

**Practice: 521A - Pond Sealing or Lining, Flexible Membrane**

**Scenario: #1 - Flexible Membrane - Uncovered without liner drainage or venting**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure:** Surface area of Liner Material (including anchorage)

**Scenario Unit:** Square Yard

**Scenario Typical Size:** 2,420

**Scenario Cost:** \$24,105.16

**Scenario Cost/Unit:** \$9.96

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.25	2420	\$5,445.00
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$27.01	40	\$1,080.40
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$103.18	32	\$3,301.76
<b>Materials</b>						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2420	\$14,278.00

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**Scenario: #2 - Flexible Membrane - Uncovered with liner drainage or venting**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure:** Surface area of Liner Material (including anchorage)

**Scenario Unit:** Square Yard

**Scenario Typical Size:** 2,420

**Scenario Cost:** \$31,340.96

**Scenario Cost/Unit:** \$12.95

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.25	2420	\$5,445.00
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$27.01	40	\$1,080.40
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$103.18	32	\$3,301.76
<b>Materials</b>						
Geonet	1778	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only.	Square Yard	\$2.99	2420	\$7,235.80
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2420	\$14,278.00

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**Scenario: #3 - Flexible Membrane - Covered without liner drainage or venting**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, and a geotextile or soil cushion to protect liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure:** Surface area of Liner Material (including anchorage)

**Scenario Unit:** Square Yard

**Scenario Typical Size:** 2,420

**Scenario Cost:** \$27,042.64

**Scenario Cost/Unit:** \$11.17

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.64	807	\$2,937.48
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.25	2420	\$5,445.00
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$27.01	40	\$1,080.40
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$103.18	32	\$3,301.76
<b>Materials</b>						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2420	\$14,278.00

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**Scenario: #4 - Flexible Membrane - Covered with liner drainage or venting**

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Scenario Feature Measure:** Surface area of Liner Material (including anchorage)

**Scenario Unit:** Square Yard

**Scenario Typical Size:** 2,420

**Scenario Cost:** \$34,278.44

**Scenario Cost/Unit:** \$14.16

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.25	2420	\$5,445.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.64	807	\$2,937.48
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$27.01	40	\$1,080.40
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$103.18	32	\$3,301.76
<b>Materials</b>						
Geonet	1778	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only.	Square Yard	\$2.99	2420	\$7,235.80
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$5.90	2420	\$14,278.00