

APPENDIX B

Cost Data

AVERAGE STORM DRAIN SYSTEM COST PER FOOT

Table Updated By: **GJP**
 Consultant: **Hansen, Allen & Luce, Inc.**
 Date Updated: **1/25/2022**

Year: **2022**
 Reference: **2019 RSMMeans Heavy Construction Cost Data**
 RSMMeans "Location Factor" for Salt Lake City: **100.0%**

Diameter (in)	Diameter (ft)	Outside Diameter (ft)	Material	RS Means Item #	Pipe Material & Installation (1)	Excavation (\$/cy)	Imported Bedding (\$/cy)	Hauling Excess Native Mat'l (\$/cy)	Trench Backfill Installed ² (\$/cy)	Trench Box (\$/day)	Average Daily Output (ft/day)	# Trench Box Days Req'd	Top Trench Width (ft)	Road Repair Width (ft)	Asphalt Cost (\$/lf)	Manhole Cost (\$/lf)	Inlet Cost (\$/lf)	Curb & Gutter Cost (\$/lf)	Utility Relocation (\$/lf)	Trench Dewatering ³ (\$/lf)	Total Pipe Cost (\$/lf)	Adjusted Pipe Cost (\$/lf)	Pipe Cost Out of Street ³ (\$/lf)	Pipe Cost Out of Street w/ NO inlets (\$/lf)
15	1.3	1.46	RCP	2020	\$45.90	5.31	19.58	7.83	7.12	179.97	150	1.20	4.86	8.86	35.78	15.75	16.9	22.16	0	18.23	196	196	147	130
18	1.5	1.75	RCP	2030	\$53.08	5.98	22.15	8.82	7.57	179.97	132	1.36	5.15	9.15	36.78	15.75	16.9	22.16	0	19.97	211	211	161	144
21	1.8	2.04	RCP	2035	\$60.42	6.69	24.79	9.86	8.03	179.97	120	1.50	5.44	9.44	37.78	15.75	16.9	22.16	0	21.53	225	225	175	159
24	2.0	2.33	RCP	2040	\$73.86	7.43	27.48	10.97	8.48	179.97	100	1.80	5.73	9.73	38.78	15.75	16.9	22.16	0	24.14	248	248	197	180
27	2.3	2.63	RCP	2045	\$107.39	8.22	30.24	12.13	8.94	179.97	92	1.96	6.03	10.03	39.77	15.75	16.9	22.16	0	25.83	289	289	238	222
30	2.5	2.92	RCP	2050	\$120.92	9.05	33.06	13.35	9.40	179.97	88	2.05	6.32	10.32	40.77	15.75	16.9	22.16	0	27.09	311	311	259	242
33	2.8	3.21	RCP	n/a ⁽¹⁾	\$150.04	9.92	35.94	14.63	9.85	179.97	80	2.25	6.61	10.61	41.77	15.75	16.9	22.16	0	29.09	348	348	297	280
36	3.0	3.50	RCP	2060	\$179.15	10.83	38.89	15.97	10.31	179.97	72	2.50	6.90	11.00	43.11	20.59	16.9	22.16	40	31.38	432	432	339	322
42	3.5	4.08	RCP	2070	\$231.72	12.77	44.96	18.83	11.22	179.97	72	2.50	7.48	11.48	44.77	20.59	16.9	22.16	40	32.76	499	499	406	389
48	4.0	4.67	RCP	2080	\$284.82	14.87	51.29	21.93	12.13	179.97	64	2.81	8.07	12.07	46.77	29.75	16.9	22.16	40	36.15	580	580	485	469
54	4.5	5.25	RCP	2085	\$305.82	17.13	57.86	25.26	13.05	179.97	56	3.21	8.65	12.65	48.76	29.75	16.9	22.16	110	40.10	690	690	525	508
60	5.0	5.83	RCP	2090	\$358.42	19.55	64.68	28.83	13.96	179.97	48	3.75	9.23	13.23	50.76	56.28	16.9	22.16	110	44.91	790	790	624	607
66	5.5	6.42	RCP	n/a ⁽¹⁾	\$425.30	22.13	71.75	32.64	14.87	179.97	44	4.09	9.82	13.82	52.76	56.28	16.9	22.16	110	48.47	877	877	710	694
72	6.0	7.00	RCP	2100	\$492.17	24.87	79.07	36.68	15.78	179.97	40	4.50	10.40	14.40	54.76	56.28	16.9	22.16	110	52.47	966	966	798	781
78	6.5	7.58	RCP	n/a ⁽¹⁾	\$620.66	27.77	86.63	40.96	16.69	179.97	36	5.00	10.98	14.98	56.76	56.28	16.9	22.16	110	57.05	1117	1117	948	931
84	7.0	8.17	RCP	2120	\$749.14	30.83	94.44	45.48	17.61	179.97	32	5.62	11.57	15.57	58.75	56.28	16.9	22.16	110	62.43	1270	952	1100	1083
5' x 4' box	5.0	6.00	RCP		\$752.10	18.14	48.44	26.76	14.22	179.97	140	1.29	9.40	13.40	51.33	15.75	16.9	22.16	110	29.53	1107	1107	940	923
8' x 5' box	8.0	9.00	RCP		\$940.13	32.65	71.39	48.17	18.91	179.97	113	1.59	12.40	16.40	61.61	15.75	16.9	22.16	110	38.60	1378	1378	1207	1190
9' x 5' box	8.0	10.00	RCP		\$1,195.84	35.37	73.94	52.17	20.47	179.97	113	1.59	13.40	17.40	65.03	15.75	16.9	22.16	130	40.96	1670	1670	1478	1461
10' x 5' box	8.0	11.00	RCP		\$1,338.74	38.08	76.49	56.17	22.04	179.97	113	1.59	14.40	18.40	68.46	15.75	16.9	22.16	140	43.33	1840	1840	1636	1619
10' x 6' box	8.0	11.00	RCP		\$1,376.34	38.08	76.49	56.17	22.04	179.97	113	1.59	14.40	18.40	68.46	15.75	16.9	22.16	140	43.33	1877	1877	1673	1656
12' x 6' box	8.0	13.00	RCP		\$1,579.41	43.50	81.59	64.17	25.16	179.97	113	1.59	16.40	30.00	108.19	15.75	16.9	44.33	150	48.06	2179	2179	1906	1889
8' x 8' box	8.0	9.00	RCP		\$955.17	32.65	71.39	48.17	18.91	179.97	100	1.80	12.40	16.40	61.61	15.75	16.9	22.16	120	39.92	1404	1404	1223	1207

1 - Cost of Pipe Material & Installation interpolated between sizes. Costs may be higher because they are odd sizes. Box Culvert costs using Means 2019 and 2021 Geneva Pipe prices

2. Backfill Material & Installation assumes in street. For out of street unit costs, the backfill material cost has been added in place of base course and asphalt.

3. Dewatering assumes 1' stabilization gravel at the bottom of the trench plus dewatering pumps

ASSUMPTIONS:

Y	Total Import Trench Backfill? (Y/N)
Y	Dewatering? (Y/N)
Y	Catch Basins & Inlets? (Y/N)
	One side of street C&G is regraded (30' street).
10	v:1h trench side slope (use trench boxes)
3	Average depth to top of pipe (ft)
0.33	Thickness of asphalt road covering (ft)
0.75	Thick untreated base course (ft)
200	Average distance between manholes (ft)
3	Bottom trench width in excess of Pipe Dia (ft)
1	Bedding over pipe (ft)
0.5	Bedding under pipe (ft)
1	# Inlets per 100 ft of pipe
30%	Percent of curb & gutter on a radius (ft)

Costs:	Unit Cost	Cost Basis	Item #	Section	Item Name
\$ 45.89	\$/CY Import Trench Backfill using Imported Select Fill				
	\$ 2.94	\$/cy	3020	31 23 16.13	Backfill
	\$ 1.32	\$/cy	6020	31 23 23.23	Compaction
	1.39			Calculated	Loose to compacted volume Conversion Factor - 125 pcf compacted / 90 pcf loose = 1.39
\$ 45.89	\$/CY Imported Select Fill				
	\$ 22.93	\$/cy	0200	31 23 23.16	Fill Borrow and Utility Bedding - Sand, dead or bank
	\$ 6.44	\$/cy	0500	31 23 23.16	Fill Borrow and Utility Bedding - Compacted Bedding in Trench
	\$ 5.07	\$/cy	4022	31 23 23.20	Hauling
	1.39			Calculated	Loose to compacted volume Conversion Factor
\$ 6.37	\$/CY Excavation				
	\$ 6.37	\$/cy	1375	31 23 16.13	Excavating, Trench
\$ 30.82	\$/SY 4" Asphalt Pavement				
	\$ 9.03	\$/sy	0390	32 11 23.23	Base Course - Base Course Drainage Layers
	\$ 9.08	\$/sy	0120	32 12 16.13	Plant Mix Asphalt Paving, Binder Course
	\$ 10.17	\$/sy	0380	32 12 16.13	Plant Mix Asphalt Paving, Wearing Course
	\$ 5.07	\$/cy	4022	31 23 23.20	Hauling
	1.39			Calculated	Loose to compacted volume Conversion Factor
\$ 2.72	\$/LF 4" Asphalt cutting				
	\$ 1.73	\$/lf	0015	02 41 19.25	Selective Demolition, Saw Cutting
	\$ 0.99	\$/lf	0020	02 41 19.25	Selective Demolition, Saw Cutting

\$ 3,150.29	\$/EA 4' Manhole (for pipes =< 2.5' diameter)				
	\$ 3,150.29	\$ each	1130	33 05 61.10	Storm Drainage Manholes, Frames and Covers
	\$ 256.15	\$ each	1140	33 05 61.10	Storm Drainage Manholes, Frames and Covers (Added Cost for depth < 8')
\$ 4,118.18	\$/EA 5' Manhole (for pipes > 2.5' and <= 3.5')				
	\$ 4,118.18	\$ each	1170	33 05 61.10	Storm Drainage Manholes, Frames and Covers
	\$ 646.00	\$ each	1180	33 05 61.10	Storm Drainage Manholes, Frames and Covers (Added Cost for depth < 8')
\$ 5,950.00	\$/EA 6' Manhole (for pipes > 3.5' and <= 4.5')				
	\$ 7,504.28	\$ each	1210	33 05 61.10	Storm Drainage Manholes, Frames and Covers, Concrete, Cast-in-Place
	\$ 675.91	\$ each	1220	33 05 61.10	Storm Drainage Manholes, Frames and Covers (Added Cost for depth < 8')
\$ 11,256	\$/EA Manholes (for pipes > 4.5')				
	\$ 7,504.28	\$ each	1210	33 05 61.10	Storm Drainage Manholes, Frames and Covers, Concrete, Cast-in-Place
	1.5				Factor for Custom Build > 4.5' diameter pipes
\$ 1,694.17	\$/EA Catch basins				
	\$ 1,694.17	\$ each	1582	33 42 33.13	Catch Basin
\$ 22.16	\$/LF Curb & Gutter - Calculated based on percentage of C&G on radius.				
	\$ 19.13	\$/lf	0440	32 16 13.13	Cast-on-Place Concrete Curbs and Gutters
	\$ 20.88	\$/lf	0441	32 16 13.13	Cast-on-Place Concrete Curbs and Gutters
	\$ 9.03	\$/sy	0390	32 11 23.23	Base Course Drainage Layers
	\$ 2.51	\$/lf			Conversion from SY to LF
\$ 9.40	\$/CY Hauling				
	\$ 6.76	\$/cy	4622	31 23 23.20	Cast-on-Place Concrete Curbs and Gutters
	1.39		Calculated		Loose to compacted volume Conversion Factor
\$ 179.97	\$/day Trench Box				
	\$ 179.97	\$/day	4500	31 52 16.10	Trench Box 7' deep, 16' x 8'
\$ 63.90	\$/CY Stabilization Gravel				
	\$ 36.27	\$/cy	0050	31 23 23.16	Fill by Borrow and Utility Bedding
	\$ 6.44	\$/cy	0500	31 23 23.16	Fill Borrow and Utility Bedding - Compacted Bedding in Trench
	\$ 5.07	\$/cy	4022	31 23 23.20	Hauling
	1.39		Calculated		Loose to compacted volume Conversion Factor
\$ 1,152.00	\$/day Dewatering				
	\$ 1,035.60	\$/day	1000	31 23 19.20	Dewatering Systems
	\$ 127.00	\$/day	1020	31 23 19.20	Dewatering Systems, Additional Pumps