Collin County

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	PHASE I PLAN ADEQUATE (60%)	PHASE II FINAL PLAN & CONSTRUCTION SERVICE	TOTAL COST
110	Route and Design Studies	$ 19,600.00	$ -	$ 19,600.00
150	Field Surveying	$ 7,600.00	$ -	$ 7,600.00
160	Roadway Design Controls	$ 380,680.00	$ 119,600.00	$ 500,280.00
161	Drainage	$ 298,160.00	$ 92,560.00	$ 390,720.00
162	Signing, Markings and Signalization	$ 134,472.00	$ 48,768.00	$ 183,240.00
163	Miscellaneous Roadway	$ 283,910.00	$ 114,230.00	$ 398,140.00
	Direct Costs	$ 4,209.00	$ 2,807.00	$ 7,016.00
	CP&Y Subtotal	**$ 1,128,631.00**	**$ 377,965.00**	**$ 1,506,596.00**
Sub	**BW2 Engineering**	**$ 94,140.00**	**$ 10,460.00**	**$ 104,600.00**
	SAM	**$ 104,315.00**	$ -	**$ 104,315.00**
Construction Phase Services (COST PLUS SPECIFIED RATE)				
309	Design Verification, Changes & Alterations	**$ -**	**$ 106,800.00**	**$ 106,800.00**
	Total	**$1,327,086.00**	**$495,225.00**	**$1,822,311.00**

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 110 - Route and Design Studies											
110.1	Geotechnical Investigations										
110.1.3	Geotechnical Report		not included (txdot provide pavement design)						0	$0.00	$0.00
110.2	Pavement Design										
110.3	Geotechnical Supervision and Coordination										
110.3.1	Subconsultant Supervision and Coordination								0	$0.00	$0.00
110.1	Data Collection and Preliminary Project Development										
110.4.1	Design Concept Conference w/ TxDOT		2	8	8	8	8		34	$4,720.00	$4,720.00
110.4.2	Collect/Review Available Data			16	40	40	16		112	$14,880.00	$14,880.00
	Total		2	24	48	48	24	0	146	$19,600.00	$19,600.00
	Cost		$ 400.00	$ 4,320.00	$ 6,720.00	$ 5,760.00	$ 2,400.00	$ -			

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 150 - Field Surveying											
150.1	Field Surveying										
			Services provided by BW2 Engineering, Inc.						0	$0.00	$0.00
150.2	Subsurface Utility Engineering										
			Services provided by SAM, Inc.						0	$0.00	$0.00
150.3	Surveying Supervision and Coordination										
110.3.1	Subconsultant Supervision and Coordination		2	24	8	8	8		50	$7,600.00	$7,600.00
	Total		2	24	8	8	8	0	50	$7,600.00	$7,600.00
	Cost		$ 400.00	$ 4,320.00	$ 1,120.00	$ 960.00	$ 800.00	$ -			

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 160 - Roadway Design Controls											
160.1	**Verify Schematic Geometry**										
160.1.1	Establish/Verify Horizontal and Vertical Geometry		4	40	80	80	80		284	$36,800.00	$36,800.00
160.2	**Horizontal Alignment Data Sheets**										
160.2.1	Project Layout Sheets	7		8	32	32	32		104	$12,960.00	$11,664.00
160.2.2	Horizontal Alignment Data Sheets	2		8	40	40	40		128	$15,840.00	$14,256.00
160.3	**Typical Sections**										
160.3.1	Existing Typical Sections	1		2	8	16	16		42	$5,000.00	$4,500.00
160.3.2	Proposed Typical Sections	4		8	40	40	40		128	$15,840.00	$14,256.00
160.4	**Roadway Plan and Profile**										
160.4.1	FM 2551 Plan & Profile	28	4	80	240	280	320		924	$114,400.00	$97,240.00
160.4.5	Cross Street Plan & Profile	5		16	80	80	100		276	$33,680.00	$28,628.00
160.5	**Miscellaneous Roadway Sheets**										
160.5.1	Intersection Layout	4		8	80	80	40		208	$26,240.00	$20,992.00
160.5.2	Driveway Details and Profiles	13		8	80	80	80		248	$30,240.00	$24,192.00
160.5.3	Miscellaneous Roadway Details	1		8	24	24	24		80	$10,080.00	$8,064.00
160.6	**Roadway Quantity and Summary Sheets**										
160.6.1	Calculate Roadway and Earthwork Quantities				80	80	40		200	$24,800.00	$14,880.00
160.6.2	Roadway Summary Sheets	2		8	40	40	24		112	$14,240.00	$4,272.00
Subtotal Roadway Design									**2734**	**$340,120.00**	**$279,744.00**
160.7	**Cross Sections**										
160.7.1	Final Roadway Cross Sections	90		16	160	200	200		576	$69,280.00	$41,568.00
160.7.2	Construction Phase Cross Sections			16	80	80	40		216	$27,680.00	$16,608.00
Subtotal Cross Sections									**792**	**$96,960.00**	**$58,176.00**
160.8	**Removal Plans**										
160.8.1	Removal Layouts	14		4	40	80	120		244	$27,920.00	$22,336.00
160.8.2	Calculate Removal Quantities			4	8	24	24		60	$7,120.00	$4,272.00
160.8.3	Removal Summary	1		4		8	8		20	$2,480.00	$744.00
Subtotal Removal Plans									**324**	**$37,520.00**	**$27,352.00**
160.10	**Quality Assurance/Quality Control**		2	48	64	64			**178**	**$25,680.00**	$15,408.00
	Total	**172**	**10**	**286**	**1176**	**1328**	**1228**	**0**	**4028**	**$500,280.00**	**$380,680.00**
	Cost		**$ 2,000.00**	**$ 51,480.00**	**$ 164,640.00**	**$ 159,360.00**	**$ 122,800.00**	**$ -**			

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 161 - Drainage											
161.1	**Culvert Design**										
161.1.1	Exterior Drainage Area Map	3		8	40	40	16		104	$13,440.00	$11,424.00
161.1.2	Culvert Hydraulic Data Sheet	3			24	40	40		104	$12,160.00	$10,336.00
161.1.3	Culvert Layout	3		8	40	80	80		208	$24,640.00	$20,944.00
161.1.4	Complete BCS	1			8	24	24		56	$6,400.00	$5,440.00
161.2	**Storm Drain Design**										
161.2.1	Field Inventory of Existing Drainage Structures					16	16		32	$3,520.00	$3,168.00
161.2.3	Interior Drainage Area Maps	13		16	80	80	40		216	$27,680.00	$23,528.00
161.2.4	Storm Sewer Hydraulic Data Sheets	12		16	80	80	80		256	$31,680.00	$26,928.00
161.2.5	Storm Sewer Plan & Profiles	40		40	240	320	320		920	$111,200.00	$94,520.00
161.2.6	Lateral Profiles	6		16	40	80	80		216	$26,080.00	$22,168.00
161.2.7	Ditch Tables	0							0	$0.00	$0.00
161.2.8	Miscellaneous Drainage Details	1		8	40	40	40		128	$15,840.00	$13,464.00
161.3	**Drainage Quantities and Summary Sheets**										
161.3.1	Calculate Drainage Quantities			4	40	40	40		124	$15,120.00	$9,072.00
161.3.2	Drainage Summary Sheet	1		4	16	40	40		100	$11,760.00	$3,528.00
Subtotal Drainage Design									**2464**	**$299,520.00**	**$244,520.00**
161.4	**Erosion Control Plans**										
161.4.1	SW3P Narrative	2		8	16	16	8		48	$6,400.00	$3,840.00
161.4.2	SW3P Layouts (Assumed 3 Phases)	40		16	100	120	160		396	$47,280.00	$28,368.00
161.5	**SW3P Quantities and Summary Sheets**										
161.5.1	Calculate SW3P Quantities			4	8	40	16		68	$8,240.00	$4,944.00
161.5.2	SW3P Summary Sheet	1		4	8	8	8		28	$3,600.00	$1,080.00
Subtotal Erosion Control Design									**540**	**$65,520.00**	**$38,232.00**
161.6	**Quality Assurance/Quality Control**		2	48	64	64			**178**	**$25,680.00**	$15,408.00
	Total	**126**	**2**	**200**	**844**	**1128**	**1008**	**0**	**3182**	**$390,720.00**	**$298,160.00**
	Cost		**$ 400.00**	**$ 36,000.00**	**$ 118,160.00**	**$ 135,360.00**	**$ 100,800.00**	**$ -**			

COLLIN COUNTY

EXHIBIT B

SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)

CP&Y, Inc.

LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 162 - Signing, Markings and Signalization											
162.1	**Signing and Pavement Marking Layouts**										
162.1.1	Existing Sign Inventory				4	16	16		36	$4,080.00	$3,468.00
162.1.2	Signing & Pavement Marking Layouts (1"=60')	13		16	64	80	80		240	$29,440.00	$25,024.00
162.3	**Signing and Pavement Marking Quantities/Summary**										
162.3.1	Calculate Signing and Pavement Marking Quantities			4	8	16	24		52	$6,160.00	$3,696.00
162.3.3	Summary of Pavement Markings	1		4	8	16	24		52	$6,160.00	$1,848.00
162.3.4	Small Sign Summary	3		2	4	16	16		38	$4,440.00	$1,332.00
Subtotal Signing & Striping									**418**	**$50,280.00**	**$35,368.00**
162.4	**Traffic Signal Plans**										
162.4.1.1	Traffic Signal Layout Sheet	16		16	120	120	120		376	$46,080.00	$36,864.00
162.4.1.2	Traffic Signal Elevation Sheet	3		4	8	16	40		68	$7,760.00	$6,208.00
162.4.1.3	Phasing and Wiring Plans	3		4	120	120	80		324	$39,920.00	$31,936.00
162.4.1.4	Complete Traffic Signal Standards Sheets				8	8	16		32	$3,680.00	$2,944.00
162.4.1.5	Miscellaneous Signal Details	1		4	8	8	16		36	$4,400.00	$3,520.00
162.4.2	Field Verify Signal Layouts					8	8		16	$1,760.00	$1,408.00
162.5	**Traffic Signal Quantities and Summary Sheets**										
162.5.1	Calculate Traffic Signal Quantities				8	16	16		40	$4,640.00	$2,784.00
162.5.2	Summary of Traffic Signals	1			8	16	16		40	$4,640.00	$1,392.00
Subtotal Traffic Signals									**932**	**$112,880.00**	**$87,056.00**
162.6	**Quality Assurance/Quality Control**		2	40	48	48			**138**	**$20,080.00**	$12,048.00
	Total	**41**	**2**	**94**	**416**	**504**	**472**	**0**	**1488**	**$183,240.00**	**$134,472.00**
	Cost		**$ 400.00**	**$ 16,920.00**	**$ 58,240.00**	**$ 60,480.00**	**$ 47,200.00**	**$ -**			

COLLIN COUNTY

EXHIBIT B

SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)

CP&Y, Inc.

LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 163 - Miscellaneous Roadway											
163.1	**Miscellaneous Roadway Sheets**										
163.1.1	Title Sheet	1		2	8	8	8		26	$3,240.00	$2,916.00
163.1.2	Index of Sheets	1		4		8	8		20	$2,480.00	$2,232.00
Subtotal Misc. Roadway Sheets									**46**	**$5,720.00**	**$5,148.00**
163.3	**Traffic Control Plans**										
163.3.1	Conceptual Phasing Layout			8	40	40	80		168	$19,840.00	$16,864.00
163.3.2	General Notes/Sequence of Construction Narrative	1		2	16	24	24		66	$7,880.00	$6,698.00
163.3.3	Advance Warning Sign Layouts	8		4	40	40	40		124	$15,120.00	$12,852.00
163.3.4	TCP Typical Sections	36		8	40	80	80		208	$24,640.00	$20,944.00
163.3.5	Traffic Control Plans	36		48	240	280	280		848	$103,840.00	$88,264.00
163.3.6	Detour Layouts	2			40	80	40		160	$19,200.00	$16,320.00
163.3.8	Shoring Wall Layouts	2			16	24	16		56	$6,720.00	$5,712.00
163.3.9	Construction Time Estimate			8	40	40			88	$11,840.00	$7,104.00
163.4	**Traffic Control Quantities and Summary Sheets**										
163.4.1	Calculate TCP Quantities				24	40	40		104	$12,160.00	$7,296.00
163.4.2	Construction Phase Summary Sheets	1			8	16	8		32	$3,840.00	$1,152.00
Subtotal Traffic Control									**1854**	**$225,080.00**	**$183,206.00**
163.6	**Collect Appropriate TxDOT Standard Sheets**	**160**		4	8	8	16		**36**	**$4,400.00**	**$4,400.00**
163.7	**Construction Cost Estimate**										
163.7.1.1	Preliminary Design Construction Cost Estimate			8	16	16			40	$5,600.00	$5,600.00
163.7.1.2	Plans Adequate Construction Cost Estimate			8	16	16			40	$5,600.00	$5,600.00
163.7.1.3	District Review Construction Cost Estimate			8	16	16			40	$5,600.00	
163.7.2	Final Opinion of Probable Construction Cost			4	16	16			36	$4,880.00	
Subtotal Construction Cost Estimates									**156**	**$21,680.00**	**$11,200.00**
163.8	**Specification and General Notes**										
163.8.1	General Notes			16	24	40			80	$11,040.00	$6,624.00
163.8.2	Prepare Specification and Special Provision List			8	24	40			72	$9,600.00	$5,760.00
163.8.3	Prepare Misc. PS&E Documents			8	16	16			40	$5,600.00	$3,360.00
Subtotal Specifications & General Notes									**192**	**$26,240.00**	**$15,744.00**
163.9	**Quality Assurance/Quality Control**										
163.9.1	Traffic Control QA/QC			48	64	64			176	$25,280.00	$15,168.00
Subtotal QA/QC									**176**	**$25,280.00**	**$15,168.00**
163.10	**Miscellaneous Project Management**										
163.10.1	Routine Project Management		4	120					124	$22,400.00	$13,440.00
163.10.2	Invoices and Progress Reports		4	48				12	64	$10,220.00	$6,132.00
163.10.3.1	Miscellaneous Project Meetings (assumed 8 meetings)		4	40	40	16			100	$15,520.00	$9,312.00
163.10.3.2	Milestone Review Meetings		4	40	40	16			100	$15,520.00	$9,312.00
163.10.6	Project Closeout Tasks		4	8	16	16	16		60	$8,000.00	$0.00
163.10.6	Mtgs (18 mos.)		4	54	54				112	$18,080.00	$10,848.00
Subtotal Project Management									**560**	**$89,740.00**	**$49,044.00**
	Total	**248**	**24**	**506**	**862**	**960**	**656**	**12**	**3020**	**$398,140.00**	**$283,910.00**
	Cost		**$ 4,800.00**	**$ 91,080.00**	**$ 120,680.00**	**$ 115,200.00**	**$ 65,600.00**	**$ 780.00**			

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

TxDOT FUNCTION CODE	DESCRIPTION OF WORK TASK	No. of PS&E Sheets	Principal	Project Manager	Senior Design Engineer	Design Engineer / SR ENGR Tech	EIT/CADD Tech	Clerical	Total Labor Hours	Total Labor Cost per Task	Total Labor Cost per Task (60% PS&E)
			$200.00	$180.00	$140.00	$120.00	$100.00	$65.00			
FC 309 - Design Verification, Changes, and Alterations											
309.1	Construction Phase Services										
	Preconstruction Meeting		2	8		8			18	$2,800.00	$0.00
	Partnering Meeting		2	8		8			18	$2,800.00	$0.00
	Respond to RFI's		2	40	40	40	40	8	170	$22,520.00	$0.00
	Shop Drawing Review			40	40	40		8	128	$18,120.00	$0.00
	Miscellaneous Meetings and Communication			40	40	40		32	152	$19,680.00	$0.00
	Prepare Miscellaneous Change Orders		2	40	40	80	160	32	354	$40,880.00	$0.00
	Total		8	176	160	216	200	80	840	$106,800.00	$0.00
	Cost		$ 1,600.00	$ 31,680.00	$ 22,400.00	$ 25,920.00	$ 20,000.00	$ 5,200.00			

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
CP&Y, Inc.
LUMP SUM

DIRECT COSTS

DESCRIPTION	ASSUMPTIONS	UNITS	COST PER	TOTAL COST
Color Bond Plot	/ Foot	100	$ 6.00	$ 600.00
Mileage	/ Mile	3200	$ 0.505	$ 1,616.00
Car Rental	/ Day		$ 65.00	$ -
11" X 17" copies	/ Sheet	32000	$ 0.10	$ 3,200.00
11" X 17" Mylar	/ Sheet	800	$ 1.00	$ 800.00
Delivery Services	/ Delivery	50	$ 16.00	$ 800.00
	TOTAL DIRECT COSTS			**$ 7,016.00**

COLLIN COUNTY

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
SURVEY AND ROW (BW2 Engineering)
LUMP SUM

DIRECT COSTS	QUANTITY	UNIT	UNIT COST	TOTAL
Task 1 - Topographic survey	1	LS	$65,000.00	$65,000.00
Task 2 - ROW map and legal descriptions	40	PARCEL	$790.00	$31,600.00
Task 3 - Additional Service	1	LS	$8,000.00	$8,000.00

EXHIBIT B
SUMMARY OF MANHOURS BY CLASSIFICATION & MAJOR TASK ANALYSIS

FM 2551 (FM 2514 to FM 2170)
SUBSURFACE UTILITY ENGINEERING (SAM)
LUMP SUM

SUBSURFACE UTILITY COST ESTIMATOR	
Project Name: FM 2551 (FM 2514 to FM 2170)	**Date:** October 1, 2011
Project Location: Collin	**Prepared By:** SAM
DESCRIPTION	CHARGE
GRAND TOTAL:	**$104,315.00**

EXHIBIT A

FM 2551 (from FM 2514 to FM 2170)
Collin County

SERVICES TO BE PROVIDED BY THE ENGINEER

The Engineer shall provide the necessary engineering and technical services for the preparation of plans, specifications and estimates (PS&E) for the reconstruction of FM 2551 from FM 2514 (Parker Road) to FM 2170 (Main Street) within Collin County. The project length along FM 2551 is approximately 3.4 miles.

The construction will include the widening of FM 2551 from an existing two-lane asphalt roadway to an ultimate six-lane concrete section with curbs and gutters, enclosed storm sewers, a raised median, and a horizontal re-alignment. The re-alignment will eliminate the approximately 2200 ft. offset of FM 2551 at FM 2514 by connecting the two sections of FM 2551 with an "S-curve", beginning approximately 760 ft. north of FM 2514 and ending approximately 320 ft. north of Curtis Drive.

Project development will be developed in two phases. Phase one work will include obtaining accurate locations and depths for the major North Texas Municipal Water District (NTMWD) water and wastewater lines that parallel and cross the roadway. With this water and wastewater line information the approved schematic design will be reviewed and any adjustments made that are necessary to insure the proposed roadway does not conflict with the existing major NTMWD facilities. A project will be identified that can be built without conflicting with the NTMWD facilities, probably four-lanes of the ultimate six-lane facility.

Phase two will be the development of construction plans (PS&E) for the project identified in phase one. The Cost Proposal, Exhibit D, is for the ultimate six-lane facility. If the project identified in phase one is a four-lane facility the Cost Proposal will be adjusted accordingly.

The project will be prepared in conformance with TxDOT Dallas District requirements. The construction plan set shall contain the required drawings, details and applicable standards required to describe the grading, paving, drainage, culverts, signing, pavement marking, delineation, sequence of construction, and traffic control for this construction project. The project will also involve Geotech investigation, SUE investigation, Topographic Survey, and the preparation of ROW maps and deed descriptions.

The engineering work for this project will be divided into a number of tasks as outlined below. It is the intent of Exhibit A (TASK OUTLINE), in coordination with Exhibit B (Services to be provided by the County), to help clarify the scope of work.

TASK OUTLINE

Function Code 110 – Route and Design Studies

110.1 Geotechnical Engineering and Soil Borings

Since there is no bridge and retaining walls for this project and that TxDOT will provide pavement design, it is assumed that geotechnical work will not be required as part of this contract. However, should TxDOT deem this service necessary at a later time, it can be added as a special service and included in a supplemental agreement.

110.2 Pavement Design

The Pavement Design for this project will be provided by TxDOT.

110.3 Geotechnical Supervision and Coordination

110.3.1 The ENGINEER will be required to interpret field tests performed by the geotechnical subconsultant. Boring logs will be incorporated into CADD and included on bridge and retaining wall plans. The ENGINEER will establish a work program for the geotechnical subconsultant at the beginning of the project. The Engineer will be responsible for the coordination, supervision, and review of the geotechnical subconsultant's work.

110.4 Data Collection and Preliminary Project Development

110.4.1 Attend and conduct Design Concept Conference with TxDOT.
110.4.2 Collect and review available data including existing plans, hydraulic studies, etc.

The Engineer shall prepare exhibits for and attend one public meeting to inform the nearby residents of the nature of the project and receive input from the community. These comments and concerns will be evaluated and addressed during the design phase where practical. It is assumed that a formal Public Hearing will not be required.

Function Code 130 – Right-of-Way Data

130.1 ROW Mapping

130.1.1 Obtain permission from the affected property owners to perform the aforementioned surveys.

130.1.2 Research property owners affecting the project and obtaining deeds, addresses, easements and other title information.

130.1.3 Prepare a Right-of-Way Map with appropriate right-of-way instruments of conveyance once the Engineer and the State have established the need for easements and additional right-of-way. Locate property corners of affected parcels of land. All procedures shall conform with TxDOT's Right-of-Way, Book I and II and in accordance with the Texas Board of Professional Land Surveying Practices Act and special procedures as may be require by the Dallas District. Submit (3) three copies each of the preliminary right-of-way strip maps. All final deliverables shall be signed and sealed by a Texas Registered Professional Land Surveyor.

130.1.4 Revise Right-of-Way Map due to changes set forth by the State.

130.1.5 Prepare computation sheets for Survey Closure and Area for each parcel acquired.

130.1.6 Prepare exhibits with field notes for right-of-way acquisition for forty (40) parcels takings. The fee will be based on a per property basis. All exhibits and legal descriptions shall be in accordance with State specifications. Submit three (3) copies of acquisition documents with parent tract deeds and traverse sheets to the TxDOT Area Office for preliminary review. All final deliverables shall be signed and sealed by a Texas Registered Professional Land Surveyor.

130.1.7 Prepare exhibits with field notes for drainage easement acquisition for four (4) easement takings. The fee will be based on a per property basis. All exhibits and legal descriptions shall be in accordance with State specifications. Submit three (3) copies of acquisition documents with parent tract deeds and traverse sheets to the TxDOT Area Office for preliminary review. All final deliverables shall be signed and sealed by a Texas Registered Professional Land Surveyor.

130.1.8 Stake final Right-of-Way and centerline.

Function Code 150 – Field Surveying

150.1 Field Surveying

150.1.1 Establish horizontal control for project from the Dallas District TxDOT survey control and set survey control points along the project limits with a minimum of four being beyond the construction limits.

150.1.2 Establish a vertical control loop along the project and set at least two project Benchmarks.

150.1.3 Provide topographic survey for the project. The limits of the project are as follows: 1.) Along FM 2551, starting approximately 200 linear feet South of the intersection of FM 2551 & FM 2514 and extending north to 200 linear north of the intersection of FM 2551 & FM 2170 for a total linear feet length of approximately 18,500 feet. The topographic survey shall include, but not limited to, driveways, drainage structures with invert elevations, flow lines of drainage ditches, concrete rip rap, curb & gutter, drive lanes, paint strips along FM 2551, tops & toes of slopes. Cross-sections shall be taken along the drainage ways for approx. 200-foot upstream and downstream of the existing right-of way, and along FM 2551 at approx. 200-foot intervals to provide hard ties to the paving surface.

Perform field survey which includes the staking of the proposed center line at the P.C.'s, and P.T.'s, at 500 foot intervals, and at other locations designated by CP&Y.

Contact DIGTESS for the purpose of locating franchise utilities along the proposed corridor and acquire (by field survey) the franchise utility information from the locates placed in the field by DIGTESS.Contact cities along the proposed corridor for the purpose of locating city utilities along the proposed corridor and acquire (by field survey) the city utility information from the locates placed in the field by the cities. When buried utility lines are exposed by SUE work, performed field survey to locate the utility lines horizontally and vertically.

Analyze properties along the proposed corridor in order to establish common property lines for the purpose of establishing these lines for the base map.
Prepare a base map showing the information acquired by research and field survey and provide a digital and hard copy to CP&Y.

150.1.4 Deliverables shall include a final design/topographic drawing in a digital 2D Microstation file showing all survey features located in the field and provide a 3D Microstation file with a digital terrain model and contours utilizing the field ties and the aerial survey data. Deliverables shall also include a copy of the field notes, an ASCII coordinate file of all points located in the field and a hard copy of the coordinates.

150.2 Subsurface Utility Engineering

150.2.1 SUE work will be performed as required for this project in general accordance with the recommended practices and procedures described in ASCE Publication CI/ASCE 38-02 (Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data). As described in the mentioned ASCE publication:

(1) **Modified Quality Service Level B (QL-B Designating Services) -** Designate is to indicate, by marking with paint, the presence and approximate horizontal location of subsurface utilities using geophysical prospecting techniques, including, without limitations, electromagnetic, sonic and acoustical techniques.

SAM, Inc. will provide the following modified designating services to aid CP&Y in the defining the Test Hole locations.

(2) **Quality Service Level A - Locating (Test Hole) Services -** Locating services is to locate the accurate horizontal and vertical position of subsurface utilities by excavating a test hole using vacuum excavation techniques and equipment that is non-destructive to utilities.

(3) Upon receipt of the processed survey data, we will perform a preliminary review of the data to check for completeness and accuracy. Once this preliminary review is complete we will prepare the required SUE deliverables which include plan sheets that are signed and sealed by a Registered Professional Engineer.

150.3 Surveying Supervision and Coordination

150.3.1 The ENGINEER will be required to interpret data performed by the surveying subconsultant. The ENGINEER will establish a work program for the surveying subconsultant at the beginning of the project. The Engineer will be responsible for the coordination, supervision, and review of the surveying subconsultant's work.

Function Code 160 - Roadway Design Controls

160.1 Verify Schematic Geometry

160.1.1 Establish/verify horizontal and vertical geometry set during schematic development utilizing field survey at the project tie-down points.

160.2 Horizontal Alignment Data Sheets

160.2.1 Prepare Project Layout
160.2.2 Prepare Horizontal Alignment Data Sheets.

160.3 Typical Sections

160.3.1 Prepare Existing Typical Section Sheets (FM 2551, Crossings & Intersecting Roadways).
160.3.2 Prepare Proposed Typical Section Sheets (FM 2551, Crossings & Intersecting Roadways).

160.4 Roadway Plan and Profile

160.4.1 Prepare Plan and Profile Sheets for FM 2551
160.4.5 Prepare Cross Street Plan and Profiles

160.5 Miscellaneous Roadway Sheets

160.5.1 Prepare Intersection Layouts at intersections.
160.5.2 Prepare Driveway Details/Profiles.
160.5.3 Prepare Miscellaneous Roadway Details.

160.6 Roadway Quantity and Summary Sheets

160.6.1 Compute roadway quantities for the Preliminary Design, Plans Adequate, and Final Design submittals.
160.6.2 Prepare Summary of Grading and Basis of Estimate Sheets.

160.7 Earthwork Cross Sections

160.7.1 Prepare final grading cross sections at a 50' interval. Grading cross sections will include centerline/profile grade line elevation, pavement elevation at face of curb, subgrade break line elevations and offsets to proposed toe of slope and ROW limits.
160.7.2 Prepare phase construction grading sections to identify the grading to be done in each phase to ensure the constructability and provide adequate drainage.

160.8 Pavement Removal Plans

160.8.1 Prepare Pavement removal plan sheets.
160.8.2 Compute removal quantities for the Preliminary Design, Plans Adequate, and Final Design submittals.
160.8.3 Prepare Removal Summary.

160.10 Quality Assurance/Quality Control

160.10.1 Perform QA/QC of project roadway plans prior to milestone review submittals.

Function Code 161 – Drainage

161.1 Culvert Design

161.1.1 Prepare Exterior Drainage Area Map
161.1.2 Prepare Culvert Hydraulic Sheet/Computations for proposed culverts.
161.1.3 Prepare Culvert Layout.
161.1.4 Complete BCS.

161.2 Storm Drain Design

161.2.1 Perform field inventory of existing drainage structures to verify structure size and condition and channel characteristics.
161.2.3 Prepare Interior Drainage Area Maps. Task includes determining drainage areas and calculating runoff to determining size and location of inlets.
161.2.4 Prepare Hydraulic Data Sheets utilizing Geopak Drainage
161.2.5 Prepare Storm Sewer Plan & Profile Sheets. Perform hydraulic computations for the sizing and location of storm sewer lines and manholes. Utilize approved hydraulic software to verify the adequacy of the proposed storm sewer lines.
161.2.6 Prepare Lateral Profile Sheets.
161.2.7 Analyze drainage ditch capacity and develop ditch tables for inclusion in drainage plans.
161.2.8 Prepare Miscellaneous Drainage Details.

161.3 Drainage Quantities and Summary Sheets

161.3.1 Compute drainage quantities for the Preliminary Design, Plans Adequate, and Final Design submittals.
161.3.2 Prepare Culvert and Storm Sewer Summary Sheets.

161.4 Erosion Control Plans

161.4.1 Prepare SW3P District/Area Office standard narrative sheet.
161.4.2 SW3P layouts will be produced showing limits of proposed riprap, soil retention, sediment control fences, rock filter dams, permanent seeding, etc. Erosion control plan shall be coordinated with the traffic control plan and sequence of work.

161.5 SW3P Quantities and Summary Sheets

161.5.1 Perform SW3P quantity calculations.
161.5.2 Prepare SW3P Summary Sheets.

161.6 Quality Assurance/Quality Control

161.9.1 Perform QA/QC of project drainage and SW3P plans prior to milestone review submittals.

Function Code 162 - Signing, Markings and Signalization

162.1 Signing and Pavement Markings Layouts

162.1.1 Perform a site survey to inventory existing signs and pavement markings.
162.1.2 Prepare Signing, Delineation and Pavement Marking Layouts

162.3 Signing and Pavement Marking Quantities and Summary Sheets

162.3.1 Perform signing and pavement marking quantity calculations for the Plans Adequate, and Final Design submittals.
162.3.2 Perform Overhead Sign quantity calculations.
162.3.3 Prepare Summary of Pavement Markings Sheet.
162.3.4 Prepare Small Sign Summary Sheets.
162.3.5 Prepare Large Sign Summary Sheets.

162.4 Traffic Signal Plans (Discuss w/ Reggie to see when we will need temporary signal)

162.4.1 It is assumed that three permanent signals and two temporary signals will be required. The following permanent signal sheets will be produced:
- 162.4.1.1 Traffic Signal Layout Sheet
- 162.4.1.2 Traffic Signal Elevation Sheet
- 162.4.1.3 Phasing and Wiring Plans
- 162.4.1.4 Complete Traffic Signal Pole Arm and Foundation Standards
- 162.4.1.5 Miscellaneous Signal Details

162.4.2 Perform project walkthrough to field verify preliminary signal layouts for pole and controller locations and potential overhead and underground conflicts.

162.5 Traffic Signal Quantities and Summary Sheets

162.5.1 Perform traffic signal quantity calculations for the Final Design submittal.
162.5.2 Prepare Summary of Traffic Signals Sheet.

162.6 Quality Assurance/Quality Control

162.6.1 Check signing and pavement marking quantities and plans sheets prior to District review. Check traffic signal quantities and plans prior to District review.

Function Code 163 - Miscellaneous Roadway

163.1 Miscellaneous Roadway Sheets

163.1.1 Prepare Title Sheet.

163.1.2 Prepare Index Sheet.

163.3 Traffic Control Plans

163.3.1 Prepare Conceptual Phasing Layout of major phases of construction for approval by Area Office at Preliminary Design stage. Provided on scroll plot at appropriate scale to be determined.
163.3.2 Prepare TCP Narrative for Sequence of Construction Sheets.
163.3.3 Prepare Advance Signing Layout Sheets.
163.3.4 Prepare TCP Typical Sections for each Phase. Assume three phases and two sections per phase.
163.3.5 Prepare TCP Layouts. Assume three phases with multiple stages will be required.
163.3.6 Prepare TCP Detour Sheets. Include horizontal and vertical alignment information for each cross-over, temporary ramp, temporary roadway, etc.
163.3.7 Prepare Shoring Wall Layouts.
163.3.8 Prepare Construction Time Estimate using Primavera (SureTrak).

163.4 Traffic Control Plan Quantities and Summary Sheets

163.4.1 Perform TCP quantity calculations for the Preliminary Design, Plans Adequate, and Final Design submittals.
163.4.2 Prepare Construction Phase Summary Sheets.

163.6 Apply Provided Standard Details

163.6.1 Download applicable TxDOT standards, complete title block information and modify as required for project needs.

163.7 Construction Cost Estimate

163.7.1 Prepare opinions of probable construction cost using Estimator for milestone reviews.
- 163.7.1.1 Preliminary Plan Submittal
- 163.7.1.2 Plans Adequate Submittal
- 163.7.1.3 District Plan Review Submittal

163.7.2 Prepare a final opinion of probably construction cost using Estimator software.

163.8 Specifications and General Notes

163.8.1 Soft copies of the TxDOT Standard General Notes, provided by the District in WORD format or hard copy, will be revised as required and hard copies submitted at the Plans Adequate and 95 percent reviews. The revised WORD file, if provided, will be included with the final plan submittal. TxDOT will place General Notes and Special Provision data on the plan sheets.
163.8.2 Prepare specification and special provisions list.
163.8.3 Prepare TxDOT Form 1002, PS&E. Submission Data, for final submittal of PS&E package to Design Division.

163.9 Quality Assurance/Quality Control

163.9.1 Perform TCP plans check prior to Plans Adequate Review.
163.9.2 Check quantities and perform plans check for remaining plans sheets prior to 95 percent complete review.

163.10 Miscellaneous Project Management

163.10.1 Provide routine project management, supervision, and communications. Task includes maintaining project schedule, semi-monthly progress reports to TxDOT project manager (email), and other miscellaneous tasks.

163.10.2 Prepare monthly invoices and progress reports summarizing project status. Assume 18 invoices.

163.10.3 Project Development Meetings

163.10.3.1 Attend/conduct twelve (12) non-milestone progress meetings with Area Office and/or consultant project team. Prepare and submit meeting minutes.

163.10.3.2 Attend Preliminary Design, Plans Adequate, and District Review meetings with the State. Prepare and submit meeting minutes.

163.10.4 Project Closeout. Copy and assemble design/quantity calculations, output and summaries. Prepare CD-ROM of electronic files to be submitted to TxDOT.

163.10.5 Attend monthly meeting with City of Rockwall.

Function Code 309 – Design Verification, Changes, and Alterations

309.1 **Construction Phase Services**

The Engineer shall provide Construction Phase Services at the written request of the TxDOT Project Manager. The written request shall include a description of the work requested, ad mutually agreed upon time limit, and any special instructions for coordination and submittal. These services shall include, but are not limited to the following:

1. Attend preconstruction meeting
2. Attend partnering meeting, if requested
3. Respond to contractor RFI's, when requested
4. Review contractor show drawings, when requested
5. Attend field meetings and make visits to site, when requested
6. Answer contractor and area engineer questions throughout construction
7. Prepare plan revisions when needed to address changed conditions or other requested field changes
8. Calculate quantities and assist the area engineer in preparing change orders
9. Other miscellaneous duties related to the project.

Deliverables

All PS&E milestone review submittals will be in accordance with the attached Texas Department of Transportation (TxDOT) - Dallas District Standard Project Management Guidelines for Submission of Plans, Specifications and Estimates (PS&E).

Assume Preliminary PS&E submittal will include the following:

- One (1) set of 11x17 inch plans consisting of an in-progress Title sheet; Index of sheets, Project Layout Sheets, preliminary Typical Section sheets, TCP sheets, Plan/Profile sheets, Hydraulic Data and Drainage Map sheets for bridge class culverts, culvert computations, Culvert layout and section sheets, and preliminary design cross section sheets.
- One (1) copy of the Construction Cost Estimate in Estimator format.

Assume Plans Adequate PS&E submittal will include the following:

- Six (6) sets of 11x17 inch plans consisting of an in-progress Title sheet; final Typical Section sheets, TCP sheets, Plan/Profile sheets, Intersection Layout/Contour sheets, Misc. Paving Details, Hydraulic Data and Drainage Map sheets for culverts, Culvert Section/Layout sheets, Drainage Plan & Profile sheets, SW3P sheets, Removal plans, and cross sections.
- One (1) copy of the Construction Cost Estimate in Estimator format.

Assume 95 percent complete PS&E submittal for District Review will include the following:

- Seven (7) sets of 11x17 inch plans consisting of all plans sheets including TxDOT Standard sheets.
- One (1) copy of the Construction Cost Estimate in Estimator format.
- Seven (7) copies of the General Notes and Specification list.
- One (1) copy of the Construction Time Estimate.

Assume the Final Plans submittal will include the following:

- One (1) set of 11x17 inch sealed and signed original Mylar plans consisting of all plan sheets including TxDOT Standard sheets.
- Nine (9) sets of prints of original Mylar plans.
- Nine (9) copies of the final Construction Cost Estimate in Estimator format.
- Nine (9) hard copies of the final General Notes and Special Provisions/Specifications.
- Nine (9) copies of the final Construction Time Estimates in SureTrak format.
- Two (2) duplicate originals of CADSEAL of responsible engineer.
- One (1) Read/Write CD ROM containing electronic files of Final PS&E Microstation drawings, GEOPAK design, design cross sections, design cross section data.
- Authorize CADD seal.

EXHIBIT B

SERVICES TO BE PROVIDED BY THE COUNTY

FOR

FM 2551 (MURPHY ROAD) REALIGNMENT AND CONSTRUCTION FROM FM 2514 (PARKER ROAD) TO FM 2170 (Main Street)

IN
COLLIN COUNTY, TEXAS

The County will provide the following to the Engineer in the performance of the Project upon request:

A. Provide any existing data the County has on file concerning the Project, if available.

B. Provide any available as-built plans for the existing roadway facility.

C. Provide any available as-built plans for the water and sanitary sewer lines that will be relocated.

D. Assist the Engineer, as necessary, in obtaining any required data and information from the State or other local utility companies.

E. Coordinate the preparation and subsequent approval of the required environmental documentation prior to construction.

F. Assist the Engineer by requiring appropriate utility companies to expose underground utilities within the right-of-way, when required.

G. Give prompt written notice to Engineer whenever the County observes or otherwise becomes aware of any development that affects the scope or timing of Engineer's services.

EXHIBIT C

SCHEDULE

FOR

FM 2551 (MURPHY ROAD) REALIGNMENT AND CONSTRUCTION FROM FM 2514 (PARKER ROAD) TO FM 2170 (Main Street) IN COLLIN COUNTY, TEXAS

The Engineer will work diligently to complete the design phase, prepare bid documents and provide any support services required during construction. Review periods are estimates based on previous experience with the County staff and TxDOT and may vary from the duration shown. Adjustments to this schedule may be required during the design and/or construction phase and will be coordinated with the County staff as necessary.

	FM 2551 (From FM 2514 to FM 2170)	
	Duration	Completion Date
Award of Contract	N/A	N/A
Notice to Proceed	N/A	N/A
Utility Investigation & Define Project	90	Nov 1, 2012
Submit Conceptual Plan (30%)	60	Dec 31, 2012
Review by TxDOT/County Staff	35	Feb 4, 2013
Submit Preliminary Plans (65%)	120	Jun 4, 2013
Review by TxDOT/County Staff	60	Aug 3, 2013
Submit Final Plans (95%)	120	Dec 1, 2013
Review by TxDOT/County Staff	60	Jan 30, 2014
Prepare Construction Documents	30	Mar 1, 2014
Advertise for Construction		
Receive.Open Bids		
Award Construction Contract		
Begin Construction		
Construction Complete		

To be established by TxDOT