


$$\tau_c = \gamma * d * s$$

Where:

$$\tau_c = \text{Maximum Shear Stress}$$

$$\gamma = \text{Density of Water } \left(62.4 \frac{\text{Lb}}{\text{Ft}^3} \right)$$

$$d = \text{Depth of Water (ft.)}$$

$$s = \text{Channel Slope } \left(\frac{\text{Ft}}{\text{Ft}} \right)$$
$$\tau_c = 62.4 * 0.96 * .0188$$
$$\tau_c = 1.13 \text{ psf}$$

Conclusion: All disturbed areas within Swale A-A will be required to re-establish vegetation. The vegetation within Swale A-A is classified as Class "B" vegetation. This has a permissible shear stress of 2.1 psf. Therefore, the shear stress with the swale is permissible.

$$\tau_c = 62.4 * 0.39 * .036$$
$$\tau_c = 0.88 \text{ psf}$$

Conclusion: All disturbed areas within Swale B-B will be required to re-establish vegetation. The vegetation within Swale B-B is classified as Class "C" vegetation. This has a permissible shear stress of 1.0 psf. Therefore, the shear stress with the swale is permissible.

$$\tau_c = 62.4 * 0.24 * .040$$
$$\tau_c = 0.60 \text{ psf}$$

Conclusion: All disturbed areas within Swale C-C will be required to re-establish vegetation. The vegetation within Swale C-C is classified as Class "C" vegetation. This has a permissible shear stress of 1.0 psf. Therefore, the shear stress with the swale is permissible.



LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

SHEET
20

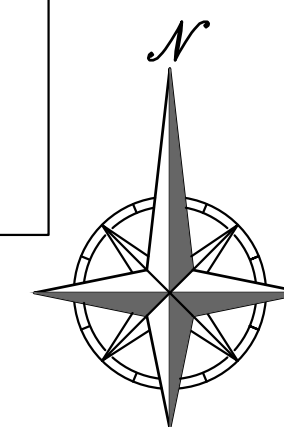


UTILITY NOTES:
 VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
 UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR
 LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN
 THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL
 FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

LEGEND

———— PL ———— PROPERTY LINE
——— LOT LINE
— —R/W— — RIGHT-OF-WAY

DRAINAGE BOUNDARY
FOR LOS VALUE RATING
CALCULATION



SCALE: 1"=100'



A horizontal scale bar with alternating black and white segments. It is marked with '0'', '100'', and '200''.

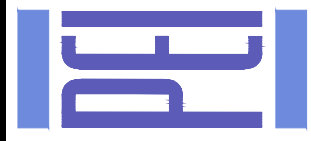
“AS-BUILT”

DATED: 11-13-23 BY: JTK



PHILIPS ENGINEERING, INC.
1370 N. Winchester
Olathe, Kansas 66061
(913) 993-1155
Fax (913) 993-1166
www.philipsengineering.com

PLANNING
ENGINEERING
IMPLEMENTATION



MASTER DRAINAGE PLAN
ORCHARD WOODS
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

PROJECT NO.	211142	DATE	Revisions:	By	App.
DATE 10-21-2022	DRAWING	1.	2-27-23	JMO	DEU
CHECKED DEU	APPROVED DEU	2.	4-24-23	JMO	DEU
CORPORATE OF AUTHORIZATION		3.	6-15-23	BIG	DEU
LAND SURVEYING - LS-82		4.	7-20-23	MRH	DEU
ENGINEERING - E-381		5.	10-11-23	KAD	DEU
CERTIFICATE OF AUTHORIZATION					
LAND SURVEYING - 200701028					
ENGINEERING - 200700308					

SHEET
21

PARTIAL - Accepted
Master Drainage Plan
[LOTS 9-21 EXCLUDED]
This as-graded Master Drainage Plan (MDP) has been reviewed for accuracy. It is accepted for basic conformance to the approved MDP and may be used for the review of individual lot grading (plot) plans.

NOTE:

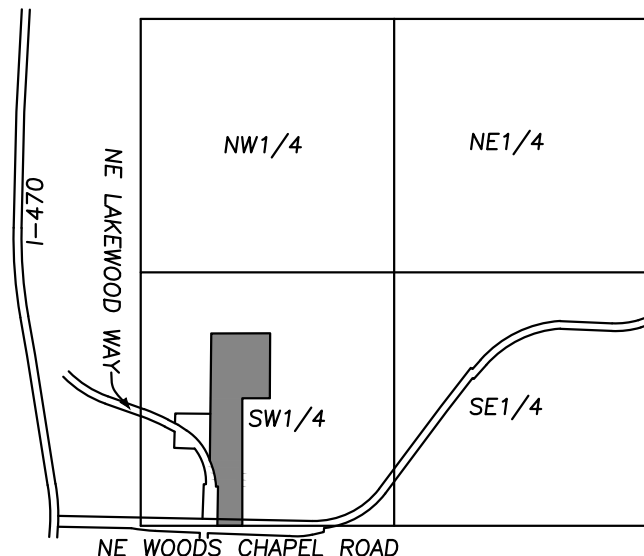
LOTS 11, 12, 17-25 & 27-30 HAVE BEEN IDENTIFIED AS LOTS REQUIRING AS-GRADED PLOT PLANS. THESE LOTS HAVE BEEN DISTINGUISHED WITH "AGPP" ON THE PLAN. AS-GRADED PLOT PLANS ARE REQUIRED DUE TO EITHER SPECIFIC GRADING THAT PART OF THE OVERALL STORMWATER DESIGN OR THE LOT'S PROXIMITY TO ENGINEERED SWALES, DRAINAGE WAYS, DETENTION BASINS, OR DRAINAGE BERMS.

OIL-GAS WELLS:

MISSOURI DEPARTMENT OF NATURAL RESOURCES, MISSOURI GEOLOGICAL SURVEY, GEOSTRAT WEBSITE INDICATES THERE ARE TWO WELLS DRILLED ON THIS PROPERTY. ID #095-00155 IS SHOWN AS A DRY HOLE, DATED 10/27/1938. ID# 0005120 IS SHOWN AS AN EXPLORATORY HOLE, DATED 10/28/1938. PHELPS ENGINEERING HAS MADE A FIELD INVESTIGATION AND FOUND NO VISIBLE EVIDENCE OF THESE WELLS ON THE PROPERTY, AS OF THIS DATE.

FLOOD NOTE:

THIS PROPERTY LIES WITHIN ZONE X, DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE CITY OF LEE'S SUMMIT, COMMUNITY NO. 290174, JACKSON COUNTY, MISSOURI, PANEL NO. 29095C0430G, AND DATED JANUARY 20, 2017.

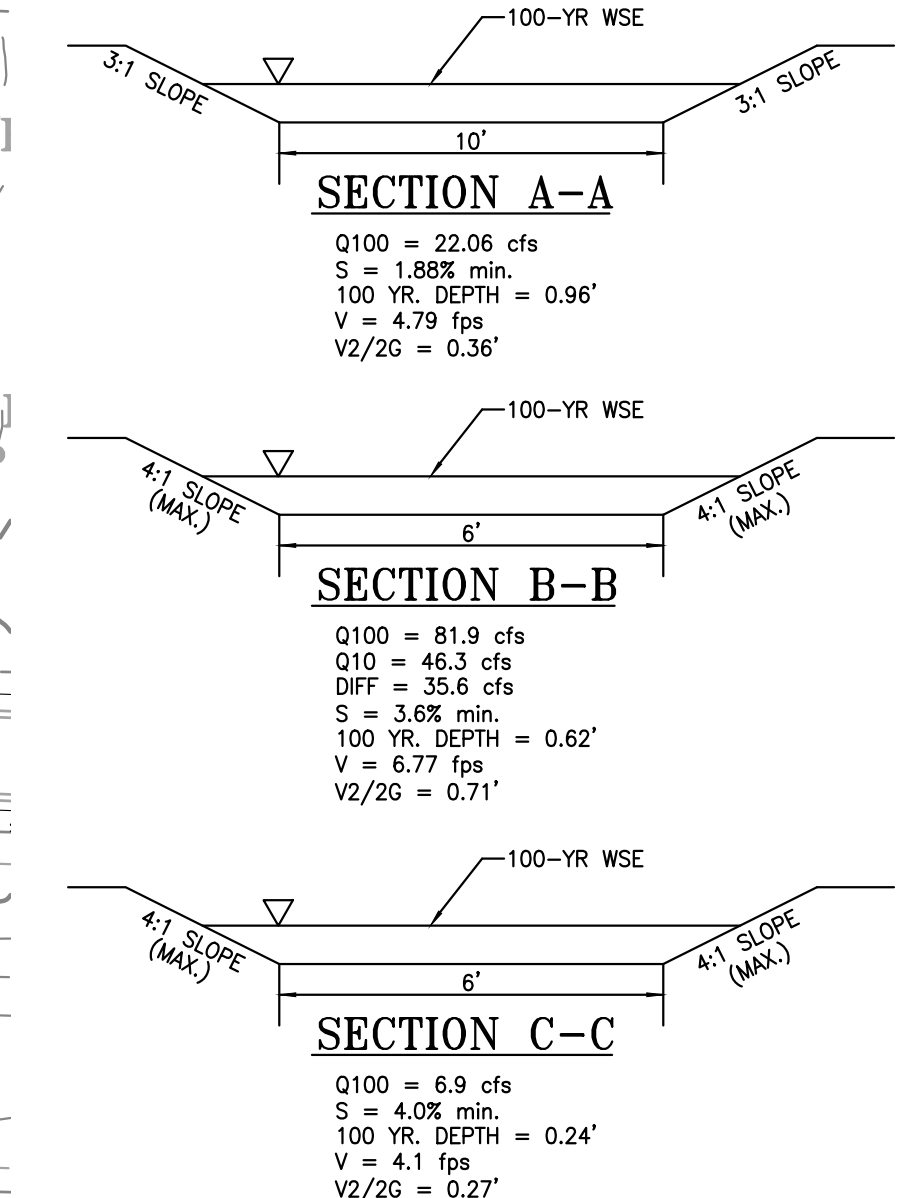
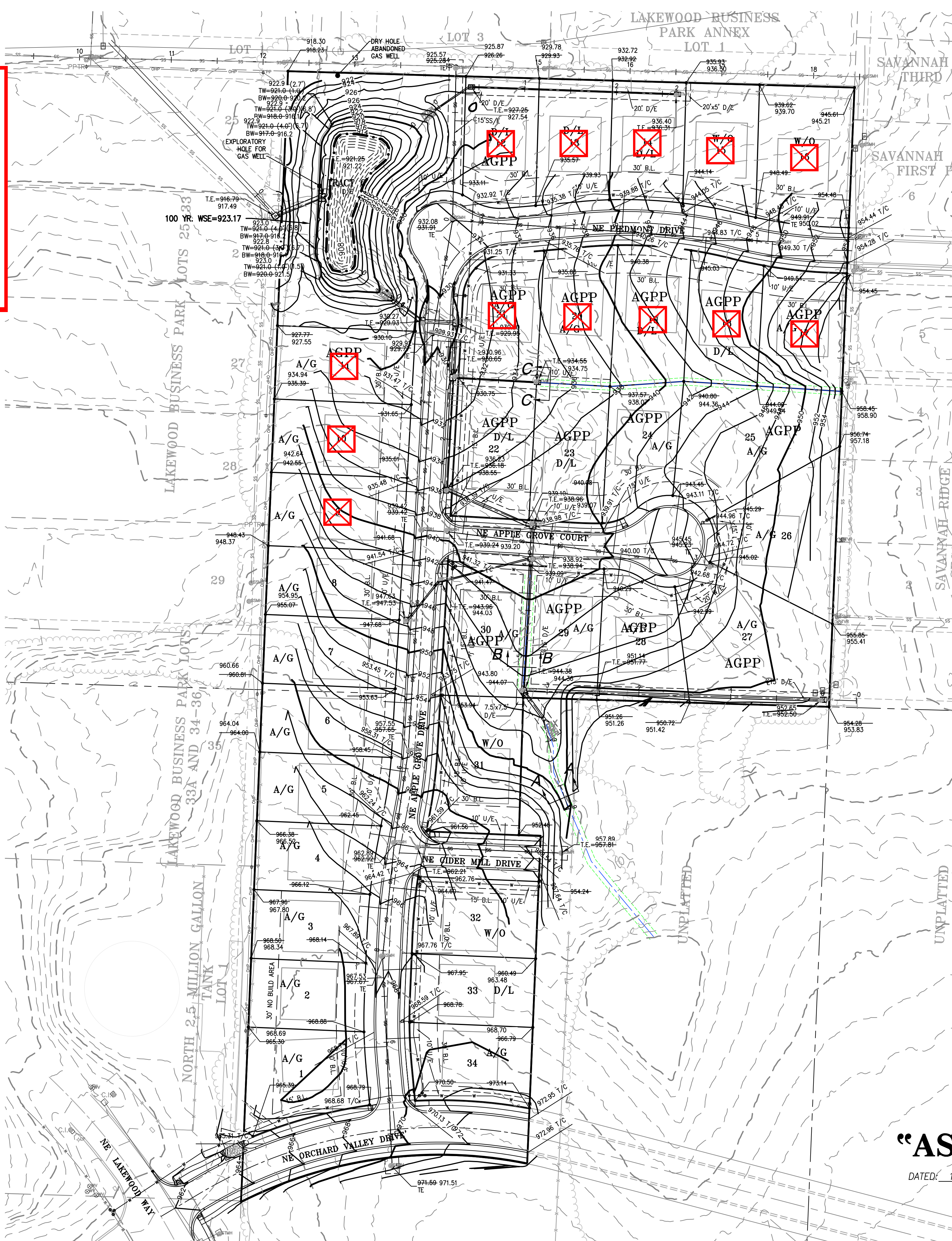


VICINITY MAP
SEC. 9-48-31



Know what's below.
Call before you dig.

UTILITY NOTES:
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UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

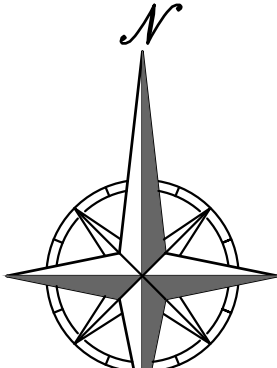


NOTE:
SEE SHEET 25 FOR LIMITS OF TRM INSTALLATION WITHIN SWALES

Orchard Woods Lot Type Table		
Lot #	Lot Type	MBOE
1	A/G	972.0
2	A/G	967.9
3	A/G	967.1
4	A/G	965.1
5	A/G	961.5
6	A/G	957.5
7	A/G	952.6
8	A/G	946.7
9	A/G	940.7
10	A/G	934.6
11	A/G	930.7
12	D/L	925.2
13	W/O	925.6
14	W/O	929.9
15	W/O	934.1
16	W/O	938.5
17	A/G	954.8
18	A/G	953.5
19	A/G	948.5
20	A/G	944.0
21	A/G	939.4
22	W/O	937.1
23	D/L	939.3
24	A/G	942.3
25	A/G	947.8
26	A/G	944.3
27	A/G	944.0
28	A/G	942.0
29	A/G	944.0
30	A/G	944.0
31	W/O	952.1
32	W/O	958.0
33	D/L	962.8
34	A/G	969.5

LEGEND

- PL - PROPERTY LINE
- LOT LINE
- R/W - RIGHT-OF-WAY
- 920- - EXISTING CONTOURS
- 918- - EXISTING CONTOURS
- 920- - PROPOSED CONTOURS
- 918- - PROPOSED CONTOURS
- A/G - AT GRADE
- D/L - DAYLIGHT
- W/O - WALKOUT



SCALE: 1"=60'
0' 60' 120'

"AS-BUILT"

DATED: 11-13-23 BY: JTK