

# MAINLINE, ROTATING HEAD SEWER TELEVISION CAMERA SYSTEM AND ACCESSORIES

## PART 1 – GENERAL

### 1.01 SCOPE OF WORK

- A. The Contractor shall furnish and install in a trailer all equipment described in this specification. The equipment furnished shall be designed, constructed and installed in conformity with high quality standards. All equipment shall be thoroughly tested and certified by the Contractor prior to final acceptance.
- B. It is the intent and purpose of these specifications to secure for the Owner the necessary equipment and accessories, which will comprise and furnish the system described below. A detailed list of components required is included and is the basis upon which the bidder's proposal must be made. The specified camera shall be fully compatible with the Owner's existing equipment, if any. It shall be each Contractor's responsibility to inspect existing equipment in order to verify said compatibility.
- C. All equipment, materials and workmanship shall be of the highest grade in accordance with modern practices. The equipment supplied shall be new and unused except for the necessary testing and calibration or unless otherwise specified.
- D. All items furnished in accordance with these specifications shall be covered by the manufacturers and/or supplier's standard warranty or guarantee on new equipment. The minimum warranty period on new equipment shall be two years.
- E. It is the intent of these specifications to secure equipment which can be properly maintained and serviced without the necessity of stocking an expensive part inventory or being subjected to long periods of interrupted service due to lack of spare parts. Therefore, the Contractor must have available a factory parts and service center. The center shall be staffed with full time technical personnel and order and shipping personnel during regular business hours and days. The factory center must have toll free telephone service and be convenient to air freight, bus or overnight parcel service. The Contractor shall list his nearest factory parts and service location plus any other pertinent information requested. The proximity of the service location will be weighed in the evaluation of the bids.

- F. The Contractor shall maintain loaner electronic equipment at his/her service center. The buyer can request that a loaner unit be made available while his/her equipment is being returned for repair. The Contractor shall indicate whether a rental charge is made for this equipment and service both during and after warranty. Typical turnaround time for repairs shall be two to four days.

## 1.02 SUBMITTALS

- A. Descriptive literature, catalog cuts, dimension prints, shop drawings, and installation, operation and maintenance instructions shall be submitted to Berea Municipal Utilities for review before shipment. The data shown on the shop drawings shall be complete with respect to dimensions, materials of construction, wiring diagrams, and the like, to enable the Berea Municipal Utilities to review the information as required. At the time of submission, the Contractor shall, in writing, call the Utilities' attention to any deviations that the Drawings may have from the requirements of these Specifications.
- B. All submittals must include separate pricing for the trailer, the trailer equipment and installation, and the camera and its accessories.

## PART 2 – EQUIPMENT

### 2.01 MANUFACTURERS

- A. The Mainline, Rotating Head Sewer Television Camera System and Accessories shall be as manufactured by R.S. Technical Services, Inc.; or equal.

### 2.02 12 FOOT ALUMINUM TRAILER

- A. Contractor shall supply an aluminum trailer for the purpose of installation of the Mainline Rotating Head Sewer Television Camera System and Accessories. The trailer shall be constructed of aluminum with a side entry door having flush mount locks providing entry to the viewing/control room. The body length shall be twelve feet with an overall length of approximately eighteen feet. The overall width shall be approximately 8'6" and the overall height shall be approximately 7'10". The Gross Vehicle Weight shall be 7,700 pounds with a payload capacity of 5,730 pounds. Tandem axles with electric brakes shall be provided. The tire size shall be 15" with five bolt wheels. Rear double barn style doors with Cam Bar lock shall be provided. LED Stop/tail/turn lights shall be provided. Exterior lights including clearance, marker, and brake lights shall be LED. Hitch Ball size shall be 2 5/16" with seven way 12V trailer end connector. A 2000 pound Jack Ram Hoist with stand pad shall be provided.

## 2.03 TRAILER INSTALLATION

- A. The interior of the trailer shall be divided into two compartments: the control/viewing room and the equipment room. The interior walls of the control/viewing room and the equipment room shall be paneled with structoglass or equivalent lamination. Bulkhead dividing walls shall be constructed to divide the trailer into compartments and to rack mount the equipment at the electronic equipment console. A swing door, with a see through window, shall separate the control room from the equipment room. The ceiling of the control/viewing room and the equipment room shall be covered with white tile board. Side body walls in both the control room and equipment room shall be covered with reinforced structoglass sheeting. The facings on the interior doors shall be professionally finished with laminate. The electrical system shall be designed to fully sustain the complete electrical requirements of all components of the television inspections system. Standard electrical switches and outlets shall be supplied in both the control/viewing and equipment rooms. Provision shall be made for disconnection of the generator power supply and connection to a commercial 120-volt “shore” power supply. A 25’ “shore” power cord shall be furnished. All wiring shall be done in compliance with the National Electric Code.
- B. The control/viewing room shall have a Formica covered desktop installed between the bulkhead and front trailer wall on the driver’s side of the trailer. There shall be a laminated leg and laminated cabinet underneath the desktop to give support and supply storage. A 28”-34” laminated cabinet shall be mounted above the desktop to offer additional storage. A laminated cabinet to be used as the operator’s station shall be mounted on the desktop. It will be designed to accept standard 19” rack mountable equipment. An office quality chair will be provided for the operator. An additional bench seat with 2” cushion will be mounted along the passenger wall. The floor of the control/viewing room shall be 3/8” plywood covered with seamless commercial grade linoleum. A standard 4’ fluorescent light shall be mounted in the control/viewing room along the passenger wall. A 12-volt dome light will be provided to offer lighting when the generator is not running.
- C. The equipment room, located to the rear of the trailer, shall have a butcher-block counter top mounted along one wall, with a 5-drawer lockable storage chest mounted underneath. The equipment room shall be outfitted with brackets and tie downs for equipment storage. Cabinets with doors shall be installed for ease of accessibility to the rear section of the control room. The floor of the equipment room shall be covered with .125 thick aluminum treadbrite for durability. A standard 4’ fluorescent light shall be mounted in the equipment room along the driver’s wall. A 12-volt dome light will be provided to offer lighting when the generator is not running.

- D. The rear exterior of the trailer shall be equipped with a 12-volt DC sequential light bar with halogen lamps. The front of the trailer shall be equipped with strobe type revolving warning light. A set of floodlights for the work area shall be installed on the top rear-facing portion of the trailer body.
- E. All TV control components shall be of modular design and available for mounting at the operator's station in the control room. Organization of the control center components shall permit maximum operating efficiency by a single operator. The mounted components shall permit fast and easy inspection, adjustment, servicing, removal and replacement. Systems that use case mounted or freestanding control units that are subject to damage during travel shall not be acceptable.

#### 2.04 GASOLINE GENERATOR – 5,500 WATT

- A. The gasoline generator shall be manufactured by Onan; or equal.
- B. The power source for the system shall be a 5,500-watt alternating current gasoline-powered generator. It shall be the product of a company regularly engaged in the manufacture of gasoline-powered generators. The generator shall be capable of continuously producing 7,000 watts of power (60 amps) at 120 volts AC, while rotating at 1,000 rpm without undue hearing, wear or vibration. The engine shall be an air-cooled, 4-cycle, 2-cylinder unit developing at least 12 BHP. It shall be designed to operate the generator at 60 cycles +/- 2 CPS and shall be governed to maintain these cycles under varying load conditions. There shall be a 12-volt battery charging circuit rated at 15 amps. The engine shall be equipped with a low oil pressure shut down system, vibration isolators and a heavy-duty industrial muffler to ensure quiet operation. Fuel shall be supplied from an auxiliary tank.
- C. The generator shall be installed in an insulated metal box that is built onto the tongue of the vehicle.

#### 2.05 PAN AND TILT HEAD ZOOM CAMERA

- A. The Pan and Tilt Head Zoom Camera shall be an Omni Star LED camera as manufactured by R.S. Technical Services, Inc.; or equal.
- B. The rotating head, color inspection camera shall be environmentally designed to withstand the surroundings of sanitary and storm sewers while operating on up to 2,500 feet of double armored, single conductor cable. Cameras using separate

conductors for the camera, light power and video, therefore requiring heavy cable, which is difficult to terminate in the field, shall not be acceptable. The directional camera head shall be capable of 330-degree axial rotation and 27-degree lateral swing or any combination of the two, enabling the 360-degree viewing of laterals perpendicular to the direction of camera travel. A 70-degree diagonal field of view shall be provided. Lighting adequate for 6"-24" pipe shall be built into the camera head. Minimum sensor sensitivity shall be 0.2 lux to produce an NTSC color video picture with a horizontal resolution of 460 lines. A 10x zoom f=4.2 mm (f 1.8 to f 2.9) 4x zoom beyond the 10x optical for a total zoom capacity of 40x. The CDD image sensor shall provide ½' type IT, total of 379,000 pixels. Produces a 1 volt p-p video signal after transmission through up to 2,500 feet of double armored single conductor cable. Lighting shall be provided by 60 white long life low power LED lights. Lamp intensity, lens focus, iris aperture, camera head rotation and swing shall be able to be transported through line via skids or a tractor transporter, each of which shall be quickly and easily installed and removed, by an operator in the field.

#### A. PHYSICAL DESCRIPTION

1. The camera housing shall be fabricated from anodized aircraft aluminum. Lamps shall be replaceable in the field.
2. Maximum diameter of the camera body shall be 3.5". The rotation diameter of the directional head shall be less than 4.5", allowing full swing and rotation of the head in 5" pipe. No part of the camera shall protrude more than 0.25' from the camera body. Overall camera length shall not exceed 21". A single, sealed bulkhead connector in the back of the camera shall provide conduction of power to the camera and conduction of the video signal from the camera. Cameras having more than one electrical feed – through shall be considered at high risk for leakage and corrosion and shall not be acceptable.
3. The rotating head shall be mechanically driven with a gear train and precision DC motors. Cameras with rotating heads driven with belts, which can wear out, shall be considered high maintenance and shall not be acceptable. All drive components shall be sealed to protect parts from water and grit.
4. The camera shall have an operating temperature range of zero to fifty degrees centigrade and shall be sealed to withstand external pressures up to 50 psi without leaking. A self-sealing pressure test port shall be provided in the camera back to check the leak resistance of the camera. The camera shall be designed to withstand the shocks and vibrations normally sustained while traveling through a pipe.

#### B. ELECTRONICS

1. Circuitry shall be all solid state. The solid state CCD image sensor shall have at least 379,000 pixels. A sharp true color image shall be transmitted on video bandwidths only and produce a low volt video signal at the monitor after transmission through up to 2,500 feet of single conductor cable. The signal-to-noise ratio shall be at least 46 dBs. There shall be no geometric distortion of the image. Picture transmission subject to local transmitter interference shall not be acceptable.
2. Lens shall be 10x zoom fl. 8-f2.9; 4x zoom beyond the 10x optical for a total zoom capability of 40x. Lens shall also incorporate manual or continuous automatic focus, manual or automatic iris, freeze frame, white balance selection, back lighting and frame speed reduction to achieve the equivalent of .2 lux in ultra-low light conditions.
3. Lighting, adequate for illumination in 6"-24" lines, shall be provided by 60 white long life low power LED lights. Lamp and camera power shall be derived from the single conductor input by a power supply within the camera. An automatic on-screen video indicator shall indicate excessive voltage at the camera regardless of cable length or other loading. A color bar generator shall be located in the camera and shall be capable of activation from the viewing station, enabling the user to check or adjust the color retention and contrast on the monitoring equipment.

#### C. MAINTENANCE KIT

1. A maintenance kit, with one set of replacement parts, which includes but is not limited to: spare LED lights, spare connectors, miscellaneous hardware and system test cable shall be included with the camera.

#### D. AUXILIARY CONTROLLERS

1. Two auxiliary controllers shall be supplied. Both the desktop and rear of vehicle units shall incorporate all camera head movement features, iris control, focus control, as well as a home position function. The controllers shall also incorporate all functions of the tractor transporter.

### 2.06 MAINLINE TRACTOR TRANSPORT VEHICLE

## A. PERFORMANCE

1. The inspection transport vehicle (tractor) shall be capable of transporting a standard, rotating hear or mini/mainline camera through water mains, sanitary sewers or storm sewers from 6" to 36" in diameter. The tractor shall receive power and control signals on the same single conductor cable, which drives the camera. Traction drives shall provide sufficient traction to inspect main lines up to 1,500 feet from the entry point (depending on pipe condition) while operating on double armored, single conductor cable. Tractor wheel width shall be adjustable, with extensions, for line sizes 6"-36". The tractor shall be capable of negotiating 5/8" offsets and clearing 5/8" protruding laterals in 6" lines. Tractors not able to negotiate these obstacles in 6" lines shall not be acceptable. The tractor shall free wheel for easy extraction.
2. The tractor shall have a minimum of three forward speeds, reverse, a stop function and a freewheeling mode for easy retrieval. It shall be controllable from a modular, desktop unit that plugs into the camera controller at the viewing station. The controller shall be easily disconnected and stored when not in use. The tractor, loaded with a 13-pound camera, shall be capable of speeds to 45 feet per minute. Under heavy loading, controls within the tractor shall automatically increase the torque of the motor.

## B. PHYSICAL DESCRIPTION

1. The motor housing shall be fabricated from aluminum and stainless steel and be waterproof. The motor assembly shall contain electronic circuit boards to provide current and voltage control to the tractor drive motor. It shall have hardened steel reduction gears in a sealed housing. Tractors with drive systems that are subject to fouling from debris and grit shall not be acceptable. The tractor motor assembly output shall include a unidirectional clutch. The clutch shall be machined from stainless steel and engage the main drive shaft of the tractor body. The motor assembly shall be housed in a hermetically sealed stainless steel tube with a hard-anodized rear cover. The rear cover shall include connectors for main cable in and camera interface. The housing shall be protected by attached stainless steel. The motor and wheel drive assembly shall be no longer than 25".
2. The tractor body shall be machined from solid brass plates, fastened together, to form a strong, U-channel body. The center channel shall house a gear drive transmission. The 1/2" driven axles shall be constructed of high strength stainless steel. The driven axles shall be supported by individual bearings

and sealed with Buna annular seals pressed into the tractor body to form a watertight barrier. Each axle shall deliver torque to one pair of wheels/tires.

3. A solid brass, machined block at the front of the tractor shall provide a hinge/pivot point for camera cradle attachment. The pivot point shall allow the camera to move approximately 2" laterally to assist in camera/tractor insertion into a pipe. The rear of the tractor body shall include four machined recessed sockets to secure the tractor motor drive assembly.

#### C. ELECTRONICS

1. Electronic components shall be all solid state. A power supply, built into the tractor, shall extract control signals and power from the single conductor cable. A power supply shall also limit current and increase motor torque when loading causes current to approach one ampere.

#### D. TRACTOR TIRES

1. The tractor shall be supplied with six standard tires, six knobby high traction tires, four knobby balloon tires and a tractor axle extension kit.
2. A Carbide Wheel kit containing nickel plated steel wheels with carbide grit flake treads having brass hubs shall be provided. The wheels shall be provided in 2.7", 3.3" and 4.4" sizes. The wheels shall be provided in a kit format with grit wheels, brass hubs and installation tools.

### 2.07 COLOR TV SYSTEM CONTROLLER SINGLE CONDUCTOR

- A. The system control unit shall provide all the necessary power and controls to operate and monitor the television inspection system. The controller shall be divided into three sections. The power section shall be devoted to the stop, start and monitoring of an optional, built-in generator unit. It shall have bar graph displays to indicate the voltage and frequency delivered by the generator. An hour-time meter shall be included to display operating time. This is customarily required to perform the maintenance schedule of the generator. The camera control section shall provide DC power and video processing and control circuits for camera system functions. Bar graph voltage and current conditions shall be displayed. The third section of the controller shall provide necessary controls for the cable reel and optional power winch operation. All circuits shall be of solid-state design, assembled in a rack-mounted chassis for installation in a modular control center. The faceplate shall be



powder-coated, heavy-gauge aluminum and shall have permanent labels designating the function or purpose of the various switches, meters and controls. The controller shall have a back plate for all cable connectors, each separately indexed and locking and labeled as to purpose.

- B. The color system controller shall operate from a power source of 120 VAC, 60Hz. The input power source shall be fully isolated from the camera system DC power supply. This isolation shall provide operator protection from electrical shock hazards. The variable voltage, DC camera power supply shall be designed to operate any compatible mainline camera and its accessories through up to 2,500 feet of armored, single conductor cable, i.e., crawler transporter(s), auxiliary lighting or reinstatement cutters. An internal solid-state circuit interrupter shall be provided to allow instantaneous shut-off of camera power should an overload occur. This feature prevents risk of equipment damage. The interrupter shall have an LED indicator, which lights when the electronic shutdown circuit is tripped. The interrupter shall be resettable by switching off the controller for approximately 10 seconds. LED indicators shall be provided to display camera signal level and a switch selected LED bar graph meter shall provide voltage and current readings. The camera controller shall also contain a compatible video processing circuit to provide a controlled NTSC color signal at the video output connector. The controller shall be capable of generating basic control signals for camera and transporter operation. A control input jack shall be provided for injection of analog control signals to operate dual tone cameras, crawler transporters or tap cutter controls.

#### C. REMOTE CAMERA ADJUSTMENTS

The Color System Controller shall be equipped with the following remote camera adjustments:

1. Focus Control – a two-pole switch spring loaded to “off” shall permit the operator to adjust the camera focus for changes in pipe diameter or different views of defect conditions. In the center position, the camera focus will be electronically locked.
2. Iris Control – a two-pole switch spring loaded to “off” shall permit the operator to adjust the automatic iris setting to compensate for changing light conditions.

#### D. CABLE REEL AND WINCH CONTROL

1. The reel control shall contain an on/off switch, LED bar graph load amperage indicator, a speed control knob to vary the cable rate and a gear speed selector switch to select high speed, neutral or low speed ratios. A directional switch shall allow the operator to choose the direction of cable travel. A light on the face of the controller shall indicate that the reel power is on. The reel shall be controllable from either the operators' position or from local controls on the cable reel. Reel control shall be transferable from the operators' station to local control and the reverse by pressing the on switch from either location.

#### 2.08 MONITOR

- A. A 16", color, high resolution, industrial grade, rack mountable video monitor, with speakers, shall be provided for viewing of the video inspection from inside the control room. The monitor shall be mounted in the modular control center in the office of the vehicle. Minimum standards shall be resolution of 500 lines and 6500k color temperature, metal case, beam current feedback and input power of 100 to 24 volts ac. The monitor shall be able to accept four (4) color standards, NTSC, PAL, SECAM, and NTSC 4.43, with menu display available on screen in 5 languages. Monitor shall be model SVHS, NTSC, JVC SR-7365U as manufactured by JVC, or approved equal.

#### 2.09 MANHOLE CABLE GUIDE SYSTEM

- A. The necessary pulley assemblies shall be furnished to protect the TV cable from damage during operation in pipe sections. They shall be constructed of aluminum to minimize weight and be equipped with corrosion resistant pulleys. The minimum bend radius of the TV cable pulley assembly shall be 6".
- B. Quick lock extension poles shall be supplied to connect to the pulley assemblies. The poles shall be constructed of 1" chrome moly tube with a specially designed quick lock assembly consisting of a push button disconnect. A manhole adaptor hook shall be supplied to secure the extended pulley and pole assembly at the manhole ring. A manhole top roller assembly shall be furnished to guide the cables into the manhole. The top roller shall consist of a welded steel angle iron frame with the necessary pulleys.

C. The complete down hole equipment assembly shall be designed for quick solid installation in various sizes of pipe and depths of manhole from above ground. Down hole equipment systems requiring manhole entry for installation shall not be acceptable.

D. The following components shall be included in the Manhole Cable Guide system:

1. Top Manhole Roller Assembly
2. Down hole Roller Single
3. Down hole Roller Double
4. Manhole Hook (Wing Shaped)
5. Push Button Extension Pole, (6)
6. Push Button Grab Hook Assembly
7. Lowering Rope

## 2.10 MAINLINE TV CABLE REEL

### A. PHYSICAL DESCRIPTION

1. The reel system shall be the Mainline TD Cable Reel or approved equal and shall include: a cable drum capable of storing 2,000 feet of double armored, single conductor coaxial cable (equipped with 1,500 feet), a variable speed motor, a chain driven multi-ratio transmission, a mercury wetted slip ring assembly, automatic level wind with footage meter and conveniently located controls.
2. The reel shall be constructed of aluminum plate, powder coated for lasting corrosion protection. The aluminum cable drum shall be supported by self-aligning, heavy-duty pillow block bearings with grease fittings. To conserve space the reel dimensions shall not exceed 26" in length, 26" in width and 37" in height.
3. A permanently sealed, mercury wetted slip ring assembly shall be used to provide for noise free video transmission and maintenance free operation. Systems that use disc-type, continuous contact rotary slip rings, which are subject to wear and contamination, shall not be acceptable.

### B. VARIABLE SPEED MOTOR AND DUAL GEAR RATIOS

The cable drum shall be driven by a ½ horsepower, variable speed motor, a drive chain and a multiple speed transmission. Low gear ratio, high gear ratio, or neutral shall be electronically selectable. A switch shall allow the cable drum to be

disengaged from the drive assembly so that the cable may be unreeled with minimum drag. Cable reels not allowing for freewheeling payout shall not be acceptable.

#### C. AUTOMATIC LEVEL WIND

An automatic level wind shall be installed in the cable reel frame with heavy-duty, self-aligning ball bearings in cast iron bearing blocks with grease fittings. A chain drive shall connect the level wind shaft to the cable drum shaft for proper timing of the rewind. A footage counter wheel shall be attached to level wind follower to guide the cable and measure cable travel. The footage counter wheel shall be machined from aircraft grade 6061-T6 aluminum plate and have a 2' circumference for accuracy and to minimize the effects of wear. The cable measurement accuracy shall be +/-1%.

#### D. CABLE TRAVEL MEASUREMENT

A mechanical counting meter, which shall accurately indicate the cable travel in feet and tenths of feet, shall be mounted on the level wind shaft of the TV cable reel and shall be driven by the footage counter wheel. The footage counter wheel shall also drive an electronic sensor that shall provide cable travel information compatible with an optional data collection information system.

#### E. CABLE REEL CONTROL

1. The TV cable reel shall be capable of operation from either the front panel of the cable reel or from the system controller at the operator's station. Controls shall include an on/off switch, gear selector switch in/out camera direction switch and speed control.
2. The front panel of the cable reel shall also have a twist lock outlet for an optional power remote winch. The cable reel controls shall also be capable of operating the power remote winch, allowing the cable to be unreeled by the power remote winch or retrieved by the cable reel. All clutch and transmission functions shall be automatically controlled by micro switches.

#### F. TRANSMISSION CABLE – 1500'

1. A combination TV transmission, double steel armored towing cable shall be furnished in a continuous length of 1,500'. The complete cable shall be

torque balanced to prevent unraveling or stretching of the steel wire wraps. The cable shall have a minimum break strength of 5,400 lb. and shall not be more than 1/4" in diameter. A cable grip shall be included to transfer the cable towing strength to the camera skid runners or camera transporter. A dummy plug shall be provided for cable end protection.

2. A removable, reusable bullet connector, allowing simple determination, shall be provided. The connector shall be constructed of durable stainless steel and have a delrin, abrasive resistant coating. It shall have a twist on/twist off connector at the transporter/camera end and a ferrule and nut assembly at the cable end.
3. Any system employing soldering and/or scotch cast molding that requires non-productive curing time, shall not be acceptable.

## 2.11 CABLE REEL MECHANICAL FOOTAGE COUNTER

### A. PERFORMANCE

A mechanical footage counter shall be provided to measure the passage of cable feeding in and out of either the push cable basket or a main line cable reel.

### B. PHYSICAL DESCRIPTION

The mechanical footage counter shall include a five-digit read-out, which is capable of reset and is set up for maximum visibility by the operator. The read-out shall be measured in feet (maximum capacity – 9,999.9 feet). Input and output rollers shall be provided to guide the cable past the metering roller.

## 2.12 ROOF MOUNTED AIR CONDITIONER

- A. The Contractor shall install a 13,500 BTU roof mounted air conditioner connected to the generator system.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

Installation shall be in accordance with the manufacturer's recommendations.

### 3.02 TECHNICAL ASSISTANCE

The Contractor shall furnish the services of an experienced and qualified manufacturer's technician to supervise the installation, start-up and calibration of the equipment specified in this Section, and provide eight (8) hours of training of the Owner's staff on the use of the equipment.

#### PART 4 – SOFTWARE

The Contractor shall furnish and install POSM software or approved equivalent. The software shall support hardware video encoding MPEG 1,2,4 DIVX, WMD video sources for BMP/JPEG picture and AVI/DIVX Clip Capture, JVC RS232 VCR controls, RST inclination units, Decade XBOB video text overlay, and ATAPI CD and DVD burners.

Software shall manage and create databases and shall be provided with NASSCO PACP Certified templates and codes. Neztex and WRC templates and database manager shall also be included. Software shall have ability to import and export information in a format commensurate with ESRI ArcGIS9.

Training shall be provided by Contractor for up to eight personnel for three days at the Berea Municipal Utilities offices located in Berea, Kentucky. Class scheduling shall meet the requirements of Berea Municipal Utilities.

#### PART 5 – PACP TRAINING

The Contractor shall provide for training and certification of 6 persons designated by Berea Municipal Utilities in the NASCCO Pipeline Assessment Certification Program. Training shall be provided at the Berea Municipal Utilities offices located in Berea, Kentucky and shall be provided over a three day period.