

SPURLOCK STATION - PEGS HILL LANDFILL

CLOSURE PLAN

SPURLOCK POWER STATION EAST KENTUCKY POWER COOPERATIVE MASON COUNTY, KENTUCKY

**PERMIT No. 081-00005
(AI No. 3004)**

JULY 3, 2023

PROJECT No. 2015070

**KENVIRONS, INC.
770 WILKINSON BLVD.
FRANKFORT, KY 40601**




CERTIFICATION

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK STATION – PEG’S HILL LANDFILL
CLOSURE PLAN

CERTIFICATION

I HEREBY CERTIFY THAT THIS SPURLOCK STATION – PEG’S HILL LANDFILL CLOSURE PLAN WAS PREPARED IN ACCORDANCE WITH STANDARD ENGINEERING PRACTICES, AND BASED ON MY KNOWLEDGE, INFORMATION, AND BELIEF, THE CONTENT OF THIS SPURLOCK STATION – PEG’S HILL LANDFILL CLOSURE PLAN MEETS THE REQUIREMENTS OF 40 CFR 257.102.



S. Tim Oakes, P.E. [21,483] – Kenvirons

Date: 7/3/2023



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1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual Rule (CCR Rule) to regulate the disposal of coal combustion residual (CCR) materials generated at coal-fired units. The rule will be administered as part of the Resource Conservation and Recovery Act (RCRA, 42 United States Code [U.S.C.] §6901 et seq.), using the Subtitle D approach. East Kentucky Power Cooperative (EKPC) is subject to the CCR Rule and as such will develop a Closure Plan per 40 Code of Federal Regulations (CFR) §257.102. Section 2.0 of this document serves as EKPC’s Closure Plan for Peg’s Hill CCR Landfill (as defined in §257.53) at Spurlock Station. The Closure Plan will contain the following as required in §257.102(b)(1):

- A description of how the CCR unit will be closed.
 - For in-place closure:
 - A description of the final cover system, methods for installing final cover system, and methods for achieving compliance with the standards outlined in §257.102(d)
- An estimate of the maximum inventory of CCR material ever stored in the CCR unit over its active life.
- An estimate of the largest area of the CCR unit ever requiring a final cover as required by §257.102(d) at any time during the CCR unit’s active life.
- A schedule for completing closure activities, including the anticipated year of closure and major milestones for permitting and construction activities.

2.0 CLOSURE PLAN

2.1 Landfill Description

Spurlock Station (Spurlock) is owned and operated by EKPC. Spurlock is a 1,346 net megawatt (MW) coal-fired power plant located in Mason County, approximately five miles Northwest of Maysville, Kentucky. The Peg’s Hill CCR Landfill (Landfill) is a CCR waste landfill currently in the process of being permitted by the Kentucky Department of Environmental Protection (KDEP Permit No. 081-00005). The Landfill is located on the west side of the plant site. Construction drawings prepared by Kenvirons, Inc., dated 2017, were reviewed along with landfill design documents to gain an understanding of the Landfill design and geometry. The final grading plans included in the design drawings can be found in Appendix A. The construction drawings are in general accordance with conventional landfill design and permitting standards. The following is a summary of information within the design documents and construction drawings applicable to this Closure Plan.

2.1.1 CCR Inventory

The total volume for the Landfill is 25,309,260 cubic yards. The Landfill life is estimated to be 13 years. However, the life of the Landfill could be extended in the future depending on the capacity factor of the generating units.

2.1.2 CCR Extent

All final cover slopes for the Landfill are to be 3H:1V and the maximum crest elevation for the final landfill grading plan is 1,102 feet. Per the design documents, the waste boundary is 101 acres, while the Landfill operational area is 1359.93 acres. The waste boundary is for Peg’s Hill CCR waste disposal only, while the landfill operational area includes all CCR material handling areas, soil borrow areas, sedimentation ponds, buffer zones, and the unaffected land between these areas.

2.2 Closure Method

The Landfill Closure Plan is described in this document. Construction drawings for closure were prepared by Kenvirons, Inc. in 2017. The Landfill is required to be capped and closed in place as described in this document and in the design documents. The final cover system as required by the CCR Rule and noted herein is equivalent to the final cover system described in the Landfill design documents.

2.2.1 Final Cover System

The final cover system will be designed and constructed to meet the following criteria pursuant to §257.102(d)(3)(i):

- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters per second (cm/sec), whichever is less.
- The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.
- The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.
- The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

The final cover system will consists of the following components, in ascending order: 40 mil HDPE or LLDPE Textured Geomembrane, Geocomposite Drainage Layer (50 to 100 ft wide at toe of slope), 18-inch infiltration layer and six-inch vegetative soil layer. The CCR materials will form a suitable subgrade for installation of the final cover

material. The physical properties of coal ash material should result in minimal settling. Furthermore, settling would occur during the prolonged period of filling up the Landfill and minimal settling would occur after installation of the cover. Precipitation that penetrates the vegetative layer will be directed to drainage ditches. Vegetation will be established within the vegetative layer to prevent erosion of the soil from the slopes, The Final Cap Design detail can be found in Appendix B.

2.2.2 Installation of Final Cover

Installation of the final cover will include the following general steps:

- Development of construction plans and specification.
- Final cover construction bidding and procurement.
- Final cover construction.
- Documentation of final cover construction quality assurance activities.

Prior to development of the final cover construction plans and specification, a ground or aerial survey will be conducted to develop a detailed surface topography. If vegetation exists on the surface of the CCR material or the intermediate cover, the vegetation will be removed. The subgrade will be prepared and the final cover system will be installed. The maximum area requiring final cover is estimated to be 101 acres, which is the designed waste boundary area for CCR waste disposal as indicated in Section 2.1.2. Construction Quality Assurance (CQA) activities will be conducted in accordance with the CQA Plan. The final cover installation will be closely documented in a CQA documentation report.

2.2.3 Methods to Achieve Closure Performance Standards

As outlined in in §257.102(d), the Closure Plan will at a minimum:

- Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.
- Prevent future impoundment of water.
- Provide for slope stability to protect against sloughing or movement of the final cover system.
- Minimize future maintenance of the CCR unit.
- Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The following sections describe performance standards by which closure of the unit will meet these listed criteria.

2.2.3.1 Sediment Control Ponds

Two (2) existing sediment control ponds serve the existing landfill facility (Areas A-C). Pond 1 is an existing geosynthetic lined sediment/leachate collection pond located to the southeast of the Landfill. Pond 1 will continue to be utilized for leachate collection and sediment control for the existing Landfill (Areas A-C). Pond 2A is a geosynthetic lined pond located east of Pegs Hill Landfill. Pond 2A was recently constructed in 2022 to replace the existing structure, Pond 2, since it was located within the first phase of Pegs Hill Landfill’s disposal footprint. Pond 2A provides sediment control and leachate collection for Pegs Hill Landfill. Pond 2A also provides sediment collection/control for the western portion of Spurlock Landfill. All sediment ponds will be monitored at their point of discharge. Sampling will be conducted in accordance with a Kentucky Pollutant Discharge Elimination System (KPDES) permit.

2.2.3.2 Soil Borrow Areas

Soil borrow areas identified in the design documents will be utilized to support the construction of the final cover. Soil removed from these borrow areas will be amended as necessary to promote vegetative growth in the final cap. Borrow areas will be graded and seeded to prevent erosion. The previously permitted and proposed borrow area acreage is 470 acres and includes the proposed waste disposal footprint (101 acres). Borrow areas contain an estimated soil volume of 2.9 million cubic yards. The estimated number of acres to close Pegs Hill Landfill is 50 acres.

2.2.3.3 Methods of Revegetation

All areas that require seeding, both for final cover and in soil borrow areas, will be mulched at a rate of 1.5 tons/acre. Soil samples may be obtained prior to seeding to determine if amendments are necessary to promote growth. Seeding requirements are described in the design documents.

Vegetation is planned to provide 90 percent ground cover. Vegetation ground coverage will be evaluated during routine landfill inspections.

2.3 Closure Commencement

Closure of the Landfill will commence no later than 30 days after the date on which the Landfill receives the known final receipt of waste. At the time of development of this Closure Plan, assuming the initial receipt of waste occurs in September of 2023 and the life expectancy of the Landfill indicated in Section 2.1.1 does not change, the estimated year of final receipt of CCR material is 2036. For purposes of this plan, and in accordance with the CCR Rule, closure of the Landfill has commenced when EKPC ceases placing waste and completes any of the following actions or activities:

- Take any steps necessary to implement the written Closure Plan.
- Submits a completed application for any required state or agency permit or permit modification.
- Takes any steps necessary to comply with any state or other agency standards that are a prerequisite, or are otherwise applicable, to initiating or completing the closure of a CCR Unit.

No later than the date EKPC initiates closure of the Landfill, a notification of intent to close the Landfill will be prepared. The intent to close will include a certification by a qualified professional engineer in the Commonwealth of Kentucky for the design of the final cover system. The notification has been completed when it has been placed in the facility’s CCR Operating Record. The notification will then be placed on EKPC’s CCR public website 30 days. The planned closure schedule for the Landfill is included within Appendix C of this plan.

2.4 Closure Completion

Closure for the Landfill will be completed within six months of commencing closure activities per the CCR Rule and Section 2.3 of this plan. The timeframe for completing closure of the CCR unit may be extended if EKPC can demonstrate that it is not feasible to complete closure of the CCR unit within the required timeframe due to factors beyond the facility’s control. A request for the extension of closure timeframe will be completed pursuant to §257.102(f)(2). Within 30 days of completion of closure of the Landfill, a notification of closure of the Landfill will be prepared and placed in the facility’s CCR Operating Record and on EKPC’s CCR public website. This notification will include a certification by a qualified professional engineer in the Commonwealth of Kentucky verifying that closure has been completed in accordance with this Closure Plan and the requirements of §257.102. The CCR Rule does not define “closure complete” for CCR Landfills. For the purpose of this Closure Plan, closure of the Landfill is considered complete when the final cover system is installed and applicable construction completion documentation is completed. Based on the estimated year of final receipt of CCR waste as noted in Section 2.3 and the closure schedule provided in Appendix C, it is estimated that the closure of the Landfill will be complete in 2036.

3.0 REVISIONS AND AMENDMENTS

The initial Closure Plan will be placed in the CCR Operating Record no later than the date of the initial receipt of CCR in the CCR unit. The plan will be amended whenever there is a change in operation of the CCR unit that affects the current or planned closure operations. The Closure Plan will be amended 60 days prior to a planned change in operation, or within 60 days following an unplanned change in operation. If a written Closure Plan is revised after closure activities have commenced, the written Closure Plan will be amended no later than 30 days following the triggering event. The

initial Closure Plan and any amendment will be certified by a qualified professional engineer in the Commonwealth of Kentucky for meeting the requirements of §257.102 of the CCR Rule. All amendments and revisions will be placed on the CCR public website within 30 days following placement in the facility’s CCR Operating Record. A record of revisions made to this document is included in Section 4.0 of this document.

4.0 RECORD OF REVISIONS AND UPDATES

Revision Number	Date	Revisions Made	By Whom
0	06/03/19	Issued for Initial Compliance	Kenvirons, Inc.
1	07/3/23	Issued for Final Compliance	Kenvirons

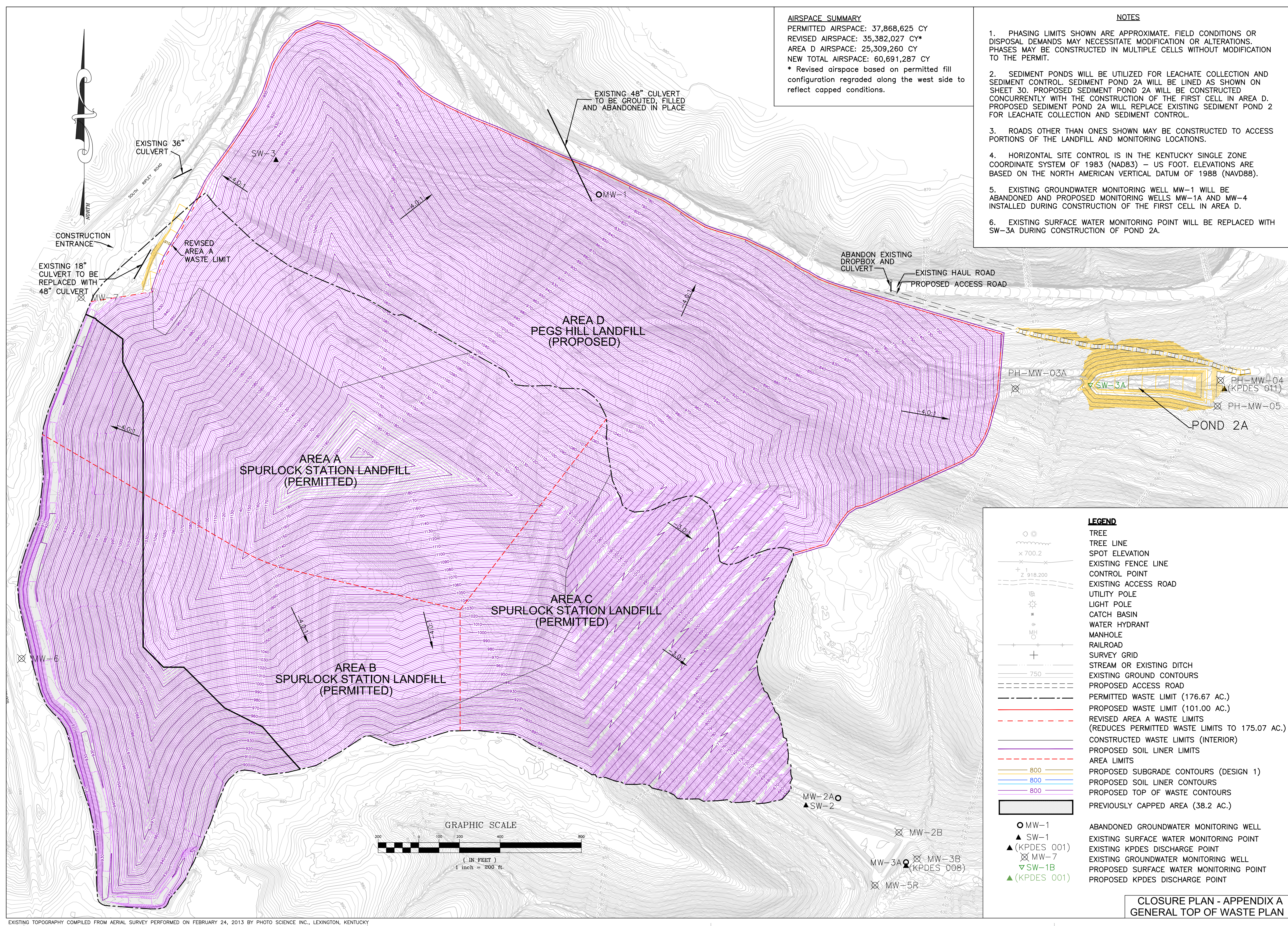
APPENDIX A

FINAL GRADING PLAN DRAWINGS

DRAWN BY: SWR
CHECKED BY: STO
DATE: JULY 2019
SCALE: T = 200'
REVISIONS

AIRSPACE SUMMARY
PERMITTED AIRSPACE: 37,868,625 CY
REVISED AIRSPACE: 35,382,027 CY*
AREA D AIRSPACE: 25,309,260 CY
NEW TOTAL AIRSPACE: 60,691,287 CY
* Revised airspace based on permitted fill configuration regraded along the west side to reflect capped conditions.

- NOTES**
1. PHASING LIMITS SHOWN ARE APPROXIMATE. FIELD CONDITIONS OR DISPOSAL DEMANDS MAY NECESSITATE MODIFICATION OR ALTERATIONS. PHASES MAY BE CONSTRUCTED IN MULTIPLE CELLS WITHOUT MODIFICATION TO THE PERMIT.
 2. SEDIMENT PONDS WILL BE UTILIZED FOR LEACHATE COLLECTION AND SEDIMENT CONTROL. SEDIMENT POND 2A WILL BE LINED AS SHOWN ON SHEET 30. PROPOSED SEDIMENT POND 2A WILL BE CONSTRUCTED CONCURRENTLY WITH THE CONSTRUCTION OF THE FIRST CELL IN AREA D. PROPOSED SEDIMENT POND 2A WILL REPLACE EXISTING SEDIMENT POND 2 FOR LEACHATE COLLECTION AND SEDIMENT CONTROL.
 3. ROADS OTHER THAN ONES SHOWN MAY BE CONSTRUCTED TO ACCESS PORTIONS OF THE LANDFILL AND MONITORING LOCATIONS.
 4. HORIZONTAL SITE CONTROL IS IN THE KENTUCKY SINGLE ZONE COORDINATE SYSTEM OF 1983 (NAD83) - US FOOT. ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
 5. EXISTING GROUNDWATER MONITORING WELL MW-1 WILL BE ABANDONED AND PROPOSED MONITORING WELLS MW-1A AND MW-4 INSTALLED DURING CONSTRUCTION OF THE FIRST CELL IN AREA D.
 6. EXISTING SURFACE WATER MONITORING POINT WILL BE REPLACED WITH SW-3A DURING CONSTRUCTION OF POND 2A.

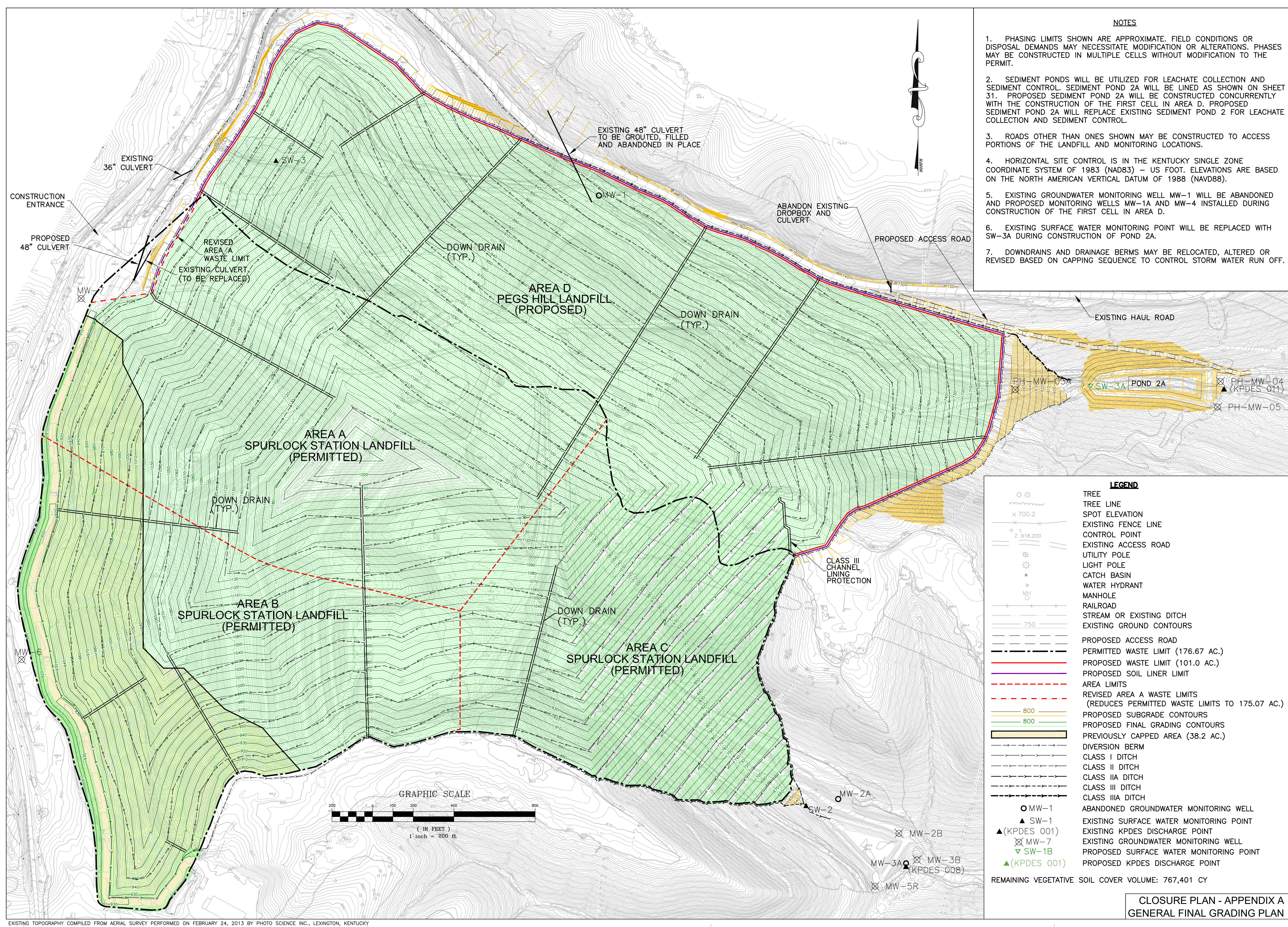


LEGEND

	TREE
	TREE LINE
	SPOT ELEVATION
	EXISTING FENCE LINE
	CONTROL POINT
	EXISTING ACCESS ROAD
	UTILITY POLE
	LIGHT POLE
	CATCH BASIN
	WATER HYDRANT
	MANHOLE
	RAILROAD
	SURVEY GRID
	STREAM OR EXISTING DITCH
	EXISTING GROUND CONTOURS
	PROPOSED ACCESS ROAD
	PERMITTED WASTE LIMIT (176.67 AC.)
	PROPOSED WASTE LIMIT (101.00 AC.)
	REVISED AREA A WASTE LIMITS (REDUCES PERMITTED WASTE LIMITS TO 175.07 AC.)
	CONSTRUCTED WASTE LIMITS (INTERIOR)
	PROPOSED SOIL LINER LIMITS
	AREA LIMITS
	PROPOSED SUBGRADE CONTOURS (DESIGN 1)
	PROPOSED SOIL LINER CONTOURS
	PROPOSED TOP OF WASTE CONTOURS
	PREVIOUSLY CAPPED AREA (38.2 AC.)
	ABANDONED GROUNDWATER MONITORING WELL
	EXISTING SURFACE WATER MONITORING POINT
	EXISTING KPDES DISCHARGE POINT
	EXISTING GROUNDWATER MONITORING WELL
	PROPOSED SURFACE WATER MONITORING POINT
	PROPOSED KPDES DISCHARGE POINT

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EXISTING TOPOGRAPHY COMPILED FROM AERIAL SURVEY PERFORMED ON FEBRUARY 24, 2013 BY PHOTO SCIENCE INC., LEXINGTON, KENTUCKY



- NOTES**
1. PHASING LIMITS SHOWN ARE APPROXIMATE. FIELD CONDITIONS OR DISPOSAL DEMANDS MAY NECESSITATE MODIFICATION OR ALTERATIONS. PHASES MAY BE CONSTRUCTED IN MULTIPLE CELLS WITHOUT MODIFICATION TO THE PERMIT.
 2. SEDIMENT PONDS WILL BE UTILIZED FOR LEACHATE COLLECTION AND SEDIMENT CONTROL. SEDIMENT POND 2A WILL BE LINED AS SHOWN ON SHEET 31. PROPOSED SEDIMENT POND 2A WILL BE CONSTRUCTED CONCURRENTLY WITH THE CONSTRUCTION OF THE FIRST CELL IN AREA D. PROPOSED SEDIMENT POND 2A WILL REPLACE EXISTING SEDIMENT POND 2 FOR LEACHATE COLLECTION AND SEDIMENT CONTROL.
 3. ROADS OTHER THAN ONES SHOWN MAY BE CONSTRUCTED TO ACCESS PORTIONS OF THE LANDFILL AND MONITORING LOCATIONS.
 4. HORIZONTAL SITE CONTROL IS IN THE KENTUCKY SINGLE ZONE COORDINATE SYSTEM OF 1983 (NAD83) - US FOOT. ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
 5. EXISTING GROUNDWATER MONITORING WELL MW-1 WILL BE ABANDONED AND PROPOSED MONITORING WELLS MW-1A AND MW-4 INSTALLED DURING CONSTRUCTION OF THE FIRST CELL IN AREA D.
 6. EXISTING SURFACE WATER MONITORING POINT WILL BE REPLACED WITH SW-3A DURING CONSTRUCTION OF POND 2A.
 7. DOWNDRAINS AND DRAINAGE BERMS MAY BE RELOCATED, ALTERED OR REVISED BASED ON CAPPING SEQUENCE TO CONTROL STORM WATER RUN OFF.

LEGEND

- TREE
- TREE LINE
- SPOT ELEVATION
- EXISTING FENCE LINE
- CONTROL POINT
- EXISTING ACCESS ROAD
- UTILITY POLE
- LIGHT POLE
- CATCH BASIN
- WATER HYDRANT
- MANHOLE
- RAILROAD
- STREAM OR EXISTING DITCH
- EXISTING GROUND CONTOURS
- PROPOSED ACCESS ROAD
- PERMITTED WASTE LIMIT (176.67 AC.)
- PROPOSED WASTE LIMIT (101.0 AC.)
- PROPOSED SOIL LINER LIMIT
- AREA LIMITS
- REVISED AREA A WASTE LIMITS (REDUCES PERMITTED WASTE LIMITS TO 175.07 AC.)
- PROPOSED SUBGRADE CONTOURS
- PROPOSED FINAL GRADING CONTOURS
- PREVIOUSLY CAPPED AREA (38.2 AC.)
- DIVERSION BERM
- CLASS I DITCH
- CLASS II DITCH
- CLASS IIIA DITCH
- CLASS III DITCH
- CLASS IIIA DITCH
- ABANDONED GROUNDWATER MONITORING WELL
- EXISTING SURFACE WATER MONITORING POINT
- EXISTING KPDES DISCHARGE POINT
- EXISTING GROUNDWATER MONITORING WELL
- PROPOSED SURFACE WATER MONITORING POINT
- PROPOSED KPDES DISCHARGE POINT

REMAINING VEGETATIVE SOIL COVER VOLUME: 767,401 CY

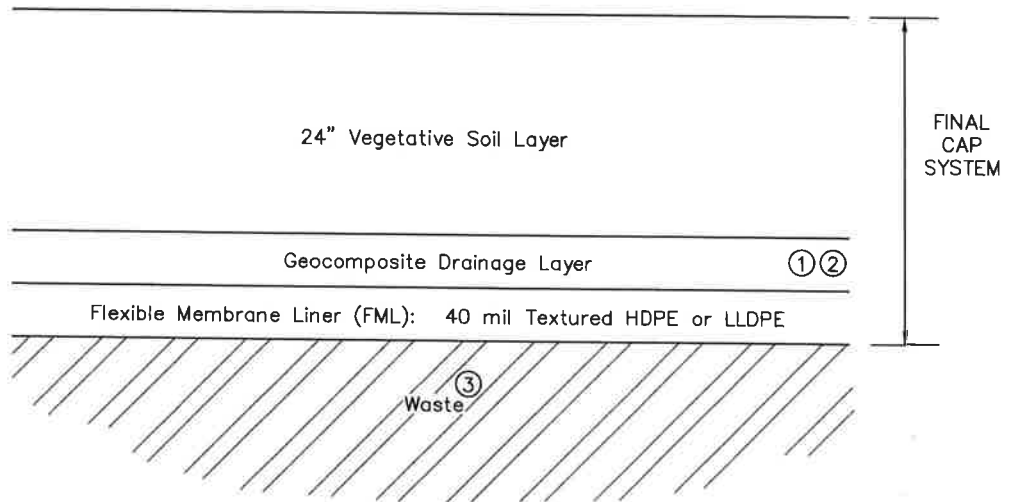
**CLOSURE PLAN - APPENDIX A
GENERAL FINAL GRADING PLAN**

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EXISTING TOPOGRAPHY COMPILED FROM AERIAL SURVEY PERFORMED ON FEBRUARY 24, 2013 BY PHOTO SCIENCE INC., LEXINGTON, KENTUCKY

APPENDIX B

FINAL CAP DETAIL



NOTES

1. Geocomposite Drainage Layer above the 40 mil. FML may be installed as owner option on final slopes $\geq 15\%$.
2. A Synthetic Drainage Layer will be Installed along the Perimeter of the Permitted Waste Area. The Drainage Layer will be Field Fitted and may Extend 50 to 100 Feet up the Waste Slope.
3. Surface shall be smooth drum rolled and free of particles larger than 1" in diameter.

FINAL CAP DESIGN

NTS



EAST KENTUCKY POWER COOPERATIVE, INC
PEGS HILL LANDFILL



KENVIRONS, INC.

770 WILKINSON BLVD, FRANKFORT, KENTUCKY

(502) 695-4357

APPENDIX C

CLOSURE SCHEDULE

APPENDIX D

CLOSURE COST ESTIMATES

**PEGS HILL LANDFILL
CLOSURE COST ESTIMATE
2023**

I. FINAL COVER SYSTEM COSTS

Closure Area 101.00 acres

<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1. Cap construction for all slopes	101.00	Acre	\$80,178.81	\$8,098,060.06
2. Vegetation Removal	50	Acre	\$3,800.00	\$190,000.00
3. Final cap subgrade preparation (Grade and Recompact)	101	Acre	\$5,200.00	\$525,200.00
4. Anchor Trench Cleaning and Exposure	10,433	LF	\$25.00	\$260,825.00
5. FML Boots for Leachate Cleanouts	7	EA	\$350.00	\$2,450.00
6. Tie-In Weld at Liner Anchor Trench	10,433	LF	\$8.00	\$83,464.00
7. Revegetation	101	Acre	\$3,350.00	\$338,350.00
8. Downdrains	7,333	LF	\$92.00	\$674,636.00
9. Drainage Berms	28,499	LF	\$10.45	\$297,814.55
10. Contingency (10%)	N/A	N/A	N/A	\$1,047,079.96
			Subtotal:	\$11,517,879.57

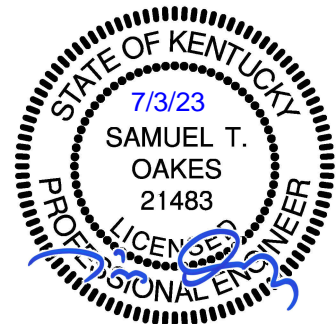
II. BORROW AREA COSTS

<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1. Site grading	50	acre	\$5,200.00	\$260,000.00
2. Revegetation	50	acre	\$2,500.00	\$125,000.00
			Subtotal:	\$385,000.00

III. DESIGN (applicable if revised closure plan is necessary)

<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1. Design	1	LS	\$40,000.00	\$40,000.00
			Subtotal:	\$40,000.00

GRAND TOTAL : \$11,942,879.57



**PEGS HILL LANDFILL
CLOSURE COST ESTIMATE
2023**

Earthwork Items

Item	Unit	Unit Cost	Required in Acre ³	Cost per Acre
Vegetative Layer (18 in.)	CY	\$8.50	2,420	\$20,570.00
Topsoil Layer (6 in.)	LF	\$16.00	807	\$12,912.00

Geosynthetic Installation

Item	Unit	Unit Cost	Required in Acre ³	Cost per Acre
FML ³	SF	\$0.15	43,560	\$6,534.00
Geocomposite ^{3,4}	SF	\$0.13	14,377	\$1,869.01

Geosynthetic Materials

Materials	Unit	Unit Cost	Required SF in Acre	Cost per Acre
FML ³	SF	\$0.40	43,560	\$17,424.00
Geocomposite ^{3,4}	SF	\$0.65	14,377	\$9,345.05

Miscellaneous

		Item	Unit	Cost per Acre
		Surveying	AC	\$2,000.00
		CQA	AC	\$7,000.00
Item	Unit	Unit Cost	Total Acres	Cost per Acre
Earthwork Mobilization	EA	\$200,000.00	101.00	\$1,980.20
Geosynthetics Mobilization	EA	\$15,000.00	101.00	\$148.51
General Conditions	EA	\$20,000.00	101.00	\$198.02
Site Investigation	EA	\$20,000.00	101.00	\$198.02

Total Cost per Acre

\$80,178.81

Notes

1. Unit costs are based on Kenvirons' historical construction cost records.
2. Total area that would require cap construction is 123.76 acres.
3. Based on geosynthetic contractor estimate.
4. Geocomposite is only 33% of each acre since it is only placed 50 ft up the slope from the toe.