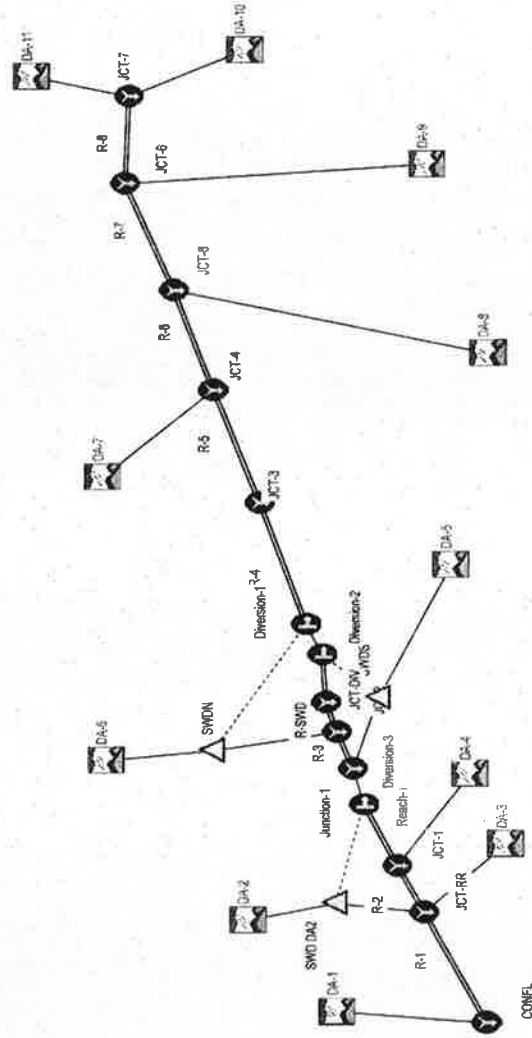
Basin Model: RegionSWD w DA4SWD



HEC-HMS

Project: SALT CREEK STUDY

Basin Model: RegionalSWD w DA2SWD



STORMWATER DETENTION INPUT DATA SHEETS
(PROPOSED PROJECT)

Project: City of Dyers - Red Creek BWRB Interiors
 Manning's Equation for Pipe Flow

Convention: Proposed Size (ft) / Proposed Slope (ft/ft)

G = 1.4876 kft^{1.4876} (ft^{1.4876}/s)

INPUT:

No. of Curbel Pipes: 3

D = 30 (Diameter of Pipe (inches))

D = 0.25 (Diameter of Pipe (feet))

D = 30 (Diameter of Pipe (inches))

D = 0.25 (Diameter of Pipe (feet))

B = 12.57 (Cross Sectional Area of Single Pipe (ft²))

n = 0.013 (Manning's Coefficient for 12.57 ft² of 30" SDR 35 Steel Pipe)

n = 0.015 (Manning's Coefficient for 12.57 ft² of 30" SDR 35 Concrete Pipe)

n = 0.017 (Manning's Coefficient for 12.57 ft² of 30" SDR 35 Cast Iron Pipe)

n = 0.022 (Manning's Coefficient for 12.57 ft² of 30" SDR 35 Corrugated Pipe)

R = Hydraulic Radius

S = Slope of Hydraulic Gradient

S = 0.001 (Slope of Hydraulic Gradient)

S = 0.001 (Slope of Hydraulic Gradient)

S = 0.001 (Slope of Hydraulic Gradient)

ELEVATION - DECREASE CAPACITY OF OUTLET PIPE

ELEV. WATER SURFACE (FT)	Q (MGD)	VELOCITY (FPS)	DECREASE IN CAPACITY (%)
627.00	0.00	114.31	0.000
627.20	0.00	114.31	0.000
627.40	0.00	114.31	0.000
627.60	0.00	114.31	0.000
627.80	0.00	114.31	0.000
628.00	0.00	114.31	0.000
628.20	0.00	114.31	0.000
628.40	0.00	114.31	0.000
628.60	0.00	114.31	0.000
628.80	0.00	114.31	0.000
629.00	0.00	114.31	0.000
629.20	0.00	114.31	0.000
629.40	0.00	114.31	0.000
629.60	0.00	114.31	0.000
629.80	0.00	114.31	0.000
630.00	0.00	114.31	0.000

ELEV. WATER SURFACE (FT)	Q (MGD)	VELOCITY (FPS)	DECREASE IN CAPACITY (%)
627.00	0.00	114.31	0.000
627.20	0.00	114.31	0.000
627.40	0.00	114.31	0.000
627.60	0.00	114.31	0.000
627.80	0.00	114.31	0.000
628.00	0.00	114.31	0.000
628.20	0.00	114.31	0.000
628.40	0.00	114.31	0.000
628.60	0.00	114.31	0.000
628.80	0.00	114.31	0.000
629.00	0.00	114.31	0.000
629.20	0.00	114.31	0.000
629.40	0.00	114.31	0.000
629.60	0.00	114.31	0.000
629.80	0.00	114.31	0.000
630.00	0.00	114.31	0.000

ELEV. WATER SURFACE (FT)	Q (MGD)	VELOCITY (FPS)	DECREASE IN CAPACITY (%)
627.00	0.00	114.31	0.000
627.20	0.00	114.31	0.000
627.40	0.00	114.31	0.000
627.60	0.00	114.31	0.000
627.80	0.00	114.31	0.000
628.00	0.00	114.31	0.000
628.20	0.00	114.31	0.000
628.40	0.00	114.31	0.000
628.60	0.00	114.31	0.000
628.80	0.00	114.31	0.000
629.00	0.00	114.31	0.000
629.20	0.00	114.31	0.000
629.40	0.00	114.31	0.000
629.60	0.00	114.31	0.000
629.80	0.00	114.31	0.000
630.00	0.00	114.31	0.000

ELEV. WATER SURFACE (FT)	Q (MGD)	VELOCITY (FPS)	DECREASE IN CAPACITY (%)
627.00	0.00	114.31	0.000
627.20	0.00	114.31	0.000
627.40	0.00	114.31	0.000
627.60	0.00	114.31	0.000
627.80	0.00	114.31	0.000
628.00	0.00	114.31	0.000
628.20	0.00	114.31	0.000
628.40	0.00	114.31	0.000
628.60	0.00	114.31	0.000
628.80	0.00	114.31	0.000
629.00	0.00	114.31	0.000
629.20	0.00	114.31	0.000
629.40	0.00	114.31	0.000
629.60	0.00	114.31	0.000
629.80	0.00	114.31	0.000
630.00	0.00	114.31	0.000

INCREMENTAL LENGTH INCREASE PER 0.1% INCREMENTAL SLOPE INCREASE

ELEV. WATER SURFACE (FT)	Q (MGD)	VELOCITY (FPS)	DECREASE IN CAPACITY (%)
627.00	0.00	114.31	0.000
627.20	0.00	114.31	0.000
627.40	0.00	114.31	0.000
627.60	0.00	114.31	0.000
627.80	0.00	114.31	0.000
628.00	0.00	114.31	0.000
628.20	0.00	114.31	0.000
628.40	0.00	114.31	0.000
628.60	0.00	114.31	0.000
628.80	0.00	114.31	0.000
629.00	0.00	114.31	0.000
629.20	0.00	114.31	0.000
629.40	0.00	114.31	0.000
629.60	0.00	114.31	0.000
629.80	0.00	114.31	0.000
630.00	0.00	114.31	0.000

HYDRAULIC RADIUS OF PIPE

Depth of Water (ft)	Full R ² /R _{full} ²	R ²
0.0	0.00	0.000
0.5	0.19	0.481
1.0	0.38	0.962
1.5	0.57	1.443
2.0	0.76	1.924
2.5	0.95	2.405
3.0	1.14	2.886
3.5	1.33	3.367
4.0	1.52	3.848
4.5	1.71	4.329

From Chow Figure 8.5
 R_{full} = Hydraulic Radius for Pipe Flowing Full
 R_{0.5} = R_{0.5}}
 R_{1.0} = 1.002 R_{full}}
 R_{1.5} = 1.001 R_{full}}

STORMWATER DETENTION BASIN OUTLET STRUCTURE WITH LOW FLOW PIPE AND STEPPED WEIR
 ORIFICE FLOW CONTROL WEIR

Project: City of Poplar - 13th Canal RWD North
 Bank: Proposed 13th Canal RWD North

ELEVATION OF WATER	DISCHARGE (SEE DETENTION BASIN I)	WEIR FLOW CALCULATION - SECTION 1						WEIR FLOW CALCULATION - SECTION 2						WEIR FLOW CALCULATION - SECTION 3					
		HEIGHT OF WATER SECTION 1	C	L (FT)	H (FT)	H ³	FLOW (CFS)	HEIGHT OF WATER SECTION 1	C	L (FT)	H (FT)	H ³	FLOW (CFS)	HEIGHT OF WATER SECTION 1	C	L (FT)	H (FT)	H ³	FLOW (CFS)
627.20	0.00	0.00	2.66	75.0	0.0	0.0	0.00	0.00	2.66	75.0	0.0	0.0	0.00	0.00	2.66	75.0	0.0	0.0	0.00
623.00	15.46	0.00	2.66	75.0	0.5	0.1	70.50	0.00	2.66	75.0	0.5	0.1	70.50	0.00	2.66	75.0	0.5	0.1	70.50
623.00	41.87	1.00	2.66	75.0	1.0	1.0	196.50	0.00	2.66	75.0	1.0	1.0	196.50	0.00	2.66	75.0	1.0	1.0	196.50
623.00	81.10	1.50	2.66	75.0	1.5	3.4	366.75	0.00	2.66	75.0	1.5	3.4	366.75	0.00	2.66	75.0	1.5	3.4	366.75
624.50	100.35	2.00	2.66	75.0	2.0	8.0	562.50	1.50	2.66	75.0	2.0	8.0	562.50	1.50	2.66	75.0	2.0	8.0	562.50
625.00	116.00	2.50	2.66	75.0	2.5	15.6	786.25	2.00	2.66	75.0	2.5	15.6	786.25	2.00	2.66	75.0	2.5	15.6	786.25
625.00	132.00	3.00	2.66	75.0	3.0	27.0	1038.75	2.50	2.66	75.0	3.0	27.0	1038.75	2.50	2.66	75.0	3.0	27.0	1038.75
626.00	148.00	3.50	2.66	75.0	3.5	42.9	1310.25	3.00	2.66	75.0	3.5	42.9	1310.25	3.00	2.66	75.0	3.5	42.9	1310.25
626.00	165.00	4.00	2.66	75.0	4.0	64.0	1606.25	3.50	2.66	75.0	4.0	64.0	1606.25	3.50	2.66	75.0	4.0	64.0	1606.25
627.00	182.00	4.50	2.66	75.0	4.5	91.1	1928.25	4.00	2.66	75.0	4.5	91.1	1928.25	4.00	2.66	75.0	4.5	91.1	1928.25
627.00	216.81	5.00	2.66	75.0	5.0	125.0	2362.50	4.50	2.66	75.0	5.0	125.0	2362.50	4.50	2.66	75.0	5.0	125.0	2362.50
627.00	250.34	5.50	2.66	75.0	5.5	166.4	2918.75	5.00	2.66	75.0	5.5	166.4	2918.75	5.00	2.66	75.0	5.5	166.4	2918.75
628.00	285.25	6.00	2.66	75.0	6.0	216.0	3506.25	5.50	2.66	75.0	6.0	216.0	3506.25	5.50	2.66	75.0	6.0	216.0	3506.25
629.00	320.00	6.50	2.66	75.0	6.5	274.4	4126.25	6.00	2.66	75.0	6.5	274.4	4126.25	6.00	2.66	75.0	6.5	274.4	4126.25
629.00	355.00	7.00	2.66	75.0	7.0	343.0	4788.75	6.50	2.66	75.0	7.0	343.0	4788.75	6.50	2.66	75.0	7.0	343.0	4788.75
630.00	390.00	7.50	2.66	75.0	7.5	421.9	5493.75	7.00	2.66	75.0	7.5	421.9	5493.75	7.00	2.66	75.0	7.5	421.9	5493.75

No. of Outlet Pipes: 3

D1 = 48" Diameter of Pipe (Inches)
 D2 = 4.00" Diameter of Pipe (Inch)
 D3 = 0.00" Diameter of Pipe (Inches)
 0.00" Diameter of Pipe (Inch)

#1 = 25.13 Crest Sectional Area of Pipe (ft²) #1 = 0.00
 #2 = 0.213 Unventilated Cast Iron Pipe = 0.012 to 0.015
 0.012 to 0.015
 Steel Pipe = 0.012 to 0.015
 Galvanized Steel Pipe = 0.013 to 0.017
 Concrete Pipe = 0.010 to 0.016

R = #P Hydraulic Radius
 S = 0.00 Friction Hydraulic Gradient
 0.00 Length of Pipe
 622.00 Bottom Elev. of Pipe
 626.50 Top Elev. of Pipe

#1 = 0.00 Friction Hydraulic Gradient
 0.00 Length of Pipe
 622.00 Bottom Elev. of Pipe
 626.50 Top Elev. of Pipe

Manning's Equation for Pipe Flow

$$Q = 1.486 \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

- No. of Outlet Pipes:
- Velocity of Pipe (feet/sec):
- Diameter of Pipe (feet):
- Diameter of Pipe (inches):
- Diameter of Pipe (feet):
- Diameter of Pipe (inches):
- Manning's "n":
- Slope:
- Pipe Material:
- Pipe Diameter:

ELEVATION - DISCHARGE CAPACITY OF OUTLET PIPE

ELEV. (FEET)	DISCHARGE (MGD)
620.00	0.00
621.00	1.50
622.00	4.50
623.00	10.50
624.00	20.50
625.00	35.50
626.00	50.50
627.00	65.50
628.00	80.50
629.00	95.50
630.00	110.50

ELEV. (FEET)	DISCHARGE (MGD)
631.00	125.50
632.00	140.50
633.00	155.50
634.00	170.50
635.00	185.50
636.00	200.50
637.00	215.50
638.00	230.50
639.00	245.50
640.00	260.50

ELEV. (FEET)	DISCHARGE (MGD)
641.00	275.50
642.00	290.50
643.00	305.50
644.00	320.50
645.00	335.50
646.00	350.50
647.00	365.50
648.00	380.50
649.00	395.50
650.00	410.50

ELEV. (FEET)	DISCHARGE (MGD)
651.00	425.50
652.00	440.50
653.00	455.50
654.00	470.50
655.00	485.50
656.00	500.50
657.00	515.50
658.00	530.50
659.00	545.50
660.00	560.50

Note: Calculations consider surge conditions on outlet pipe

INCIDENTAL LENGTH INCREASE PER

ELEV. (FEET)	INCREMENTAL LENGTH INCREASE PER
620.00	0.00
621.00	1.50
622.00	4.50
623.00	10.50
624.00	20.50
625.00	35.50
626.00	50.50
627.00	65.50
628.00	80.50
629.00	95.50
630.00	110.50

HYDRAULIC RADIUS OF PIPE

DEPTH (FEET)	HYDRAULIC RADIUS OF PIPE
0.00	0.00
0.05	0.02
0.10	0.04
0.15	0.06
0.20	0.08
0.25	0.10
0.30	0.12
0.35	0.14
0.40	0.16
0.45	0.18
0.50	0.20

From Chow Figure 8.5

DEPTH (FEET)	HYDRAULIC RADIUS OF PIPE
0.55	0.22
0.60	0.24
0.65	0.26
0.70	0.28
0.75	0.30
0.80	0.32
0.85	0.34
0.90	0.36
0.95	0.38
1.00	0.40

ELEV. (FEET)	DISCHARGE (MGD)
651.00	425.50
652.00	440.50
653.00	455.50
654.00	470.50
655.00	485.50
656.00	500.50
657.00	515.50
658.00	530.50
659.00	545.50
660.00	560.50

STORMWATER DETENTION BASIN OUTLET STRUCTURE WITH LOW FLOW PIPE AND STEPPED WIER
OUTLET FLOW CONTROL WIER

Project: City of Propec - Salt Creek BWD South
 Basin: Proposed Salt Creek SWD South

ELEVATION OF WATER (FEET)	DISCHARGE (CFS) (SEE DETENTION BASIN 1)	WEIR FLOW CALCULATION - SECTION 1				WEIR FLOW CALCULATION - SECTION 2				WEIR FLOW CALCULATION - SECTION 3			
		HEIGHT OF WATER SECTION 1 (FT)	L (FT)	H (FT)	H ^{1.5}	HEIGHT OF WATER SECTION 1 (FT)	L (FT)	H (FT)	H ^{1.5}	HEIGHT OF WATER SECTION 1 (FT)	L (FT)	H (FT)	H ^{1.5}
620.00	0.00	0.00	50.0	0.0	0.0	0.00	300.0	0.0	0.0	0.00	300.0	0.0	0.0
620.50	17.28	0.50	50.0	0.5	0.4	0.0	300.0	0.5	0.4	0.0	300.0	0.5	0.4
621.00	46.81	1.00	50.0	1.0	1.0	133.00	300.0	1.0	1.0	262.14	300.0	1.0	1.0
621.50	90.74	1.50	50.0	1.5	1.8	244.34	300.0	1.5	1.8	408.18	300.0	1.5	1.8
622.00	153.00	2.00	50.0	2.0	2.8	376.18	300.0	2.0	2.8	527.72	300.0	2.0	2.8
622.50	229.50	2.50	50.0	2.5	4.0	527.72	300.0	2.5	4.0	718.11	300.0	2.5	4.0
623.00	324.00	3.00	50.0	3.0	6.5	670.81	300.0	3.0	6.5	904.00	300.0	3.0	6.5
623.50	436.50	3.50	50.0	3.5	8.0	829.81	300.0	3.5	8.0	1094.00	300.0	3.5	8.0
624.00	567.00	4.00	50.0	4.0	9.5	1004.00	300.0	4.0	9.5	1299.61	300.0	4.0	9.5
624.50	715.50	4.50	50.0	4.5	11.2	1486.98	300.0	4.5	11.2	1866.98	300.0	4.5	11.2
625.00	882.00	5.00	50.0	5.0	11.2	1486.98	300.0	5.0	11.2	1866.98	300.0	5.0	11.2
625.50	1066.50	5.50	50.0	5.5	11.2	1486.98	300.0	5.5	11.2	1866.98	300.0	5.5	11.2
626.00	1269.00	6.00	50.0	6.0	11.2	1486.98	300.0	6.0	11.2	1866.98	300.0	6.0	11.2
626.50	1489.50	6.50	50.0	6.5	11.2	1486.98	300.0	6.5	11.2	1866.98	300.0	6.5	11.2
627.00	1728.00	7.00	50.0	7.0	11.2	1486.98	300.0	7.0	11.2	1866.98	300.0	7.0	11.2
627.50	2000.00	7.50	50.0	7.5	11.2	1486.98	300.0	7.5	11.2	1866.98	300.0	7.5	11.2
628.00	2306.50	8.00	50.0	8.0	11.2	1486.98	300.0	8.0	11.2	1866.98	300.0	8.0	11.2
628.50	2649.00	8.50	50.0	8.5	11.2	1486.98	300.0	8.5	11.2	1866.98	300.0	8.5	11.2
629.00	3028.50	9.00	50.0	9.0	11.2	1486.98	300.0	9.0	11.2	1866.98	300.0	9.0	11.2
629.50	3445.00	9.50	50.0	9.5	11.2	1486.98	300.0	9.5	11.2	1866.98	300.0	9.5	11.2
630.00	3900.00	10.00	50.0	10.0	11.2	1486.98	300.0	10.0	11.2	1866.98	300.0	10.0	11.2

No. of Outlet Pipes: 3

D₁ = 48 Diameter of Pipe (inches)
 D₂ = 4.00 Diameter of Pipe (feet)
0.00 Diameter of Pipe (inches)
0.00 Diameter of Pipe (feet)

a₁ = 25.13 Cross Sectional Area of Pipe (ft²)
 n = 0.013 Uncoated Cast Iron Pipe = 0.012 to 0.015
 Coated Cast Iron Pipe = 0.011 to 0.013
 Steel Pipe = 0.012 to 0.015
 Galvanized Steel Pipe = 0.013 to 0.017
 Concrete Pipe = 0.010 to 0.016

R = a/P Hydraulic Radius
 S = 0 Slope - Hydraulic Gradient
0.00 Length of Pipe
500.00 Bottom Elev. of Pipe
524.00 Top Elev. of Pipe

OPTIONAL SWDs CONSIDERED

STORMWATER DETENTION BASIN/OUTLET STRUCTURE WITH LOW FLOW PIPE AND STEPPED WEIR
OUTLET FLOW CONTROL WEIR

Project: City of Fryer - Salt Creek SMD South
 Basin: Proposed Salt Creek SMD DA4

ELEVATION OF WATER	WEIR FLOW CALCULATION - SECTION 1				WEIR FLOW CALCULATION - SECTION 2				WEIR FLOW CALCULATION - SECTION 3				FLOW (CFS)
	DISCHARGE (CFS)	HEIGHT OF WATER SECTION 1	L (FT)	H (FT)	FLOW (CFS)	HEIGHT OF WATER SECTION 2	L (FT)	H (FT)	FLOW (CFS)	HEIGHT OF WATER SECTION 3	L (FT)	H (FT)	
626.00	0.00	2.66	25.0	0.0	0.00	0.00	100.0	0.0	0.00	0.00	100.0	0.0	0.00
625.50	21.34	2.66	25.0	0.5	23.51	0.00	100.0	0.0	0.00	0.00	100.0	0.0	0.00
627.00	172.24	2.66	25.0	1.0	66.50	0.00	100.0	0.0	0.00	0.00	100.0	0.0	0.00
627.50	472.24	2.66	25.0	1.5	122.17	0.00	100.0	0.0	0.00	0.00	100.0	0.0	0.00
628.00	818.00	2.66	25.0	2.0	189.08	0.50	100.0	0.5	94.05	0.50	100.0	0.5	94.05
628.50	1170.00	2.66	25.0	2.5	265.54	1.00	100.0	1.0	168.07	1.00	100.0	1.0	168.07
629.00	1532.00	2.66	25.0	3.0	352.54	1.50	100.0	1.5	238.07	1.50	100.0	1.5	238.07
629.50	1901.15	2.66	25.0	3.5	450.54	2.00	100.0	2.0	302.06	2.00	100.0	2.0	302.06
630.00	2272.28	2.66	25.0	4.0	559.44	2.50	100.0	2.5	352.06	2.50	100.0	2.5	352.06
630.50	2645.00	2.66	25.0	4.5	678.54	3.00	100.0	3.0	388.06	3.00	100.0	3.0	388.06
631.00	3019.00	2.66	25.0	5.0	807.54	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
631.50	3394.00	2.66	25.0	5.0	843.46	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
632.00	3770.00	2.66	25.0	5.0	879.06	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
632.50	4147.00	2.66	25.0	5.0	914.26	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
633.00	4524.00	2.66	25.0	5.0	949.06	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
633.50	4901.00	2.66	25.0	5.0	983.46	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
634.00	5278.00	2.66	25.0	5.0	1017.46	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
634.50	5655.00	2.66	25.0	5.0	1051.06	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
635.00	6032.00	2.66	25.0	5.0	1084.26	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
635.50	6409.00	2.66	25.0	5.0	1117.06	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06
636.00	6786.00	2.66	25.0	5.0	1149.46	3.50	100.0	3.5	410.06	3.50	100.0	3.5	410.06

No. of Outlet Pipes: 3

D₁: 36 Diameter of Pipe (Inches)
 D₂: 3.00 Diameter of Pipe (feet)
 D₃: 3.00 Diameter of Pipe (Inches)
 D₄: 0.00 Diameter of Pipe (feet)

a₁: 14.14 Cross Sectional Area of Pipe (FT²) a₂: 0.00

n: 0.013 Uncoated Cast Iron Pipe = 0.012 to 0.015
 Coated Cast Iron Pipe = 0.011 to 0.013
 Steel Pipe = 0.012 to 0.015
 Aluminum Sheet Pile = 0.013 to 0.017
 Concrete Pipe = 0.010 to 0.016

R: Hydraulic Radius

S: 0 Slope - Hydraulic Gradient
0.00 Length of Pipe
0.00 Diameter of Pipe
0.00 Top Elev. of Pipe

Salt Branch

South Regional SMD

STORMWATER DETENTION BASIN OUTLET STRUCTURE WITH LOW FLOW PIPE AND STEPPED WEIR
OUTLET FLOW CONTROL WEIR

Project: City of Poyser - Salt Creek Regional SWD
 Basin: Proposed Salt Creek SWD DAZ

ELEVATION OF WATER (SEE DETENTION BASIN)	LOW FLOW DISCHARGE PIPE				WEIR FLOW CALCULATION - SECTION 1				WEIR FLOW CALCULATION - SECTION 2				WEIR FLOW CALCULATION - SECTION 3				
	DISCHARGE (CFS)	HEIGHT OF WATER SECTION 1	L (FT)	H (FT)	FLOW (CFS)	HEIGHT OF WATER SECTION 1	L (FT)	H (FT)	FLOW (CFS)	HEIGHT OF WATER SECTION 1	L (FT)	H (FT)	FLOW (CFS)	HEIGHT OF WATER SECTION 1	L (FT)	H (FT)	FLOW (CFS)
612.00	0.00	0.00	35.0	0.0	0.00	0.00	35.0	0.0	0.00	0.00	35.0	0.0	0.00	0.00	35.0	0.0	0.00
613.00	12.18	0.00	2.66	0.5	23.51	0.00	2.66	0.5	23.51	0.00	2.66	0.5	23.51	0.00	2.66	0.5	23.51
613.50	42.24	0.00	2.66	1.0	66.50	0.00	2.66	1.0	66.50	0.00	2.66	1.0	66.50	0.00	2.66	1.0	66.50
614.00	90.05	0.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17
614.50	94.95	0.00	2.66	2.0	188.06	0.00	2.66	2.0	188.06	0.00	2.66	2.0	188.06	0.00	2.66	2.0	188.06
615.00	96.00	0.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54
615.50	99.57	0.00	2.66	3.0	349.44	0.00	2.66	3.0	349.44	0.00	2.66	3.0	349.44	0.00	2.66	3.0	349.44
616.00	111.33	0.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44
616.50	121.95	0.00	2.66	4.0	532.08	0.00	2.66	4.0	532.08	0.00	2.66	4.0	532.08	0.00	2.66	4.0	532.08
617.00	140.12	0.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81
617.50	149.36	0.00	2.66	5.0	743.46	0.00	2.66	5.0	743.46	0.00	2.66	5.0	743.46	0.00	2.66	5.0	743.46
618.00	157.44	1.50	2.66	1.0	66.50	0.00	2.66	1.0	66.50	0.00	2.66	1.0	66.50	0.00	2.66	1.0	66.50
618.50	165.13	2.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17	0.00	2.66	1.5	121.17
619.00	172.47	2.50	2.66	2.0	188.06	0.00	2.66	2.0	188.06	0.00	2.66	2.0	188.06	0.00	2.66	2.0	188.06
620.00	179.25	3.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54	0.00	2.66	2.5	262.54
620.50	185.25	3.50	2.66	3.0	349.44	0.00	2.66	3.0	349.44	0.00	2.66	3.0	349.44	0.00	2.66	3.0	349.44
621.00	192.32	4.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44	0.00	2.66	3.5	439.44
621.50	200.00	4.50	2.66	4.0	532.08	0.00	2.66	4.0	532.08	0.00	2.66	4.0	532.08	0.00	2.66	4.0	532.08
622.00	208.00	5.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81	0.00	2.66	4.5	634.81

No. of Outlet Pipes: 2

D₁ = 36 Diameter of Pipe (inches)
 D₂ = 3.00 Diameter of Pipe (feet)
0.00 Diameter of Pipe (feet)

a₁ = 14.14 Cross Sectional Area of Pipe (ft²)

n = 0.013

Uncoated Cast Iron Pipe = 0.012 to 0.015
 Coated Cast Iron Pipe = 0.011 to 0.013
 Steel Pipe = 0.012 to 0.015
 Galvanized Steel Pipe = 0.013 to 0.017
 Concrete Pipe = 0.010 to 0.016

R = 0.00 Hydraulic Radius

S = 0.00 Slope - Hydraulic Gradient
0.00 Length of Pipe
0.00 Top Elev. of Pipe
615.00 Top Elev. of Pipe

HEC RAS OUTPUT DATA

FEMA CURRENT EFFECTIVE MODEL

HEC-RAS Plan: Salt Creek FP River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	1650	PF 2 - 50-Yr	5830.00	595.80	607.75		607.98	0.001361	3.88	1523.28	195.78	0.23
Reach-1	1650	PF 3 - 100-Yr	6910.00	595.80	608.35		608.63	0.001513	4.26	1748.90	652.02	0.24
Reach-1	1650	PF 4 - 500-Yr	10490.00	595.80	609.79		610.08	0.001539	4.72	3199.53	1264.47	0.25
Reach-1	450	PF 1 - 10-Yr	2800.00	593.40	604.11	601.12	604.23	0.001802	3.11	1030.91	305.41	0.24
Reach-1	450	PF 2 - 50-Yr	5830.00	593.40	608.17	602.76	606.34	0.001800	3.76	1825.42	463.99	0.25
Reach-1	450	PF 3 - 100-Yr	6910.00	593.40	606.72	603.14	606.90	0.001788	3.92	2090.86	506.02	0.25
Reach-1	450	PF 4 - 500-Yr	10490.00	593.40	608.23	604.10	608.44	0.001802	4.35	2907.65	586.25	0.26

HEC HMS FLOWS AND LIDAR TOPOGRAPHY MODEL

HEC-RAS Plan: LIDAR HMS River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	3660	PF 4 - 500-Yr	7403.00	605.40	612.47	610.78	612.79	0.005573	6.16	1853.23	834.75	0.44
Reach-1	2300	PF 1 - 10-Yr	2951.40	598.30	608.69		608.74	0.000443	2.14	1882.83	494.95	0.13
Reach-1	2300	PF 2 - 50-Yr	4527.30	598.30	610.15		610.23	0.000518	2.57	2744.82	949.79	0.14
Reach-1	2300	PF 3 - 100-Yr	5281.00	598.30	610.20		610.30	0.000682	2.96	2792.46	956.29	0.17
Reach-1	2300	PF 4 - 500-Yr	7403.00	598.30	610.67		610.82	0.000980	3.66	3257.74	1017.57	0.20
Reach-1	2204	PF 1 - 10-Yr	2951.40	598.30	608.64	602.73	608.70	0.000455	2.16	1860.76	491.37	0.13
Reach-1	2204	PF 2 - 50-Yr	4527.30	598.30	610.10	603.82	610.18	0.000537	2.61	2693.54	942.74	0.15
Reach-1	2204	PF 3 - 100-Yr	5281.00	598.30	610.13	604.25	610.23	0.000716	3.02	2722.60	946.74	0.17
Reach-1	2204	PF 4 - 500-Yr	7403.00	598.30	610.56	605.22	610.71	0.001055	3.77	3145.26	1003.10	0.21
Reach-1	2202	PF 1 - 10-Yr	2951.40	598.00	607.85	603.11	608.51	0.009155	6.53	451.88	47.99	0.38
Reach-1	2202	PF 2 - 50-Yr	4527.30	598.00	609.98	604.79	610.15	0.002905	4.21	1908.48	1133.38	0.22
Reach-1	2202	PF 3 - 100-Yr	5281.00	598.00	609.96	605.52	610.19	0.004057	4.97	1863.88	1124.54	0.26
Reach-1	2202	PF 4 - 500-Yr	7403.00	598.00	610.45	609.62	610.69	0.004434	5.34	2469.57	1268.41	0.27
Reach-1	2187	Bridge										
Reach-1	2172	PF 1 - 10-Yr	2951.40	598.00	607.19	603.11	607.95	0.011474	7.03	420.01	47.92	0.42
Reach-1	2172	PF 2 - 50-Yr	4527.30	598.00	609.95	604.79	610.12	0.003009	4.27	1875.24	1121.42	0.22
Reach-1	2172	PF 3 - 100-Yr	5281.00	598.00	609.93	605.52	610.17	0.004237	5.06	1843.24	1109.77	0.26
Reach-1	2172	PF 4 - 500-Yr	7403.00	598.00	610.40	609.62	610.65	0.004706	5.48	2405.37	1253.90	0.28
Reach-1	2170	PF 1 - 10-Yr	2951.40	598.00	607.16	603.11	607.93	0.011587	7.05	418.68	47.92	0.42
Reach-1	2170	PF 2 - 50-Yr	4527.30	598.00	609.94	604.79	610.12	0.003043	4.30	1864.65	1117.57	0.22
Reach-1	2170	PF 3 - 100-Yr	5281.00	598.00	609.91	605.52	610.16	0.004315	5.11	1826.35	1103.57	0.27
Reach-1	2170	PF 4 - 500-Yr	7403.00	598.00	610.39	609.62	610.64	0.004785	5.52	2387.72	1249.88	0.28
Reach-1	2110	PF 1 - 10-Yr	2951.40	598.00	606.27	603.10	607.25	0.009306	7.93	372.17	45.00	0.49
Reach-1	2110	PF 2 - 50-Yr	4527.30	598.00	607.62	604.79	609.32	0.013999	10.46	433.02	45.00	0.59
Reach-1	2110	PF 3 - 100-Yr	5281.00	598.00	608.79	605.51	609.53	0.018529	7.54	888.85	662.93	0.68
Reach-1	2110	PF 4 - 500-Yr	7403.00	598.00	610.00	609.27	610.30	0.006215	5.25	1885.71	988.83	0.41
Reach-1	1650	PF 1 - 10-Yr	2951.40	595.80	605.89		605.98	0.000734	2.48	1191.44	162.52	0.16
Reach-1	1650	PF 2 - 50-Yr	4527.30	595.80	607.26		607.42	0.000986	3.19	1430.20	186.75	0.19
Reach-1	1650	PF 3 - 100-Yr	5281.00	595.80	607.78		607.97	0.001101	3.50	1530.67	196.48	0.20
Reach-1	1650	PF 4 - 500-Yr	7403.00	595.80	608.00		609.24	0.001252	4.05	2281.21	977.69	0.22
Reach-1	450	PF 1 - 10-Yr	3457.00	593.40	604.65	601.61	604.79	0.001801	3.29	1209.29	347.38	0.24
Reach-1	450	PF 2 - 50-Yr	5300.90	593.40	605.88	602.53	606.04	0.001800	3.67	1692.35	441.42	0.25
Reach-1	450	PF 3 - 100-Yr	6164.00	593.40	606.35	602.87	606.52	0.001802	3.81	1907.47	477.38	0.25
Reach-1	450	PF 4 - 500-Yr	8625.30	593.40	607.52	603.68	607.72	0.001803	4.15	2513.80	541.11	0.25

HEC HMS FLOWS WITH REGIONAL SWDs
AND LIDAR TOPOGRAPHY MODEL

HEC-RAS Plan: LI SWD River: RIVER-1 Reach: Reach-1 (Continued)

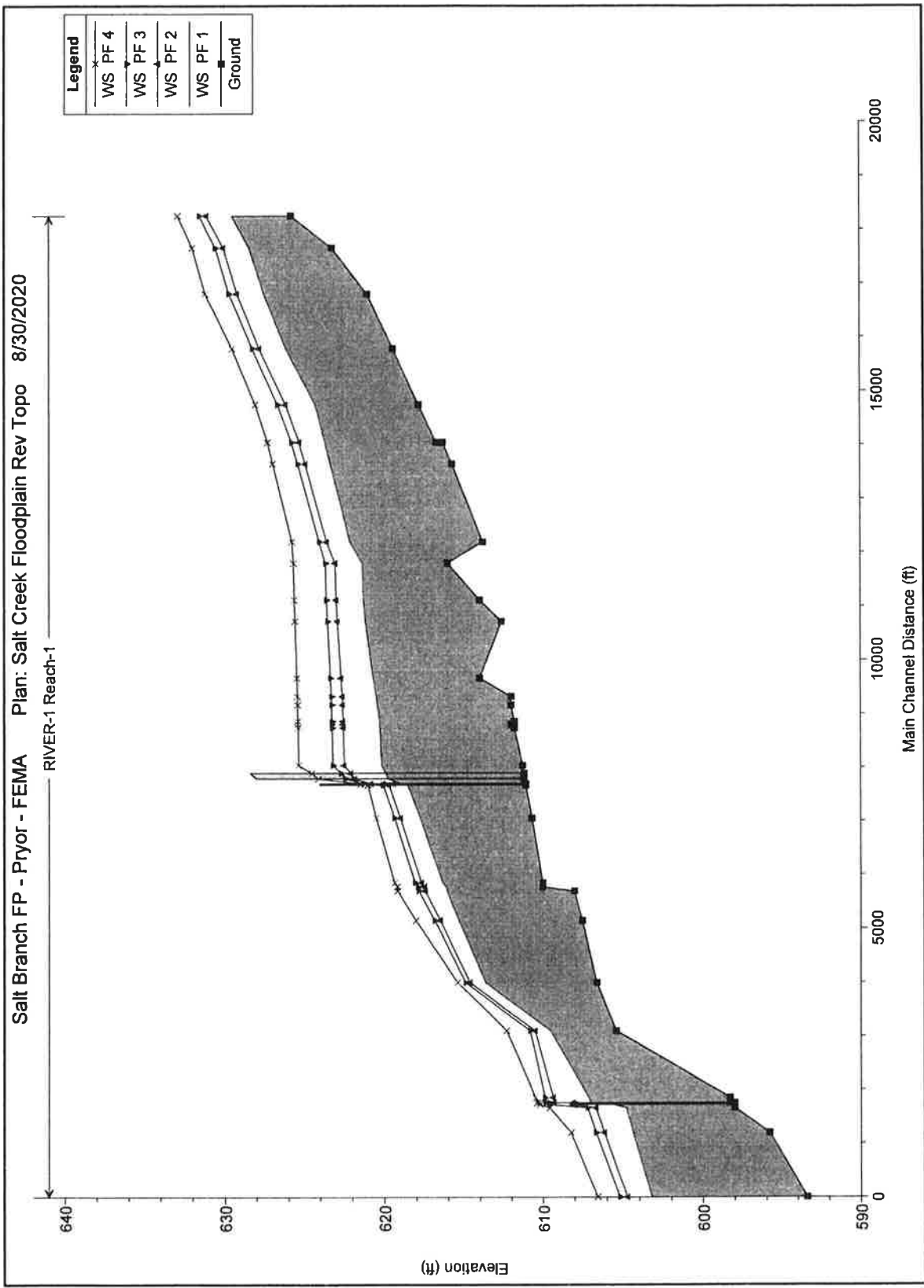
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	3550	PF 4 - 500-Yr	7366.90	605.40	612.46	610.78	612.78	0.005598	6.17	1843.66	833.55	0.44
Reach-1	2300	PF 1 - 10-Yr	2343.50	598.30	607.48		607.54	0.000598	2.24	1342.52	398.15	0.15
Reach-1	2300	PF 2 - 50-Yr	4092.20	598.30	609.71		609.77	0.000471	2.38	2431.23	576.82	0.14
Reach-1	2300	PF 3 - 100-Yr	4986.30	598.30	610.25		610.33	0.000590	2.76	2835.20	962.09	0.15
Reach-1	2300	PF 4 - 500-Yr	7366.90	598.30	610.66		610.80	0.000978	3.66	3245.64	1016.03	0.20
Reach-1	2204	PF 1 - 10-Yr	2343.50	598.30	607.33	602.23	607.45	0.000952	2.78	841.90	386.76	0.19
Reach-1	2204	PF 2 - 50-Yr	4092.20	598.30	609.66	603.55	609.73	0.000484	2.40	2403.79	573.00	0.14
Reach-1	2204	PF 3 - 100-Yr	4986.30	598.30	610.18	604.09	610.27	0.000615	2.81	2775.33	953.95	0.16
Reach-1	2204	PF 4 - 500-Yr	7366.90	598.30	610.55	605.20	610.70	0.001052	3.76	3133.57	1001.59	0.21
Reach-1	2202	PF 1 - 10-Yr	2343.50	598.00	606.80	602.38	607.33	0.008324	5.84	401.40	47.88	0.36
Reach-1	2202	PF 2 - 50-Yr	4092.20	598.00	609.30	604.35	609.64	0.005331	5.47	1230.76	856.89	0.29
Reach-1	2202	PF 3 - 100-Yr	4986.30	598.00	610.07	605.24	610.24	0.003182	4.42	2004.04	1159.10	0.23
Reach-1	2202	PF 4 - 500-Yr	7366.90	598.00	610.44	609.62	610.67	0.004468	5.35	2450.79	1264.18	0.27
Reach-1	2187	Bridge										
Reach-1	2172	PF 1 - 10-Yr	2343.50	598.00	606.22	602.38	606.83	0.010375	6.27	373.94	47.82	0.39
Reach-1	2172	PF 2 - 50-Yr	4092.20	598.00	609.26	604.35	609.62	0.005627	5.61	1191.09	837.88	0.30
Reach-1	2172	PF 3 - 100-Yr	4986.30	598.00	610.03	605.24	610.22	0.003311	4.50	1966.90	1149.93	0.23
Reach-1	2172	PF 4 - 500-Yr	7366.90	598.00	610.39	609.62	610.64	0.004725	5.49	2390.62	1250.55	0.28
Reach-1	2170	PF 1 - 10-Yr	2343.50	598.00	606.20	602.38	606.81	0.010477	6.29	372.76	47.82	0.40
Reach-1	2170	PF 2 - 50-Yr	4092.20	598.00	609.23	604.35	609.61	0.005771	5.67	1172.68	828.91	0.30
Reach-1	2170	PF 3 - 100-Yr	4986.30	598.00	610.02	605.24	610.21	0.003358	4.53	1953.59	1146.63	0.23
Reach-1	2170	PF 4 - 500-Yr	7366.90	598.00	610.37	609.62	610.63	0.004805	5.53	2372.87	1246.49	0.28
Reach-1	2110	PF 1 - 10-Yr	2343.50	598.00	605.47	602.39	606.23	0.007945	6.97	336.26	45.00	0.45
Reach-1	2110	PF 2 - 50-Yr	4092.20	598.00	607.29	604.37	608.78	0.012675	9.79	418.14	45.00	0.57
Reach-1	2110	PF 3 - 100-Yr	4986.30	598.00	608.50	605.25	609.52	0.026360	8.52	707.25	584.31	0.80
Reach-1	2110	PF 4 - 500-Yr	7366.90	598.00	609.98	609.26	610.29	0.006278	5.26	1870.78	984.74	0.42
Reach-1	1650	PF 1 - 10-Yr	2343.50	595.80	605.10		605.17	0.000637	2.20	1065.63	156.62	0.15
Reach-1	1650	PF 2 - 50-Yr	4092.20	595.80	606.91		607.05	0.000922	3.01	1366.55	180.31	0.18
Reach-1	1650	PF 3 - 100-Yr	4986.30	595.80	607.59		607.76	0.001056	3.38	1492.28	192.82	0.20
Reach-1	1650	PF 4 - 500-Yr	7366.90	595.80	608.98		609.22	0.001252	4.05	2263.92	968.84	0.22
Reach-1	450	PF 1 - 10-Yr	2631.30	593.40	603.95	600.94	604.07	0.001801	3.06	983.68	294.67	0.24
Reach-1	450	PF 2 - 50-Yr	4772.20	593.40	605.56	602.34	605.71	0.001802	3.58	1556.37	417.10	0.24
Reach-1	450	PF 3 - 100-Yr	5827.70	593.40	606.17	602.76	606.34	0.001800	3.76	1824.85	463.90	0.25
Reach-1	450	PF 4 - 500-Yr	8579.30	593.40	607.51	603.67	607.70	0.001803	4.14	2503.70	540.08	0.25

HEC RAS COMPARISON
CURRENT EFFECTIVE FEMA MODEL vs. POST- PROJECT MODEL

HEC-RAS River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	450	PF 4 - 500-Yr	Salt Creek FP	10490.00	593.40	608.23	604.10	608.44	0.001802	4.35	2907.65	588.25	0.26
Reach-1	450	PF 4 - 500-Yr	RevDSTopo	8579.30	593.40	607.51	603.67	607.70	0.001803	4.14	2503.70	540.08	0.25

HEC RAS WATER SURFACE PROFILES

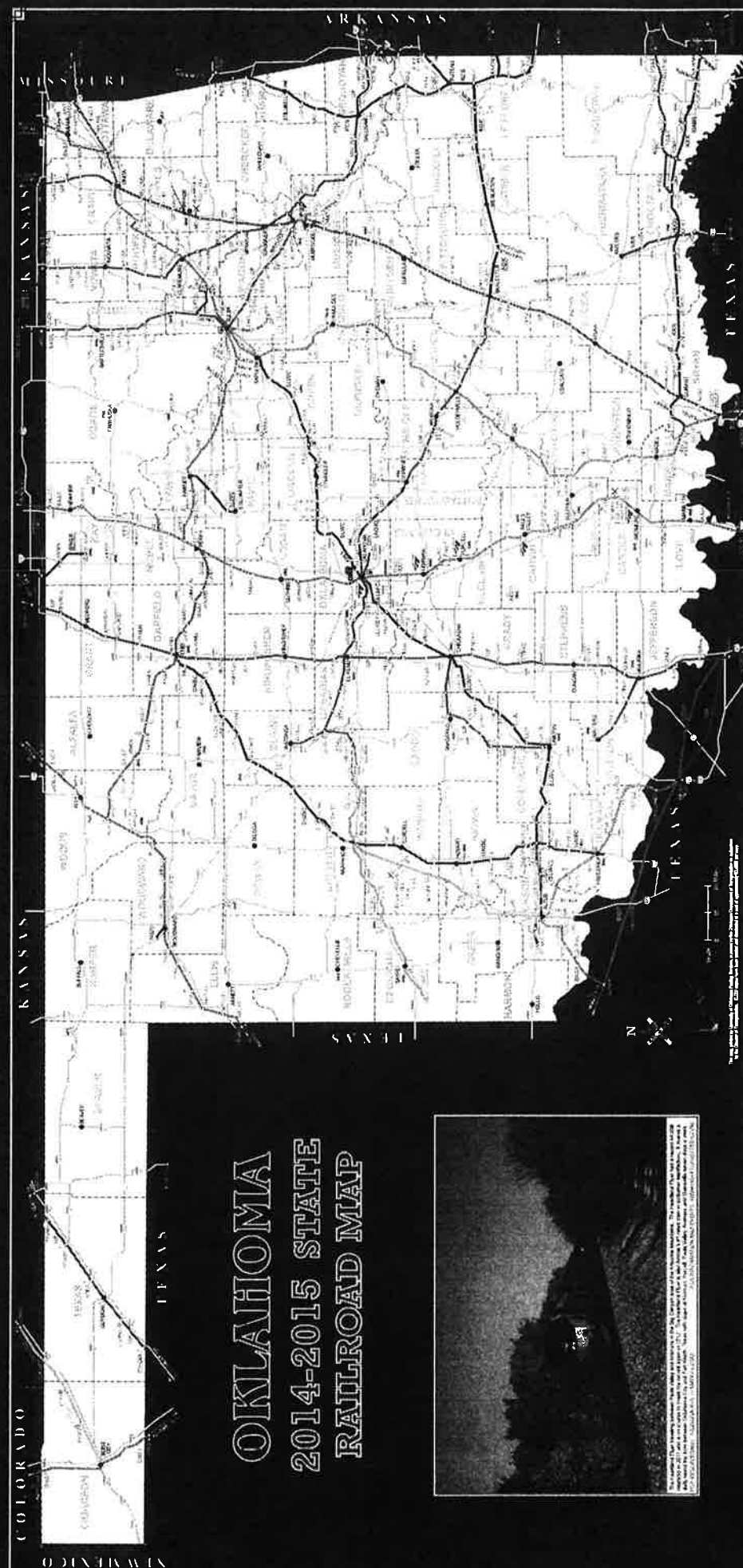


CURRENT EFFECTIVE FEMA PROFILES



REVISED HEC RAS BACKWATER MODEL

RAILROAD MAP



COLORADO
NEW MEXICO
TEXAS
MISSOURI
KANSAS
ARKANSAS

OKLAHOMA 2014-2015 STATE RAILROAD MAP



LEGEND

<p>SYMBOL</p> <p>CLASS I RAILROADS</p> <p>CLASS II RAILROADS</p> <p>CLASS III RAILROADS</p> <p>STATE RAILROADS</p> <p>RAILROADS UNDER CONSTRUCTION</p> <p>COUNTY BOUNDARIES</p> <p>COUNTY SEALS</p> <p>COUNTY SEALS</p>	<p>1075</p> <p>923</p> <p>156</p> <p>031</p> <p>030</p> <p>029</p> <p>028</p> <p>027</p> <p>026</p>	<p>1075</p> <p>923</p> <p>156</p> <p>031</p> <p>030</p> <p>029</p> <p>028</p> <p>027</p> <p>026</p>	<p>STILLWATER CAPITAL RAILROADS</p> <p>OKLAHOMA CENTRAL RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>	<p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p>	<p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p>	<p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p> <p>OKLAHOMA CITY RAILROADS</p>
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Maple Street and 20th Street Bridge

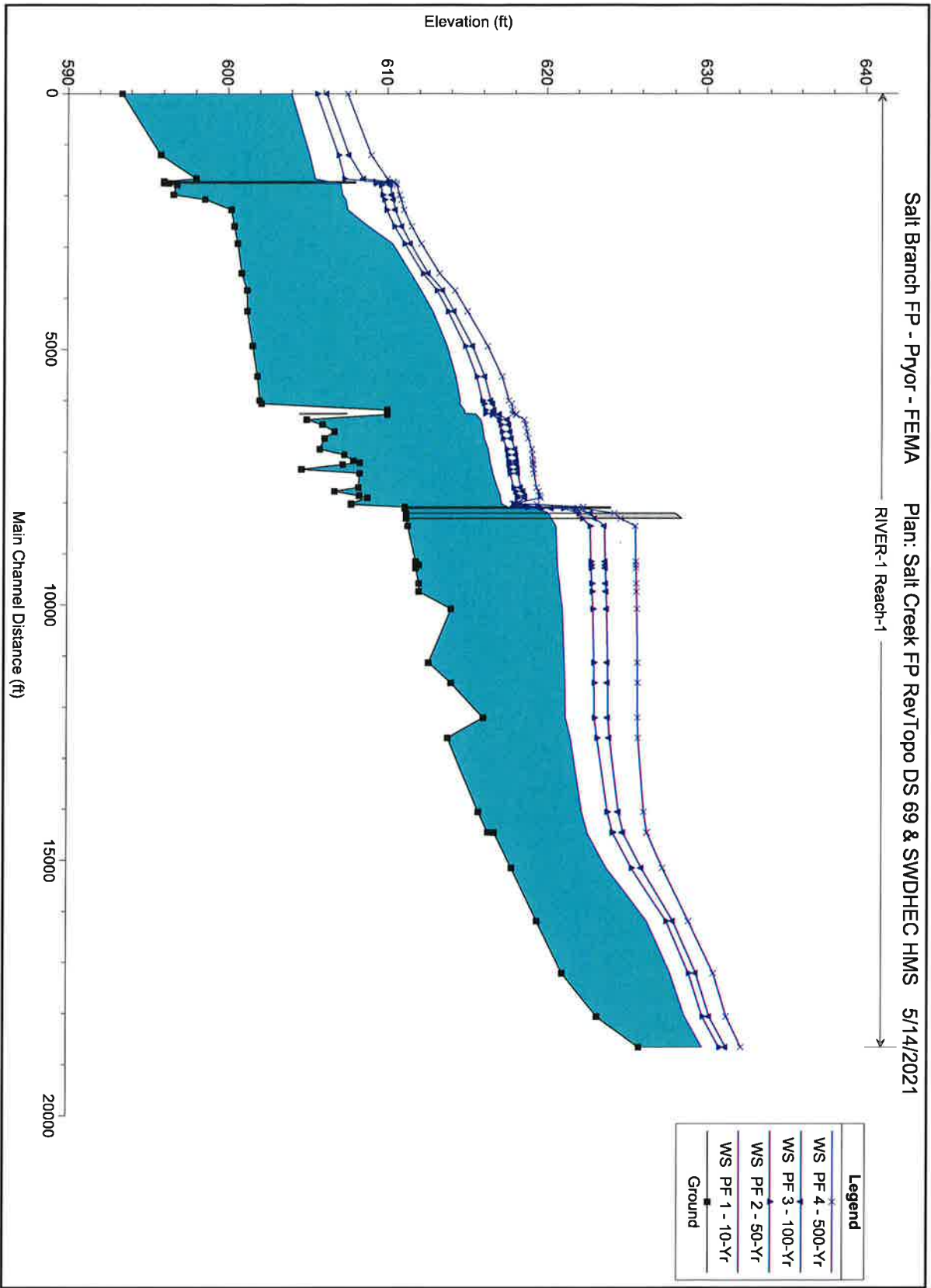
Maple Street and 20th Street Bridge

Maple Street and 20th Street Bridge

Maple Street and 20th Street Bridge

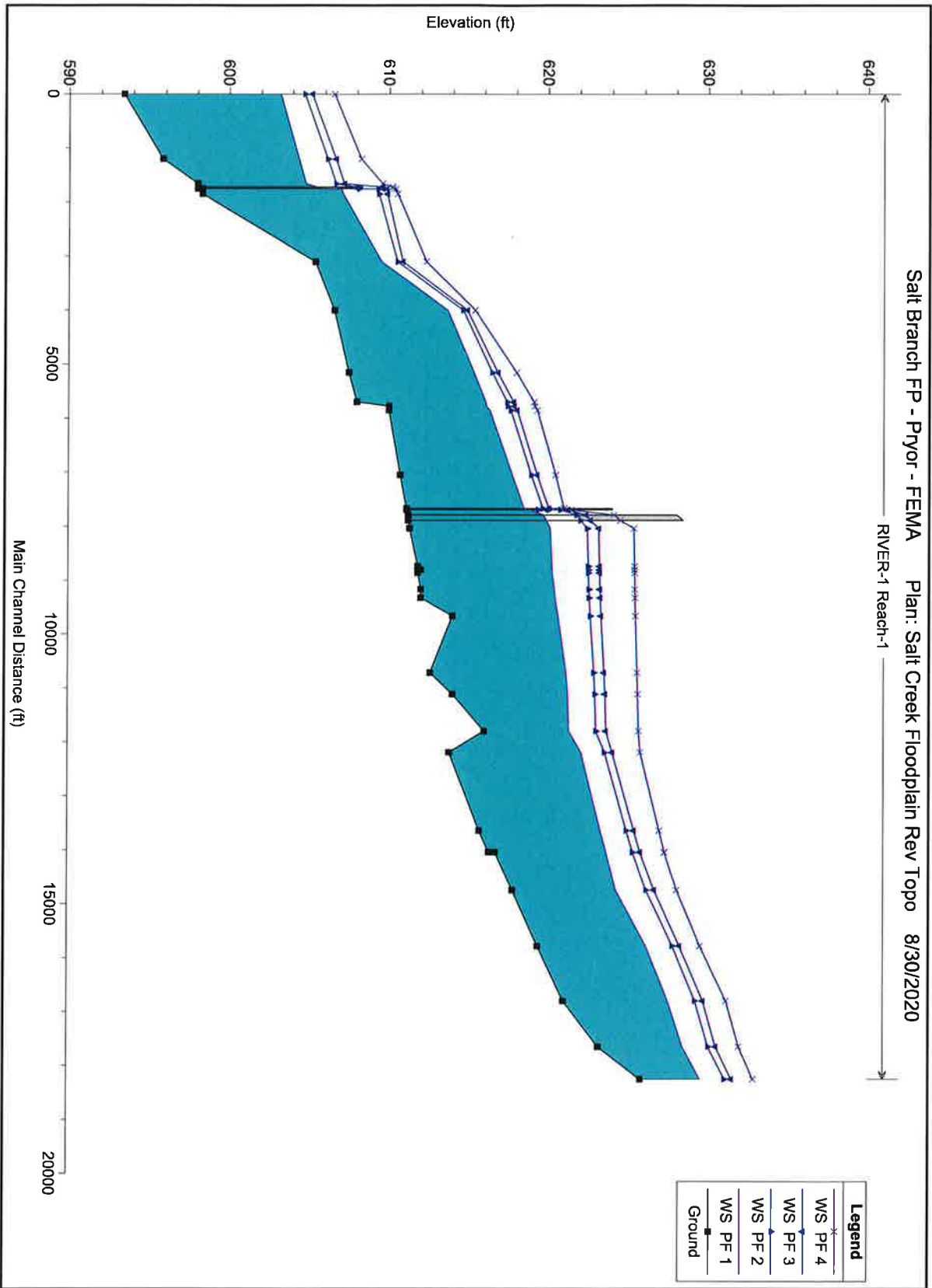
Maple Street and 20th Street Bridge

RIVER-1 Reach-1



Salt Branch FP - Pryor - FEMA Plan: Salt Creek Floodplain Rev Topo 8/30/2020

RIVER-1 Reach-1



HEC-RAS River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Val Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	17870	PF 3 - 100-Yr	RevDSTopo	3601.00	625.80	631.23		631.46	0.002756	4.82	1095.60	429.34	0.36
Reach-1	17870	PF 3 - 100-Yr	LI SWD	3601.00	625.80	631.23		631.46	0.002756	4.82	1095.70	429.37	0.36
Reach-1	17870	PF 4 - 500-Yr	RevDSTopo	5082.90	625.80	632.20		632.42	0.00321	4.93	1573.59	544.39	0.34
Reach-1	17870	PF 4 - 500-Yr	LI SWD	5082.90	625.80	632.20		632.42	0.002320	4.93	1574.09	544.45	0.34
Reach-1	17270	PF 3 - 100-Yr	RevDSTopo	3601.00	623.20	630.21		630.37	0.001302	3.93	1282.54	365.28	0.26
Reach-1	17270	PF 3 - 100-Yr	LI SWD	3601.00	623.20	630.21		630.37	0.001301	3.93	1282.80	365.29	0.26
Reach-1	17270	PF 4 - 500-Yr	RevDSTopo	5082.90	623.20	631.26		631.44	0.001255	4.23	1681.12	391.61	0.26
Reach-1	17270	PF 4 - 500-Yr	LI SWD	5082.90	623.20	631.27		631.44	0.001253	4.23	1681.89	391.66	0.26
Reach-1	16420	PF 3 - 100-Yr	RevDSTopo	3601.00	621.00	629.36		629.50	0.000956	3.46	1444.81	411.68	0.22
Reach-1	16420	PF 3 - 100-Yr	LI SWD	3601.00	621.00	629.36		629.50	0.000957	3.46	1445.41	411.76	0.22
Reach-1	16420	PF 4 - 500-Yr	RevDSTopo	5082.90	621.00	630.46		630.60	0.000923	3.72	1929.16	488.22	0.23
Reach-1	16420	PF 4 - 500-Yr	LI SWD	5082.90	621.00	630.46		630.60	0.000921	3.72	1930.79	488.36	0.23
Reach-1	15400	PF 3 - 100-Yr	RevDSTopo	3601.00	619.40	627.92		628.18	0.001693	4.32	981.77	267.52	0.29
Reach-1	15400	PF 3 - 100-Yr	LI SWD	3601.00	619.40	627.92		628.18	0.001688	4.31	982.88	267.64	0.29
Reach-1	15400	PF 4 - 500-Yr	RevDSTopo	5082.90	619.40	628.89		629.23	0.001940	5.05	1311.93	425.06	0.32
Reach-1	15400	PF 4 - 500-Yr	LI SWD	5082.90	619.40	628.90		629.24	0.001929	5.04	1315.90	426.69	0.32
Reach-1	14360	PF 3 - 100-Yr	RevDSTopo	3601.00	617.80	625.98		626.27	0.002161	4.90	1034.43	387.81	0.33
Reach-1	14360	PF 3 - 100-Yr	LI SWD	3601.00	617.80	626.02		626.30	0.002102	4.85	1048.13	392.04	0.32
Reach-1	14360	PF 4 - 500-Yr	RevDSTopo	5082.90	617.80	627.26		627.49	0.001552	4.65	1640.12	572.40	0.29
Reach-1	14360	PF 4 - 500-Yr	LI SWD	5082.90	617.80	627.33		627.55	0.001478	4.56	1677.89	585.45	0.28
Reach-1	13664	PF 3 - 100-Yr	RevDSTopo	3601.00	616.70	624.81		625.00	0.001484	3.47	1070.45	287.20	0.26
Reach-1	13664	PF 3 - 100-Yr	LI SWD	3601.00	616.70	624.89		625.07	0.001439	3.41	1091.40	297.94	0.26
Reach-1	13664	PF 4 - 500-Yr	RevDSTopo	5082.90	616.70	626.31		626.49	0.001334	3.47	1671.38	525.68	0.25
Reach-1	13664	PF 4 - 500-Yr	LI SWD	5082.90	616.70	626.45		626.62	0.001212	3.36	1746.13	552.54	0.24
Reach-1	13662	PF 3 - 100-Yr	RevDSTopo	3601.00	616.30	624.82		624.99	0.001287	3.32	1117.83	288.44	0.25
Reach-1	13662	PF 3 - 100-Yr	LI SWD	3601.00	616.30	624.89		625.06	0.001250	3.27	1138.74	299.12	0.24
Reach-1	13662	PF 4 - 500-Yr	RevDSTopo	5082.90	616.30	626.32		626.48	0.001205	3.37	1718.72	526.54	0.24
Reach-1	13662	PF 4 - 500-Yr	LI SWD	5082.90	616.30	626.46		626.61	0.001098	3.27	1793.30	553.30	0.23
Reach-1	13661	PF 3 - 100-Yr	RevDSTopo	3601.00	616.30	624.82		624.99	0.001288	3.32	1117.44	288.24	0.25
Reach-1	13661	PF 3 - 100-Yr	LI SWD	3601.00	616.30	624.89		625.06	0.001251	3.27	1138.33	298.91	0.24
Reach-1	13661	PF 4 - 500-Yr	RevDSTopo	5082.90	616.30	626.32		626.48	0.001206	3.37	1718.05	526.29	0.24
Reach-1	13661	PF 4 - 500-Yr	LI SWD	5082.90	616.30	626.45		626.61	0.001099	3.27	1792.66	553.08	0.23
Reach-1	13660	PF 3 - 100-Yr	RevDSTopo	3601.00	616.30	624.82		624.99	0.001288	3.32	1117.05	288.04	0.25
Reach-1	13660	PF 3 - 100-Yr	LI SWD	3601.00	616.30	624.89		625.06	0.001252	3.27	1137.93	298.71	0.24
Reach-1	13660	PF 4 - 500-Yr	RevDSTopo	5082.90	616.30	626.32		626.48	0.001207	3.37	1717.37	526.04	0.24
Reach-1	13660	PF 4 - 500-Yr	LI SWD	5082.90	616.30	626.45		626.61	0.001100	3.27	1792.01	552.85	0.23

HEC-RAS River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
Reach-1	9256.7	PF 3 - 100-Yr	RevDSTopo	4986.30	612.00	623.72		623.73	0.000086	1.13	6108.00	1302.69	0.07
Reach-1	9256.7	PF 3 - 100-Yr	LI SWD	4986.30	612.00	623.87		623.89	0.000078	1.09	6312.10	1314.99	0.07
Reach-1	9256.7	PF 4 - 500-Yr	RevDSTopo	7366.90	612.00	625.62		625.63	0.000066	1.13	8758.75	1427.06	0.06
Reach-1	9256.7	PF 4 - 500-Yr	LI SWD	7366.90	612.00	625.84		625.85	0.000059	1.09	9073.92	1431.39	0.06
Reach-1	9190	PF 3 - 100-Yr	RevDSTopo	4986.30	611.80	623.71		623.72	0.000087	1.12	5644.54	1077.63	0.07
Reach-1	9190	PF 3 - 100-Yr	LI SWD	4986.30	611.80	623.87		623.88	0.000080	1.09	5814.01	1086.51	0.07
Reach-1	9190	PF 4 - 500-Yr	RevDSTopo	7366.90	611.80	625.61		625.62	0.000074	1.19	7758.92	1144.73	0.07
Reach-1	9190	PF 4 - 500-Yr	LI SWD	7366.90	611.80	625.83		625.84	0.000067	1.15	8012.82	1151.69	0.06
Reach-1	8490	PF 3 - 100-Yr	RevDSTopo	4986.30	611.30	623.66		623.67	0.000102	1.26	7113.90	1471.33	0.07
Reach-1	8490	PF 3 - 100-Yr	LI SWD	4986.30	611.30	623.82		623.83	0.000093	1.22	7352.56	1494.26	0.06
Reach-1	8490	PF 4 - 500-Yr	RevDSTopo	7366.90	611.30	625.57		625.58	0.000088	1.30	10159.41	1718.29	0.06
Reach-1	8490	PF 4 - 500-Yr	LI SWD	7366.90	611.30	625.79		625.80	0.000080	1.25	10549.61	1746.82	0.06
Reach-1	8343	PF 3 - 100-Yr	RevDSTopo	4986.30	611.20	623.06	617.28	623.50	0.002801	5.31	939.64	102.00	0.31
Reach-1	8343	PF 3 - 100-Yr	LI SWD	4986.30	611.20	623.25	617.28	623.67	0.002445	5.20	956.53	102.00	0.30
Reach-1	8343	PF 4 - 500-Yr	RevDSTopo	7366.90	611.20	624.64	618.86	625.33	0.003487	6.70	1100.06	102.00	0.36
Reach-1	8343	PF 4 - 500-Yr	LI SWD	7366.90	611.20	624.91	618.86	625.57	0.003231	6.53	1127.75	102.00	0.35
Reach-1	8291		Bridge										
Reach-1	8239	PF 3 - 100-Yr	RevDSTopo	4986.30	611.20	622.79	617.28	623.26	0.001982	5.47	912.06	102.00	0.32
Reach-1	8239	PF 3 - 100-Yr	LI SWD	4986.30	611.20	622.94	617.28	623.39	0.002709	5.38	927.51	102.00	0.31
Reach-1	8239	PF 4 - 500-Yr	RevDSTopo	7366.90	611.20	624.25	618.86	625.00	0.002711	6.95	1060.52	102.00	0.38
Reach-1	8239	PF 4 - 500-Yr	LI SWD	7366.90	611.20	624.48	618.86	625.20	0.003647	6.79	1084.18	102.00	0.37
Reach-1	8143	PF 3 - 100-Yr	RevDSTopo	4986.30	611.10	621.72	619.86	622.76	0.007007	8.19	608.75	1321.83	0.58
Reach-1	8143	PF 3 - 100-Yr	LI SWD	4986.30	611.10	621.73	619.86	622.77	0.010038	8.18	609.69	1322.62	0.58
Reach-1	8143	PF 4 - 500-Yr	RevDSTopo	7366.90	611.10	622.25	621.16	622.52	0.011566	11.13	661.98	1366.35	0.76
Reach-1	8143	PF 4 - 500-Yr	LI SWD	7366.90	611.10	621.50	621.16	622.13	0.024892	12.55	586.81	1303.48	0.91
Reach-1	8131.5		Bridge										
Reach-1	8120	PF 3 - 100-Yr	RevDSTopo	4986.30	611.10	619.46	616.25	620.16	0.003541	6.70	744.15	785.38	0.43
Reach-1	8120	PF 3 - 100-Yr	LI SWD	4986.30	611.10	620.15	616.25	620.24	0.000932	3.04	2851.86	912.81	0.19
Reach-1	8120	PF 4 - 500-Yr	RevDSTopo	7366.90	611.10	622.32	617.55	622.38	0.000429	2.89	5247.88	1287.37	0.16
Reach-1	8120	PF 4 - 500-Yr	LI SWD	7366.90	611.10	621.18	617.55	621.28	0.001006	3.42	3883.48	1097.54	0.20
Reach-1	8070.5	PF 3 - 100-Yr	RevDSTopo	4986.30	607.76	618.31		619.70	0.008320	9.45	527.80	74.27	0.62
Reach-1	8070.5	PF 4 - 500-Yr	RevDSTopo	7366.90	607.76	619.39		621.66	0.011823	12.10	608.99	76.27	0.75
Reach-1	8046	PF 3 - 100-Yr	RevDSTopo	4986.30	607.76	618.07		619.55	0.009242	9.78	509.74	73.82	0.66
Reach-1	8046	PF 4 - 500-Yr	RevDSTopo	7366.90	607.76	617.88		621.30	0.021904	14.85	496.04	73.48	1.01

HEC-RAS River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Chl W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Val Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	6396.7	PF 3 - 100-Yr	RevDSTopo	4986.30	604.94	617.52		617.61	0.001019	3.28	2284.06	710.62	0.18
Reach-1	6396.7	PF 4 - 500-Yr	RevDSTopo	7366.90	604.94	618.59		618.69	0.001001	3.48	3105.57	815.39	0.19
Reach-1	6300	PF 3 - 100-Yr	RevDSTopo	4986.30	610.00	617.02	614.38	617.40	0.004146	5.23	1141.55	429.97	0.38
Reach-1	6300	PF 3 - 100-Yr	LI SWD	4986.30	610.00	618.41		618.56	0.001412	3.49	1864.32	597.84	0.23
Reach-1	6300	PF 4 - 500-Yr	RevDSTopo	7366.90	610.00	618.08	615.80	618.49	0.003951	5.69	1676.14	575.44	0.38
Reach-1	6300	PF 4 - 500-Yr	LI SWD	7366.90	610.00	619.54		619.70	0.001360	3.77	2578.49	673.66	0.23
Reach-1	6262.5												
				Inl Struct									
Reach-1	6225	PF 3 - 100-Yr	RevDSTopo	4986.30	610.00	616.68		617.31	0.010699	8.40	865.01	371.62	0.60
Reach-1	6225	PF 3 - 100-Yr	LI SWD	4986.30	610.00	618.24		618.42	0.002338	4.58	1587.28	547.72	0.29
Reach-1	6225	PF 4 - 500-Yr	RevDSTopo	7366.90	610.00	617.86		618.40	0.007259	7.79	1385.69	512.90	0.51
Reach-1	6225	PF 4 - 500-Yr	LI SWD	7366.90	610.00	619.38		619.57	0.001981	4.63	2261.54	633.35	0.28
Reach-1	6212.6	PF 3 - 100-Yr	RevDSTopo	4986.30	602.13	616.61		616.78	0.001519	4.33	1860.28	629.68	0.24
Reach-1	6212.6	PF 4 - 500-Yr	RevDSTopo	7366.90	602.13	617.80		617.96	0.001356	4.40	2679.31	745.85	0.23
Reach-1	6150	PF 3 - 100-Yr	RevDSTopo	4986.30	602.00	616.47		616.69	0.001242	4.03	1640.20	499.51	0.22
Reach-1	6150	PF 3 - 100-Yr	LI SWD	4986.30	608.00	618.20		618.30	0.000854	3.06	2259.09	614.14	0.18
Reach-1	6150	PF 4 - 500-Yr	RevDSTopo	7366.90	602.00	617.62		617.87	0.001395	4.57	2258.09	578.78	0.23
Reach-1	6150	PF 4 - 500-Yr	LI SWD	7366.90	608.00	619.34		619.45	0.000872	3.36	2968.88	666.38	0.19
Reach-1	5676.3	PF 3 - 100-Yr	RevDSTopo	4986.30	601.86	616.08		616.20	0.000878	3.50	2098.09	529.65	0.19
Reach-1	5676.3	PF 4 - 500-Yr	RevDSTopo	7366.90	601.86	617.19		617.33	0.000985	3.96	2715.92	589.49	0.20
Reach-1	5600	PF 3 - 100-Yr	LI SWD	4986.30	607.50	617.17		617.46	0.002421	5.12	1335.97	370.82	0.30
Reach-1	5600	PF 4 - 500-Yr	LI SWD	7366.90	607.50	618.19		618.54	0.002729	5.85	1736.40	417.19	0.33
Reach-1	5084	PF 3 - 100-Yr	RevDSTopo	4986.30	601.56	615.31		615.50	0.001590	4.33	1600.00	414.66	0.25
Reach-1	5084	PF 4 - 500-Yr	RevDSTopo	7366.90	601.56	616.27		616.53	0.001898	5.04	2019.77	455.83	0.27
Reach-1	4450	PF 3 - 100-Yr	LI SWD	4986.30	606.60	614.98	613.37	615.14	0.002030	4.03	1800.56	678.82	0.27
Reach-1	4450	PF 4 - 500-Yr	LI SWD	7366.90	606.60	615.51		615.74	0.002671	4.85	2170.10	715.91	0.31
Reach-1	4405	PF 3 - 100-Yr	RevDSTopo	4986.30	601.22	614.18		614.37	0.002010	4.38	1657.53	547.45	0.27
Reach-1	4405	PF 4 - 500-Yr	RevDSTopo	7366.90	601.22	615.00		615.23	0.002205	4.90	2116.36	588.05	0.29
Reach-1	3996.2	PF 3 - 100-Yr	RevDSTopo	4986.30	601.20	613.44		613.57	0.002374	4.13	1773.88	600.35	0.25
Reach-1	3996.2	PF 4 - 500-Yr	RevDSTopo	7366.90	601.20	614.23		614.39	0.002482	4.48	2327.86	745.26	0.26
Reach-1	3659.3	PF 3 - 100-Yr	RevDSTopo	4986.30	600.85	612.55		612.78	0.002274	4.81	1641.46	695.65	0.29
Reach-1	3659.3	PF 4 - 500-Yr	RevDSTopo	7366.90	600.85	613.23		613.51	0.002671	5.49	2147.02	780.97	0.32
Reach-1	3550	PF 3 - 100-Yr	LI SWD	4986.30	605.40	611.55	610.97	612.03	0.009437	7.20	1128.04	737.92	0.55

HEC-RAS River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Val Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	2110	PF 3 - 100-Yr	RevDSTopo	4986.30	598.00	608.50	605.25	609.52	0.026360	8.52	707.25	584.31	0.80
Reach-1	2110	PF 3 - 100-Yr	LI SWD	4986.30	598.00	608.50	605.25	609.52	0.026360	8.52	707.25	584.31	0.80
Reach-1	2110	PF 4 - 500-Yr	RevDSTopo	7366.90	598.00	609.98	609.26	610.29	0.006278	5.26	1870.78	984.74	0.42
Reach-1	2110	PF 4 - 500-Yr	LI SWD	7366.90	598.00	609.98	609.26	610.29	0.006278	5.26	1870.78	984.74	0.42
Reach-1	1650	PF 3 - 100-Yr	RevDSTopo	4986.30	595.80	607.59	602.76	607.76	0.001056	3.38	1492.28	192.82	0.20
Reach-1	1650	PF 3 - 100-Yr	LI SWD	4986.30	595.80	607.59	602.76	607.76	0.001056	3.38	1492.28	192.82	0.20
Reach-1	1650	PF 4 - 500-Yr	RevDSTopo	7366.90	595.80	608.98	609.22	609.22	0.001252	4.05	2263.92	968.84	0.22
Reach-1	1650	PF 4 - 500-Yr	LI SWD	7366.90	595.80	608.98	609.22	609.22	0.001252	4.05	2263.92	968.84	0.22
Reach-1	450	PF 3 - 100-Yr	RevDSTopo	5827.70	593.40	606.17	602.76	606.34	0.001800	3.76	1824.85	463.90	0.25
Reach-1	450	PF 3 - 100-Yr	LI SWD	5827.70	593.40	606.17	602.76	606.34	0.001800	3.76	1824.85	463.90	0.25
Reach-1	450	PF 4 - 500-Yr	RevDSTopo	8579.30	593.40	607.51	603.67	607.70	0.001803	4.14	2503.70	540.08	0.25
Reach-1	450	PF 4 - 500-Yr	LI SWD	8579.30	593.40	607.51	603.67	607.70	0.001803	4.14	2503.70	540.08	0.25

HEC-RAS Plan: RevDSTopo River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	450	PF 2 - 50-Yr	4772.20	593.40	605.56	602.34	605.71	0.001802	3.58	1556.37	417.10	0.24
Reach-1	450	PF 3 - 100-Yr	5827.70	593.40	606.17	602.76	606.34	0.001800	3.76	1824.85	463.90	0.25
Reach-1	450	PF 4 - 500-Yr	8579.30	593.40	607.51	603.67	607.70	0.001803	4.14	2503.70	540.08	0.25

**MINUTES
CITY COUNCIL MEETING
FOLLOWED BY PRYOR PUBLIC WORKS AUTHORITY MEETING
CITY OF PRYOR CREEK, OKLAHOMA
TUESDAY, MAY 18TH, 2021 AT 6:00 P.M.**

The City Council of the City of Pryor Creek, Oklahoma met in regular session on the above date and time in the Council Chamber upstairs at City Hall, 12 North Rowe Street in Pryor Creek, Oklahoma. This meeting was followed immediately by a meeting of the Pryor Public Works Authority. Notice of these meetings was posted on the East bulletin board located outside to the South of the entrance doors and the City website at www.pryorcreek.org. Notice was also e-mailed to The Paper newspaper and e-mailed to the Council members.

1. CALL TO ORDER, PRAYER, PLEDGE OF ALLEGIANCE, ROLL CALL.

Mayor Lees called the meeting to order at 6:00 p.m. The Prayer and Pledge of Allegiance were led by Rev. Dan Hazelton. Roll Call was conducted by Deputy Clerk Darla Coats. Council members present included: Jon Ketcher, Choya Shropshire, Dennis Nance, Steve Smith, Randy Chitwood, Briana Brakefield, Jimmy Tramel and Yolanda Thompson. Members absent: none.

Department Heads and other City Officials present: City Attorney Kim Ritchie, Police Chief Dennis Nichols, Assistant Police Chief James Willyard, Fire Chief BK Young, Park Superintendent Frank Powell, Golf Director Dennis Bowman, Library Director Cari Rerat, Building Inspector Kenneth Young, Recreation Center Director Jessica Long, Assistant Recreation Center Director Jerome Hopkins.

Others present: Police Captain Kevin Tramel, Police Officer Dustin VanHorn, City Engineer Steve Powell, Dalton Powell, Library Board Chairman Jeanette Anderson, Dan Hazelton, John Mozingo, Rickey Hayes, Jim Bloom, Kimmie Shropshire and Terry Aylward.

2. PETITIONS FROM THE AUDIENCE. (LIMITED TO 5 MINUTES, MUST REQUEST IN ADVANCE.)

John Mozingo spoke regarding his damaged fence and whistle.

3. DEPARTMENT HEAD REPORTS IF NEEDED:

a. Building Inspector

Young had no report.

b. Emergency Management

No report.

c. Fire

Young had no report.

d. Golf

Bowman reported that the new equipment has arrived. He provided an updated membership report to the Council members. He reported that the membership promotion went well. He also reported that all the tournaments that were recently held went well and there are more coming soon. The plans for the Halloween Festival are also going well. There has been some minimal Bermuda grass loss, but it is manageable and the course is in good shape.

e. Library

Rerat handed out a statistics report for April. She reported that they sold a low number of library cards, and they had 193 physical visitors and 2,250 digital visitors. They have in-person, online and grab-and-go programs, and the Summer Reading Program begins next week.

f. Parks / Cemetery

Powell reported that they are getting the parks ready for summer and the cemeteries ready for Memorial Day. He reported that the Splash Pad is now open for the season. The State inspector did a walk-through of the Whitaker Park pool today and his findings will go to the Park Board next week. He reported that the Whitaker Park restrooms should be finished within the next three weeks and the plans to install the equipment at Bobby Buck are still on for the week after Memorial Day.

g. Police

Nichols included his statistics report in the Council packet. Councilman Tramel asked him about the juveniles who have been harassing people in the park. Nichols stated those issues are being addressed.

h. Recreation Center

Long reported that their new sign is up and she is still learning how to work it. She reported that plans for summer programs are finalized and will start on June 7th. They plan to increase the water aerobics classes due to large groups. They have added new senior classes and new senior challenges. She reported that they will increase family swim hours to seven days a week after Memorial Day. When asked about the Fitness Court, she stated that she has been in contact with possible donors and is awaiting their responses. She also reported that the new awning is still in the design phase. There has been some fishing taking place, as well.

i. Street

No report.

4. MAYOR'S REPORT:

a. Possible Executive Session pursuant to the Oklahoma Open Meeting Act for the purpose of conferring on matters pertaining to economic development, including the transfer of property, financing, or the creation of a proposal to entice a business to remain or to locate within the jurisdiction of the City of Pryor Creek where the public disclosure of the matter discussed would interfere with the development of products or services or would violate the confidentiality of the business. (25 O.S. § 307 (C) (11).

Motion was made by Thompson, second by Chitwood to enter Executive Session at 6:35 p.m. Voting yes: Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield, Thompson. Voting no: Tramel.

b. Discussion and possible action regarding resuming regular session. No action taken during Executive Session.

Motion was made by Chitwood, second by Nance to resume regular session at 8:08 p.m. No action taken during Executive Session. Voting yes: Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel, Thompson, Ketcher. Voting no: none.

c. Discussion and possible action regarding renewal with or without change in contract language (automatic renewal) or termination of the agreement between City of Pryor Creek, Oklahoma and Retail Attractions, LLC (consultant) as provided in Part II, Term of Agreement and Part VII, Miscellaneous Provision Paragraph 1, Termination, Modification, and Suspension.

Motion was made by Chitwood, second by Smith to approve renewal without change in contract language (automatic renewal) of the agreement between City of Pryor Creek, Oklahoma and Retail Attractions, LLC (consultant) as provided in Part II, Term of Agreement and Part VII, Miscellaneous Provision Paragraph 1, Termination, Modification, and Suspension. Voting yes: Nance, Smith, Chitwood, Brakefield, Thompson, Ketcher, Shropshire. Voting no: Tramel.

d. Discussion and possible action regarding removing from the table Item d. from Mayor's Report on May 4th, 2021.

Motion was made by Ketcher, second by Nance to approve removing from the table Item d. from Mayor's Report on May 4th, 2021. Voting yes: Smith, Chitwood, Brakefield, Tramel, Thompson, Ketcher, Shropshire, Nance. Voting no: none.

e. Discussion and possible action regarding spending the remainder of the CARES Act Relief funds towards remedy of the Salt Branch Creek seasonal flooding.

Motion was made by Shropshire, second by Smith to approve spending the remainder of the CARES Act Relief funds towards remedy of the Salt Branch Creek seasonal flooding.

After some discussion, Shropshire and Smith amended their motion and second to table spending the remainder of the CARES Act Relief funds towards remedy of the Salt Branch Creek seasonal flooding.

Voting yes: Chitwood, Brakefield, Tramel, Thompson, Shropshire, Smith. Voting no: Ketcher and Nance.

f. A few updates.

- 1. Whitaker Park Pool**
- 2. Castle Theater (PYO)**
- 3. Local cleanup of rights-of-way and drainage improvements**
- 4. Budget progress – 2021-2022 FY**

No action. Mayor briefly spoke to each item.

Mayor moved to the Addendum.

**ADDENDUM
CITY COUNCIL MEETING
TUESDAY, MAY 18TH, 2021 AT 6:00 P.M.**

1. Discussion and possible action regarding removing the Cares Act Funding, which has been awarded to City of Pryor Creek by the State of Oklahoma, from the General Revenue and Expenditure Accounts, 02-000-4401, 02-000-4405, and 02-201-5401 respectively, and creating a separate fund for receiving, expending, and accounting of the Cares Act Funding.

Motion was made by Chitwood, second by Thompson to approve removing the Cares Act Funding, which has been awarded to City of Pryor Creek by the State of Oklahoma, from the General Revenue and Expenditure Accounts, 02-000-4401, 02-000-4405, and 02-201-5401 respectively, and creating a separate fund for receiving, expending, and accounting of the Cares Act Funding. Voting yes: Brakefield, Tramel, Thompson, Ketcher, Shropshire, Nance, Smith, Chitwood. Voting no: none.

Mayor moved back to regular Agenda.

5. CITY ATTORNEY’S REPORT:

No report.

6. DISCUSSION AND POSSIBLE ACTION ON CONSENT AGENDA.

(Items deemed non-controversial and routine in nature to be approved by one motion without discussion. Any Council member wishing to discuss an item may request it be removed and placed on the regular agenda.)

- a. Approve minutes of the May 4th, 2021 Council meeting.
- b. Approve payroll purchase orders through May 28th, 2021.
- c. Approve claims for purchase orders through May 18th, 2021.

<u>FUNDS</u>	<u>PURCHASE ORDER NUMBER</u>	<u>TOTALS</u>
GENERAL	2020202753 – 2020202851	192,212.33
STREET & DRAINAGE	2020202751 – 911226B	5,277.96
GOLF COURSE	2020202871 - 2020201989	44,685.16
CAPITAL OUTLAY	2020202812 - 2020202305	8,804.15
RECREATION CENTER	2020202825 - 2020202836	48,144.29
DONATIONS AND EARMARKED	2020202794 - 2020202757	881.99
	TOTAL	300,005.88
NO BLANKETS		

- d. Acknowledge receipt of deficient purchase orders.
There were no deficient purchase orders.
- e. Approve March 2021 Appropriation Requests.
- f. Discussion and possible action regarding expenditure in the amount of \$3,000.00 to OverDrive for the Thomas J Harrison Pryor Public Library from Library Non-Book Materials Account #02-221-5032.
- g. Discussion and possible action regarding accepting bid for hot water pressure washer from Northern Tool and Equipment in the amount of \$3,799.99 as lowest and best bid for the Pryor Creek Park Department from Covid Reimbursement Account #02-201-5401. Other bids received: Best Buy Automotive Equipment: \$3,860.00; Pressure Washers Direct: \$3,899.99; C&A Sales: \$5,069.50.
- h. Discussion and possible action regarding accepting bid for ice machine from Air Heat Systems, LLC in the amount of \$3,700.00 as lowest and best bid for the Pryor Creek Fire Department from Fire Repair and Maintenance Account #02-217-5091. Other bids received: Masters Heating Cooling & Appliances: \$4,200.00; Melton’s A/C & Appliance: \$4,027.98.
- i. Discussion and possible action regarding an expenditure in the amount of \$10,080.00 to UpCurve Cloud for the GSuite Basic Annual License subscription from May 12th, 2021 – May 11th, 2022, from General Software Account #02-201-5260.
- j. Discussion and possible action regarding accepting bid from Carman Concrete, LLC in the amount of \$27,646.52 for extended parking on North end of existing fire building to accommodate firefighters and assist in Medivac transport, from Covid Reimbursement Account #02-201-5401. Other bids received: Matlock Construction: \$28,700.00.
- k. Discussion and possible action regarding removing from the table Item 6.i. on May 4th, 2021.
- l. Discussion and possible action regarding Change Order No. 1, for Drainage Project at 3rd and Eastmanor.
- m. Discussion and possible action regarding acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Police Department Miscellaneous Account #96-000-4502.
- n. Discussion and possible action regarding acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Fire Department Cherokee Nation Contribution Account #96-000-4535.

- o. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Wilma Ruth Wells, 604 Belmont, Pryor Creek, Oklahoma (Property ID: 1010-00-004-031-0-001-00) Base ID: 16714, Legal Description: BELMONT ADDITION, BLK 4 LOT 31 in an amount not to exceed \$3,700.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.
- p. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Antolino Villegas, 203 N. Adair, Pryor Creek, Oklahoma (Property ID: 1001-00-004-011-0-001-00) Base ID: 15975, Legal Description: PRYOR ORIG BLK 4 N 50' LOT 11 in an amount not to exceed \$8,500.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.
- q. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Mitchell S. Smith, 302 S. Whitaker, Pryor Creek, Oklahoma (Property ID: 1300-00-006-001-0-001-00) Base ID: 18100, Legal Description: LANDRUM ADDITION BLK 6 N 65' LOT 1, in an amount not to exceed \$1,200.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.

Motion was made by Ketcher, second by Smith to approve items a – q, less items j, k, l, m n, o, p and q.

Voting yes: Tramel, Thompson, Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield. Voting no: none.

j. Discussion and possible action regarding accepting bid from Carman Concrete, LLC in the amount of \$27,646.52 for extended parking on North end of existing fire building to accommodate firefighters and assist in Medivac transport, from Covid Reimbursement Account #02-201-5401. Other bids received: Matlock Construction: \$28,700.00.

Motion was made by Thompson, second by Chitwood to approve accepting bid from Carman Concrete, LLC in the amount of \$27,646.52, and amend item by the addition of a third bid from Rick Ogden Construction, for extended parking on North end of existing fire building to accommodate firefighters and assist in Medivac transport, from Covid Reimbursement Account #02-201-5401. Other bids received: Matlock Construction: \$28,700.00; Rick Ogden Construction: \$29,642.00. Voting yes: Thompson, Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel. Voting no: none.

k. Discussion and possible action regarding removing from the table Item 6.i. on May 4th, 2021.

Motion was made by Chitwood, second by Smith to approve removing from the table Item 6.i. on May 4th, 2021. Voting yes: Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel, Thompson. Voting no: none.

l. Discussion and possible action regarding Change Order No. 1, for Drainage Project at 3rd and Eastmanor.

Motion was made by Tramel, second by Chitwood to approve Change Order No. 1, for Drainage Project at 3rd and Eastmanor and include amount of \$308,401.75. Mayor commended the City Engineer for his diligence and hard work on all the projects he oversees for the City. Voting yes: Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel, Thompson, Ketcher. Voting no: none.

m. Discussion and possible action regarding acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Police Department Miscellaneous Account #96-000-4502.

Motion was made by Chitwood, second by Smith to approve acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Police Department Miscellaneous Account #96-000-4502. Chitwood thanked the Cherokee Nation for their partnership with the City of Pryor Creek. Voting yes: Nance, Smith, Chitwood, Brakefield, Tramel, Thompson, Shropshire. Abstaining, counting as a no vote: Ketcher. Voting no: none.

n. Discussion and possible action regarding acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Fire Department Cherokee Nation Contribution Account #96-000-4535.

Motion was made by Shropshire, second by Chitwood to approve acceptance of donation from the Cherokee Nation in the amount of \$3,500.00 to the Pryor Creek Fire Department Cherokee Nation Contribution Account #96-000-4535. Chitwood thanked the Cherokee Nation for their partnership with the City of Pryor Creek. Voting yes: Smith, Chitwood, Brakefield, Tramel, Thompson, Shropshire, Nance. Abstaining, counting as a no vote: Ketcher. Voting no: none.

o. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Wilma Ruth Wells, 604 Belmont, Pryor Creek, Oklahoma (Property ID: 1010-00-004-031-0-001-00) Base ID: 16714, Legal Description: BELMONT ADDITION, BLK 4 LOT 31 in an amount not to exceed \$3,700.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.

Motion was made by Shropshire, second by Smith to approve the City of Pryor Creek bidding on property owned by Wilma Ruth Wells, 604 Belmont, Pryor Creek, Oklahoma (Property ID: 1010-00-004-031-0-001-00) Base ID: 16714, Legal Description: BELMONT ADDITION, BLK 4 LOT 31 in an amount not to exceed \$3,700.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office. Ketcher stated that Ms. Wells is his late grandmother, so he will be abstaining. Voting yes: Chitwood, Brakefield, Tramel, Thompson, Shropshire, Nance, Smith. Abstaining, counting as a no vote: Ketcher. Voting no: none.

p. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Antolino Villegas, 203 N. Adair, Pryor Creek, Oklahoma (Property ID: 1001-00-004-011-0-001-00) Base ID: 15975, Legal Description: PRYOR ORIG BLK 4 N 50' LOT 11 in an amount not to exceed \$8,500.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.

Motion was made by Chitwood, second by Smith to approve the City of Pryor Creek bidding on property owned by Antolino Villegas, 203 N. Adair, Pryor Creek, Oklahoma (Property ID: 1001-00-004-011-0-001-00) Base ID: 15975, Legal Description: PRYOR ORIG BLK 4 N 50' LOT 11 in an amount not to exceed \$8,500.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.

Thompson informed the Council that Mr. Villegas paid his delinquent taxes, so this property has been removed from the sale.

Chitwood and Smith modified their motion and second to take no action. No vote was taken.

q. Discussion and possible action regarding the City of Pryor Creek bidding on property owned by Mitchell S. Smith, 302 S. Whitaker, Pryor Creek, Oklahoma (Property ID: 1300-00-006-001-0-001-00) Base ID: 18100, Legal Description: LANDRUM ADDITION BLK 6 N 65' LOT 1, in an amount not to exceed \$1,200.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office.

Motion was made by Chitwood, second by Smith to approve the City of Pryor Creek bidding on property owned by Mitchell S. Smith, 302 S. Whitaker, Pryor Creek, Oklahoma (Property ID: 1300-00-006-001-0-001-00) Base ID: 18100, Legal Description: LANDRUM ADDITION BLK 6 N 65' LOT 1, in an amount not to exceed \$1,200.00 at the Sale of Real Estate for Delinquent Tax to be held on June 14th, 2021 at 9:00 a.m. at the Mayes County Courthouse, Treasurer's Office. Voting yes: Tramel, Thompson, Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield. Voting no: none.

7. COMMITTEE REPORTS:

a. Budget and Personnel (Brakefield)

Brakefield reported that the next Budget and Personnel Committee meeting will be on June 8th, at 5:30 pm.

b. Ordinance and Insurance (Shropshire)

Shropshire reported that they have a meeting in the works, but it has not been scheduled.

c. Street (Smith)

Smith had nothing to report at this time.

8. UNFORESEEABLE BUSINESS.

(ANY MATTER NOT REASONABLY FORESEEN PRIOR TO POSTING OF AGENDA.)

There was no unforeseeable business.

9. ADJOURN.

Motion was made by Ketcher, second by Smith to adjourn. Voting yes: Thompson, Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel. Voting no: none.

PRYOR PUBLIC WORKS AUTHORITY

1. CALL TO ORDER.

Meeting was called to order at 8:53 p.m.

2. APPROVE MINUTES OF MAY 4TH, 2021 MEETING.

Motion was made by Smith, second by Chitwood to approve minutes of May 4th, 2021 meeting. Voting yes: Ketcher, Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel, Thompson. Voting no: none.

3. UNFORESEEABLE BUSINESS.

(ANY MATTER NOT REASONABLY FORESEEN PRIOR TO POSTING OF AGENDA.)

There was no unforeseeable business.

4. ADJOURN.

Motion was made by Ketcher, second by Chitwood to adjourn. Voting yes: Shropshire, Nance, Smith, Chitwood, Brakefield, Tramel, Thompson, Ketcher. Voting no: none.

MINUTES APPROVED BY MAYOR / P.P.W.A. CHAIRMAN LARRY LEES

MINUTES WRITTEN BY DEPUTY CLERK DARLA COATS

CITY OF PRYOR

PRYOR, OKLAHOMA

05-22-2021

BID FOR MOWING OF THE RIGHTS-OF-WAY WITHIN THE CITY
LIMITS OF PRYOR (JULY 2021, AUGUST 2021, SEPTEMBER
2021, APRIL 2022, MAY 2022, JUNE 2022)

\$28,000.00

THANK YOU

A handwritten signature in cursive script that reads "Duane Fought". The signature is written in black ink and is positioned above the printed name and address.

DUANE FOUGHT
2151 N. 432
PRYOR, OKLAHOMA 74361