

ATTACHMENT B



FEE ESTIMATE - TWO 3 City of NTMC System Integration and PD Support Cost

			Supervisor - Engineer (SR ENG)	Sr. Systems Engineer	Sr. System Integrator (EOI)	Electrical Engineer	Hardware & Test Support Lead	CADD Designer	Centrace Software Training/Sys. Engrg.	Expenses (Other)	Travel Expenses									
Name			Holt, Mike, PE	Pati, Ron, PE	Irvin, Kyle, PE, IMSA III	Wadje, Nishant, PE	Davis, Matt, PE, PTOE	Munshaw, William, PE	Khazraeian, Sama, PhD, PE			Project Summary								
										8,053.60	20,800.00	Hours	Labour	Expense	Total					
												2,040.00	\$444,332.00	\$28,853.60	\$473,185.60					
												0.00	\$0.00	\$0.00	\$0.00					
												Total Fee (LS)								
WBS Code	Task Code	Task Name	Units																	
1	1	TWO 3 City of Norman																		
2	1.1	Project Management and Meetings	17.00	162.00	32.00	1.00	15.00	3.00	42.00	8,053.60	20,800.00									
2.1		Project Management (status reporting, invoicing, budgeting, schedule and meeting minutes)	4.00	92.00						8,053.60										
2.2		PM and ODOT and Architect Coordination/Status Meetings (Status of work, Systems Integration, testing) Virtual -26 weeks	6.00	26.00	13.00				12.00											
2.3		Construction/Technical meeting/Coordination	4.00	26.00	13.00		12.00		12.00											
2.4		PM meeting/Kick-off Pre-Construction TMC Site Visit (Meetings -In person)	1.00	16.00	4.00	1.00	1.00	1.00	16.00											
2.5		NTMC systems Demonstration On-line/Virtual (with City and Stakeholders)	2.00	2.00	2.00		2.00	2.00	2.00		20,800.00									
3	1.2	Procurement Support	52.00	248.00	244.00	104.00	72.00	147.00	105.00											
3.1		Assist Norman/ODOT/Federal Staff on technical/procurement issues and procedures		8.00	4.00		4.00													
3.2		Develop a System Procurement Plan -covering all key systems equipment	2.00	8.00	4.00			4.00												
3.3		Develop construction/Installation scopes of NTMC System Construction, equipment- Hardware/Software, integration and testing	4.00	16.00	8.00	8.00	4.00	2.00	2.00											
3.4		Develop construction schedule - procurement, installation, Integration and Testing	2.00	4.00				4.00	24.00											
3.5		Develop scopes and assist in schedule of System infrastructure for construction with Architect	2.00	8.00	4.00			8.00												
3.6		Review construction overall scopes of NTMC Architect's Electrical, HVAC, Flooring and others for three ITOC/Server Room	2.00	8.00	8.00		4.00	4.00												
3.7		Develop Software Stack Plan (SSP), Centracs, City IT, Audio/Video System -Video and KVM Processors/ITOC (5 pages max)	2.00	8.00	4.00		4.00	2.00	4.00											
3.8		Develop Document Equipment Installation and Integration/transport Logistics		2.00	2.00	4.00	4.00	2.00	2.00											
3.9		Develop Systems Integration Plan (SIP) covering all equipment (max. 5 pages)	4.00	12.00	8.00		4.00	4.00												
3.10	1.2.1	NTMC Submittal Reviews and Request for Information (RFI)																		
3.10.1		Create RFI Log with Contractor Question dates and responses/resolution		8.00	8.00	12.00	4.00	12.00												
3.10.2		Submittal reviews -multiple (NTMC physical space - buildings)		8.00	8.00	8.00	8.00	4.00												
3.10.3		Submittal Review Systems - hardware and software - audio, video distribution submittals	4.00	8.00	12.00		4.00	4.00	6.00											
3.10.4		Submittal Review - compatibility with City IT services and Centracs		8.00	8.00		4.00	12.00	4.00											
3.10.5		Minor Plan revisions/changes as needed	4.00	4.00	4.00	4.00		16.00	2.00											
3.10.6		Request for Information (RFI) -Develop Responses		8.00	8.00	4.00		4.00												
3.10.7		Submittal Review - Electrical Circuits for ITOC integration (high/low voltage)		2.00	2.00	32.00	0.00													
3.10.8		Submittal Review - Comm Racks and Electrical Details/UPS Submission/PDU		2.00	2.00	20.00	0.00													
3.10.9		Documentation		2.00	2.00		0.00	12.00	4.00											
3.10.10		Review Hardware and Software test plans (FAT, Standalone, subsystem and System)	4.00	8.00	16.00	4.00			2.00											
3.10.11		Review Fiber Termination/Test Plan/OTDR Test Result Review		4.00	4.00			24.00												
3.11	1.2.2	ITOC and System Component Procurement Verification																		
3.11.1		integrated Transportation Operations Console (ITOC) Factory Acceptance Test (FAT) Test Plan	2.00	4.00	4.00	2.00	2.00	2.00	2.00											
3.11.2		Travel to Vendor/Contractor facility to Witness FAT Test and Conformance of ITOCs (4 units)		24.00	24.00				4.00											
3.11.3		Coordinate on ITOC delivery and Acceptance at NTMC and Logistics	2.00	8.00	8.00		8.00	2.00	2.00											
3.11.4		ITOC Rack Assembly and Factory Acceptance Test (FAT) review (4 units) - final results		2.00	4.00			2.00	2.00											
3.11.5		Send Layer 2 and 3 Switches to Norman IT for configuration		4.00	4.00		8.00	2.00	2.00											
3.11.6		Travel to Vendor/Contractor facility to Witness Test and Conformance of Comm Racks		24.00	24.00	4.00		2.00	4.00											
3.11.7		Coordinate on ITOC Comm Rack delivery and Acceptance at NTMC and Logistics		2.00	2.00			2.00	2.00											
3.11.8		Coordinate with Norman IT on Layer 2 and Layer 3 and Rack PC configuration		4.00	4.00		0.00													
3.11.9		Review VLAN configuration by Norman IT		2.00	2.00		2.00													

Project Summary		Hours	Labour	Expense	Total
		2,040.00	\$444,332.00	\$28,853.60	\$473,185.60
		0.00	\$0.00	\$0.00	\$0.00
Total Fee (LS)		2,040.00	\$444,332.00	\$28,853.60	\$473,185.60

Hours	Labour	Expense	Total
272.00	\$64,112.00	\$28,853.60	\$92,965.60
96.00	\$24,060.00	\$8,053.60	\$32,113.60
57.00	\$13,476.00	\$0.00	\$13,476.00
67.00	\$15,286.00	\$0.00	\$15,286.00
40.00	\$8,658.00	\$0.00	\$8,658.00
12.00	\$2,632.00	\$20,800.00	\$23,432.00
972.00	\$213,564.00	\$0.00	\$213,564.00
16.00	\$3,780.00	\$0.00	\$3,780.00
18.00	\$4,242.00	\$0.00	\$4,242.00
44.00	\$9,928.00	\$0.00	\$9,928.00
34.00	\$6,514.00	\$0.00	\$6,514.00
22.00	\$4,954.00	\$0.00	\$4,954.00
26.00	\$6,022.00	\$0.00	\$6,022.00
24.00	\$5,378.00	\$0.00	\$5,378.00
16.00	\$3,180.00	\$0.00	\$3,180.00
32.00	\$7,552.00	\$0.00	\$7,552.00
358.00	\$74,396.00	\$0.00	\$74,396.00
44.00	\$8,980.00	\$0.00	\$8,980.00
36.00	\$7,648.00	\$0.00	\$7,648.00
38.00	\$8,620.00	\$0.00	\$8,620.00
36.00	\$7,628.00	\$0.00	\$7,628.00
34.00	\$6,952.00	\$0.00	\$6,952.00
24.00	\$5,400.00	\$0.00	\$5,400.00
36.00	\$6,504.00	\$0.00	\$6,504.00
24.00	\$4,440.00	\$0.00	\$4,440.00
20.00	\$3,848.00	\$0.00	\$3,848.00
34.00	\$8,104.00	\$0.00	\$8,104.00
32.00	\$6,272.00	\$0.00	\$6,272.00
290.00	\$65,534.00	\$0.00	\$65,534.00
18.00	\$3,976.00	\$0.00	\$3,976.00
52.00	\$12,712.00	\$0.00	\$12,712.00
30.00	\$6,802.00	\$0.00	\$6,802.00
10.00	\$2,212.00	\$0.00	\$2,212.00
20.00	\$4,272.00	\$0.00	\$4,272.00
58.00	\$13,756.00	\$0.00	\$13,756.00
8.00	\$1,712.00	\$0.00	\$1,712.00
8.00	\$2,000.00	\$0.00	\$2,000.00
6.00	\$1,390.00	\$0.00	\$1,390.00

3.11.10		Coordinate with Centracs on NTMC platform, modules and connectivity to ITOCs		2.00	4.00		0.00		12.00				18.00	\$3,636.00	\$0.00	\$3,636.00
3.11.11		Develop Centracs Integration Document	2.00	4.00	4.00			12.00	12.00				34.00	\$6,802.00	\$0.00	\$6,802.00
3.11.12		Half Day Integration Related Internal Workshop (all parties)/Presentation	4.00	8.00	4.00		4.00	4.00	4.00				28.00	\$6,264.00	\$0.00	\$6,264.00
3.12	1.2.3	NTMC Construction Support											92.00	\$22,084.00	\$0.00	\$22,084.00
3.12.1		Coordination with NTMC Architect Contractor for procurement schedule and logistics		4.00	8.00			1.00	1.00				14.00	\$3,356.00	\$0.00	\$3,356.00
3.12.2		Cursory review of HVAC, Flooring, Telecom, Security, Generator, and Various cabling	4.00	4.00	8.00		2.00	2.00	2.00				22.00	\$5,162.00	\$0.00	\$5,162.00
3.12.3		TMC ITOC and Server Room Construction Coordination - Site Review	4.00	8.00	8.00	2.00	2.00	2.00	2.00				28.00	\$6,506.00	\$0.00	\$6,506.00
3.12.4		NTMC Other Construction logistics/ITOC placement and traffic controller and other conference room equipment	4.00	8.00	8.00								20.00	\$5,060.00	\$0.00	\$5,060.00
3.12.5		Fiber and low voltage conduit installation/ ITOC cable pulling			8.00								8.00	\$2,000.00	\$0.00	\$2,000.00
4	1.4	Integration and Testing Support	14.00	64.00	100.00	8.00	88.00	22.00	56.00				352.00	\$77,130.00	\$0.00	\$77,130.00
4.1		One Day All Party Integration Workshop (EOR firm, client and contractor)		8.00	8.00		8.00	2.00	8.00				34.00	\$7,340.00	\$0.00	\$7,340.00
4.2		ITOC furniture and AV-IP Vendor /Integration/Test Plan Review	2.00	4.00	8.00		2.00	2.00	2.00				20.00	\$4,632.00	\$0.00	\$4,632.00
4.3		Centracs Team coord... - Review test plans		4.00	4.00				4.00				12.00	\$2,712.00	\$0.00	\$2,712.00
4.4		NTMC Comm. equipment config/set in NTMC (Norman IT) Test Plan Review		8.00	4.00	4.00	4.00						20.00	\$4,468.00	\$0.00	\$4,468.00
4.5		ITOC Test Stand Alone, Subsystem and System Plan Review and Finalization	2.00	2.00	4.00								8.00	\$2,030.00	\$0.00	\$2,030.00
4.6		Witness Standalone Test and Sign off	4.00	2.00	16.00		16.00	4.00					42.00	\$9,392.00	\$0.00	\$9,392.00
4.7		Witness Subsystem Test/with VLAN and Server Integration and sign off		2.00	16.00		16.00	4.00					38.00	\$8,332.00	\$0.00	\$8,332.00
4.8		Witness System END TO END Test (full System) - Sign off		16.00	16.00	4.00	16.00	2.00	2.00				56.00	\$12,520.00	\$0.00	\$12,520.00
4.9		Go Live Issues and Trouble Shooting if any		4.00	4.00		4.00						12.00	\$2,780.00	\$0.00	\$2,780.00
4.10		Start of 30 day Test - Conditional Acceptance		2.00	8.00								10.00	\$2,500.00	\$0.00	\$2,500.00
4.11		Final Acceptance Test with Vendors and Norman IT - begin NTMC Operation upon passing	2.00	8.00	8.00		2.00						20.00	\$4,920.00	\$0.00	\$4,920.00
4.12		System Training and Manual Review and Attend Workshop	4.00	4.00	4.00		20.00	8.00	40.00				80.00	\$15,504.00	\$0.00	\$15,504.00
5	1.4.1	RTVM Development (this task to be completed before all Testing activities)	10.00	26.00	24.00	0.00	10.00	40.00	56.00				166.00	\$34,188.00	\$0.00	\$34,188.00
5.1		Develop Key System Requirements for major NTMC elements and Verification Method		4.00	4.00		4.00	24.00	32.00				68.00	\$12,748.00	\$0.00	\$12,748.00
5.2		Internal in-person RTVM Workshop	2.00	2.00	2.00		2.00	2.00	2.00				12.00	\$2,632.00	\$0.00	\$2,632.00
5.3		Centracs Testing Through ITOC test Plan		2.00					4.00				6.00	\$1,212.00	\$0.00	\$1,212.00
5.4		Develop verification test cases for requirements to be verified through testing	2.00	2.00	2.00		2.00	2.00	2.00				12.00	\$2,632.00	\$0.00	\$2,632.00
5.5		End-to-End Test Plan Criteria	2.00	4.00	4.00		2.00	4.00	8.00				24.00	\$5,056.00	\$0.00	\$5,056.00
5.6		Develop Go-Live Test Criteria	2.00	4.00	4.00			4.00	4.00				18.00	\$3,954.00	\$0.00	\$3,954.00
5.7		Conditional and Final Acceptance test criteria	2.00	8.00	8.00			4.00	4.00				26.00	\$5,954.00	\$0.00	\$5,954.00
6	1.6	NTMC Record Drawings	2.00	2.00	8.00	0.00	4.00	52.00	0.00				68.00	\$13,066.00	\$0.00	\$13,066.00
6.1		Record Drawings	2.00	2.00	8.00		4.00	52.00					68.00	\$13,066.00	\$0.00	\$13,066.00
7	1.7	Training Support and SOP Development	8.00	20.00	12.00	0.00	36.00	4.00	62.00				142.00	\$28,888.00	\$0.00	\$28,888.00
7.1		Coordination with Contractor on Training		2.00	2.00		2.00		2.00				8.00	\$1,746.00	\$0.00	\$1,746.00
7.2		Schedule Training Sessions (Various)					2.00		4.00				6.00	\$1,102.00	\$0.00	\$1,102.00
7.3		Contractor Training Material Review		2.00			4.00	2.00	4.00				12.00	\$2,348.00	\$0.00	\$2,348.00
7.4		Attend Select Training Sessions	2.00	4.00	4.00		4.00		4.00				18.00	\$4,022.00	\$0.00	\$4,022.00
7.5		Conduct one training Session (Virtual) on Standard Operating Procedure (SOP)					8.00		16.00				24.00	\$4,408.00	\$0.00	\$4,408.00
7.6		SOP Draft	4.00	8.00	2.00		16.00	2.00	32.00				64.00	\$12,732.00	\$0.00	\$12,732.00
7.7		Sop Final	2.00	4.00	4.00								10.00	\$2,530.00	\$0.00	\$2,530.00
8	1.8	System Engineering Validation	4.00	6.00	6.00	0.00	4.00	4.00	44.00				68.00	\$13,384.00	\$0.00	\$13,384.00
8.1		Begin NTMC Operation Start and Open house		2.00	2.00								4.00	\$1,000.00	\$0.00	\$1,000.00
8.2		Data Review (before-after)			2.00		2.00	2.00	12.00				18.00	\$3,382.00	\$0.00	\$3,382.00
8.3		Report Development	2.00	2.00	2.00		2.00	2.00	32.00				42.00	\$7,972.00	\$0.00	\$7,972.00
8.4		Validation report QA/QC and Submission	2.00	2.00									4.00	\$1,030.00	\$0.00	\$1,030.00

Expense Break Down

Travel Costs (Three persons - 1 time (kick-off)=3 trips,-ITOC Factory /Comm Rack FAT) - 2 persons 2 trips = 4 trips; and 3 systems int. trips- 2 persons (6 trips) + 2 additional trips internal meetings) =16

Air	Rental Car	Hotel	Per Diem	Total
\$ 700.00	\$ 140.00	\$ 320.00	\$ 140	\$ 1,300.00
Expense				

Total Travel Expense

\$ 20,800.00

\$ 8,053.60

Non-Travel Expense = 8% of raw labor
Document
Postage/ Freight/ Courier
Supplies/ Equipment

Total Expenses

\$ 28,853.60