

Appendix B

Cost Estimates

- B . 1 Alternative C - Detention in Medians**
- B . 2 Alternative C - Detention in Upsized Adirondack Trail Pond**
- B . 3 Alternative A - Detention in Medians**
- B . 4 Rain Gardens**
- B . 5 Water System Upgrades**
- B . 6 Life Cycle Maintenance**



B.1 Alternative C - Detention in Medians

Date Created

7/19/2018

Date Revised

Date

Checked by

Initials

CIVIL PROJECT BUDGET ESTIMATE

PROJECT CHARTER ATTACHMENT A

NOTE: Refer to the Project Charter or Construction Cost Estimate for goals and initial scope of work

Project Name

Spicewood Springs Rd - Alternate C with on-site detention in medians

Department

PWD

CIP ID

11880.001

Category

Mobility Infrastructure

Index²¹

11069

Class²⁰

Class 4 Cost Estimate - Preliminary Engineering Report (PER) (-20% to 30%)

2800 - ARCHITECTURE/ ENGINEERING (A/E)		14%	\$2,335,419.80
CONSULTANTS		\$1,178,410.80	
5590	A/E Basic Services ²	\$1,178,410.80	
INTERDEPARTMENTAL CHARGES		\$1,157,009.00	
6237	PWD Project Management Services (PMD) ³	\$491,004.50	
6238	PWD Construction Services (CSD) ³	\$491,004.50	
6203	Sponsor Department Charges ⁴	\$175,000.00	
2801 - SURVEYING⁵		1%	\$103,110.95
2802 - TESTING		1%	\$211,761.62
5730	Construction Material Testing ⁶	\$98,200.90	
5730	Geotechnical Report ⁷	\$78,560.72	
5588	Hazardous Material Testing ⁸	\$0.00	
5588	Environmental Assessment ⁹	\$35,000.00	
2803 - INSPECTIONS		0%	\$0.00
2804 - CONSTRUCTION (see detailed cost estimate)		59%	\$9,820,090.00
5560	New Construction ¹	\$9,604,000.00	
5600	Hazardous Material Abatement ¹⁸	\$0.00	
6324	ROCIP ¹⁹	\$216,090.00	
2805 - LAND & RIGHT-OF-WAY¹¹		0%	\$0.00
2806 - MISCELLANEOUS		1%	\$165,123.72
5580	Debt Issuance ¹³	\$91,473.05	
6843	Permits/ Fees ¹⁴	\$73,650.68	
7157	GAATN Connection ¹⁵	\$0.00	
2807 - EQUIPMENT/FURNISHINGS¹⁶		0%	\$0.00
2808 - MATERIALS		0%	\$0.00
2809 - ART IN PUBLIC PLACES (Rounded to nearest \$100)¹²		1%	\$249,400.00
PROJECT SUB-TOTAL			\$12,793,433.04
COST CONTINGENCY (Based on project risk analysis)		Risk Probability % ¹⁰ 30.00%	23% \$3,838,029.91
TOTAL PROJECT BUDGET ESTIMATE (Rounded to nearest \$1,000)		100%	\$16,723,000.00

CLASS 4 COST ESTIMATE ACCURACY RANGE LOW (-20%) to HIGH (30%)
 \$13,378,400.00 to \$21,739,900.00

FOOTNOTES (Assumptions & Constraints)

- 1 The construction cost estimate is based on the detailed estimate provided by <name> with <company> dated <mm/dd/yyyy>. The detailed estimate includes a description of the project scope, assumptions, exclusions and source/ references for all cost information.
- 2 The A/E design budget estimate is based on historical City of Austin actual costs per construction value. It includes reimbursable expenses and all services from conceptual through warranty phases. This estimate excludes additional services.
- 3 Project management and construction services budget estimates are based on historical City of Austin - Public Works actual costs per construction value.
- 4 The Sponsoring department has chosen to charge their project management time to the project. This budget estimate is provided by <name> with <department> dated <mm/dd/yyyy> and accounts for management through all phases of the project life cycle.
- 5 The survey cost estimate is based on a historical average of City of Austin - Public Works actual costs per construction value.
- 6 The material testing cost estimate is based on a historical average of City of Austin - Public Works actual costs per construction value.
- 7 The geotechnical cost estimate is based on a historical average of City of Austin - Public Works actual costs per construction value.
- 8 The cost estimate for hazardous testing for asbestos, lead and mold is based on a historical average of City of Austin - Public Works actual costs per construction value. <This cost is included in the 'Environmental Assessment' budget line.>
- 9 The cost estimate for an Environmental Phase 1 assessment is based on historical averages of City of Austin - Public Works actual costs per construction value. <This cost estimate includes the testing for hazardous materials.>
- 10 When estimating the cost for a project, there is always uncertainty as to the precise content of all items in the estimate, how work will be performed, what work conditions will be like when the project is implemented and so on. These uncertainties are risks to the project. Some refer to these risks as "known-unknowns" because the estimator is aware of them, and based on past experience, can even estimate their probable costs, or in this case, the 'Risk Probability %'. The estimated costs of the known-unknowns is referred to by cost estimators as cost contingency. The Cost Contingency amount is calculated by multiplying the Risk Probability % by the 'Project Sub-Total' which excludes the 'Debt Issuance'.
- 11 The land acquisition cost estimate is based on average real estate prices per zip code and is provided by <name> of the Real Estate Office dated <mm/dd/yyyy>.
- 12 As required by the 1985 City Ordinance (No. 850926-0; amended by No. 861009-A; amended by No. 970904-B; Austin City Code Volume 1, Title IX, Chapter 9-2).
- 13 This amount is not included in the subtotal for '2806 - Miscellaneous'. It is instead included in the Total Project Budget Estimate.
- 14 Permits/ fees includes costs for site development, building and demolition permits, LEED certification, TDLR requirements and any others.
- 15 The GAATN connection cost estimate is based on the detailed estimate provided by <name> with CTM dated <mm/dd/yyyy>. Assumes a specific site exits to determine the scope of work.
- 16 The budget line for equipment/ furniture (FF&E) includes costs for office furniture, equipment, data and voice, audio/ visual solutions, and security. See attached breakdown of the budget estimate for each cost.
- 17 Not used.
- 18 Demolition is required and the area may contain hazardous material. This cost estimate is provided by <name> with Building Services dated <mm/dd/yyyy>. It includes the cost of abatement before demolition can begin and is separate from the construction contract.
- 19 Rolling Owner Controlled Insurance Program (ROCIP)
- 20 The cost estimate classification is to align the project budget estimate with the phase of design scope development and decision making process. The five (5) class levels provides a summary of the maturity level of project definition (i.e., 30% or PER) characteristic. The maturity is roughly indicated by a percentage of complete definition, or design phase; however, it is the maturity of the defining design deliverables that is the determinant, not the percent or design phase. The specific deliverables, and their maturity or status are provided in the Construction Cost Estimating instructions. The percentage range in parenthesis represents the variation of the cost estimate from actual costs. The budget estimate uses the highest value of the range and is reflected in the Contingency's costs. The contingency level reduces as the design matures to a Class 1.
- 21 The base index represents the Engineering News-Record's Building Cost Index (BCI) for the month the budget estimate is created and accepted. The index is used to validate the escalation rate to improve the cost estimating processes.

Spicewood Springs Road Reconstruction Preliminary Phase Cost Estimate Summary Class 4 Cost Estimate

Roadway Construction - Alternative C with on-site detention in medians	
Street Improvements ¹	\$ 6,007,000
Austin Energy Relocation ²	\$ 600,000
On-site Stormwater Detention ³	\$ 1,733,000
Rain Gardens for Water Quality ⁴	\$ 895,000
Roadway Items	\$ 9,235,000
	\$ -
Mobilization percent	4%
Mobilization	\$ 369,000
	\$ -
Total Roadway Construction Cost Estimate⁵	\$ 9,604,000

Notes:

1. Street improvements include roadway widening, 25-foot wide raised medians, shared use path traffic control, landscape irrigation, temporary traffic lane during construction
2. The Austin Energy relocation cost estimate is Class 5 (Concept Screening)
3. The On-site Detention cost includes storm drain pipes and inlets, detention in the proposed medians, and detention at the southeast corner of Old Spicewood Springs Road and Spicewood Springs Road.
4. Rain garden are located in the proposed medians and at the southeast corner of Old Spicewood Springs Rd and Spicewood Springs Rd. The rain garden cost includes an underdrain system with full plantings. The cost could be lower for a different planting plan.
5. Unit cost data is derived from COA bid tabs from November 2007 through October 2017.

**Cost estimate for Street Improvement items - Alternative C - two lanes in each direction
with raised median and left turn bays at limited locations**

Ref: DI layers on: [SSRD-COST-EST-Alt3-KD.dwg](#)

Date: June 2018

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-</u>	<u>60800</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness</u>	\$ 11.01	\$ 669,509.33
<u>433S-C:</u>	<u>23515</u>	<u>SF</u>	<u>Type II P.C. Concrete Driveway</u>	\$ 9.45	\$ 222,242.88
<u>110S:</u>	<u>1481</u>	<u>CY</u>	<u>Street Excavation - Temporary lane during consturction</u>	\$ 40.00	\$ 59,259.26
<u>201S:</u>	<u>4444</u>	<u>SY</u>	<u>Subgrade Preparation - Temporary lane during construction</u>	\$ 8.50	\$ 37,777.78
<u>210S-A:</u>	<u>1235</u>	<u>CY</u>	<u>Flexible Base, 10" - Temporary lane during construction</u>	\$ 47.13	\$ 58,179.01
<u>340S-B:</u>	<u>4444</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 2 in, Type C - Temporary lane during construction</u>	\$ 29.12	\$ 129,439.08
<u>210S-A:</u>	<u>211</u>	<u>CY</u>	<u>Flexible Base, 13" - hill buffer</u>	\$ 47.13	\$ 9,926.79
<u>340S-B:</u>	<u>583</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - hill buffer</u>	\$ 24.46	\$ 14,266.14
<u>430S-B</u>	<u>2100</u>	<u>LF</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading) - hill buffer</u>	\$ 25.41	\$ 53,356.15
<u>608S-2:</u>	<u>1</u>	<u>LS</u>	<u>Irrigation System</u>	\$ 30,000.00	\$ 30,000.00
	<u>36</u>	<u>MO</u>	<u>Landscape Maintenance and watering during construction</u>	\$ 1,074.00	\$ 38,664.00

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>641S:</u>	<u>2</u>	<u>EA</u>	<u>Stabilized Construction Entrance</u>	\$ 1,735.70	\$ 3,471.39
	<u>15</u>	<u>EA</u>	<u>Elect MH adjustment</u>	\$ 450.00	\$ 6,750.00
<u>704</u>	<u>620</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 33,893.33
<u>704-T</u>	<u>2</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 1,569.00
<u>432-PRC</u>	<u>620</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 55,983.52
<u>803S-MO:</u>	<u>720</u>	<u>CD</u>	<u>Barricades, Signs, and Traffic Handling</u>	\$ 750.00	\$ 540,000.00
					\$ -
<u>829S-G:</u>	<u>32</u>	<u>EA</u>	<u>Type II Bicycle Lane (Bike Rider) Symbol, white in color</u>	\$ 202.98	\$ 6,495.41
<u>829S-G:</u>	<u>8</u>	<u>EA</u>	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, arrow symbol</u>	\$ 202.98	\$ 1,623.85
					\$ -
<u>210S-A:</u>	<u>363</u>	<u>CY</u>	<u>Flexible Base, 13" - intersection</u>	\$ 47.13	\$ 17,122.87
<u>340S-B:</u>	<u>1052</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - intersection</u>	\$ 24.46	\$ 25,733.39
<u>210S-A:</u>	<u>485</u>	<u>CY</u>	<u>Flexible Base, 13" - left bay</u>	\$ 47.13	\$ 22,878.90
<u>340S-B:</u>	<u>1344</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - left bay</u>	\$ 24.46	\$ 32,880.05
					\$ -

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>506</u>	<u>18</u>	<u>EA</u>	<u>WWMH Height adjustments</u>	\$ 1,552.00	\$ 27,936.00
<u>504</u>	<u>112</u>	<u>EA</u>	<u>Valve, meter box, pull box, etc adjustments</u>	\$ 414.94	\$ 46,473.12
				\$	-
<u>414S-C</u>	<u>274</u>	<u>CY</u>	<u>Concrete Retaining Walls east of Adiorndak, north side only</u>	\$ 600.00	\$ 164,693.33
<u>414S-C</u>	<u>166</u>	<u>CY</u>	<u>Concrete Retaining walls west of Vet Clinic near drive to 4614 SSRD</u>	\$ 600.00	\$ 99,645.33
				\$	-
<u>201S:</u>	<u>342</u>	<u>SY</u>	<u>Subgrade Preparation</u>	\$ 8.50	\$ 2,904.17
<u>210S-A:</u>	<u>123</u>	<u>CY</u>	<u>Flexible Base, 13"</u>	\$ 47.13	\$ 5,814.27
<u>340S-B:</u>	<u>342</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	\$ 8,355.88
<u>414S-C</u>	<u>635</u>	<u>CY</u>	<u>Concrete Retaining walls, both sides of road</u>	\$ 600.00	\$ 380,944.44
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb Ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-6:</u>	<u>9840</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness , both sides</u>	\$ 11.01	\$ 108,354.80
<u>704</u>	<u>1230</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 67,240.00
<u>704-T</u>	<u>4</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 3,138.00
	<u>1230</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 111,064.08

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
					\$ -
	<u>580</u>	<u>EA</u>	<u>Tree Mitigation - 2" tree</u>	\$ 325.00	\$ 188,621.88
	<u>4000</u>	<u>LF</u>	<u>Typical Roadway cross-section</u>	\$ 676.30	\$ 2,705,212.32
TOTAL STREET IMPROVEMENTS					\$ 6,006,625.30

Price per Liner Foot for typical roadway cross-section - Alternative C - two lanes in each direction with raised median and left turn bays at limited locations

DI layers on

[SSRD-COST-EST-Alt3-KD.dwg](#)

Ref:

Date: June 2018

Notes: Cost for typical Modified Alt 3 cross-section (MAD-4 modified to fit in existing ROW)

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
<u>101S-A:</u>	<u>Preparing right-of-way</u>	\$ 4,286.67	<u>AC</u>	\$ 0.10	<u>SF</u>	80	\$ 7.87
<u>110S:</u>	<u>Street Excavation</u>	\$ 40.00	<u>CY</u>	\$ 1.48	<u>CF</u>	152	\$ 225.00
<u>201S:</u>	<u>Subgrade Preparation</u>	\$ 8.50	<u>SY</u>	\$ 0.94	<u>SF</u>	81	\$ 76.50
<u>210S-A:</u>	<u>Flexible Base, 13"</u>	\$ 47.13	<u>CY</u>	\$ 1.75	<u>CF</u>	65.0	\$ 113.45
<u>340S-B:</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	<u>SY</u>	\$ 2.72	<u>SF</u>	44.0	\$ 119.56
<u>430S-B</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading)</u>	\$ 25.41	<u>LF</u>	\$ 25.41	<u>LF</u>	4	\$ 101.63
<u>602S</u>	<u>Sodding</u>	\$ 7.97	<u>SY</u>	\$ 0.89	<u>SF</u>	16	\$ 14.17

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
604S-C:	<u>Native Seeding for Erosion Control, Mulch</u>	\$ 1.91	<u>SY</u>	\$ 0.21	<u>SF</u>	11	\$ 2.33
642S:	<u>Silt Fence for Erosion Control</u>	\$ 2.59	<u>LF</u>	\$ 2.59	<u>LF</u>	2	\$ 5.18
871S-A:	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, 4" wide, white</u>	\$ 2.65	<u>LF</u>	\$ 2.65	<u>LF</u>	4	\$ 10.61
Total Estimated Cost per LF for typical cross section							\$ 676.30

*For items measured by LF, this column represents the number of times the item appears in the cross-section
For items measured by CF, this column represents the cross-sectional area of the item
For items measured by SF, this column represents the cross-sectional width of the item

1.00 AC 43560 SF
1.00 SY 9 SF
1.00 CY 27 CF

Ref

..\DWG\Reference_Files\DWG\X-SSRD-C-STRM-ONSITE.dwg**Cost Estimate for Alternative C with On-site detention in the medians****Storm Drain**

Bid Item	Quantity	Unit	Description		Est. Unit Price	Est. Amount
<u>508S-IG:</u>	<u>4</u>	<u>EA</u>	<u>Area/grate Inlet,</u>		\$ 4,238.89	\$ 16,955.56
<u>508S-I5S</u>	<u>6</u>	<u>EA</u>	<u>Curb inlet, 10 ft</u>		\$ 4,856.82	\$ 101,073.08
	<u>1</u>	<u>EA</u>	<u>Remove/replace area inlet at Realty Board</u>		\$ 5,000.00	\$ 5,000.00
	<u>3</u>	<u>LS</u>	<u>level spreader outfall</u>		\$ 5,000.00	\$ 15,000.00
	<u>8</u>	<u>LS</u>	<u>outfall structure/energy dissipator</u>		\$ 1,500.00	\$ 12,000.00
<u>510-A:</u>			<u>Pipe, 36" Dia. RCP (all depths), including Excavation and Backfill</u>			
	<u>115</u>	<u>LF</u>			\$ 291.58	\$ 33,531.35
<u>510-A:</u>			<u>Pipe, 24" Dia. RCP (all depths), including Excavation and Backfill</u>			
	<u>1515</u>	<u>LF</u>			\$ 262.50	\$ 397,687.50
<u>510-A:</u>			<u>Pipe, 18" Dia. RCP (all depths), including Excavation and Backfill</u>			
	<u>1290</u>	<u>LF</u>			\$ 156.07	\$ 201,327.95
Storm drain for ON-site detention =						\$ 782,575.43

Cost Estimate for Alternative C with On-site detention in the medians

Detention Ponds

Pond Vol

	Max Depth (FT)	Top Area (AC)	AC-FT
Pond -MED3-1	4.5	0.125	0.56
Pond-MED5-4	2.6	0.08	0.21
Pond-MED5-5	3.4	0.045	0.15

Total Pond Vol = 0.92 AC-FT
 40228 CF
 1490 CY

Pond Cost

Note: Cost estimate is based on 6 ponds in the medians and one pond at the corner of Old SSRD and SSRD

	Quantity	Unit	Unit Cost	
Excavation	1490	CY	\$ 50.00	\$ 74,495.67
Area inlets	6	EA	\$ 4,238.89	\$ 25,433.33
outflow structure	1	EA	\$ 10,000.00	\$ 10,000.00
pond walls	66	CY	\$ 600.00	\$ 39,555.56
inflow pad	7	EA	\$ 1,500.00	\$ 10,500.00
Mortared Limestone	5059	SF	\$ 140.00	\$ 708,224.48
maint access pad	8750	SF	\$ 9.45	\$ 82,697.22
Total Pond Cost =			\$	950,906.26

Total for ON-site Detention \$ 1,733,481.70
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B.2 Alternative C - Detention in Upsized Adirondack Trail Pond

Date Revised

Date

Checked by

Initials

CIVIL PROJECT BUDGET ESTIMATE

PROJECT CHARTER ATTACHMENT A

NOTE: Refer to the Project Charter or Construction Cost Estimate for goals and initial scope of work

Project Name	Spicewood Springs Rd - Alternate C with off-site detention in upsized Adirondack pond		
Department	PWD	CIP ID	11880.001
Category	Mobility Infrastructure	Index ²¹	11069
Class ²⁰	Class 4 Cost Estimate - Preliminary Engineering Report (PER) (-20% to 30%)		

2800 - ARCHITECTURE/ ENGINEERING (A/E)		12%	\$2,293,489.12
CONSULTANTS		\$1,103,379.75	
5590	A/E Basic Services ²	\$1,103,379.75	
INTERDEPARTMENTAL CHARGES		\$1,190,109.37	
6237	PWD Project Management Services (PMD) ³	\$507,554.69	
6238	PWD Construction Services (CSD) ³	\$507,554.69	
6203	Sponsor Department Charges ⁴	\$175,000.00	
2801 - SURVEYING⁵		0%	\$82,753.48
2802 - TESTING		1%	\$217,057.66
5730	Construction Material Testing ⁶	\$99,304.18	
5730	Geotechnical Report ⁷	\$82,753.48	
5588	Hazardous Material Testing ⁸	\$0.00	
5588	Environmental Assessment ⁹	\$35,000.00	
2803 - INSPECTIONS		0%	\$0.00
2804 - CONSTRUCTION (see detailed cost estimate)		58%	\$11,033,797.50
5560	New Construction ¹	\$10,791,000.00	
5600	Hazardous Material Abatement ¹⁸	\$0.00	
6324	ROCIP ¹⁹	\$242,797.50	
2805 - LAND & RIGHT-OF-WAY¹¹		3%	\$528,000.00
2806 - MISCELLANEOUS		1%	\$164,277.11
5580	Debt Issuance ¹³	\$103,591.23	
6843	Permits/ Fees ¹⁴	\$60,685.89	
7157	GAATN Connection ¹⁵	\$0.00	
2807 - EQUIPMENT/FURNISHINGS¹⁶		0%	\$0.00
2808 - MATERIALS		0%	\$0.00
2809 - ART IN PUBLIC PLACES (Rounded to nearest \$100)¹²		1%	\$272,500.00
PROJECT SUB-TOTAL			\$14,488,283.65
COST CONTINGENCY (Based on project risk analysis)		Risk Probability % ¹⁰ 30.00%	23% \$4,346,485.09
TOTAL PROJECT BUDGET ESTIMATE (Rounded to nearest \$1,000)		100%	\$18,938,000.00

CLASS 4 COST ESTIMATE ACCURACY RANGE

LOW (-20%)	\$15,150,400.00	to	HIGH (30%)	\$24,619,400.00
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- 1 The construction cost estimate is based on the detailed estimate provided by <name> with <company> dated <mm/dd/yyyy>. The detailed estimate includes a description of the project scope, assumptions, exclusions and source/ references for all cost information.
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- 6 The material testing cost estimate is based on a historical average of City of Austin - Public Works actual costs per construction value.
- 7 The geotechnical cost estimate is based on a historical average of City of Austin - Public Works actual costs per construction value.
- 8 The cost estimate for hazardous testing for asbestos, lead and mold is based on a historical average of City of Austin - Public Works actual costs per construction value. <This cost is included in the 'Environmental Assessment' budget line.>
- 9 The cost estimate for an Environmental Phase 1 assessment is based on historical averages of City of Austin - Public Works actual costs per construction value. <This cost estimate includes the testing for hazardous materials.>
- 10 When estimating the cost for a project, there is always uncertainty as to the precise content of all items in the estimate, how work will be performed, what work conditions will be like when the project is implemented and so on. These uncertainties are risks to the project. Some refer to these risks as "known-unknowns" because the estimator is aware of them, and based on past experience, can even estimate their probable costs, or in this case, the 'Risk Probability %'. The estimated costs of the known-unknowns is referred to by cost estimators as cost contingency. The Cost Contingency amount is calculated by multiplying the Risk Probability % by the 'Project Sub-Total' which excludes the 'Debt Issuance'.
- 11 The land acquisition cost estimate is based on average real estate prices per zip code and is provided by <name> of the Real Estate Office dated <mm/dd/yyyy>.
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FOOTNOTES (Assumptions & Constraints)

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Spicewood Springs Road Reconstruction Preliminary Phase Cost Estimate Summary Class 4 Cost Estimate

Roadway Construction - Alternative C with off-site detention in upsized Adirondack pond	
Street Improvements ¹	\$ 6,007,000
Austin Energy Relocation ²	\$ 600,000
Off-site Stormwater Detention ³	\$ 2,874,000
Rain Gardens for Water Quality ⁴	\$ 895,000
Roadway Items	\$ 10,376,000
Mobilization percent	4%
Mobilization	\$ 415,000
Total Roadway Construction Cost Estimate⁵	\$ 10,791,000

Notes:

1. Street improvements include roadway widening, shared use path, traffic control, landscape irrigation, temporary traffic lane during construction
2. The Austin Energy relocation cost estimate is Class 5 (Concept Screening)
3. The off-site detention cost estimate is for upsizing the existing pond adjacent to Adirondack Trail in order to provide additional detention capacity. The Off-site Detention cost includes upsizing the existing pond and storm drain that routes runoff to the pond.
4. Rain garden are located in the proposed medians and at the southeast corner of Old Spicewood Springs Rd and Spicewood Springs Rd. The rain garden cost includes an underdrain system with full plantings. The cost could be lower for a different planting plan.
5. Unit cost data is derived from COA bid tabs from November 2007 through October 2017.

**Cost estimate for Street Improvement items - Alternative C - two lanes in each direction
with raised median and left turn bays at limited locations**

Ref: DI layers on: [SSRD-COST-EST-Alt3-KD.dwg](#)

Date: June 2018

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-</u>	<u>60800</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness</u>	\$ 11.01	\$ 669,509.33
<u>433S-C:</u>	<u>23515</u>	<u>SF</u>	<u>Type II P.C. Concrete Driveway</u>	\$ 9.45	\$ 222,242.88
<u>110S:</u>	<u>1481</u>	<u>CY</u>	<u>Street Excavation - Temporary lane during consturction</u>	\$ 40.00	\$ 59,259.26
<u>201S:</u>	<u>4444</u>	<u>SY</u>	<u>Subgrade Preparation - Temporary lane during construction</u>	\$ 8.50	\$ 37,777.78
<u>210S-A:</u>	<u>1235</u>	<u>CY</u>	<u>Flexible Base, 10" - Temporary lane during construction</u>	\$ 47.13	\$ 58,179.01
<u>340S-B:</u>	<u>4444</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 2 in, Type C - Temporary lane during construction</u>	\$ 29.12	\$ 129,439.08
<u>210S-A:</u>	<u>211</u>	<u>CY</u>	<u>Flexible Base, 13" - hill buffer</u>	\$ 47.13	\$ 9,926.79
<u>340S-B:</u>	<u>583</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - hill buffer</u>	\$ 24.46	\$ 14,266.14
<u>430S-B</u>	<u>2100</u>	<u>LF</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading) - hill buffer</u>	\$ 25.41	\$ 53,356.15
<u>608S-2:</u>	<u>1</u>	<u>LS</u>	<u>Irrigation System</u>	\$ 30,000.00	\$ 30,000.00
	<u>36</u>	<u>MO</u>	<u>Landscape Maintenance and watering during construction</u>	\$ 1,074.00	\$ 38,664.00

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>641S:</u>	<u>2</u>	<u>EA</u>	<u>Stabilized Construction Entrance</u>	\$ 1,735.70	\$ 3,471.39
	<u>15</u>	<u>EA</u>	<u>Elect MH adjustment</u>	\$ 450.00	\$ 6,750.00
<u>704</u>	<u>620</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 33,893.33
<u>704-T</u>	<u>2</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 1,569.00
<u>432-PRC</u>	<u>620</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 55,983.52
<u>803S-MO:</u>	<u>720</u>	<u>CD</u>	<u>Barricades, Signs, and Traffic Handling</u>	\$ 750.00	\$ 540,000.00
					\$ -
<u>829S-G:</u>	<u>32</u>	<u>EA</u>	<u>Type II Bicycle Lane (Bike Rider) Symbol, white in color</u>	\$ 202.98	\$ 6,495.41
<u>829S-G:</u>	<u>8</u>	<u>EA</u>	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, arrow symbol</u>	\$ 202.98	\$ 1,623.85
					\$ -
<u>210S-A:</u>	<u>363</u>	<u>CY</u>	<u>Flexible Base, 13" - intersection</u>	\$ 47.13	\$ 17,122.87
<u>340S-B:</u>	<u>1052</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - intersection</u>	\$ 24.46	\$ 25,733.39
<u>210S-A:</u>	<u>485</u>	<u>CY</u>	<u>Flexible Base, 13" - left bay</u>	\$ 47.13	\$ 22,878.90
<u>340S-B:</u>	<u>1344</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - left bay</u>	\$ 24.46	\$ 32,880.05
					\$ -

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>506</u>	<u>18</u>	<u>EA</u>	<u>WWMH Height adjustments</u>	\$ 1,552.00	\$ 27,936.00
<u>504</u>	<u>112</u>	<u>EA</u>	<u>Valve, meter box, pull box, etc adjustments</u>	\$ 414.94	\$ 46,473.12
				\$	-
<u>414S-C</u>	<u>274</u>	<u>CY</u>	<u>Concrete Retaining Walls east of Adiorndak, north side only</u>	\$ 600.00	\$ 164,693.33
<u>414S-C</u>	<u>166</u>	<u>CY</u>	<u>Concrete Retaining walls west of Vet Clinic near drive to 4614 SSRD</u>	\$ 600.00	\$ 99,645.33
				\$	-
<u>201S:</u>	<u>342</u>	<u>SY</u>	<u>Subgrade Preparation</u>	\$ 8.50	\$ 2,904.17
<u>210S-A:</u>	<u>123</u>	<u>CY</u>	<u>Flexible Base, 13"</u>	\$ 47.13	\$ 5,814.27
<u>340S-B:</u>	<u>342</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	\$ 8,355.88
<u>414S-C</u>	<u>635</u>	<u>CY</u>	<u>Concrete Retaining walls, both sides of road</u>	\$ 600.00	\$ 380,944.44
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb Ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-6:</u>	<u>9840</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness , both sides</u>	\$ 11.01	\$ 108,354.80
<u>704</u>	<u>1230</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 67,240.00
<u>704-T</u>	<u>4</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 3,138.00
	<u>1230</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 111,064.08

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
					\$ -
	<u>580</u>	<u>EA</u>	<u>Tree Mitigation - 2" tree</u>	\$ 325.00	\$ 188,621.88
	<u>4000</u>	<u>LF</u>	<u>Typical Roadway cross-section</u>	\$ 676.30	\$ 2,705,212.32
TOTAL STREET IMPROVEMENTS					\$ 6,006,625.30

Price per Liner Foot for typical roadway cross-section - Alternative C - two lanes in each direction with raised median and left turn bays at limited locations

DI layers on

[SSRD-COST-EST-Alt3-KD.dwg](#)

Ref:

Date: June 2018

Notes: Cost for typical Modified Alt 3 cross-section (MAD-4 modified to fit in existing ROW)

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
<u>101S-A:</u>	<u>Preparing right-of-way</u>	\$ 4,286.67	<u>AC</u>	\$ 0.10	<u>SF</u>	80	\$ 7.87
<u>110S:</u>	<u>Street Excavation</u>	\$ 40.00	<u>CY</u>	\$ 1.48	<u>CF</u>	152	\$ 225.00
<u>201S:</u>	<u>Subgrade Preparation</u>	\$ 8.50	<u>SY</u>	\$ 0.94	<u>SF</u>	81	\$ 76.50
<u>210S-A:</u>	<u>Flexible Base, 13"</u>	\$ 47.13	<u>CY</u>	\$ 1.75	<u>CF</u>	65.0	\$ 113.45
<u>340S-B:</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	<u>SY</u>	\$ 2.72	<u>SF</u>	44.0	\$ 119.56
<u>430S-B</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading)</u>	\$ 25.41	<u>LF</u>	\$ 25.41	<u>LF</u>	4	\$ 101.63
<u>602S</u>	<u>Sodding</u>	\$ 7.97	<u>SY</u>	\$ 0.89	<u>SF</u>	16	\$ 14.17

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
604S-C:	<u>Native Seeding for Erosion Control, Mulch</u>	\$ 1.91	<u>SY</u>	\$ 0.21	<u>SF</u>	11	\$ 2.33
642S:	<u>Silt Fence for Erosion Control</u>	\$ 2.59	<u>LF</u>	\$ 2.59	<u>LF</u>	2	\$ 5.18
871S-A:	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, 4" wide, white</u>	\$ 2.65	<u>LF</u>	\$ 2.65	<u>LF</u>	4	\$ 10.61
Total Estimated Cost per LF for typical cross section							\$ 676.30

*For items measured by LF, this column represents the number of times the item appears in the cross-section
For items measured by CF, this column represents the cross-sectional area of the item
For items measured by SF, this column represents the cross-sectional width of the item

1.00 AC 43560 SF
1.00 SY 9 SF
1.00 CY 27 CF

Ref: [SSRD-COST-EST-Alt3-KD.dwg](#)

Cost Estimate for Alternative C with Off-site detention at upsized Adirondack Trail Pond

Bid Item	Quantity	Unit	Description	Est. Unit Price	Est. Amount
508S-1G:	4	EA	Area Inlet	\$ 4,238.89	\$ 16,955.56
508S-15S	13	EA	Curb inlet, 5 ft	\$ 4,856.82	\$ 101,073.08
508S-120S	16	EA	Curb inlet, 20 ft	\$ 7,250.00	\$ 101,073.08
	1	EA	Remove/replace area inlet at Realty Board	\$ 5,000.00	\$ 5,000.00
	1	LS	level spreader outfall	\$ 5,000.00	\$ 5,000.00
	5	LS	outfall structure/energy dissipator	\$ 1,500.00	\$ 7,500.00
510-A:	2865	LF	Pipe, 36" Dia. RCP (all depths), including Excavation and Backfill	\$ 291.58	\$ 835,367.88
510-A:	1146	LF	Pipe, 24" Dia. RCP (all depths), including Excavation and Backfill	\$ 262.50	\$ 300,825.00
510-A:	1927	LF	Pipe, 18" Dia. RCP (all depths), including Excavation and Backfill	\$ 156.07	\$ 300,743.39
				\$ 1,673,537.98	Storm drain for OFF-site detention

Notes from review with JMG on 3/9/18
Cost for upsizing existing Adirondack Pond = Off-site Detention

Item	Description	Quantity Notes	Cost Notes	Quantity	Unit	Unit Cost	Total
Maint access road	similar to 15' temp construction entrance	need approx 1700 LF on each side of pond = 2 x (1700 ft long) x (15 ft wide)		51000	SF	\$ 5.00	\$ 255,000.00
Excavation	assume excavate in rock; does not include soil/muck built up in pond	10 AC-FT is prop vol - exist vol from HMS analysis; convert to CY		16133	CY	\$ 50.00	\$ 806,666.67
Outlet structure	similar to overtop protection		Estimate from Meadow Lake project that overtop protection for a large pond is \$500k				
						\$ 1,061,666.67	use \$1.2 million
						\$ 1,200,000.00	Upsized Pond Cost
						\$ 2,873,537.98	Total for OFF-site Detention



B.3 Alternative A - Detention in Medians

Date Created

Date Revised

7/19/2018

Date

Checked by

Initials

CIVIL PROJECT BUDGET ESTIMATE

PROJECT CHARTER ATTACHMENT A

NOTE: Refer to the Project Charter or Construction Cost Estimate for goals and initial scope of work

Project Name	Spicewood Springs Rd - Alternate A with on-site detention in medians		
Department	PWD	CIP ID	11880.001
Category	Mobility Infrastructure	Index ²¹	11069
Class ²⁰	Class 4 Cost Estimate - Preliminary Engineering Report (PER) (-20% to 30%)		

2800 - ARCHITECTURE/ ENGINEERING (A/E)		14%	\$1,892,493.25
CONSULTANTS		\$936,814.50	
5590	A/E Basic Services ²	\$936,814.50	
INTERDEPARTMENTAL CHARGES		\$955,678.75	
6237	PWD Project Management Services (PMD) ³	\$390,339.38	
6238	PWD Construction Services (CSD) ³	\$390,339.38	
6203	Sponsor Department Charges ⁴	\$175,000.00	
2801 - SURVEYING⁵		1%	\$81,971.27
2802 - TESTING		1%	\$175,522.18
5730	Construction Material Testing ⁶	\$78,067.88	
5730	Geotechnical Report ⁷	\$62,454.30	
5588	Hazardous Material Testing ⁸	\$0.00	
5588	Environmental Assessment ⁹	\$35,000.00	
2803 - INSPECTIONS		0%	\$0.00
2804 - CONSTRUCTION (see detailed cost estimate)		58%	\$7,806,787.50
5560	New Construction ¹	\$7,635,000.00	
5600	Hazardous Material Abatement ¹⁸	\$0.00	
6324	ROCIP ¹⁹	\$171,787.50	
2805 - LAND & RIGHT-OF-WAY¹¹		0%	\$0.00
2806 - MISCELLANEOUS		1%	\$131,584.05
5580	Debt Issuance ¹³	\$73,033.14	
6843	Permits/ Fees ¹⁴	\$58,550.91	
7157	GAATN Connection ¹⁵	\$0.00	
2807 - EQUIPMENT/FURNISHINGS¹⁶		0%	\$0.00
2808 - MATERIALS		0%	\$0.00
2809 - ART IN PUBLIC PLACES (Rounded to nearest \$100)¹²		1%	\$199,100.00
PROJECT SUB-TOTAL			\$10,214,425.10
COST CONTINGENCY (Based on project risk analysis)		Risk Probability % ¹⁰	
		30.00%	23%
			\$3,064,327.53
TOTAL PROJECT BUDGET ESTIMATE (Rounded to nearest \$1,000)		100%	\$13,352,000.00

CLASS 4 COST ESTIMATE ACCURACY RANGE LOW (-20%) to HIGH (30%)
 \$10,681,600.00 to \$17,357,600.00

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Spicewood Springs Road Reconstruction Preliminary Phase Cost Estimate Summary Class 4 Cost Estimate

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Street Improvements ¹	\$ 4,833,000
Austin Energy Relocation ²	\$ 440,000
On-site Stormwater Detention ³	\$ 1,493,000
Rain Gardens for Water Quality ⁴	\$ 575,000
Roadway Items	\$ 7,341,000
Mobilization percent	4%
Mobilization	\$ 294,000
Total Roadway Construction Cost Estimate⁵	\$ 7,635,000

Notes:

1. Street improvements include roadway widening, 25-foot wide raised median, shared use path traffic control, landscape irrigation, temporary traffic lane during construction
2. The Austin Energy relocation cost estimate is Class 5 (Concept Screening)
3. The On-site Detention cost includes detention in the proposed medians, detention at the southeast corner of Old Spicewood Springs Road and Spicewood Springs Road and storm drain.
4. Rain garden are located in the proposed medians and at the southeast corner of Old Spicewood Springs Rd and Spicewood Springs Rd. The rain garden cost includes an underdrain system with full plantings. The cost could be lower for a different planting plan.
5. Unit cost data is derived from COA bid tabs from November 2007 through October 2017.

Cost estimate for Street Improvement items - Alternative A - one lane in each direction with raised median and left turn bays at limited locations

Ref: DI layers on: [SSRD-COST-EST-Alt3-KD.dwg](#)

Date: June 2018

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-</u>	<u>58720</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness</u>	\$ 11.01	\$ 646,605.07
<u>433S-C:</u>	<u>26500</u>	<u>SF</u>	<u>Type II P.C. Concrete Driveway</u>	\$ 9.45	\$ 250,454.44
<u>110S:</u>	<u>180</u>	<u>CY</u>	<u>Street Excavation - Temporary lane during consturction</u>	\$ 40.00	\$ 7,200.00
<u>201S:</u>	<u>540</u>	<u>SY</u>	<u>Subgrade Preparation - Temporary lane during construction</u>	\$ 8.50	\$ 4,590.00
<u>210S-A:</u>	<u>150</u>	<u>CY</u>	<u>Flexible Base, 10" - Temporary lane during construction</u>	\$ 47.13	\$ 7,068.75
<u>340S-B:</u>	<u>540</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 2 in, Type C - Temporary lane during construction</u>	\$ 29.12	\$ 15,726.85
<u>210S-A:</u>	<u>211</u>	<u>CY</u>	<u>Flexible Base, 13" - hill buffer</u>	\$ 47.13	\$ 9,926.79
<u>340S-B:</u>	<u>583</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - hill buffer</u>	\$ 24.46	\$ 14,266.14
<u>430S-B</u>	<u>2100</u>	<u>LF</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading) - hill buffer</u>	\$ 25.41	\$ 53,356.15
<u>608S-2:</u>	<u>1</u>	<u>LS</u>	<u>Irrigation System</u>	\$ 30,000.00	\$ 30,000.00
	<u>36</u>	<u>MO</u>	<u>Landscape Maintenance and watering during construction</u>	\$ 1,074.00	\$ 38,664.00

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
<u>641S:</u>	<u>2</u>	<u>EA</u>	<u>Stabilized Construction Entrance</u>	\$ 1,735.70	\$ 3,471.39
	<u>15</u>	<u>EA</u>	<u>Elect MH adjustment</u>	\$ 450.00	\$ 6,750.00
<u>704</u>	<u>620</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 33,893.33
<u>704-T</u>	<u>2</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 1,569.00
<u>432-PRC</u>	<u>620</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 55,983.52
<u>803S-MO:</u>	<u>540</u>	<u>CD</u>	<u>Barricades, Signs, and Traffic Handling</u>	\$ 750.00	\$ 405,000.00
					\$ -
<u>829S-G:</u>	<u>32</u>	<u>EA</u>	<u>Type II Bicycle Lane (Bike Rider) Symbol, white in color</u>	\$ 202.98	\$ 6,495.41
<u>829S-G:</u>	<u>8</u>	<u>EA</u>	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, arrow symbol</u>	\$ 202.98	\$ 1,623.85
					\$ -
<u>210S-A:</u>	<u>363</u>	<u>CY</u>	<u>Flexible Base, 13" - intersection</u>	\$ 47.13	\$ 17,122.87
<u>340S-B:</u>	<u>1052</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - intersection</u>	\$ 24.46	\$ 25,733.39
<u>210S-A:</u>	<u>485</u>	<u>CY</u>	<u>Flexible Base, 13" - left bay</u>	\$ 47.13	\$ 22,878.90
<u>340S-B:</u>	<u>1344</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C - left bay</u>	\$ 24.46	\$ 32,880.05

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
				\$	-
<u>506</u>	<u>18</u>	<u>EA</u>	<u>WWMH Height adjustments</u>	\$ 1,552.00	\$ 27,936.00
<u>504</u>	<u>112</u>	<u>EA</u>	<u>Valve, meter box, pull box, etc adjustments</u>	\$ 414.94	\$ 46,473.12
				\$	-
<u>414S-C</u>	<u>274</u>	<u>CY</u>	<u>Concrete Retaining Walls east of Adiorndak, north side only</u>	\$ 600.00	\$ 164,693.33
<u>414S-C</u>	<u>0</u>	<u>CY</u>	<u>Concrete Retaining walls west of Vet Clinic near drive to 4614 SSRD</u>	\$ 600.00	\$ -
				\$	-
<u>201S:</u>	<u>0</u>	<u>SY</u>	<u>Subgrade Preparation</u>	\$ 8.50	\$ -
<u>210S-A:</u>	<u>0</u>	<u>CY</u>	<u>Flexible Base, 13"</u>	\$ 47.13	\$ -
<u>340S-B:</u>	<u>0</u>	<u>SY</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	\$ -
<u>414S-C</u>	<u>577</u>	<u>CY</u>	<u>Concrete Retaining walls, both sides of road</u>	\$ 600.00	\$ 346,166.67
<u>432S-RP</u>	<u>4</u>	<u>EA</u>	<u>Curb Ramps</u>	\$ 1,900.69	\$ 7,602.77
<u>432S-6:</u>	<u>9840</u>	<u>SF</u>	<u>New P.C. Concrete Sidewalks for 8' SUP, Inch thickness , both sides</u>	\$ 11.01	\$ 108,354.80
<u>704</u>	<u>1230</u>	<u>LF</u>	<u>guard rail, both sides of road</u>	\$ 54.67	\$ 67,240.00
<u>704-T</u>	<u>4</u>	<u>EA</u>	<u>guard rail, terminal end sections</u>	\$ 784.50	\$ 3,138.00

Bid Item	Quantity	Unit	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Est. Amount
	<u>1230</u>	<u>LF</u>	<u>hand rail, both sides of road</u>	\$ 90.30	\$ 111,064.08
					\$ -
	<u>467</u>	<u>EA</u>	<u>Tree Mitigation - 2" tree</u>	\$ 325.00	\$ 151,653.13
	<u>4000</u>	<u>LF</u>	<u>Typical Roadway cross-section</u>	\$ 524.87	\$ 2,099,460.28

\$ 4,832,644.85

Price per Liner Foot for typical roadway cross-section - Alternative A - one lane in each direction with raised median and left turn bays at limited locations

Ref: DI layers on [SSRD-COST-EST-KD.dwg](#)
 Date: June 2018
 Notes: Cost for typical Modified Alt 3 cross-section (MAD-4 modified to fit in existing ROW)

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
<u>101S-A:</u>	<u>Preparing right-of-way</u>	\$ 4,286.67	<u>AC</u>	\$ 0.10	<u>SF</u>	80	\$ 7.87
<u>110S:</u>	<u>Street Excavation</u>	\$ 40.00	<u>CY</u>	\$ 1.48	CF	118	\$ 175.00
<u>201S:</u>	<u>Subgrade Preparation</u>	\$ 8.50	<u>SY</u>	\$ 0.94	<u>SF</u>	63	\$ 59.50
<u>210S-A:</u>	<u>Flexible Base, 13"</u>	\$ 47.13	<u>CY</u>	\$ 1.75	<u>CF</u>	45.5	\$ 79.41
<u>340S-B:</u>	<u>Hot Mix Asphaltic Concrete Pavement, 3.5 in, Type C</u>	\$ 24.46	<u>SY</u>	\$ 2.72	<u>SF</u>	26.0	\$ 70.65
<u>430S-B</u>	<u>P.C. Concrete Curb and Gutter (Fine Grading)</u>	\$ 25.41	<u>LF</u>	\$ 25.41	<u>LF</u>	4	\$ 101.63
<u>602S</u>	<u>Sodding</u>	\$ 7.97	<u>SY</u>	\$ 0.89	<u>SF</u>	16	\$ 14.17

Bid Item	Item Description	Est. Unit Price by KD Compiled Thru 10-2017	Unit	Est. Unit Price	Unit	x-sec area, width or count of item in cross-section*	Cost per LF of road construction along centerline
604S-C:	<u>Native Seeding for Erosion Control, Mulch</u>	\$ 1.91	<u>SY</u>	\$ 0.21	<u>SF</u>	29	\$ 6.14
642S:	<u>Silt Fence for Erosion Control</u>	\$ 2.59	<u>LF</u>	\$ 2.59	<u>LF</u>	2	\$ 5.18
871S-A:	<u>Reflectorized Type 1 Thermoplastic Pavement Marking, 4" wide, white</u>	\$ 2.65	<u>LF</u>	\$ 2.65	<u>LF</u>	2	\$ 5.30
Total Estimated Cost per LF for typical cross section							\$ 524.87

*For items measured by LF, this column represents the number of times the item appears in the cross-section
For items measured by CF, this column represents the cross-sectional area of the item
For items measured by SF, this column represents the cross-sectional width of the item

1.00 AC 43560 SF
1.00 SY 9 SF
1.00 CY 27 CF

Cost Estimate for Alternative A with On-site detention in the medians

Storm Drain

Bid Item	Quantity	Unit	Description		Est. Unit Price	Est. Amount	
<u>508S-IG:</u>	<u>9</u>	<u>EA</u>	<u>Area/grate Inlet,</u>		\$ 4,238.89	\$ 38,150.00	storm
<u>508S-I5S</u>	<u>6</u>	<u>EA</u>	<u>Curb inlet, 10 ft</u>		\$ 4,856.82	\$ 101,073.08	storm
	<u>1</u>	<u>EA</u>	<u>Remove/replace area inlet at Realty Board</u>		\$ 5,000.00	\$ 5,000.00	storm
	<u>3</u>	<u>LS</u>	<u>level spreader outfall</u>		\$ 5,000.00	\$ 15,000.00	storm
	<u>8</u>	<u>LS</u>	<u>outfall structure/energy dissipator</u>		\$ 1,500.00	\$ 12,000.00	storm
<u>510-A:</u>			<u>Pipe, 36" Dia. RCP (all depths), including Excavation and Backfill</u>				
	<u>115</u>	<u>LF</u>			\$ 291.58	\$ 33,531.35	storm
<u>510-A:</u>			<u>Pipe, 24" Dia. RCP (all depths), including Excavation and Backfill</u>				
	<u>990</u>	<u>LF</u>			\$ 262.50	\$ 259,875.00	storm
<u>510-A:</u>			<u>Pipe, 18" Dia. RCP (all depths), including Excavation and Backfill</u>				
	<u>1815</u>	<u>LF</u>			\$ 156.07	\$ 283,263.75	storm
					Total for ON-site Storm Drain = \$ 747,893.17		

Cost Estimate for Alternative A with On-site detention in the medians

Pond Cost

	Quantity	Unit	Unit Cost	
Excavation	1117.5	CY	\$ 50.00	\$ 55,875.00
Area inlets	6	EA	\$ 4,238.89	\$ 25,433.33
outflow structure	1	EA	\$ 10,000.00	\$ 10,000.00
pond walls	49.5	CY	\$ 600.00	\$ 29,700.00
inflow pad	7	EA	\$ 1,500.00	\$ 10,500.00
Mortared Limestone	3794	SF	\$ 140.00	\$ 531,195.00
maint access pad	8750	SF	\$ 9.45	\$ 82,687.50

Total Pond Cost = \$ 745,390.83

Impervious Cover in cross section

Alt 1	50
Alt 3	68

Alt 1 IC / Alt 3 IC = 74% Note: The Alternative 3 pond quantities for Excavation, Pond Walls and Mortared Limestone are scaled by this factor to get the Alternative 1 quantity

Total for ON-site Detention \$ 1,493,284.01

B.4 Rain Gardens

Spicewood Springs Roadway Reconstruction - Rain Garden Cost Estimate

Ref

Notes Assume rain gardens are full **filtration**; top area is smaller if rain gardens are full **infiltration**. See ECM 1.6.7.H.4 Equations H-1 and H-3
Cost estimated assuming growing media depth is 0

Drainage Area description	On-site Drainage Area	Existing IC within on-site area	Existing % IC	Prop Corridor Length	Proposed IC	Proposed IC for SUP	Proposed IC for WQ calcs	Proposed % IC	% increase in IC	Required On-site WQ Capture Depth		On-site WQV	RG Poned Depth (H)	Growing Media Depth (L)	Rain Garden Filtration Area (Af)	RG Cost/SF	Rain Garden Cost Estimate
	SF	SF		LF	SF	SF				IN	FT	CF	FT	FT	SF	\$/SF	\$
	(1)	(2)		(3)	(4)	(5)	(6)		(7)	(8)		(9)			(10)	(11)	
Proposed Alternative C	428,000	-	0%	4,000	240,526	-	240,526	56%	56%	0.86	0.072	30,744	1.0		30,744	\$ 40.00	\$ 1,229,754
Proposed Alternative C	428,000	100,359	23%	4,000	240,526	-	240,526	56%	33%	0.63	0.052	22,381	1.0		22,381	\$ 40.00	\$ 895,222
Proposed Alternative A	344,000	100,359	29%	4,000	148,360	-	148,360	43%	14%	0.50	0.042	14,333	1.0		14,333	\$ 40.00	\$ 573,333
															30,744	\$ 25.00	\$ 768,596
Areas from DWG and SHP files	447377	29841	7%		240,526	-	240,526	54%	47%	0.77	0.064	28,742					

- (1) assume off-site area is routed around water quality facilities, then on-site drainage area for Alt 3= outside edge of SUP to outside edge of SUP (107') x length (4000'); length extends from Old SSRD to high point approx 0.2 miles east of Mesa DR.
- (2) assume off-site area is routed around water quality facilities, then on-site drainage area for Alt 1= outside edge of SUP to outside edge of SUP (86') x length (4000'); length extends from Old SSRD to high point approx 0.2 miles east of Mesa DR.
- (2) assume 0% existing IC since cuts may be greater than 18" meaning can't count existing IC; MS estimates 220590 SF for existing conditions; this is based on existing drainage areas. KD shapefile calculation gives xxxxx SF of existing IC within the proposed corridor.
Per meeting with DSD on 5/31/18, existing pavement is base IC if drainage area outfall points don't change,
- (3) Measured on dwg file [..\\Cost Estimate\\SSRD-COST-EST-KD.dwg](#)
- (4) see Prop IC tab; based on Alt 3 cross section with regular 25' wide medians; SUP excluded from IC calculations
- (5) SUP area not included in WQ calculations
- (6) IC for WQ calcs = proposed IC - IC for SUP
- (7) % increase = (proposed %IC) - (existing % IC)
- (8) ECM 1.6.2: WQ Capture Depth = 0.5 + (% increase - 20%) x 0.1
- (9) WQV = Capture Depth x proposed drainage area
- (10) ECM 1.6.7.H.4 Equation H-3: Af = WQV / (H+0.24 x L); for cost estimate, assume growing media depth = 0
- (11) cost estimate used for Meadow Lake was \$30/SF, based on analysis of Annie rain gardens in front of Fulmore and at Bartlett/Live Oak; also rule of thumb that filtration RGs are \$25/SF; increased \$30 to \$35/SF to cover nicer plantings and updated to 2018 cost based on ENR index => \$40/SF

Notes:

Areas and IC are for Modified Alternative 3 (MAD-4 cross-section modified to fit within constrained ROW)

Most of off-site area at southeast end of project is already treated through sed/fil ponds as part of site development permits. Exception is the old house/dr office across from Vet. 4505 appears to have a detention pond but not sure if WQ is included; site plan unclear.

Approx 1000 ft from Adirondak to top of hill. This section is too narrow for rain gardens in median.

Required storage (email 12/19/17)

See bay taper length in TCM Figure 1-11; standard option is 118', asymmetrical option is 102'

The growing medium will hold some volume, but that volume is not included in this analysis. See DCM 1.6.7.H

Area at SE corner of Old SSRD/SSRD could be rain garden, although the slope is ~17% and ECM says 15% is max slope for rain gardens. ECM 1.6.7.5.H.2

If area at SE corner of Old SSRD/SSRD is used as a rain garden, it may have to provide detention as well or only treat the small existing area draining to that corner. Or, pipe the rain garden outfall across SSRD to the Adirondak pond

B.5 Water System Upgrades

Cost Sharing Calculations and

Water System Improvements Construction Cost Estimate

Spicewood Springs Road 2016 Mobility Bond Project

Notes:

1. The 2016 Mobility bond funds roadway items and associated improvements such as drainage, water quality, utility relocation. Austin Water funds water system improvements.
2. The Mobility Bond and Austin Water share the cost of bid items that pertain to roadway and water system construction. Shared items include temporary traffic control, erosion control and mobilization. Austin Water pays a proportional amount of the shared bid items based on the water system improvement cost as a percentage of the total cost.
3. Manually entered data is found in cost estimating spreadsheets that are provided as back up data.
4. The steps below provide a preliminary phase estimate of the water system improvement construction cost. The actual amount paid by Austin Water should be based on the final construction phase pay application from the contractor.

Manually entered data

Step 1 - Compile data

	Amount	Line	Equations
Sum of roadway bid items ¹	\$ 8,674,384.41	A	does not include E&S or TC items
Sum of water system improvement bid items ²	\$ 2,774,881.72	B	does not include E&S or TC items
Sum of erosion and sedimentation control bid items ³	\$ 20,722.58	C	
Sum of temporary traffic control bid items ⁴	\$ 540,000.00	D	
Sub-total	\$ 12,009,988.72	E	E = A + B + C + D
Mobilization % for the project ⁵	4%	F	
Mobilization amount	\$ 480,399.55	G	G = E x F

Step 2 - Calculate cost share percentages

	Amount	Line	Equations
Total roadway and water system improvement bid items	\$ 11,449,266.14	H	H = A + B
2016 Mobility Bond cost share %	76%	I	I = A ÷ H
Austin Water cost share %	24%	J	J = B ÷ H

Step 3 - Sum items for cost sharing

	Amount	Line	Equations
Sum of erosion and sedimentation control bid items ³	\$ 20,722.58	C	
Sum of temporary traffic control bid items ⁴	\$ 540,000.00	D	
Mobilization	\$ 480,399.55	G	
Cost Share Total	\$ 1,041,122.13	K	K = C + D + G

Step 4 - Calculate cost share amounts

	Amount	Line	Equations
2016 Mobility Bond cost share amount	\$ 788,792.35	L	L = I x K
Austin Water cost share amount	\$ 252,329.78	M	M = J x K

Step 5 - Calculate Austin Water cost estimate with contingency

	Amount	Line	Equations
Sum of water system improvement bid items	\$ 2,774,881.72	B	
Austin Water cost share amount	\$ 252,329.78	M	
Sub-total	\$ 3,027,211.50	N	N = B + M
30% Contingency	\$ 908,163.45	O	O = 30% x N
Preliminary Phase Construction Cost Estimate for Water System Improvements	\$ 3,935,374.95	P	P = N + O

Footnotes:

1. Roadway Items (including E&S and TC, from Appendix B.1) = \$ 9,235,106.99
Sum of erosion and sedimentation control bid items = \$ 20,722.58
Sum of temporary traffic control bid items = \$ 540,000.00
(roadway items) - (E&S) - (traffic control) = \$ 8,674,384.41
2. See bid item cost estimate on following page
3. Appendix B.1: Silt Fence Item 642S unit cost per LF of roadway (\$5.18/SF) x 4000 LF = \$20,722.58
4. Appendix B.1: Item 803S-MO "Barricades, Signs and Traffic Handling"
5. Mobilization percent is from Standard Specification 700S "Mobilization"

Cost estimate for water system upgrades

Ref: DI layers on: [SSRD-COST-EST-KD.dwg](#)

Date: Feb 2018

Bid Item	Quantity	Unit	Item Description	Est. Unit Price	Est. Amount
510-AW-48	1545	LF	Pipe, 48" DI (all depths) including excavation and backfill	\$ 1,030.07	\$ 1,591,465.11
	1545	LF	Abandon (remove) 24" DI water line	\$ 50.00	\$ 77,250.00
510-AW-16	1370	LF	Pipe, 16" DI (all depths) including excavation and backfill AND remove/abandon 8" CI	\$ 335.32	\$ 459,394.57
510-AW-12	1705	LF	Pipe, 12" DI (all depths) including excavation and backfill AND remove 8" CI	\$ 269.07	\$ 458,772.03
	3075	LF	Abandon (fill or remove) 8" CI water line	\$ 40.00	\$ 123,000.00
	2	EA	Cut/plug for 8" CI abandonment	\$ 2,500.00	\$ 5,000.00
	1	EA	Remove/replace 12" PRV station	\$ 60,000.00	\$ 60,000.00
Construction cost for water system upgrades =				\$	2,774,881.72

B.6 Life Cycle Maintenance

Pavement Maintenance Life Cycle Costs

Cost info emailed from Ed Poppitt on 6/8/18

<u>Surface Treatments over 80 years</u>	Cost	Unit	Quantity	Total Cost/LM of pavement for 80 year life
50 spot repairs (potholes, level up, surface patch)	\$ 500.00	EA	50	\$ 25,000.00
4 crack seals (preventative maint)	\$ 3,170.00	LM	4	\$ 12,680.00
5 surface treatments (fog, slurry, seal coat)	\$ 23,500.00	LM	5	\$ 117,500.00
2 overlays (edge mill & overlay)	\$ 93,900.00	LM	2	\$ 187,800.00
1 rehabilitation	\$ 275,000.00	LM	1	\$ 275,000.00
				\$ 617,980.00 per LM

SF per Lane Mile (LM) = 52,800

Alternative	Pavement area SF	Pavement LM LM	Total Life Cycle Maintenance Cost \$	Life Span YRS	Average Annual Maintenance Cost \$/YR
Alternative A	130,811	2.48	\$ 1,531,034	80	\$ 19,138
Alternative C	202,811	3.84	\$ 2,373,734	80	\$ 29,672

Rain Garden Maintenance Life Cycle Costs

Approximate Life Cycle Cost – Rain Gardens

Rain Garden Location	Approximate quarterly Maintenance Cost (low estimate) per RG	Approximate quarterly Maintenance Cost (high estimate) per RG	Design Alternative	Number of RGs	Total Annual Maint Cost (Low)	Total Annual Maint Cost (high)	Average Annual Maintenance Cost	Life Span	Total Life Cycle Maintenance Cost
6 RGs in medians, 1 RG at corner of Old SSRD and SSRD	\$500	\$700	Alt C - ON site rain gardens	7	\$14,000	\$19,600	\$16,800	25	\$420,000
6 RGs in medians, 1 RG at corner of Old SSRD and SSRD	\$500	\$700	Alt A - ON site	5	\$10,500	\$14,700	\$12,600	25	\$315,000

Notes:

total life cycle cost = quarterly cost x 4 x design life

Assume Alt 1 needs 75% of the rain gardens that Alt 3 needs; this is based on amount of new IC in cross sections

Maintenance cost estimate is based on OTC rain garden maintenance

Adirondack Pond Maintenance Life Cycle Costs

Approximate Pond Maintenance Cost - OFF site detention at Adirondack pond

	Hours/day	Days to Mow/maintain pond	Maintenance cycles per year	Hourly Rate*	Total	Overhead Multiplier	Average Annual Maintenance Cost	Life Span	Total Life Cycle Maintenance
Drainage Operations Crew Lead	8	3	12	\$24.59	\$7,081.92	3	\$21,245.76		
Drainage Operations Team Member II	16	3	12	\$20.31	\$11,698.56	3	\$35,095.68		
*Mid-range pay from COA pay scales June 2018							\$56,341.44	80	\$4,507,315.20

See ECM 1.6.3

See TAMU bermuda grass mowing recommendations

[PUB turf Maintaining Bermudagrass Lawns.pdf](#)

Assume mow once per month

Storm Drain Maintenance Life Cycle Costs

Note: Hours estimates are from WPD maintenance supervisor

Approximate Manhole Flushing Cost (2 days)

	Hours	Hourly Rate*	Total
Drainage Operations Crew Lead	16	\$24.59	\$374.72
Drainage Operations Team Member II	16	\$20.31	\$324.96
Labor sub-total			\$699.68
Overhead Multiplier			3
TOTAL			\$2,099.04

*Mid-range pay from COA pay scales June 2018

Approximate Manhole Flushing Cost (5 days)

	Hours	Hourly Rate*	Total
Drainage Operations Crew Lead	40	\$24.59	\$936.80
Drainage Operations Team Member II	40	\$20.31	\$812.40
Labor sub-total			\$1,749.20
Overhead Multiplier			3
TOTAL			\$5,247.60

*Mid-range pay from COA pay scales June 2018

Approximate Life Cycle Cost – Storm Drain Improvements

Design Alternative	Number of Proposed Maint Access points	Number of Manholes flushed during 2-year Maintenance Cycle	Annual Manhole Flushing Cost (low estimate)	Annual Manhole Flushing Cost (high estimate)	Average Annual Maintenance Cost	Life Span	Total Life Cycle Maintenance Cost
Alternative A - ON Site Detention in Medians	11.68	2.92	\$3,065	\$7,661	\$5,363	80	\$429,044
Alternative C - ON Site Detention in Medians	11.68	2.92	\$3,065	\$7,661	\$5,363	80	\$429,044
Alternative C - OFF Site Detention at upsized pond	23.752	5.938	\$6,232	\$15,580	\$10,906	80	\$872,487

Notes:

total life cycle cost = (# manholes) x 0.25 / 2 x (annual manhole flushing cost) x (design life)

Number of maint access points = total storm drain LF / 250; need maint access every 250 ft per DCM