SPECIFICATIONS

1.0 CONDUITS

1.1 DESCRIPTION
CONSTRUCT AND INSTALL CONDUITS AS DETAILED ON THE PLANS, AS NOTED BELOW, OR AS DIRECTED BY THE ENGINEER. CONDUIT SHALL BE BORED UNDER ALL EXISTING PAVEMENT NOT BEING REMOVED DURING ROADWAY CONSTRUCTION. PROVIDE CONDUITS OF THE TYPE AND SIZE AS SHOWN ON THE PLANS. PROVIDE ALL INCIDENTAL ITEMS NECESSARY TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL CONDUIT SYSTEM. IF APPROVED BY ENGINEER, CONDUIT MAY BE INSTALLED BY TRENCHING, PLOWING, OR DIRECTIONAL BORE; HOWEVER, PAYMENT WILL BE MADE BASED ON THE INSTALLATION METHOD INDICATED IN THE PLANS FOR THAT CONDUIT. NO ADDITIONAL PAYMENT WILL BE MADE FOR INSTALLATION METHODS NOT INDICATED IN THE PLANS.

1.2 MATERIALS

1.2.1 NON METALLIC CONDUIT/HDPE CONDUIT
PROVIDE HDPE CONDUIT THAT IS SCHEDULE 80 AND UL LISTED. PROVIDE COLOR-CODED CONDUIT AS REQUIRED FOR INSTALLATION LOCATION. PROVIDE RED CONDUIT FOR ELECTRICAL CABLES, GREEN CONDUIT FOR COMMUNICATION AND FIBER OPTIC CABLES, AND BLACK CONDUIT FOR SPARE. INSTALL HDPE CONDUIT ACCORDING TO MANUFACTURER'S INSTRUCTION.

1.2.2 CONDUIT REPAIR SPLICES
WHEN CONDUIT IS USED TO REPAIR A SECTION OF EXISTING CONDUIT TO PROVIDE THE REQUIRED CONDUIT PATHWAY, PROVIDE THE SAME GRADE AND SIZE HDPE CONDUIT AS THE EXISTING CONDUIT. APPROVAL BY THE ENGINEER IS REQUIRED FOR MECHANICAL CONDUIT SPLICES.

1.2.3 TRACER WIRE
PROVIDE ORANGE NO. 12 AWG THHN STRANDED COPPER WIRE.

1.2.4 WARNING TAPE
PROVIDE COLOR DURABLE AND CHEMICALLY RESISTANT RED REINFORCED 3 INCH MINIMUM WIDE, 4-MIL THICKNESS WARNING TAPE IMPRINTED WITH "CAUTION BURIED CONDUIT BELOW" FOR CONDUITS. PROVIDE COLOR DURABLE AND CHEMICALLY RESISTANT ORANGE REINFORCED 3 INCH WIDE WARNING TAPE IMPRINTED WITH "CAUTION - FIBER OPTIC CABLE BURIED BELOW" FOR FIBER OPTICS.

1.2.5 PULL ROPES
PROVIDE POLYPROPYLENE PULL ROPES WITH A MINIMUM TENSILE STRENGTH OF 1,125 LBS.

1.3 CONSTRUCTION REQUIREMENTS

1.3.1 LOCATION OF CONDUIT
PRIOR TO CONSTRUCTION, FIELD CHECK THE EXISTING CONDITIONS AT EACH SITE, INCLUDING UTILITY LOCATOR SERVICE MARKINGS, TO ASSURE NO CONFLICTS WITH EXISTING UTILITIES, INCLUDING UNDERGROUND LIGHTING, TRAFFIC SIGNALS, CATHODIC PROTECTION FACILITIES, AND DRAINAGE FEATURES. UPON WRITTEN APPROVAL BY THE ENGINEER, ALTER THE ROUTE OF THE CONDUIT TO AVOID CONFLICTS. CONDUIT SHALL BE INSTALLED IN STRAIGHT LINES EITHER PARALLEL OR PERPENDICULAR TO THE RIGHT OF WAY LINE TO THE EXTENT POSSIBLE.

UNLESS OTHERWISE SHOWN ON THE PLANS, ACCOMPLISH A CHANGE IN DIRECTION OF CONDUIT BY BENDING THE CONDUIT UNIFORMLY TO A RADIUS THAT WILL FIT THE LOCATION OR BY THE USE OF STANDARD BENDS. THE MINIMUM BENDING RADIUS OF ALL CONDUITS IS THE GREATER OF THE FOLLOWING: TWENTY (20) TIMES THE DIAMETER OF THE FIBER OPTIC CABLE; SIX (6) TIMES THE INTERNAL DIAMETER OF A 2-INCH CONDUIT OR SMALLER; TEN (10) TIMES THE INTERNAL DIAMETER OF A 3-INCH CONDUIT OR LARGER.

1.3.2 THREADING
USE NIPPLES TO ELIMINATE CUTTING AND THREADING WHERE SHORT LENGTHS OF CONDUIT ARE REQUIRED. IF IT IS NECESSARY TO CUT AND THREAD STEEL CONDUIT, NO EXPOSED THREADS WILL BE PERMITTED.

1.3.3 CLEANING
BLOW AIR THROUGH EACH CONDUIT TO REMOVE DEBRIS AND WATER. CLEAN AND SWAB ALL CONDUITS BEFORE CABLES ARE INSTALLED. INSTALL EXPANDABLE TYPE DUST PLUGS AFTER CLEANING ON EACH END OF INDIVIDUAL CONDUITS.

1.3.4 MANDREL TEST
TEST CONDUIT PATH BY PULLING A MANDREL THROUGH THE CONDUIT. THE MANDREL SHALL HAVE A DIAMETER NO LESS THAN 70% OF THE INSIDE DIAMETER OF THE CONDUIT AND A LENGTH OF 2 INCHES. IF THE CONDUIT DOES NOT ALLOW THE MANDREL TO BE PULLED THROUGH, CLEAN AND/OR REPAIR CONDUIT TO PERMIT PASSAGE OF THE MANDREL. WHEN CONDUIT RUN IS AN EXTENDED DISTANCE THE CONTRACTOR MAY SEEK ALTERNATIVE METHODS AS APPROVED BY THE ENGINEER FOR THIS TEST.

1.3.5 END TREATMENT
CUT HDPE CONDUIT INSIDE PULL BOXES AND SPLICE VAULTS AT A 90 DEGREE ANGLE WITH 8 INCHES TO 12 INCHES EXPOSED INSIDE OF THE BOX. BE AWARE THAT LONG CONDUIT PULLS (INSTALLATION) MAY STRETCH THE HDPE CONDUIT A GIVEN AMOUNT. IF THE CONDUIT IS SLIGHTLY STRETCHED DURING INSTALLATION AND PLACED AMONG SEVERAL ADJACENT BOXES DURING THE SAME CONDUIT PULL, THEN THE CONDUIT IS CUT TO PLACE THE 10 TO 12 INCHES OF EXPOSED CONDUIT INSIDE THE BOX, THE CONDUIT MAY PULL BACK INTO THE SOIL AND NOT LEAVE ANY CONDUIT EXPOSED IN THE BOX. THIS PROBLEM CAN BE AVOIDED BY PULLING FROM ONE BOX TO THE ADJACENT BOX (MINIMIZE STRETCHING), NOT PULLING THROUGH SEVERAL BOXES AT THE SAME TIME (MINIMIZE STRETCHING), AND ANTICIPATING SOME CONDUIT PULLBACK THEREFORE COMPENSATING FOR IT BY INSTALLING A SMALL AMOUNT OF EXTRA CONDUIT. CONDUIT INSTALLATION MAY BE REJECTED IF CONDUIT PULLBACK OCCURS RESULTING IN LESS THAN 10 TO 12 INCHES OF EXPOSED CONDUIT.

SAND ALL CONDUIT ENDS SMOOTH IN ORDER TO ELIMINATE ANY BURRS ON THE INSIDE OR OUTSIDE DIAMETER OF THE HDPE CONDUIT.

1.3.6 SPLICING
USE MECHANICAL SPLICES MADE IN ACCORDANCE WITH CONDUIT AND SPLICE MANUFACTURER'S RECOMMENDATIONS. FUSION CONDUIT SPLICES ARE NOT ALLOWED. SUBMIT MATERIALS TO BE USED FOR CONDUIT SPLICES TO THE ENGINEER FOR REVIEW AND APPROVAL ALONG WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTALLATION PROCEDURES.

1.3.7 EMPTY CONDUITS
CAP OR PLUG OPEN ENDS OF CONDUITS PLACED FOR FUTURE USE WITH WATER TIGHT MECHANICAL PLUGS. DO NOT CAP OR PLUG WITH TAPE. AFTER CLEANING AND TESTING HAVE BEEN COMPLETED, PLACE A PULL ROPE IN ALL EMPTY CONDUITS.

1.3.8 DEPTH
THE FOLLOWING REQUIREMENTS APPLY: A MINIMUM OF 42 INCHES OF COVER FOR ALL UNDERGROUND CONDUIT CONTAINING COMMUNICATION SERVICE; A MINIMUM OF 48 INCHES OF COVER FOR ALL UNDERGROUND CONDUIT CONTAINING ELECTRICAL SERVICE; A MINIMUM OF 5 FEET OF COVER BELOW CROWN GRADE OR 3 FEET BELOW DITCH GRADE FOR ALL UTILITIES CROSSING UNDER ROADWAYS. ENCASE CONDUIT IN CONCRETE OR OTHER APPROPRIATE MEANS AS APPROVED BY THE ENGINEER IF THIS MINIMUM CONDUIT DEPTH CANNOT BE ACHIEVED AT SITE-SPECIFIC LOCATIONS. THE ENGINEER WILL DETERMINE IF EXCEPTIONS TO MEETING THE DEPTH REQUIREMENTS ARE NECESSARY.

1.3.9 TRACER WIRE
INSTALL TRACER WIRE FOR LOCATING PURPOSES IN ALL CONDUIT CONTAINING FIBER OPTIC CABLE AND SPARE CONDUITS INTENDED FOR FUTURE FIBER OPTIC CABLES INSTALLED AS PART OF THIS PROJECT. WHEN MULTIPLE CONDUITS SHARE THE SAME TRENCH OR BORE, ONLY ONE CONDUIT WILL BE REQUIRED TO CONTAIN A TRACER WIRE. PULL TRACER WIRE INTO ALL CABINETS AND DEVICE BASES. TERMINATE TRACER WIRE INSIDE CABINETS OR DEVICE BASES. TERMINATE TRACER WIRE ON A PROTECTED TERMINAL THAT IS ISOLATED FROM THE CABINET OR BASE GROUND AND LABELED "TRACER". CONTINUOUSLY CONNECT TRACER WIRE ALONG THE FIBER BACKBONE. DO NOT CONTINUOUSLY CONNECT THE TRACER WIRE IN CONDUIT CONTAINING FIBER SPURS THAT BRANCH OUT TO THE INDIVIDUAL CONTROLLER CABINETS. FOR ALL CONDUIT CARRYING FIBER SPURS, THE CENTRAL POINT IN WHICH ALL TRACER WIRES ARE ELECTRICALLY BONDED TO EACH OTHER AT AN ISOLATED TERMINAL IS THE CONTROLLER CABINET. DO NOT ELECTRICALLY BOND TRACER WIRES TO ANY GROUND WIRE. USE CONNECTORS APPROVED BY THE ENGINEER IN A SPLICE VAULT TO ELECTRICALLY BOND THE TRACER WIRES WHEN CONTINUOUS RUNS OF TRACER WIRE CANNOT BE INSTALLED.
INSULATE THESE CONNECTORS. LABEL ALL TRACER WIRES ENDING IN A SPLICE VAULT "TRACER".

1.3.10 WARNING TAPE
INSTALL WARNING TAPE 12" ABOVE THE TOP OF ELECTRICAL, FIBER OPTIC, AND COMMUNICATIONS CONDUITS, OR AS DIRECTED BY THE ENGINEER.

1.3.11 CONDUIT IN TRENCH
EXCAVATE TRENCHES TO THE WIDTH AND DEPTH NECESSARY FOR CONDUIT INSTALLATION AS SHOWN IN THE PLANS. DO NOT USE MATERIAL WHICH MIGHT CAUSE MECHANICAL DAMAGE TO THE CONDUIT FOR BACKFILLING BELOW AN ELEVATION 6 INCHES ABOVE THE CONDUIT. CLEAN THE BOTTOM OF THE TRENCH OF SUCH MATERIAL BEFORE THE CONDUIT IS PLACED. OBTAIN APPROVAL BY THE ENGINEER OF THE TRENCH PRIOR TO CONDUIT PLACEMENT.

1.3.12 BORED CONDUIT
INSTALL BORED CONDUIT WITHOUT DISTURBING THE EXISTING SURFACE. PLACE BORED CONDUIT BY BORING OR OTHER APPROVED MEANS. LOCATE ALL BORE PITS AND SPOIL PILES A MINIMUM OF 4 FEET FROM THE EDGE OF THE PAVED ROADWAY OR SHOULDER SURFACE AND BARRICADE, FENCE, OR PROTECT THE PITS BY SOME OTHER ACCEPTABLE METHOD FROM ERRANT VEHICLES OR PEDESTRIANS.

1.3.13 PLOWED CONDUIT
CONDUITS MAY BE INSTALLED BY PLOWING UPON APPROVAL OF THE ENGINEER. USE A VIBRATORY TYPE PLOW WHICH WILL PLACE CONDUITS AT THE MINIMUM DEPTHS INDICATED ABOVE WHEN INSTALLATION IS ACCOMPLISHED BY PLOWING. COMPACT THE SOIL OVER THE INSTALLATION TO THE ORIGINAL IN-PLACE DENSITY. DO NOT PLOW CONDUITS IN ROCKY AREAS.

2.0 PULL BOXES, SERVICE BOXES, SPLICE VAULTS, AND JUNCTION BOXES

2.1 DESCRIPTION
CONSTRUCT AND INSTALL ALL BOXES AND FIBER OPTIC SPLICE VAULTS PROVIDED FOR IN THIS CONTRACT AS DETAILED IN THE PLANS, OR AS DIRECTED BY THE ENGINEER. INSTALL BOXES AND SPLICE VAULTS ACCORDING TO THE LOCATIONS, LINES, GRADES, AND DETAILS SHOWN ON THE PLANS. LOCATIONS MAY BE ADJUSTED DURING INSTALLATION TO CLEAR OBSTRUCTIONS AND TO FACILITATE WIRING AS APPROVED BY THE ENGINEER. THE QUANTITY OF BOXES AND SPLICE VAULTS AS SHOWN IN THE PLANS MAY NOT BE REDUCED WITHOUT THE ENGINEER'S APPROVAL. INSTALL ADDITIONAL BOXES AND SPLICE VAULTS AT CONTRACTOR'S EXPENSE AND WITH ENGINEER'S APPROVAL TO FACILITATE THE EASE OF CONSTRUCTION AND PULLING OF ELECTRICAL CONDUCTORS AND FIBER OPTIC CABLES.

GENERAL NOTES

1. ALL WORK WILL BE CONFINED WITHIN THE EXISTING ROADWAY RIGHT-OF-WAY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY AND KEEP INSTALLATION OF ALL EQUIPMENT AND DEVICES WITHIN THE EXISTING ROADWAY RIGHT-OF-WAY.
2. CONTRACTOR SHALL MAINTAIN 2 FT CONDUIT CLEARANCE FROM ALL LANDSCAPED FEATURES AND IRRIGATION SYSTEMS EXISTING WITHIN THE RIGHT-OF-WAY. ANY LANDSCAPING OR IRRIGATION SYSTEMS DISTURBED DURING CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO ORIGINAL CONDITION. NO ADDITIONAL PAYMENT WILL BE MADE.
3. THE CITY OF WICHITA SURVEYORS WILL STAKE LOCATIONS WHERE BOXES, AND SPLICE VAULTS ARE TO BE INSTALLED. APPROVED STAKED LOCATIONS SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO ANY EXCAVATION.
4. PLACEMENT OF ALL BOXES AND VAULTS MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION AND BEFORE SURVEYORS LEAVE EACH SITE. ORIENTATION OF ALL CABINETS SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. ANY RESTAKING NECESSITATED BY ADJUSTMENT IS CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL PAYMENT WILL BE MADE.
5. CONDUIT SHALL BE INSTALLED IN STRAIGHT LINES EITHER PARALLEL OR PERPENDICULAR TO THE RIGHT-OF-WAY TO THE EXTENT POSSIBLE. THE CONTRACTOR SHALL DETERMINE FINAL ROUTING BASED ON ACTUAL FIELD CONDITIONS PRIOR TO CONSTRUCTION AT EACH SITE, INCLUDING UTILITY LOCATOR SERVICE MARKINGS, TO PREVENT CONFLICTS WITH EXISTING UTILITIES.
6. WARNING TAPE IS REQUIRED IN ALL TRENCHES CONTAINING CONDUIT. MULTIPLE CONDUITS IN PARALLEL SHALL SHARE THE SAME TRENCH.
7. THE CONTRACTOR SHALL PROVIDE CITY OF WICHITA AN ELECTRONIC LIST OF GPS READINGS (EXCEL FORMAT) FOR ALL INSTALLED DEVICES, BOXES AND SPLICE VAULTS. THE ACCURACY OF THE GPS READINGS SHALL BE WITHIN 3 FT. OBTAIN GPS AND THREE TIE-POINT MEASUREMENTS FOR EACH BURIED ELECTRICAL PULL BOX PRIOR TO PLACING BACKFILL MATERIAL.
8. CENTER TO CENTER HORIZONTAL DISTANCES ARE ROUNDED UP TO THE NEAREST WHOLE FOOT. GRADE ELEVATION CHANGES ARE NOT ACCOMMODATED IN QUANTITES AND ARE INCIDENTAL.
9. ALL CONDUIT SIZES ARE INDUSTRY STANDARD ENGLSIH SIZE CONDUIT DESIGNATED BY THEIR ROUNDED NOMINAL INCE (IN) DIAMETER EQUIVALENT.
10. COMMUNICATION DUCT BANK SERVICE BOXES SHALL BE PAID FOR AS "COMMUNICATION DUCT SERIVCE BOX". COMMUNICATION DUCT (BORED OR TRENCHED) SHALL BE PAID BY THE LIN. FT. PRICE INCLUDES ALL WORK AND MATERIALS REQUIRED TO CONSTRUCT AND INSTALL THE SERVICE BOXES AND COMMUNICATION DUCT AS DETAILED.

SUMMARY OF COMMUNICATION DUCT QUANTITIES

(FOR INFORMATION ONLY)

STATION TO STATION		SIDE	COMMUNICATION DUCT		COMM. DUCT SERVICE VAULT (EACH)
			6" HDPE CONDUIT (TRENCHED)	6" HDPE CONDUIT (BORED)	
13+69.48	14+96.32	Lt.		125.6	1
14+96.32	16+32.51	Lt.	136.0		
16+32.51	17+18.14	Lt.		85.6	
17+18.14	18+29.38	Lt.	111.3		
18+29.38	18+59.02	Lt.		29.8	
18+59.02	20+31.43	Lt.		172.4	
20+31.43	20+99.95	Lt.		68.6	
20+99.95	23+29.58	Lt.	229.7		
23+29.58	23+57.25	Lt.	26.7		1
		TOTALS	503.7	482.0	2

RECAPITULATION OF QUANTITIES

ITEM	QUANTITY	UNIT
Communication Duct (Trenched)	504	L.F.
Communication Duct (Bored)	482	L.F.
Communication Duct Service Box	2	EACH

TranSystems
245 NORTH WACO
SUITE 222
WICHITA, KANSAS 67202
PHONE: 316-303-3000
FAX: 316-303-0156

CONSULTANTS:
LK ARCHITECTURE, INC.
345 RIVERVIEW
SUITE 200
WICHITA, KANSAS 67208
PHONE: 316-268-0230

2ND STREET IMPROVEMENTS
SANTA FE TO WASHINGTON IN OLD TOWN

WICHITA, KANSAS

CITY OF WICHITA

REVISIONS:

MARK	DATE	DESCRIPTION

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DRAWN BY: TAU
CHECKED BY: SGE

SHEET TITLE:
COMMUNICATION DUCT BANK GENERAL NOTES & QUANTITIES

SHEET NO.
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