

**Scenario Worksheet**

**Practice and Scenario Description:**

|                           |   |
|---------------------------|---|
| <b>Information Type</b>   | <b>Data</b>   |
| Region                    | Appalachian   |
| State                     | North Carolina  |
| Discipline Group          | Water Management Engineering  |
| Practice Code/Name        | 442 - Irrigation System, Sprinkler  |
| Scenario ID               | 1   |
| Scenario Name             | Center Pivot System<br>Installation of a low pressure center pivot system.  |
| Scenario Description      | Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications).<br>Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)  |
| Before Practice Situation | A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.<br>The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers on drops. |
| After Practice Situation  | The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.<br>This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.  |
| Scenario Feature Measure  | Length of Center Pivot Lateral  |
| Scenario Unit             | Linear Foot   |
| Scenario Typical Size     | 1,300   |

**Cost Summary:**

| Cost Category                      | Scenario Cost | Scenario Cost/Unit |
|------------------------------------|---------------|--------------------|
| Materials                          | \$75,569.65   | \$58.13            |
| Equipment/Installation             | \$0.00        | \$0.00             |
| Labor                              | \$0.00        | \$0.00             |
| Mobilization                       | \$236.48      | \$0.18             |
| Acquisition of Technical Knowledge | \$0.00        | \$0.00             |
| Foregone Income                    | \$0.00        | \$0.00             |
| Total                              | \$75,806.13   | \$58.31            |

**Cost Details:**

| Cost Category | Component ID | Component Name  | Component Description   | Unit | Price (\$/unit) | Quantity | Cost         |
|---------------|--------------|---|---|------|-----------------|----------|--------------|
| Materials     | 317          | Irrigation, Center pivot system with appurtenances, fixed cost portion    | Fixed cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation.    | Each | -\$4,692.35     | 1        | (\$4,692.35) |
| Materials     | 318          | Irrigation, Center pivot system with appurtenances, variable cost portion | Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Foot | \$61.74         | 1300     | \$80,262.00  |
| Mobilization  | 1137         | Mobilization, very small equipment  | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.  | Each | \$25.64         | 2        | \$51.28      |
| Mobilization  | 1139         | Mobilization, medium equipment  | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.   | Each | \$92.60         | 2        | \$185.20     |

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| Region                    | Appalachian   |
| State                     | North Carolina  |
| Discipline Group          | Water Management Engineering  |
| Practice Code/Name        | 442 - Irrigation System, Sprinkler  |
| Scenario ID               | 2   |
| Scenario Name             | Linear Move System  |
| Scenario Description      | <p>Installation of a linear or lateral move sprinkler system with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion.</p> <p>Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)</p> <p>Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)</p> <p>Payment rate is figured per foot of installed hardware length.</p> |
| Before Practice Situation | A 76 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.  |
| After Practice Situation  | <p>A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing.</p> <p>The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.</p>  |
| Scenario Feature Measure  | Length of Linear Move Lateral   |
| Scenario Unit             | Linear Foot   |
| Scenario Typical Size     | 1,280   |

**Cost Summary:**

| Cost Category                      | Scenario Cost | Scenario Cost/Unit |
|------------------------------------|---------------|--------------------|
| Materials                          | \$83,539.96   | \$65.27            |
| Equipment/Installation             | \$0.00        | \$0.00             |
| Labor                              | \$0.00        | \$0.00             |
| Mobilization                       | \$236.48      | \$0.18             |
| Acquisition of Technical Knowledge | \$0.00        | \$0.00             |
| Foregone Income                    | \$0.00        | \$0.00             |
| Total                              | \$83,776.44   | \$65.45            |

**Cost Details:**

| Cost Category | Component ID | Component Name                        | Component Description  | Unit | Price (\$/unit) | Quantity | Cost        |
|---------------|--------------|---------------------------------------|--|------|-----------------|----------|-------------|
| Materials     | 322          | Linear Move System with appurtenances | Linear Move system including: central tower, lateral towers, pipes, sprinklers, controllers, installation.   | Acre | \$1,099.21      | 76       | \$83,539.96 |
| Mobilization  | 1137         | Mobilization, very small equipment    | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | \$25.64         | 2        | \$51.28     |
| Mobilization  | 1139         | Mobilization, medium equipment        | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.  | Each | \$92.60         | 2        | \$185.20    |

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| <b>Information Type</b>   | <b>Data</b>   |
| Region                    | Appalachian   |
| State                     | North Carolina  |
| Discipline Group          | Water Management Engineering  |
| Practice Code/Name        | 442 - Irrigation System, Sprinkler  |
| Scenario ID               | 4   |
| Scenario Name             | Renovation of Existing Sprinkler System   |
| Scenario Description      | <p>Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water conservation. A typical scenario assumes a 1300 LF span, including end booms renozzled with low-pressure nozzles.</p> <p>Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)</p> <p>Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)</p> |
| Before Practice Situation | A center pivot or lateral move system has high pressure sprinklers. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.   |
| After Practice Situation  | A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.  |
| Scenario Feature Measure  | Length of Lateral Retrofitted   |
| Scenario Unit             | Linear Foot   |
| Scenario Typical Size     | 1300  |

**Cost Summary:**

| Cost Category                      | Scenario Cost | Scenario Cost/Unit |
|------------------------------------|---------------|--------------------|
| Materials                          | \$6,630.00    | \$5.10             |
| Equipment/Installation             | \$0.00        | \$0.00             |
| Labor                              | \$0.00        | \$0.00             |
| Mobilization                       | \$51.28       | \$0.04             |
| Acquisition of Technical Knowledge | \$0.00        | \$0.00             |
| Foregone Income                    | \$0.00        | \$0.00             |
| Total                              | \$6,681.28    | \$5.14             |

**Cost Details:**

| Cost Category | Component ID | Component Name  | Component Description  | Unit | Price (\$/unit) | Quantity | Cost       |
|---------------|--------------|---|--|------|-----------------|----------|------------|
| Materials     | 1480         | Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators | Sprinkler Package - Renovation including sprinkler nozzle addition, and/or replacement, including new pressure regulators and drops.   | Foot | \$5.10          | 1300     | \$6,630.00 |
| Mobilization  | 1137         | Mobilization, very small equipment  | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | \$25.64         | 2        | \$51.28    |