

APPENDIX A

TABLES

SWITZLER CREEK WATERSHED Site No. 7 - REHABILITATION

Table A-1
Estimated Installation Cost ^{1/}
Switzler Creek Watershed Site 7, Kansas

Installation Cost Item, Federal Reconstruction (Recommended Plan)	PL 83-566 Funds	Other Funds	Total
Total Project	\$1,033,600	\$350,800	\$1,384,400

Notes:

1/ Price base 2009.

Sep-09

SWITZLER CREEK WATERSHED Site No. 7 - REHABILITATION

Table A-2
Estimated Cost Distribution – Structural 1/
Switzler Creek Watershed Site 7, Kansas

Item	Installation Costs – Public Law 83-566 3/					Installation Costs – Other Funds 4/					Total Installation Cost 2/
	Const.	Eng.	Land Rights	Project Admin.	Total PL 566	Const.	Eng.	Land Rights	Project Admin.	Total Non-Federal Cost	
Federal Reconstruction (Recommended Plan)	\$651,700	\$286,400	\$0	\$95,500	\$1,033,600	\$303,100	\$0	\$0	\$47,700	\$350,800	\$1,384,400

Notes:

- 1/ Price Base: 2009
- 2/ Total installation costs does not include NRCS planning costs
- 3/ 65% of total installation cost, not to exceed 100% of construction cost. Federal technical assistance is not cost-shared by the Sponsor
- 4/ 35% of total installation cost less Federal technical assistance

Sep-09

SWITZLER CREEK WATERSHED Site No. 7 - REHABILITATION

Table A-3
Structural Data – Dams with Planned Storage Capacity¹
Switzler Creek Watershed Site 7, Kansas

Item	Unit	No. 7
Class of structure		High
Seismic zone		2
Total drainage area	Sq. mi.	4.88
Runoff curve No. (1-day) (AMC II)		77
Time of concentration (T _c)	Hours	3.0
Elevation top dam ²	Feet	1101.1
Elevation crest auxiliary spillway	Feet	1093.5
Principal spillway crest elevation – open top weir	Feet	1079.3
Principal spillway crest elevation – low flow orifice	Feet	1075.0
Auxiliary spillway type		Vegetated
Auxiliary spillway bottom width	Feet	200
Auxiliary spillway exit slope	Percent	6
Maximum height of dam	Feet	41.1
Volume of fill ⁷	CY	181,620
Total Capacity	Acre-feet	2492
Sediment submerged	Acre-feet	48
Sediment aerated	Acre-feet	381
Floodwater retarding	Acre-feet	2063
Surface area		
Sediment pool ³	Acres	32.3
Floodwater retarding pool ⁴	Acres	206
Principal spillway design		
Rainfall volume (1-day)	Inches	8.0
Rainfall volume (10-day)	Inches	13.0
Runoff volume (10-day)	Inches	7.58
Capacity at auxiliary spillway crest elevation	CFS	119.5
Dimensions of conduit	Inches	30
Type of conduit		RCP
Frequency operation auxiliary spillway	% chance	1
Auxiliary spillway hydrograph ⁵		
Rainfall volume	Inches	11
Runoff volume	Inches	9.64
Storm duration	Hours	6
Velocity of flow (V _i)	Feet/second	2.4
Maximum reservoir water surface elevation	Feet	1094.0
Freeboard hydrograph		
Rainfall volume	Inches	35
Runoff volume	Inches	31.65
Storm duration	Hours	24
Maximum reservoir water surface elevation	Feet	1101.1
Capacity equivalents		
Principal spillway volume	Inches	0.43
Floodwater retarding volume	Inches	6.66

Notes:

- ¹ Data compiled: July 2009.
- ² The embankment will be raised approximately 5.6 feet.
- ³ Surface area at principal spillway crest elevation.
- ⁴ Surface area at auxiliary spillway crest elevation.
- ⁵ Auxiliary spillway hydrograph is also known as stability design hydrograph.
- ⁷ Approximately 65,400 CY of the total volume of fill is required for rehabilitation of the structure.

SWITZLER CREEK WATERSHED Site No. 7 - REHABILITATION

Table A-4
Estimated Average Annual Costs ^{1/}
Switzler Creek Watershed Site 7, Kansas

Evaluation Unit	Project Outlays		Total
	Amortization of Installation Cost	Operation, Maintenance, and Replacement Cost	
Federal Reconstruction (Recommended Plan)	\$62,100	\$3,800	\$65,900

Notes: Sep-09
 1/ Price Base: 2009, amortized over 101 years at a discount rate of 4.375 percent (authorized rate)
 2/ Total installation costs as outlined in Table 2

Table A-5
Estimated Average Annual Flood Damage Reduction Benefits
Switzler Creek Watershed Site 7, Kansas

	Average Annual Damages ^{3/}			Net Annual Damage Reduction Benefit
	Without Dam ^{4/}	Without Project (FWOP Plan)	With Project (Recommended Plan)	
Floodwater				
Crop and Pasture	\$31,200	\$14,200	\$14,200	\$0
Other Agricultural	\$12,300	\$7,000	\$7,000	\$0
Roads and Bridges	\$18,000	\$9,600	\$9,600	\$0
Nonagricultural	\$27,500	\$13,500	\$13,500	\$0
Subtotal	\$89,000	\$44,300	\$44,300	\$0
Erosion				
Flood Plain Scour	\$8,500	\$3,400	\$3,400	\$0
Total	\$97,500	\$47,700	\$47,700	\$0

Notes: Sep-09
 1/ Price Base: 2009 - Original plan damages were indexed to 2009 dollars.
 2/ Net Annual Damage Reduction Benefit compares the difference in benefits provided for this site between the No Federal Action – High Hazard and the Federal Reconstruction Alternative.
 3/ All damages listed are agricultural damages which includes damages to rural communities with populations less than 10,000, as per National Watershed Manual Section 504.40 (g). The population of Burlingame, portions of which are in Site 7 benefit area, is 1,017 (2000 Census).
 4/ Without dam column is to demonstrate floodwater damages would occur in the absence of Site 7.

Table A5-B
Estimated Average Annual Flood Damage Reduction Benefits ^{1/ 3/}
Associated with Switzler Creek Site 7, Kansas ^{2/}

	Average Annual Damages without Dam	Average Annual Damages with Dam	Net Damage Reduction Benefit
Federal Reconstruction (Recommended Plan)	97,500	\$47,700	\$49,800

Note: From Table D5-1 Sep-09
 1/ Price base 2009
 2/ This table illustrates that Site 7 is a floodwater retarding structure, and it rehabilitation will ensure the flood reduction benefits will occur for the next 100 years.
 3/ Refer to footnotes for A-5 regarding agricultural damages and indexing damages to 2009 dollars.

**Table A-6
Comparison of Benefits and Costs
Switzler Creek Watershed Site 7, Kansas**

Evaluation Unit	Average Annual Benefits			Average Annual Costs 5/	Benefit-Cost Ratio
	Flood Damage Reduction 3/	Intensification 4/	Total Average Annual Benefits		
Federal Reconstruction (Recommended Plan)	\$49,800	\$34,300	\$84,100	\$65,900	1.28

Notes:

- 1/ Price Base: 2009
- 2/ Benefits not analyzed above the 100-year frequency flood event.
- 3/ From Table A-5B
- 4/ From original plan. See Section 5.0 of Investigation and Analysis for more information.
- 5/ From Table A-4

Sep-09