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April 24, 2019

Randall E. Groth, RLA  
City of Flagstaff  
Senior Project Manager  
Capital Improvement Program  
211 W. Aspen Avenue  
Flagstaff, AZ 86001

**RE: Cost Proposal**  
**Fourth Street Reconstruction Improvement Project – Final Design Services**  
City of Flagstaff Project Number: ST 33523 / 03-19002

Dear Mr. Groth:

Enclosed for your review and approval is AECOM's Scope of Work and Cost Proposal for the above referenced project.

We appreciate the opportunity to provide these services to ADOT for this important project. If you have any questions concerning the cost proposal please give me a call at 602-648-2440

Sincerely,  
**AECOM Technical Services, Inc.**

Robert Ringwald, PE, SE  
AECOM Project Manager

Attachments:  
Scope of Work  
Diravation of Fee Proposal

Fourth Street Reconstruction Improvement Project  
City of Flagstaff Project No. ST 3353 / 03-19002  
AECOM Scope of Work

Basis of Design

The general project scope will construct new pavement with associated edge improvements (sidewalk, parkway, curb and gutter), striping, streetlight system, traffic signals, signing, water mains, sewer line stub, separated Flagstaff Urban Trail route connection and storm water system.

Design will be based upon the current iteration of the City of Flagstaff Engineering Standards, MAG Specifications & Details, applicable AASHTO requirements, City of Flagstaff General Provisions and/or standards and specifications as deemed necessary by the Consultant.

Environmental services are not included in this scope of work.

Survey

The Consultant will research and re-establish GPS RTK survey control based on NGS/COF control points (10 points to be located). The Consultant will set approximately 3 traverse points in the vicinity of the project. For the vertical control on said traverse points, the Consultant will use differential leveling method of vertical control establishment for increased vertical accuracy. The start and the end of the level loop would be at City of Flagstaff Bench Mark "1823410". The Consultant will conduct fill-in surveys in the project vicinity using terrestrial surveying method (using Total Station).

Drainage

AECOM will provide the design of drainage. It is anticipated the drainage will be collected in drainage ditches along the west side of the roadway and culvert located on north of Soliere Avenue into basin on the northeast side of 4<sup>th</sup> Street and Soliere Avenue. The Consultant will prepare a Draft and Final Drainage Memorandum.

Right-of-Way (ROW)

Additional ROW is not anticipated. If additional ROW is needed, AECOM will show the approximate limits on the roadway plans. ROW acquisition is not included in this scope.

Traffic Data & Analysis

Traffic counts and traffic analyses are not included in this scope of work.

Geotechnical

The asphalt pavement structural section will be design by Ethos Engineering per their scope and fee proposal.

### Signing and Pavement Marking

The Consultant will prepare signing and pavement marking plans which will include the removal and replacement of all signs.

### Signals & Lighting

The Consultant will prepare signal plans for the two intersections. It is assumed that new poles, mast arms, signal heads, controllers, detection, etc. will be installed at Soliere Avenue and only 1 quadrant will require modification at Sparrow Avenue. The storage lengths and signal head types will be provided by the City of Flagstaff as this scope of work does not include any traffic analysis to determine storage lengths or signal phasing.

The Consultant will prepare lighting plans based on the City of Flagstaff Engineering Standards and APS Electric Service Requirements Manual. A lighting analysis is not included in this scope of work. The lighting plans will include two 4" conduits (for future ITS use) along with pull boxes and tracer wires.

### Roadway

The Consultant will establish the 4<sup>th</sup> Street centerline based on as-builts and/or a best fit centerline based on survey data. The typical roadway section will include the following (east to west):

- Bench at back of walk to property line
- 6' sidewalk
- 5' parkway
- 2' curb & gutter
- 4.5' bike lane
- 2 – 12' travel lanes
- 12' raised median w/ left turn lanes onto Soliere Avenue and Sparrow Avenue
- 2 – 12' travel lanes
- 4.5' bike lane
- 2' curb & gutter
- 5' parkway
- 10' concrete FUTS (replaces the asphalt FUTS)
- Bench at back of FUTS to property line

The Consultant will include access to the parcel to the west (to the City right-of-way line) in the design for the Soliere Avenue intersection (plans for access to be provided by City of Flagstaff). The Consultant will design improvements to the Sparrow Avenue intersection to facilitate two through lanes in each direction. The improvements will also include northbound to eastbound right-turn lanes at Sparrow Avenue and at Soliere Avenue. Storage lengths for these turn lanes will be provided by the City. No other driveways, access points, or intersection improvements will be included in the design.

The Consultant will inventory the existing ADA features and coordinate with the City to determine which are ADA compliant or non-compliant. Any ADA features within the project limits determined to not meet ADA requirements will be included in the plans for replacement.

No bus pull-outs will be provided. The existing facilities at the existing bus stops will be salvaged and placed on new pads.

The following assumptions are the basis of the cost proposal:

- All existing pavement along 4<sup>th</sup> Street will be removed and replaced with new AC pavement
- The pavement design for the adjacent ADOT/City of Flagstaff 4<sup>th</sup> Street Bridge Project and ADOT specification will be used for this project.
- The roadway profile will match existing
- The improvements along Soliere Avenue and Sparrow Avenue will end at the radius returns

### Utility Coordination

The Consultant will coordinate with private utility companies and City of Flagstaff to collect as-builts and facility maps. The Consultant will contact Blue Stake to field mark the existing utilities. The Consultant will pothole utilities to verify locations and depths for utilities that are conflict with the improvements. It is assumed that 20 potholes will be required.

The Consultant will coordinate with the private utility companies to identify conflicts and to review relocation plans developed by the private utility companies. The Consultant will attend up to 4 utility coordination meetings in Flagstaff. Other meetings will be conducted via WebEx, if needed.

The Consultant will coordinate with the City of Flagstaff to identify utility contacts and will send utility letters to each private utility company. The Consultant will request written feedback from each utility company to verify conflicts and relocation schedules. It is assumed that all existing utilities will be responsible for the funding and construction of their relocations and this scope of work does not include research related to prior rights.

Existing utilities and relocations (design by private utility companies) will be shown on the roadway plan sheets. Utility locating services will be provide per AECOM's subconsultant CobbFendley per their scope of work.

### Water and Sewer Design

The consultant will develop waterline plans to connect the existing 8" waterline in 4<sup>th</sup> Street. The proposed line will connect the line that ends north of Sparrow Avenue to the line that end at the intersection of 4<sup>th</sup> Street and Soliere Avenue.

The consultant will also develop waterline plans for a 12" water main that connects to the existing 12" waterline south of Sparrow Avenue and follows the alignment designed by Turner Engineering to Soliere Avenue. The waterline will turn and follow Soliere Avenue. This project will end the 12" waterline just past the paving limits for connection to future project. The City will provide the Consultant with the

CADD files and the Consultant will follow the horizontal alignment. The vertical alignment will be adjusted as required.

The Consultant will design a stub out from the existing sewer manhole in the intersection of 4<sup>th</sup> Street and Soliere Avenue. The stub out will extend to the existing R/W to allow for a future connection.

### Cost Estimates

The Consultant will prepare a cost estimate for each submittal based on MAG and/or City bid items and specifications.

### Plan Preparation

- English units
- Design and plans will be drafted in MicroStation
- 24" x 36" full-size sheets
- Plan sheet scale: 1" = 20' (full-size)
- Plans, specifications, and estimate will be submitted at 60% review, 90% review, 100% review, and Final (sealed)
- All submittals will be electronic (PDF) including final sealed plans
- Plan set will include:
  - Cover sheet
  - Typical sections
  - Survey control
  - Geometric data
  - Roadway Plan sheets
  - Roadway Profile Sheets (PGL for 4<sup>th</sup> Street and outside curb lines)
  - Drainage plans and profiles
  - Water line plan (sewer stub out to R/W will be shown on water line plans)
  - Water line profile sheet
  - Signing and pavement marking plan sheets
  - Signal sheets
  - Lighting sheets

### Management

A maximum of three staff will attend a project kickoff and field review meeting and one additional meeting in Flagstaff. A maximum of six AECOM staff will attend a maximum of six progress meetings via WebEx.

AECOM will provide administration services including project coordination, contract administration, project scheduling, progress reports and monthly project reviews.

AECOM will provide QA reviews of 60%, 90% and 100% submittals.

AECOM will provide support for bid phase. Post design services is not included in this scope of work.

#### Information to be provided by City of Flagstaff

- As-built plans
- Survey control information
- ROW legal descriptions
- ADOT FUTS plans
- CAD files of the 30% iteration of the new 12" water main by Turner Engineering, Inc. (horizontal location is fixed, vertical may be amended)
- Flagstaff Tiny House Village Site Plan by Mogollon Engineering, Inc. (shows 2 water stub out and 1 sewer stub out locations & driveway - to the property line)
- Right turn technique from Boulder, CO

#### Deliverables

AECOM will provide 60%, 90% and 100% (PSE) submittals. Project plans will be in MicroStation format. Submittal will be provided in PDF format. The City of Flagstaff will provide comments at designated time frame of submittal in a comment resolution form.

**COST PROPOSAL**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

New Contract: \_\_\_\_\_

**Final Design Services**  
**Compensation: Lump Sum**

**DIRECT LABOR RATES**

<u>Classification</u>	<u>Contract Rate</u>	<u>Quantity</u>	<u>Total</u>
Project Principal	\$ 100.00	3.0	\$ 300.00
Project Manager-Sr.	\$ 86.54	93.0	\$ 8,048.22
Project Engineer-Sr.	\$ 71.38	97.0	\$ 6,923.86
Project Engineer	\$ 60.11	237.0	\$ 14,246.07
Engineer	\$ 43.63	263.0	\$ 11,474.69
Designer - Sr.	\$ 40.58	0.0	\$ -
Designer	\$ 33.61	60.0	\$ 2,016.60
CADD Technician	\$ 37.38	292.0	\$ 10,914.96
Project Administrative	\$ 34.90	38.0	\$ 1,326.20
Registered Land Surveyor - Sr.	\$ 50.88	31.0	\$ 1,577.28
Survey Technician	\$ 39.06	0.0	\$ -
Survey Party Chief	\$ 28.98	31.0	\$ 898.38
<b>Sub Total</b>		<b>1145.0</b>	<b>\$ 57,726.26</b>

**Overhead (Negotiated)(CT PAO 18.13):** 136.85% **\$ 78,998.39**

**Fixed Fee:** 10% **\$ 13,672.47**

**Other Direct Expenses:**

		<u>Quantity</u>	<u>Total</u>
Mileage (personal vehicle only)	\$0.445 per mile	1,224	\$ 544.68
Copies & Plotting 8x11 B&W	\$0.035 each	600	\$ 21.00
8x11 COLOR	\$0.370 each	200	\$ 74.00
11x17 B&W	\$0.060 each	400	\$ 24.00
Subsistence (Meals)			\$ 540.00
Subsistence (Lodging)			\$ 440.00
<b>Sub Total</b>			<b>\$ 1,643.68</b>

**Sub Consultant Fees:**

CobbFendley (Subsurface Utility Engineering Services)	\$20,982.60	\$ 20,982.60
Ethos Engineering, LLC (DBE)	\$3,942.35	\$ 3,942.35
<b>Sub Total</b>		<b>\$ 24,924.95</b>

**TOTAL LUMP SUM \$ 176,966**

Signature   
 \_\_\_\_\_  
 Robert Ringwald  
 AECOM Associate Vice President

Date 04/24/2019

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOUR ESTIMATE - Management & Meetings**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours								
	No. Sheets	Hrs/Sheet	Total Hours	Proj. Princ.	Project Manager-Sr.	Project Engineer-Sr.	Proj. Eng.	Desig.	Proj. Admin.
<b>Information Collection/Field Review/Meetings</b>									
Project Kickoff and Field Review Meeting - Flagstaff (3 staff)			26		8	8	8		2
Meeting - Flagstaff (3 staff)			26		8	8	8		2
Progress Meetings - WebEx From AECOM office (6 meetings, 5 staff)			42		12	6	12	6	6
<b>Administration</b>									
Project Coordination			12		4	4	4		
Contract Administration			14		4				10
Project Schedule			8		4	4			
Progress Reports 6)			6		3				3
AECOM Monthly Project Reviews			6	3	3				
AECOM QMS (3 submittals)			0						
60%			9		3	6			
90%			9		3	6			
100%			9		3	6			
Bid Support			20		10	10			
<b>SUBTOTAL - FINAL DESIGN (MANAGEMENT &amp; MEETINGS)</b>			<b>187</b>	<b>3</b>	<b>65</b>	<b>58</b>	<b>32</b>	<b>6</b>	<b>23</b>

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOUR ESTIMATE - Roadway**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours								
	No. Sheets	Hrs/Sheet	Total Hours	Project Manager-Sr.	Project Engineer-Sr.	Proj. Eng.	Eng.	CADD Tech.	Proj. Admin.
Cover Sheet	1	7	7.0			1	2	4	
Design Data Sheet (Index of Sheets, Design Info, Legend, General Notes)	1	16	16.0		1	4	3	8	
Design Data Sheet (Earthwork Quants, Factors, General Notes)	1	20	20.0		1	5	6	8	
Typical Sections (Pavement Structural Sections)	1	16	16.0	1		2	5	8	
Typical Sections (Roadway Typical, Slope Tables, End Conditions)	1	16	16.0	1		2	5	8	
Roadway Detail Sheet	1	18	18.0	2		6	0	10	
Geometric Data & Plan Sheets (Benchmarks included on Sheets)	1	21	21.0	1		4	6	10	
Staking Plan Sheets	1	25	25.0	1	2	6	6	10	
Roadway Plan Sheets	2	27	54.0	2	4	12	16	20	
Profile & Superelevation Diagram Sheets	2	18	35.0		2	3	8	22	
Roadway Cross Sections at 50' Interval (Assumed 3 sections per sheet)	6	4	25.0		1	4	12	8	
Quantities/Cost Estimates - Roadway			24.0	2	2	8	8	4	
Item Special Provisions - Roadway			28.0	2	2	8	8		8
QA/QC - Roadway			24.0		24				
<b>SUBTOTAL - FINAL DESIGN (ROADWAY)</b>	<b>18</b>		<b>329.0</b>	<b>12</b>	<b>39</b>	<b>65</b>	<b>85</b>	<b>120</b>	<b>8</b>

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOUR ESTIMATE - Traffic**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours								
	No. Sheets	Hrs/Sheet	Total Hours	Project Manager-Sr.	Proj. Eng.	Eng.	Desig.	CADD Tech.	Proj. Admin.
<b>Pavement Marking &amp; Signing</b>									
General notes sheet	1	12	12	1		1	4	6	
Quantity sheet	1	27	27	1	2	4	8	12	
Signing & Pavement Marking Plan Sheets (40 Scale Full Size)	1	24	24		2	4	8	10	
Sign Format Sheet	1	20	20			2	6	12	
Signing & PM Special Provisions			6		6				
<b>Traffic Signal and Lighting</b>									
General notes sheet	1	12	12	1		1	4	6	
Quantity sheet	1	27	27	1	2	4	8	12	
Signal and Lighting Plans	2	21	42	2	4	8	16	12	
<b>SUBTOTAL -FINAL DESIGN (TRAFFIC)</b>	<b>8</b>		<b>170</b>	<b>6</b>	<b>16</b>	<b>24</b>	<b>54</b>	<b>70</b>	<b>0</b>

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOUR ESTIMATE - Drainage**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours								
	No. Sheets	Hrs/Sheet	Total Hours	Project Manager-Sr.	Proj. Eng.	Eng.	Desig.	CADD Tech.	Proj. Admin.
Research and Data Collection			8.0		8				
Onsite Hydrology (60/90%)			4.0		1	3			
Offsite & Onsite Drainage Layout (60/90%)			4.0		4				
Offsite & Onsite Drainage Hydraulics (60/90%)			5.0		1	4			
Coordination of Drainage on Roadway Plans (60/90/100%)			9.0		3	3		3	
Culvert Plan & Profile Sheet (60/90/100%)	1	9	9.0		3	3		3	
Channel/Dwvy Culvert Profile (60/90/100%)	1	9	9.0		3	3		3	
Detail Sheets (60/90/100%)	3	6	18.0		4	8		6	
Initial Drainage Memo (60%)			14.0	2	4	4		2	2
Final Drainage Memo (90%)			8.0	1	3	2		1	1
Miscellaneous Meetings/Web-x Sessions w/ COF			8.0	4	4				
<b>SUBTOTAL - FINAL DESIGN (DRAINAGE)</b>	<b>5</b>		<b>96.0</b>	<b>7</b>	<b>38</b>	<b>30</b>	<b>0</b>	<b>18</b>	<b>3.0</b>

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOOR ESTIMATE - Survey**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours								
	No. Sheets	Hrs/Sheet	Total Hours	Project Manager-Sr.	Registered Land Surveyor -	Survey Technician	Survey Party Chief	CADD Tech.	Proj. Admin.
<b>Establishment of horizontal (NAD1983 Ground) &amp; Vertical (NAVD1988) survey control</b>									
Research			4.0		2		2		
Establishment of GPS RTK survey control network based on NGS/COF survey control points (10 points to be located)			8.0		4		4		
Set approximately 3 Traverse Points in the vicinity of 4th Street bridges.3 with horizontal survey control establishment.			4.0		2		2		
Vertical control establishment on previously set 3 traverse points using differential leveling method (from COF bench mark "1823410" )			8.0		4		4		
<b>Travel Time</b>									
Travel from Pheonix to Flagstaff			5.0		2.5		2.5		
Travel from Flagstaff to Phoenix			5.0		2.5		2.5		
<b>Ground Survey at tie-in locations</b>									
Locations of various features, cross sections, utilities, drainage structures, etc			20.0		10		10		
Data processing and survey coordinates report preparation			8.0		4		4		
<b>SUBTOTAL - FINAL DESIGN (Survey)</b>	<b>0</b>		<b>62.0</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>0</b>

**LABOR HOURS**  
**Fourth Street Reconstruction Improvement Project**

**Firm Name:** AECOM Technical Services, Inc.  
**City of Flagstaff Project No.:** ST 3353 / 03-19002

**MANHOOR ESTIMATE - Utilities**

SCOPE ITEM DESCRIPTION	Estimate of Labor Hours									
	No. Sheets	Hrs/Sheet	Total Hours	Proj. Princ.	Project Manager-Sr.	Proj. Eng.	Eng.	Desig.	CADD Tech.	Proj. Admin.
Field review of blue staking			16			8	8			
Request and obtain utility information from utility companies			40			16	24			
Utility Coordination Meetings (4)			44			16	24			4
Utility Basefile (Utilities will be shown on Roadway Sheets)			32			8	12		12	
Submit plans to utility companies and obtain clearance letters			40			8	20		12	
8" Water line sheet (includes sewer stub out)	1	37	37		1	8	12		16	
12" Water line sheet	1	31	31		1	6	8		16	
Water line notes sheet	1	24	24			2	8		14	
Water line detail sheet	1	28	28			6	8		14	
Pot Hole Request					1	8				
<b>SUBTOTAL - FINAL DESIGN (UTILITIES)</b>	<b>4</b>		<b>292</b>	<b>0</b>	<b>3</b>	<b>86</b>	<b>124</b>	<b>0</b>	<b>84</b>	<b>4</b>

**DIRECT EXPENSES**

**Fourth Street Reconstruction Improvement Project**

Firm Name: AECOM Technical Services, Inc.  
City of Flagstaff Project No.: ST 3353 / 03-19002

**DERIVATION OF EXPENSES - PHASE I**

**MILEAGE (PERSONAL VEHICLE) - Progress Meetings**

	Est. Miles	Trips	Vehicles	Total Miles
Mileage Mtgs in Flagstaff				
Project Kickoff and Field Review Meeting	306	1	1	306
One Meeting	306	1	1	306
Survey	306	2	1	612
				1224

**TOTAL MILEAGE COST @ \$0.445/MILE: \$544.68**

Total Miles 1,224

**COPYING AND PLOTTING**

8.5" X 11" B&W:

Total Sheets (8.5X11) 600  
@ \$0.035/sht \$21.00

**SUBTOTAL FOR 8.5" x 11" COPYING: \$21.00**

8.5" X 11" COLOR:

Handouts/Printing 200  
@ \$0.370/sht \$74.00

**SUBTOTAL FOR 8.5" x 11" COLOR COPYING: \$74.00**

11" x 17" B&W:

Total Sheets (11X17) 400  
@ \$0.060/sht \$24.00

**SUBTOTAL FOR 11" x 17" COPYING: \$24.00**

**SUBSISTENCE (MEALS)**

	Est. of Number	Cost/ Unit	Staff Number	Total Cost
Field Review/Site Mtgs Mtgs				
Project Kickoff and Field Review Meeting	1	\$54.00	3	\$162.00
One Meeting	1	\$54.00	3	\$162.00
Survey	2	\$54.00	2	\$216.00

**TOTAL SUBSISTENCE (MEALS) \$540.00**

**SUBSISTENCE (LODGING)**

	Est. of Number	Cost/ Unit	Staff Number	Total Cost
Field Review/Site Mtgs and Flagstaff Mtgs				
Survey (2 night)	2	\$110.00	2	\$440.00

**TOTAL SUBSISTENCE (LODGING) \$440.00**

April 23, 2019

AECOM Technical Services, Inc.  
7720 North 16<sup>th</sup> Street, Suite 100  
Phoenix, Arizona 85020

Attn: Rob Ringwald, PE, SE

**RE:                    Proposal for Geotechnical Investigation  
                         4<sup>th</sup> Street Widening – East Soliere Avenue to Sparrow Avenue  
                         Coconino County, Arizona**

Dear Rob:

As requested, Ethos Engineering, LLC (Ethos) is pleased to present this scope of work, work-hour estimate, and fee proposal for professional geotechnical engineering services for the referenced project to the AECOM Technical Services, Inc. (AECOM) design team. This work will be performed in addition to our Arizona Department of Transportation (ADOT) I-40/4<sup>th</sup> Street project. We anticipate performing the field work discussed herein in conjunction with that project.

## **1.0     Purpose**

An ADOT design project is currently underway to replace the existing I-40/4<sup>th</sup> Street bridge. As part of that project, the 4<sup>th</sup> Street bridge approach pavements will be replaced including the majority of pavement north of East Soliere Avenue. The City of Flagstaff (COF) plans to extend the pavement improvements south to just south of Sparrow Avenue.

The purpose of our geotechnical engineering services will be to evaluate the physical properties of the subsurface soil, bedrock and groundwater conditions to establish geotechnical engineering criteria for the final design and construction of improvements planned along 4<sup>th</sup> Street.

The contracting method for this work is lump sum. We will utilize a qualified lab and drilling subcontractor to complete this work.

## **2.0     Geotechnical Scope of Services**

We intend to utilize geotechnical information collected as part of the ADOT project and combine that with additional subsurface information gathered from this project.

Ethos will perform the geotechnical investigation with support to be provided by qualified subconsultants. The following describes the geotechnical scope of work planned and assumptions to form the basis of our proposal.



## 2.1 Project Initiation

Ethos will prepare a Geotechnical Field Investigation Plan (FIP) showing our intended boring location. We will coordinate the drilling and traffic control subcontractors to schedule the field work. We have assumed Ethos will initially stake the boring location. After the boring location is staked, we will coordinate with Arizona 811 to locate public underground utilities that may be present on the site. It appears that the City of Flagstaff owns the land within the project limits and it is assumed that a no-cost right-of-way permit will be obtained from the City of Flagstaff.

## 2.2 Geotechnical Field Investigation

Ethos will supervise the drilling exploration for the pavement elements to evaluate the subsurface soil conditions at the site. Ethos will subcontract a drill rig and crew, and traffic control for the field exploration. We have assumed the test location will be accessible to a truck-mounted drill-rig and pickup trucks. An Ethos field engineer will oversee the drilling operations and log the test boring.

We plan on using shoulder work signage for the shoulder closure needed to perform this work. The test drilling will be completed in the shoulder, off from existing pavement. We will submit a traffic control plan for the planned traffic control setup.

One boring will be drilled to a depth of 5 feet or practical auger refusal on dense cobbles or bedrock. In soil, standard penetration test (SPT) samples, and bulk samples at selected depths will be obtained from the test borings to conduct laboratory testing. SPT sampling intervals will generally be at intervals of 2.5 feet or less. Soil samples will be obtained from the test boring in order to conduct laboratory testing.

## 2.3 Laboratory Testing

Laboratory testing of samples collected during the drilling exploration will be completed by Wood or IAS<sup>(1)</sup>, as assigned by Ethos, to characterize physical properties of the materials forming the foundations or fill materials for the project. We estimate the laboratory testing in Table 2 will be performed as part of this project.

**Table 2 – Summary of Proposed Lab Testing Program**

Item/Description	Estimated Number
Grain Size Analysis (Total - Coarse and Fine) - ASTM C136 & C117	1
Atterberg Limits (Plasticity Index) - ASTM D4318	1
Expansion (swell, constant surcharge) – ASTM D4546	1
Moisture-Density (standard Proctor) – ASTM D698, Method A or B	1
pH and resistivity – AZ 236	1
Total Soluble Sulfates & Chlorides - AZ 733 & AZ 736	1 <sup>(1)</sup>



## 2.4 Engineering Analysis & Geotechnical Report

Ethos will perform engineering analyses of the data obtained from the exploration and laboratory testing to develop geotechnical recommendations and prepare a draft and final geotechnical exploration report for the project. The report will be prepared under the supervision of a Professional Civil Engineer registered in the State of Arizona.

Generally, the Geotechnical report will include the following data:

- Description of the area covered by the report and existing site conditions, including vicinity map.
- Description of the geology and topography of the area, including soil and rock types, and drainage characteristics and estimated depth to groundwater.
- A site plan showing intended boring location and a description of procedures and equipment used in the subsurface investigation program. Field investigations will include descriptions of the soil types, penetration test results, in situ test results.
- Results of laboratory tests and a description of test methods. Laboratory test results will include classification and engineering properties for all major soil and rock strata in the study area.
- A discussion of geological and geotechnical conditions and results with reference to specific locations on the Project.
- Recommendations for:
  - Pavements based on COF Design Guidelines.
  - Roadway embankments, including material types and suitability, foundation conditions and improvements, settlement impacts and remediation. Roadway excavations, including material types and suitability for use in embankments.
  - Temporary and permanent cut and fill slopes.
  - Evaluation of shrink/swell potential and the impact on pavements, where applicable.
  - Impacts of compressible, hydro-collapsible, and/or expansive soils, if present, and proposed mitigations.
  - Corrosion potential of soils on construction materials;
  - Construction considerations; and
  - Suitability of materials (borrow, aggregates, riprap, etc.) that can be obtained from project excavations.
- Reports will also include the following items in the appendix:
  - Plan view locations of field sampling/testing
  - Copies of the boring logs and field/laboratory test data used for the analysis and design.
  - Summary of laboratory testing results.

## 2.5 Project Meetings and Management

We do not intend to attend any meetings for this work.

### 3.0 Schedule

We will develop our FIP upon notice to proceed. Once approved by AECOM, we will forward to the COF as part of our ROW Use permit application. Once the permit is approved, we will clear underground utilities by coordinating with the Arizona 811. We anticipate starting to drill within 5 days after utility clearance within our work areas.

Test drilling, provided it is performed concurrent with our ADOT investigation, will take approximately 2 hours to complete. Should a separate mobilization be required, this work will take approximately 1 day to complete.

Wood will begin the laboratory testing as samples are obtained from the field exploration. We anticipate completing the laboratory testing approximately 2 weeks after the field exploration is completed. Geotechnical analyses will be performed and preparation of our geotechnical report will begin as the laboratory testing is being completed. We anticipate submitting our draft report for the design team and COF to review approximately 4 weeks after the completion of the laboratory testing. Final reports will be finalized within 2 weeks of receipt of comments.

### 4.0 Project Fees

The attached tables present the workhours, derivation of costs and mileage for the various tasks anticipated to complete geotechnical design services for the project. Also attached are quotes from our drilling, testing laboratories and traffic control provider.

The total project lump sum fee cost based on the workhour estimate, planned drilling, and laboratory testing is **\$3,942.35**.

#### **Assumptions / Exclusions:**

The following assumptions/exclusions are summarized below:

- The test location will be readily accessible to a truck-mounted or track-mounted drill rig without the need for grading, earthwork or additional equipment.
- Dust control and SWPPP abatements to be provided by others.
- There are no private underground utilities within the right-of-way.
- Unrestricted daytime work hours.
- Delays due to inclement weather may occur and should be anticipated.

We appreciate the opportunity to submit this work scope and estimate of costs and look forward to working with you on this project. If you have any questions or require additional information pertaining to this proposal, we would be pleased to discuss them with you.

Sincerely,

**ETHOS ENGINEERING LLC**

**Reviewed By:**



Keith H. Dahlen, PE  
Principal/Senior Geotechnical Engineer



Francisco J. Garza, PE  
Senior Geotechnical Engineer

s:\public\2018\adot\adot i-40, 4th street\cost proposal\rev2\all\i-40, 4th street geotechnical scope and fee estimate\_lump sum\_ethos r2 01-11-19.docx

**Attachments:**

- Work-hour Estimate
- Derivation of Cost Summary
- Mileage Estimate
- Subcontractor Quotes

**COF - 4th Street Widening**  
**Ethos Engineering, LLC - Man-Hour Estimate**

<b>Project Work Task</b>	<b>Project Manager</b>	<b>Engineer - Sr.</b>	<b>Designer</b>	<b>Admin</b>	<b>Total Hours</b>
Permitting/Layout/Bluestake	1	2	4	0	7
Test Drilling	0	0	2	0	2
Laboratory Testing	0	1	1	0	2
Analysis & Report Preparations	2	6	2	2	12
<b>TOTAL</b>	<b>3</b>	<b>9</b>	<b>9</b>	<b>2</b>	<b>23</b>

**DERIVATION OF COST**

**DIRECT LABOR (OH + FEE BASIS)**

<u>Classification</u>	<u>Hours</u>	<u>Rate</u>	<u>Estimated Labor Costs</u>
Project Manager	3	\$82.00	\$246.00
Sr. Engineer	9	\$58.00	\$522.00
Designer	9	\$25.24	\$227.16
Administrative	2	\$25.00	\$50.00
Total Hours:	<u>23</u>		

Direct Labor:	\$1,045.16
Plus Overhead @ 145%:	<u>\$1,515.48</u>
Subtotal:	\$2,560.64
Plus 10% Fee:	<u>\$256.06</u>
Total Labor:	\$2,816.71

**DIRECT EXPENSES**

Total Estimated Direct Expenses: \$0.00

**OUTSIDE SERVICES**

Test Drilling (Geomechanics Southwest, Inc.)	1 Boring to 5'	\$320.00
Laboratory Testing -Wood (See attached quote)		\$594.00
Traffic Control - Roadsafe (See attached quote)		\$211.64

Total Estimated Outside Services: \$1,125.64

By:

**TOTAL LUMP SUM COST: \$3,942.35**



Keith Dahlen, Contract Manager



# Geomechanics Southwest, Inc.

5435 W. Mohave Street  
Phoenix, Arizona 85043  
602-252-0559  
[www.gsidrilling.com](http://www.gsidrilling.com)

Date: April 22, 2019  
Proposal # [10619P]

AROC 079441 / ADWR 498

**Keith Dahlen, PE**  
**ethos Engineering**

9180 S Kyrene Rd, #104  
Tempe, AZ 85284  
[kdahlen@ethosengineers.com](mailto:kdahlen@ethosengineers.com)

**RE: City of Flagstaff, 4th Street to Sparrow Avenue- Auger Truck-Mounted Rig**

**SCOPE:**

- Provide a CME-75 truck-mounted drill and a 2-man crew with required support equipment.
- Advance one (1) pavement boring to five (5) l.f. or refusal.
- GSI understands permitting and traffic control will be handled by others.
- GSI assumes daytime working hours.
- GSI will grout each core boring upon completion, no patching assumed.

ITEM	QUANTITY	UNITS	UNIT PRICE	LINE TOTAL
Prep / Mob / Demob * (est.)	0	EACH	1480.00	\$ 0.00
Auger/Core/Sample	1	HOURS	185.00	\$ 185.00
Access/Standby/Traffic Control Delays (est.)	.5	HOURS	185.00	\$ 92.50
Grout Abandonment (backfill requirement per client)	5	L.F.	8.50	\$ 42.50

**ESTIMATED TOTAL \$ 320.00**

**We estimate completion time to be 1 day with travel for the truck-mounted drill.**

**Prep / Mob / Demob \* will not be charged if work is done consecutively with ADOT project.**

We at Geomechanics Southwest Inc., appreciate the opportunity to provide you with an estimate. If you have any questions, please don't hesitate to call or email us. We look forward to hearing from you soon.

Respectfully submitted by,

**GEOMECHANICS SOUTHWEST, INC.**

Mike Shelquist  
Operations Manager - Phoenix

ETHOS042219 COF 4th Street to Sparrow Avenue





April 22, 2019  
Proposal No. PA18-12-01a

Ethos Engineering, LLC  
9180 South Kyrene Road, #104  
Tempe, Arizona 85284

Wood Environment & Infrastructure Solutions, Inc.  
4600 East Washington Street, Suite 600  
Phoenix, Arizona 85034  
T: (602) 733-6000  
F: (602) 733-6100  
[www.woodplc.com](http://www.woodplc.com)

Attn: Keith Dahlen PE

**Re: Laboratory Testing**  
**4<sup>th</sup> Street Widening, Soliere Drive to Sparrow Avenue**  
**Flagstaff, Arizona**

In response to your request, Wood Environment & Infrastructure Solutions, Inc. (Wood) presents herein our laboratory testing fees in support of your City of Flagstaff, 4<sup>th</sup> Street Widening project.

**Laboratory Testing**

At the completion of drilling operations by Ethos, soil samples will be delivered to the Wood laboratory for testing. Ethos has provided the following proposed testing plan, accompanied by our unit rates:

Test	Number of Tests	Cost
Sieve Analysis	1	\$89
Atterberg Limits (Plasticity Index)	1	\$70
One-Dimensional Swell	1	\$130
Proctor	1	\$115
pH & Resistivity	1	\$150
Sulfates and Chlorides	1	\$40
<b>Estimated Total:</b>		<b>\$594</b>

Laboratory testing will be performed on the samples as directed by Ethos.

Respectfully Submitted,

**Wood Environment & Infrastructure Solutions, Inc.**

Mark Hartig, PE  
Geotechnical Operations Manager





**QUOTATION**

**3015 E Illini  
Phoenix, AZ 85040  
602-243-1218  
Fax 602-243-3470**

Quote Date	Quote ID
12/6/2018	PHXJM18062
Payment Terms	Net 30 days

**Valid Through: 7/22/2019**

**Ethos Engineering**  
Pancho Garza

**Job Location:**  
I-40 & 4th St  
Flagstaff  
Quote Created By: Jeff Meirick  
Estimated Days: 1

Item Description	Price	UOM	Qty/Day	Days	Total Qty.	Total
1 Man 1 Truck (Set up) *	\$55.00	Per Hour	0	1	7	\$0.00
1 Man 1 Truck (Take down) *	\$55.00	Per Hour	0	1	7	\$0.00
TCP	\$50.00	Per Hour	1	1	1	\$50.00
Medium Sign *	\$0.84	Per Day	8	1	8	\$6.72
Spring Stand *	\$2.10	Per Day	8	1	8	\$16.80
Small Sign *	\$0.64	Per Day	4	1	4	\$2.56
Sign Stand 4 ft *	\$0.60	Per Day	4	1	4	\$2.40
Type I Barricade *	\$0.50	Per Day	8	1	8	\$4.00
Vertical Panel Side VP *	\$0.50	Per Day	30	1	30	\$15.00
Sandbags *	\$1.01	Per Each	60	1	60	\$60.60
Flags *	\$2.30	Per Each	16	1	16	\$36.80

Note: The \* indicates taxable items.

Equipment and labor estimate for a shoulder closure on 4th St.  
Includes equipment, TCP and 1 day of rental equipment.

<b>EQUIPMENT</b>	\$47.48
<b>ONE TIME CHARGES</b>	\$97.40
<b>LABOR</b>	\$50.00
<b>SUBTOTAL</b>	\$194.88
<b>SALES TAX (8.6%)</b>	\$16.76
<b>QUOTE TOTAL</b>	\$211.64

**Scope:** Final Billing will be based upon actual quantities of labor, equipment and devices called out on approved traffic control plans.

The above quantities are estimated quantities based on information provided by the customer. Actual quantities used in the field will be billed on the customer invoice.

**Included:** Traffic Control Plans

**Excluded:** Arrow Boards

Portable Message Boards

Standby Time

**Add'l Terms:** Invoices are payable with Terms of Net 30 Days.

Any additional equipment added to the job site will be billed separately.