APPENDIX F

PUMP STATION ELIMINATION CALCULATIONS AND COSTS

DE SOTO, KS SEWER MASTER PLAN
CONCEPT EVALUATION - Common Pump Station to Eliminate 5 Existing Stations

Basic Assumptions & Findings:

1 Build a single large pump station at the bottom of the floodplain bluff, to eliminate the following stations:
Timber Trails, Cedar Ridge, Lewis, Oak Drive, Sunset

2 Skaggs Pump Station is too far east with too many obstacles to cost effectively eliminate.

3 The new Common PS will be located with top above the 100-year floodplain.

Calculations for Sizing Interceptor Sewers and Pump Station

Note: The unit flow factor includes a 5.0 peaking factor and a developable area of 75%.

Pump Station Name	Exist Capacity - firm (gpm)	Basin Served (Comp. Plan)	Basin Area (ac)	Unit Flow Factor (gpm/ac)	Estimated Ult. Flow (gpm)	
Timber Trails	225	G (west)	**53.7**	**1.823**	98	Existing pumps appear to be way oversized.
Cedar Ridge	??? no data	G (east)	**113.7**	**1.823**	207	Area also includes south of Basin G
Lewis	100	F-1	**31**	**1.823**	57	
Oak Drive	100	F-2	**28.6**	**1.823**	52	
Sunset	42	F-3	**12.7**	**1.823**	23	
n/a	n/a	G-2	**11**	**1.823**	20	New area on ridge

Total Estimated Peak Flow for Common Pump Station: 250.7 ac 457 gpm

Note: Use a pump station capacity of: **500** gpm

To Estimate Size of New Pumps:

Pumps discharge into combined forcemain with NW pump station for Options 2 & 3.

Total dynamic head = **15** ft static + **40** ft friction/minor loss = 55 ft

Pump Motor Size = $\frac{500 \text{ gpm} \times 55 \text{ ft}}{3960 \text{ conv} \times 0.6 \text{ pump eff}}$ = 11.57 Hp

Say pump motor size= 15 Hp

DE SOTO, KS SEWER MASTER PLAN
Cost Estimate for Gravity Sewers to Eliminate 5 Existing Stations

Notes: 1 This estimate covers the gravity sewer system required to eliminate the 5 pump stations west of Penner Ave.
2 The system extends only to first manhole across (north of) the railroad tracks that run along the river valley.
3 The cost of the downstream pump station or gravity interceptor is not included here - but under the three Master Plan Options.

Description	Quantity	Unit	Unit Cost	Total Cost	Subtotal
Timber Trails					
8-inch PVC Interceptor	1,850	LF	$ 45	$ 83,250	
Manholes	5	EA	$ 2,000	$ 10,000	
Decommission Existing Pump Station	1	LS	$ 10,000	$ 10,000	
Subtotal				$ 103,250	
Contingency, Engineering & Survey, Admin, Legal (CELA)			35%	$ 36,138	
				$ 139,388	
Cedar Ridge (includes main interceptor across tracks)					
10-inch PVC Interceptor	1,900	LF	$ 50	$ 95,000	
Manholes	5	EA	$ 2,000	$ 10,000	
Decommission Existing Pump Station	1	LS	$ 10,000	$ 10,000	
12-inch PVC Interceptor (Across RR tracks)	400	LF	$ 55	$ 22,000	
Bore & Jack Casing across RR tracks, say 18" dia.	150	LF	$ 200	$ 30,000	
Subtotal				$ 167,000	
Contingency, Engineering & Survey, Admin, Legal (CELA)			35%	$ 58,450	
				$ 225,450	
Lewis (also includes common portion of 10")					
8-inch PVC Interceptor	1,500	LF	$ 45	$ 67,500	
Manholes	5	EA	$ 2,000	$ 10,000	
Decommission Existing Pump Station	1	LS	$ 10,000	$ 10,000	
10-inch PVC Interceptor	400	LF	$ 50	$ 20,000	
Subtotal				$ 107,500	
Contingency, Engineering & Survey, Admin, Legal (CELA)			35%	$ 37,625	
				$ 145,125	
Oak Drive				$ 145,125	
8-inch PVC Interceptor	900	LF	$ 45	$ 40,500	
Manholes	3	EA	$ 2,000	$ 6,000	
Decommission Existing Pump Station	1	LS	$ 10,000	$ 10,000	
Subtotal				$ 56,500	
Contingency, Engineering & Survey, Admin, Legal (CELA)			35%	$ 19,775	
				$ 76,275	
Sunset					
8-inch PVC Interceptor	2,000	LF	$ 45	$ 90,000	
Manholes	7	EA	$ 2,000	$ 14,000	
Decommission Existing Pump Station	1	LS	$ 10,000	$ 10,000	
Subtotal				$ 114,000	
Contingency, Engineering & Survey, Admin, Legal (CELA)			35%	$ 39,900	
				$ 153,900	
TOTAL PROJECT COST TO ELIMINATE THE 5 PUMP STATIONS:				**$ 740,000**	

Operation, Maintenance, & Replacement Costs

Existing Pump Station Operation, Maintenance, & Replacement

Category	Item				Quantity	Unit	Unit Cost		Total Cost
Operation & Maint Labor	5 pump stations x	3 hr/wk x	52 wk/yr x		$ 20.00	/ hr direct + indirect =		$	15,600
Electrical Power					99,750	kW-hr/ yr	$ 0.07	$	6,982
Equipment Maint & Replacement					1	LS	$ 36,208	$	36,208
Routine maintenance & misc. parts - grease, electronics, filters, etc.					1	LS	$ 1,000	$	1,000
TOTAL								$	59,791
Present worth factor (P/A) f	5.0% ,	n =	20 years :						12.462
20-YEAR PRESENT WORTH OF O & M COSTS								**$**	**745,123**
Present worth factor (P/A) f	5.0% ,	n =	50 years :						18.256
50-YEARPRESENT WORTH OF O & M COSTS								**$**	**1,091,532**