

CITY OF SAN ANTONIO, TEXAS GOVERNING SPECIFICATIONS

All standard specifications and special specifications applicable to this project are identified as follows:

CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION (JUNE 2008)

<u>ITEM NO.</u>	<u>DESCRIPTION</u>
100	Mobilization
308	Drilled Shafts and Under-Reamed Foundations
531	Signs
533	Cleaning and Removal of Pavement Markings and Markers
535	Hot Applied Thermoplastic Pavement Markings
537	Raised Pavement Markers
615	Traffic Signal Controller Cabinet
618	Conduit
620	Electrical Conductors
624	Ground Boxes
628	Electrical Services
633	Battery Backup System for Traffic Signal
655	Controller Foundation and Pedestal Posts
680	Installation of Highway Traffic Signals
682	Vehicle and Pedestrian Signal Heads
684	Traffic Signal Cables
686	Traffic Signal Pole Assemblies (Steel)
687	Pedestal Pole Assemblies
688	Pedestrian Detectors and Vehicle Loop Detectors
693	Internally Lighted Street Name Sign Assemblies
695	Emergency Vehicle Traffic Signal Priority Control System
696	Radar Vehicle Detection Devices (RVDD)

SPECIAL SPECIFICATIONS

8100 ITS Traffic Monitoring Camera

SPECIAL PROVISIONS

Special Provisions Update May 2009
Special Provisions Update February 2010
Special Provisions Update June 2010
Special Provisions Update November 2013
Special Provisions to the Standard Specifications for Construction

ITEM 696

RADAR VEHICLE DETECTION DEVICES (RVDD)

696.1. DESCRIPTION: *Furnish and install Radar Vehicle Detection Devices (RVDD), including: Radar Advance Detection Devices (RADD) and/or Radar Presence Detection Devices (RPDD) to detect vehicles on a roadway via processing of radar electromagnetic waves and provides detector outputs to a traffic signal controller or similar device.*

696.2. DEFINITIONS

- A. RADAR:** Radio detection and ranging. High frequency electromagnetic energy waves used to detect, identify, and determine the range, direction, and/or speed of an object such as a motor vehicle.
- B. Radar Vehicle Detection Device (RVDD):** Device that emits electromagnetic waves and senses return waves from passing and/or approaching vehicles. The RVDD shall be spatially monostatic; the transmitter and receiver shall be located on the same sensor device.
- C. Radar Advance Detection Device (RADD):** Device that accurately and continuously detects, tracks, and identifies speed of approaching vehicles simultaneously to an intersection in the selected direction of travel. The RADD is capable of detection as described in section 696.3.A. The RADD shall maintain detection of a vehicle moving within 100 ft. to 500 ft. from the device as programmed by the user.
- D. Radar Presence Detection Device (RPDD):** Device that accurately and continuously detects and tracks approaching vehicles simultaneously to an intersection in the selected direction of travel. The RPDD is capable of true presence detection as described in Section 696.3.B. The RPDD shall maintain detection of a vehicle moving or stopped within a programmed detection zone set up by the user.
- E. Interface Module:** Device that interfaces with the cabinet detector rack allowing for contact closure to occur on a selected detector channel.
- F. Communications Link:** The communications connection between the RVDD processor unit and a local area network (LAN) or laptop computer.
- G. Detection Accuracy:** The measure of the basic operation of a detection system (shows detection when a vehicle is in the detection zone and shows no detection when there is not a vehicle in the detection zone).
- H. Passage Detection:** The ability of a vehicle detector to detect the passage of a vehicle moving through the zone of detection and to ignore the presence of a vehicle stopped within the zone of detection.
- I. Presence Detection:** The ability of a vehicle detector to sense that a vehicle, whether moving or stopped, has appeared in its zone of detection.
- J. Delay Timing:** When selected, applies delayed contact closure to the associated detector channel input. When a vehicle is detected by the RVDD, the delay timing must time out before contact closure is removed from the associated detector channel.
- K. Extension Timing:** When selected, applies additional contact closure to the associated detector channel input. When a vehicle is no longer detected within a detection zone, extension timing must time out before contact closure is removed from the associated detector channel.

696.3. FUNCTIONAL CAPABILITIES

A. Radar Advance Detection Device (RADD) Capabilities and Requirements

1. The RADD shall provide passage detection and contact closure to the interface module for vehicles approaching the intersection (the unit).
2. The RADD shall provide vehicle detection, tracking, and speed of moving vehicles approaching an intersection at a range of 100 feet to 500 feet from the radar sensor.
3. The RADD system software shall be capable of creating multiple detection zones within the detection range and applying conditional logic to the detection zones, allowing contact closure to occur only when logic conditions are achieved by the RADD. The user shall be able to apply logic gating such as: “and”, “or” to a detection zone from the software GUI provided with the system. Conditional logic programming will allow the user to control when contact closure occurs to the detector rack interface module.
4. The RADD system software shall be capable of minimum and maximum speed settings to create a desired speed range for contact closure to the detector channel. Vehicles detected within the minimum and maximum speed settings will apply contact closure to the assigned detector channel input.
5. Detection accuracy will be determined by the detection of any moving vehicle or cluster of vehicles within a defined detection zone and within the minimum and maximum speed parameters programmed for the detection zone. With four (4) detection zones programmed, each zone 100 feet in length, a minimum of 95% detection accuracy shall be required for each zone. Detection zones will be set up between 100 feet and 500 feet. Conditional logic for each zone shall be set up in the “or” gate position allowing for contact closure to occur when vehicle speed conditions are met in the detection zone.
6. The RADD shall be capable of delay timing as defined in Section 696.2.J. As a minimum the user shall be able to program and select extension timing from 0-25 seconds in one/tenth (0.1) second increments from the GUI provided with the RVDD system.
7. The RADD shall be capable of extension timing as defined in section 696.2.K. As a minimum the user shall be able to program and select extension timing from 0-25 seconds in one/tenth (0.1) second increments from the GUI provided with the RADD system.
8. The RADD shall be capable of adjusting the extension time automatically based on speed of a moving vehicle.

B. Radar Presence Detection Device (RPDD) Functional Capabilities and Requirements

1. The RPDD shall provide presence detection and contact closure to the interface module for vehicles approaching an intersection. Presence detection shall operate as defined in Section 696.2.I.
2. The RPDD shall, as a minimum, detect vehicles within a 100 feet, 90 degree cone of detection from the sensor. Stop bar radar units shall be able to detect vehicles in 10 lanes of detection. The number of lanes used and detection zones shall be set up and selected from the GUI.
3. The RPDD shall be able to assign up to 4 detector outputs per unit and capable of using 2 or 4 channel interface modules to the detector rack.

4. The RPDD shall be able to distinguish and omit wrong way traffic from activating an assigned detector output
5. The RPDD shall as a minimum, maintain a detection accuracy of 95% for each detection zone set-up on the GUI.

696.4. MATERIALS: Provide components necessary for RVDD installation. A RVDD shall consist of the following components: Radar sensor (1), detector rack interface module (1), power and surge protection panel or module (1), and all associated equipment required to set up and operate in a field environment including software, serial and Ethernet communications ports, cabling, electrical connectors, and mounting hardware.

A. RVDD Interface Module

1. The RVDD interface module must comply and operate with NEMA TS-2 Type 1 detector rack or Type 170/2070 input file.
2. The RADD shall be capable of 16 contact closure inputs to the detector rack. The user shall be able to assign each contact closure to an associated detector channel. The contact closure shall occur through the interface modules or controller module plugged into the rack.
3. All components of the RVDD housed in the controller cabinet shall be rated to operate in a temperature range from -34°C to +74°C (-30°F to +165°F) at 0 percent to 95 percent relative humidity, non-condensing.
4. The RVDD shall provide a “fail safe” operation that triggers when communication between the radar vehicle sensor and the interface module is broken. Contact closure will occur on all programmed detector channels associated with the interface module when the failsafe is triggered and will remain in this state until communication is reestablished between the interface module and the radar vehicle sensor.
5. The RVDD shall be capable of either “pulse mode” or “presence mode” operation. In the pulse mode, when a vehicle is detected and conditional logic is satisfied, contact closure will occur for approximately 125 ms. In the presence mode, contact closure will occur for as long as a vehicle is detected and conditional logic programming is satisfied.

B. RVDD Sensor

1. The RVDD shall be able to operate in all types of weather conditions including: rain, snow, sleet, ice, fog, and wind blown dust. The RVDD shall be able to operate normally and with no degraded performance when the radar vehicle sensor is encased in 1/2 inch of ice.
2. The RVDD shall be rated to operate in a temperature range from -34°C to 60°C (-30°F to 140°F) at 0 percent to 95 percent relative humidity.
3. The RVDD shall comply with all applicable Federal Communications Commission (FCC) requirements. The manufacturer will provide documentation of compliance with FCC specifications. Each RVDD will be FCC certified under CFR 47, Part 15, Section 15.245, as a field disturbance sensor or Section 15.249 as an intentional radiator. This certification will be displayed on an external label on each device according to the rules set forth by the FCC.
4. The RVDD shall maintain frequency stability without the use of manual tuning elements by the user.

C. Power and Surge Protection

1. Lightning and surge protection will be provided for power connections and communications links to the RVDD meeting or exceeding EN 61000-4-5 class specifications.

D. Software and Communication Requirements

1. The RVDD system software shall utilize a GUI that runs in a Microsoft Windows Mobile and Microsoft Windows XP environment or newer Microsoft operating system. The GUI shall graphically illustrate vehicle movement and directionality when detection is achieved by the RVDD. The software shall be capable of auto configuration upon set up of the RVDD.
2. Programmed parameters from the GUI to the sensor shall be stored in non-volatile memory devices such as Flash RAM or EEPROM within the sensor. The RVDD shall not rely on battery backup or the use of a super capacitor to retain memory.
3. The RVDD shall provide a RS232 serial communications link allowing the user to interface with a laptop computer and operate the GUI. The RS232 serial port shall be full duplex and will support true RTS/CTS hardware handshaking for interfacing to various communications devices.
4. The RVDD shall provide an Ethernet communications link allowing the user to interface the system and operate the GUI via a LAN and using TCP/IP protocol.
5. The RVDD firmware shall be upgradeable by external, local, or remote download via serial or Ethernet ports.
6. The serial and Ethernet communications ports as a minimum will support the following baud rates: 9600, 19200, 38400, 57600, and 115200. The user shall be able to select the desired baud rate from the GUI.
7. The operator shall be able to save configurations settings to a file or reload the configurations settings to the RVDD from a saved file using the GUI.
8. The RPDD software shall allow for a virtual connection option so that the software can be used without connecting to an actual sensor.

E. Cabling: The cable end connector shall meet the MIL-C-26482 specification and shall be designed to interface with the appropriate MIL-C-26482 connector. The connector back shell shall be an environmentally sealed shell that offers excellent immersion capability. All conductors that interface with the connector shall be encased in a single jacket and the outer diameter of this jacket shall be within the back shell's cable O.D. range to ensure proper weather sealing. The back shell shall have a strain relief with enough strength to support the cable slack under extreme weather conditions. The cable shall conform to the following specifications:

1. Radar Advance Detection Device (RADD) Cabling

- a. Shielded, twisted pairs with a drain wire
- b. Nominal Capacitance Conductor to Conductor @ 1 KHz \leq 26 pF/Ft
- c. Nominal Conductor DC resistance at 20°C (68°F) \leq 15 ohms/1000 Ft
- d. Single continuous run with no splices allowed.

- If communication is conducted over the RS-485 bus, the communication cable can be terminated only at the two farthest ends of the cable and the operational baud rate and cable lengths shall not exceed the following limits:

Baud Rate *	Cable Length
115.2 Kbps	300 ft
57.6 Kbps	600 ft
38.4 Kbps	800 ft
19.2 Kbps	1000 ft
9.6 Kbps	2000 ft

**Note: These represent Maximum data rates. The data rate used should be the minimum data rate required for operation*

- e. RVDD supplied shall use 24 VDC, the power cable shall meet the following specifications:
 - Two shielded, twisted pairs with two drain wires connected in parallel
 - Nominal capacitance conductor to conductor @ 1 KHz \leq 26 pF/Ft
 - Nominal conductor DC resistance @ 20°C (68°F) \leq 15 ohms/1000
 - The cable length shall not exceed 600 ft.
- f. If a cable length of 600 ft to 2,000 ft is required, the power cable shall meet the following specifications:
 - 10 AWG conductor size/gauge
 - Two conductor count
 - Stranded Cable Type
 - Bare Copper Material
 - 600 Volt Range
 - 90°C Temperature Rating
 - PVC/Nylon insulation material
 - PVC jacketing material
 - 40 Amps per conductor
- g. Both communication and power conductors may be bundled together in the same cable as long as the above-mentioned conditions are met.

2. Radar Presence Detection Device (RPDD) Cabling

- a. The RS-485 conductors shall be a twisted pair.
- b. The RS-485 conductors shall have nominal capacitance conductor to conductor of less than 71 pF/Ft at 1 KHz.
- c. The RS-485 conductors shall have nominal conductor DC resistance of less than 16.5 ohms/ (304.8 m) at 20°C (68°F).

- d. The power conductors shall be one twisted pair with nominal conductor DC resistance of less than 11.5 ohms/ (304.8 m) at 20°C (68°F).
- e. Each wire bundle or the entire cable shall be shielded with an aluminum/Mylar shield with a drain wire.
- f. The cable O.D. shall not exceed 0.4 inches.
- g. The cable length shall not exceed 2,000 ft (609.6 m) for the operational baud rate of RS-485 communications (9.6 Kbps).
- h. The RVDD shall use 24 VDC and the cable length shall not exceed 500 ft (182.9 m).
- i. Both communication and power conductors can be bundled together in the same cable as long as the above-mentioned conditions are met.

696.5. EQUIPMENT: Provide the machinery, tools, and equipment necessary for proper prosecution of the work. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.

696.6. CONSTRUCTION: Install RVDD in accordance with the details shown on the plans and the requirements of this item.

A. Manufacturing and Testing

- 1. The internal electronics of the RVDD shall utilize automation for the surface mount assembly. The RPDD shall comply with the requirements set forth in IPC-A-610C Class 2 and the RADD with the requirements in IPC-A-610C Class 3, Acceptability of Electronic Assemblies.
- 2. The RVDD shall undergo a rigorous sequence of operational testing to ensure product functionality and reliability. Testing shall include the following:
 - a. Functionality testing of all internal sub-assemblies
 - b. Unit level burn-in testing of duration 48 hours or greater
 - c. Final unit functionality testing prior to shipment.

B. Installation and Training

- 1. When requested by COSA personnel or purchasing agency, the supplier of the RVDD shall supervise the installation and testing of the radar equipment.
- 2. If requested by COSA personnel or purchasing agency, up to two days of training shall be provided to personnel of COSA in the operation, setup, and maintenance of the RVDD. Instruction and materials shall be provided for a maximum of 20 persons and shall be conducted at a location selected by COSA. COSA or purchasing agency shall be responsible for the cost of training.
- 3. Instruction personnel are required to be certified by the equipment manufacturer. The User's Guide is not an adequate substitute for practical, classroom training and formal certification by an approved agency.
- 4. Formal levels of factory authorized training are required for installers, contractors, and system operators. All training must be certified by the manufacturer.

C. Warranty, Maintenance, and Support

1. The RVDD shall be warranted to be free of defects in material and workmanship for a period of 5 years from date of shipment from the supplier's facility. During the warranty period, the supplier shall repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect or fails to operate properly after installation provided the product is returned FOB to the supplier's factory or authorized repair site. Product repair or replaced under warranty by the supplier will be returned with transportation prepaid. This warranty does not apply to products damaged by accident, improper operation, abuse, serviced by unauthorized personnel or unauthorized modification.
2. If a RVDD fails with no visible or physical damage to any electronic/electrical component of the system or its wiring, then the unit is considered to have failed under normal operating conditions. A blown fuse or surge protection device failure shall be considered to have failed under normal operating conditions. Acts-of-God will not be accepted as excusable unit failures of the RVDD system.
3. Repair or full replacement will be required if a RVDD fails to operate as specified under normal operating conditions. Repaired or replaced components of the RVDD will be provided at no cost to COSA. The replaced or repaired units will inherit the remainder of the failed unit's warranty.
4. During the warranty period, technical support shall be available from the supplier via telephone within 4 hours of the time a call is made by a user, and this support shall be available from factory certified personnel or factory certified installers.
5. Ongoing software support by the supplier shall include firmware updates for the RVDD processor unit and external software needed to set up and operate the RVDD system. These updates shall be provided free of charge during the warranty period. The update of the RVDD software shall be tested and approved by COSA before installation.
6. The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to COSA in the form of a separate agreement for continuing support.
7. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the radar system.

696.7. MEASUREMENT: This item will be measured as each RADD or RPDD installed, tested, and made operational including the radar sensor, detector rack interface module, processor units, power and surge protection panel or module, software, serial and Ethernet communication ports, electrical connectors and mounting hardware.

The RVDD communication and power cable(s) shall be measured by the linear foot of the type furnished and installed (RADD or RPDD).

This is a plans quantity measurement item. Unless modified by Change Order, the quantity to be paid is the quantity shown in the proposal and/or in the "Estimate and Quantity" sheet of the contract plans. Additional measurements or calculations will be made if adjustments to the quantities are required.

696.8. PAYMENT: The work performed and materials furnished in accordance with this item and measured as provided under "Measurement" will be paid for at the unit price bid for each item listed in Section 696.9, "Bid Items". These prices are full compensation for furnishing, placing,

and testing all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages, supplies, support, personnel training, shop drawings, documentation, and incidentals.

The power and surge protection panel or module, software, serial and Ethernet communication ports, electrical connectors, all interfaces required for the field and remote communications links, and any other auxiliary equipment required for a complete and fully functional RVDD system shall be subsidiary to the price of the "RVDD Setup System"

A power cable meeting the specifications outlined in Section 696.4 "Materials" shall be included with the communication cable and is considered subsidiary to the price of the communication cables.

696.9. BID ITEMS:

Item 696.01 - Radar Presence Detection Device (RPDD) – per each

Item 696.03 - Radar Advance Detection Device (RADD) – per each

Item 696.06 - RVDD Interface Module (2-Channel) – per each

Item 696.08 - RVDD Interface Module (4-Channel) – per each

Item 696.11 - RVDD Setup System – per each

Item 696.16 - RVDD Communication and Power Cable (Type) – per linear foot

Item 696.21 - Install Radar Vehicle Detection Device – per each

Item 696.26 - Install RVDD Communications and Power Cable – per linear foot

SPECIAL SPECIFICATION 8100

ITS TRAFFIC MONITORING CAMERA

8100.1 DESCRIPTION:

Furnish and install Intelligent Transportation Systems (ITS) Traffic Monitoring Cameras to allow remote monitoring of traffic flows and incidents on arterial streets, intersections, and highways.

8100.2 MATERIALS: Provide components necessary for ITS Traffic Monitoring Camera installation. A ITS Traffic Monitoring Camera installation shall consist of the following components: digital IP camera unit (1), surge protection equipment (1), and all associated equipment required to set up and operate in a field environment including software, Ethernet communications ports, cabling, electrical connectors, and mounting hardware.

Camera should be completely configurable with current Advance Traffic Management System version the City of San Antonio is operating. Any additional configuration necessary to allow video feed to be displayed by ATMS will be verified before acceptance. Video feed should be playable from a standard Android, IOS or Windows portable device with no additional software necessary.

Camera should support a minimum of 100 onboard preset viewing positions with automatic pan and tilt speeds greater than 360 degrees per second. Camera should have configurable password protection and support a minimum of 32GB of on board storage.

Cameras should include all outdoor enclosures and mounting hardware for installation on a standard traffic signal pole. Cameras must support high definition video (1080p or greater) with minimum 30X zoom, H.264 MJPEG multi-streaming, Day/Night switching and be manufactured to support installation in harsh weather environments. Cameras shall be capable of panning 360° and tilting 180°. No separate encoder shall be required to transmit video to remote location. Cameras must support at a minimum RTP, RTSP, UDP, TCP, IP, IGMPv2, ICMP, ARP protocols. Camera control shall support ONVIF, Pelco-D, or COHU protocols.

8100.3 CONSTRUCTION: Install ITS Traffic Monitoring Camera in accordance with the details shown on the plans and the requirements of this item.

A. Manufacturing and Testing

The ITS Traffic Monitoring Camera shall undergo a rigorous sequence of operational testing to ensure product functionality and reliability

B. Installation and Training

1. When requested by COSA personnel or purchasing agency, the supplier of the ITS Traffic Monitoring Camera shall supervise the installation and testing of the radar equipment.
2. If requested by COSA personnel or purchasing agency, up to two days of training shall be provided to personnel of COSA in the operation, setup, and maintenance of the ITS Traffic Monitoring Camera. Instruction and materials shall be provided for a maximum of 20 persons and shall be conducted at a location selected by COSA. COSA or purchasing agency shall be responsible for the cost of training.

3. Instruction personnel are required to be certified by the equipment manufacturer. The User's Guide is not an adequate substitute for practical, classroom training and formal certification by an approved agency.
4. Formal levels of factory authorized training are required for installers, contractors, and system operators. All training must be certified by the manufacturer.

C. Warranty, Maintenance, and Support

1. The ITS Traffic Monitoring Camera shall be warranted to be free of defects in material and workmanship for a period of 2 years from date of shipment from the supplier's facility. During the warranty period, the supplier shall repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect or fails to operate properly after installation provided the product is returned FOB to the supplier's factory or authorized repair site. Product repair or replaced under warranty by the supplier will be returned with transportation prepaid. This warranty does not apply to products damaged by accident, improper operation, abuse, serviced by unauthorized personnel or unauthorized modification.
2. If an ITS Traffic Monitoring Camera fails with no visible or physical damage to any electronic/electrical component of the system or its wiring, then the unit is considered to have failed under normal operating conditions. A blown fuse or surge protection device failure shall be considered to have failed under normal operating conditions. Acts-of-God will not be accepted as excusable unit failures of the ITS Traffic Monitoring Camera.
3. Repair or full replacement will be required if an ITS Traffic Monitoring Camera fails to operate as specified under normal operating conditions. Repaired or replaced components of the ITS Traffic Monitoring Camera will be provided at no cost to COSA. The replaced or repaired units will inherit the remainder of the failed unit's warranty.
4. During the warranty period, technical support shall be available from the supplier via telephone within 4 hours of the time a call is made by a user, and this support shall be available from factory certified personnel or factory certified installers.
5. Ongoing software support by the supplier shall include firmware updates for the ITS Traffic Monitoring Camera and external software needed to set up and operate the ITS Traffic Monitoring Camera. These updates shall be provided free of charge during the warranty period. The update of the ITS Traffic Monitoring Camera software shall be tested and approved by COSA before installation.\
6. The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to COSA in the form of a separate agreement for continuing support.
7. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the ITS Traffic Monitoring Camera system.

8100.4 MEASUREMENT: This item will be measured as each ITS Traffic Monitoring Camera installed, tested, and made operational including the digital IP camera unit, surge protection equipment, and all associated equipment required to set up and operate in a field environment including software, Ethernet communications ports, electrical connectors, and mounting hardware.

The communication and power cable(s) will be measured by the linear foot of the cable type furnished.

8100.5 PAYMENT: The work performed and materials furnished in accordance with this item and measured as provided under “Measurement” will be paid for at the unit price bid for each item listed in Section 8001.6, “Bid Items”. These prices are full compensation for furnishing, placing, and testing all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages, supplies, support, personnel training, shop drawings, documentation, and incidentals.

These prices also include any and all interfaces required for the field and remote communications links along with any associated peripheral equipment, including cables; all associated mounting hardware and associated field equipment; required for a complete and fully functional ITS Traffic Monitoring Camera.

8100.6 BID ITEMS:

Item 8001.1 – ITS Traffic Monitoring Camera – per each

Item 8001.2 - ITS Traffic Monitoring Camera Cable – per linear foot

**THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008**

1. Item 401 Reinforced Concrete Pipe	Page 2
2. Item 402 High Density Corrugated Polyethylene Pipe	Page 2
3. Item 403 Storm Sewer Junction Boxes and Inlets	Page 3
4. Item 404 Corrugated Metal Pipe	Page 3
5. Item 405 Fiber Reinforced Concrete Pipe	Page 4
6. Item 502 Concrete Sidewalks	Page 4
7. Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways	Page 5
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9. Item 520 Hydromulching	Page 5
10. Item 523 Adjusting of Vehicular & Pedestrian Gates	Page 6
11. Bid Item Summary Revisions	Page 8

General

Throughout the City of San Antonio Standard Specifications for Construction (June 2008) replace the following:

- “Item 407 Frames, Grates, Rings and Covers” with “Item 409 Cast Iron Castings”
- “Item 304 Expansion Joint Material” with “Item 307.2.E, Expansion Joint Material”
- “Item 305, Membrane Curing” with “Item 307.2.H, Membrane Curing”

Update: May 2009

Item 401 Reinforced Concrete Pipe

Delete in its entirety:

Section 401.6 Payment

Add:

Section 401.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reinforced Concrete Pipe", "Reinforced Concrete Pipe (Arch)", or "Reinforced Concrete Pipe (Elliptical)" of the size and D-load specified or of the size and class specified. This price is full compensation for excavation and backfilling; constructing, furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, "Trench Excavation Safety Protection", or Item 551, "Special Shoring". When jacking, boring, or tunneling is used at the Contractor's option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, "Jacking, Boring or Tunneling Pipe or Box".

Item 402 High Density Corrugated Polyethylene Pipe

Delete in its entirety:

Section 402.7 Payment A & B

Add:

Section 402.7 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "High Density Corrugated Polyethylene Pipe" of the size and backfill specified. This price is full compensation for excavation and backfilling; furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, "Trench Excavation Safety Protection", or Item 551, "Special Shoring". When jacking, boring, or tunneling is used at the Contractor's option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, "Jacking, Boring or Tunneling Pipe or Box".

Update: May 2009

Item 403 Storm Sewer Junction Boxes and Inlets

Section 403.6 Bid Item

Delete:

Items 403.7 – 403.14

Add:

Item 403.7 – Inlet Type I (Complete)(10 ft)

Item 403.8 – Inlet Type II (Complete)(10 ft)

Item 403.9 – Inlet Extensions (10 ft)

Item 403.10 – Inlet (Complete)(5')(TxDOT)

Item 403.11 – Inlet (Extension)(5')(TxDOT)

Item 403.12 – Special Inlet (Complete)

Note: See Bid Item Summary revisions.

Item 404 Corrugated Metal Pipe

Delete in its entirety:

Section 404.6 Payment

Add:

Section 404.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Corrugated Metal Pipe,” “Corrugated Metal Pipe Arch,” “Spiral Rib Corrugated Metal Pipe,” or “Spiral Rib Corrugated Metal Pipe Arch” of the type, size and coating specified. This price is full compensation for excavation and backfilling; furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, “Trench Excavation Safety Protection”, or Item 551, “Special Shoring”. When jacking, boring, or tunneling is used at the Contractor’s option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, “Jacking, Boring or Tunneling Pipe or Box”.

Item 405 Fiber Reinforced Concrete Pipe

Delete in its entirety:

Section 405.6 Payment

Add:

Section 405.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Fiber Reinforced Concrete Pipe" of the backfill type, size and D-load class specified. This price is full compensation for excavation and backfilling for Type I, Type II and Type III; constructing, furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Item 502 Concrete Sidewalks

Delete first paragraph from 502.4.F.Joints:

Add :

Section 502.4.F Joints:

Unless otherwise specified on the plans or as agreed to by the Engineer, tooled joints with rounded edges will be placed at intervals equal to the sidewalk width and will be opened with one-half inch (1/2") radius by one and one-half inch (1 1/2") depth and closed by one-half inch (1/2") radius by one-inch (1") depth.

Section 502.6 Payment:

Delete from first paragraph: "removal and disposal of existing concrete;"

Update: May 2009

Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways

Delete in its entirety:

Section 503.6 Payment

Add :

Section 503.6 Payment:

The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for “Portland Cement Concrete Driveway”, Portland Cement Concrete Driveway – Commercial”, “Asphaltic Concrete Driveway”, or “Gravel Driveway”, which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Item 505 Concrete Riprap

Delete in its entirety:

Section 505.4.A Concrete Reinforcement

Add :

Section 505.4.A Concrete Reinforcement:

Unless otherwise shown on the plans, reinforce concrete riprap with 6 x 6 – W6 x W6 welded wire fabric or with No. 4 reinforcing bars spaced at a maximum of 18 in. in each direction unless otherwise shown. A combination of welded wire fabric and reinforcing bars may be provided when both are permitted. Provide a minimum 6-in. lap at all splices. At the edge of the riprap, provide a minimum horizontal cover of 1 in. and a maximum cover of 3 in. Place the first parallel bar no more than 6 in. from the edge of concrete. Use approved supports to hold the reinforcement approximately equidistant from the top and bottom surface of the slab. Adjust reinforcement during concrete placement to maintain correct position. Reinforcement protruding from existing riprap shall be thoroughly cleaned.

Item 520 Hydromulching

Section 520.4 Construction (D) Slurry:

Delete: “Annual Ryegrass (Oct. through March 15) 20 lbs per 1,000 sqft”.

Add: “Annual Ryegrass (Oct. through March 15) 5-10 lbs per 1,000 sqft”.

Item 523 Adjusting of Vehicular & Pedestrian Gates

Delete in its entirety:

Item 523 Adjusting of Vehicular & Pedestrian Gates

Add:

523.1. DESCRIPTION: *This item shall govern for the adjustment of manual or motorized, chain link or wrought iron, vehicular or pedestrian gates made necessary by the construction of new driveways or sidewalk entrances.*

523.2. MATERIALS: Additional materials needed to perform chain link fences gate adjustments shall conform to those specified in Item 507, "Chain Link Wire Fence". Materials used to adjust wrought iron gates shall be of the same type of material and configuration as the existing gate including any masonry. A combination of new and existing materials may be used if approved by the Engineer and property owner.

523.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

523.4. CONSTRUCTION: Approval from the property owner and Engineer shall be obtained by the Contractor in order to perform the necessary work required. The Contractor shall adjust gates vertically and or relocated gates horizontally by removing the existing gate from the gate posts and relocating and/or replacing (if necessary) the existing hinges, sliding mechanism, or rollers at a level such that the gate shall be provided with the necessary clearance to operate properly. Contractor shall coordinated extent of adjustments to be made with the property owner and Engineer prior to commencing any gate adjustments. Contractor shall notify property owner or tenant 48 hours in advance of any gate adjustments.

All fabric, posts, braces, gates, fittings, bolts, tension wire, tracks, wheels, rollers, operating mechanism, electrical service, wiring and miscellaneous hardware shall be carefully removed in such a manner that they will not be marred or damaged. After removal of the existing gate has been complete, any material deemed not useable shall be replaced by the Contractor with new material of the same design and quality as the existing material. A new gate constructed of the same type of material and configuration as the existing gate may be installed if so desired by the Contractor. All fences and gates shall be cut and welded by a qualified welder.

If necessary, the existing fence may be extended, reinforced, or offset in a manner that will not detract from the decorative appeal of the fence. All extensions and offsets of existing fences and gates shall be approved by the property owner.

All gates adjusted vertically shall be extended vertically so that the height of the gate will match existing fence height. Gates that are adjusted vertically shall be provided with a concrete channel for track, gate, sliding mechanism as detailed on plans or as approved by the Engineer and property owner.

All welding will be performed in a workman-like manner with solid joints of minimum protrusion. The adjusted gate will be constructed in such a manner to have minimal flexure.

Any excessive splatter of the weld will be ground off. Existing wrought iron fences and gates will be cleaned and any surface imperfections, any rust and paint will be removed completely. All surfaces of the existing gates will be roughened to accept a new coat of paint. All newly added areas will be completely primed and painted to match existing paint. A second coat will be required to cover any holidays or spots of insufficient coverage. The existing fence and gate will be spot primed in areas where surface imperfections or rust have been removed.

Painting will be by hand or spray. Areas to be painted shall be primed in accordance with paint manufacturer's recommendations. Two coats of paint shall be applied to the existing fence and gate and all newly added parts. The final surface will be of even color with out streaks, drips bubbles, or any other surface imperfection. Paint used shall match existing paint in color and texture. Color shall be approved in writing by the property owner.

523.5 MEASUREMENT: Vehicular and pedestrian gates will be measured for each driveway or sidewalk entrance and/or exit of each type that is adjusted. Additional fencing that may be required for relocation or adjustment of gates will be subsidiary to gate adjustments or gate relocation and will not be measured as a separate pay item.

523.6 PAYMENT: The work performed and the materials furnished as prescribed by this item will be paid for at the bid price per gate for "Adjusting of Vehicular & Pedestrian Gates," which price shall be full compensation for removing and installing the existing gate and for furnishing all additional materials, all labor, tools, equipment and incidentals necessary to complete the work.

523.7 Bid Item:

- Item 523.1 – Adjusting Chain Link Vehicular Gate – Each
- Item 523.2 – Adjusting Chain Link Vehicular Gate (Motorized) - Each
- Item 523.3 – Adjusting Chain Link Pedestrian Gate – Each
- Item 523.4 – Adjusting Wrought Iron Vehicular Gate – Each
- Item 523.5 – Adjusting Wrought Iron Vehicular Gate (Motorized) - Each
- Item 523.6 – Adjusting Wrought Iron Pedestrian Gate – Each

Bid Item Summary Revisions

Replace Item 403.7 with Item 403.7 – Inlet Type I (Complete)(10 ft) - Each
Replace Item 403.8 Item 403.8 – Inlet Type II (Complete)(10 ft) - Each
Replace Item 403.9 Item 403.9 – Inlet Extensions (10 ft) - Each
Replace Item 403.10 Item 403.10 – Inlet (Complete)(5')(TxDOT) - Each
Replace Item 403.11 Item 403.11 – Inlet (Extension)(5')(TxDOT) - Each
Replace Item 403.12 Item 403.12 – Special Inlet (Complete) - Each
Delete Items 403.13 & 403.14
Add Item 523.1 – Adjusting Chain Link Vehicular Gate – Each
Add Item 523.2 – Adjusting Chain Link Vehicular Gate (Motorized) - Each
Add Item 523.3 – Adjusting Chain Link Pedestrian Gate – Each
Add Item 523.4 – Adjusting Wrought Iron Vehicular Gate – Each
Add Item 523.5 – Adjusting Wrought Iron Vehicular Gate (Motorized) - Each
Add Item 523.6 – Adjusting Wrought Iron Pedestrian Gate – Each
Replace Item 682.1 with Item 682.1 – Install Vehicle Signal Section with Back Plate
(3 second) – Each
Replace Item 682.2 with Item 682.2 – Install Vehicle Signal Section with Back Plate
(4 second) – Each
Replace Item 682.3 with Item 682.3 – Install Vehicle Signal Section with Back Plate
(5 second) – Each
Replace Item 682.4 with Item 682.4 – Install Pedestrian Signal Section (12 inch) LED
(2 Ind) – Each
Add Item 682.5 – Louver (12 inch)(Adjustable) – Each

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008

1. Item 700 Project Schedules.....7 Pages

General

1. None

Standard Specifications

1. Delete Item 700 - Cost Loaded Schedules (*dated June 2008*) in its entirety and replace with Item 700 – Project Schedules (*dated February 2010*) shown on the attached document.

ITEM 700
✦
PROJECT SCHEDULES

This item shall govern the creation, maintenance, and delivery of Critical Path Method (CPM) project schedules.

CRITICAL PATH METHOD PROJECT SCHEDULE

The Contractor shall create and maintain a Critical Path Method (CPM) Project Schedule showing the manner of execution of work that the contractor intends to follow in order to complete the contract within the allotted time. The project schedule shall employ computerized CPM for the planning, scheduling and reporting of the work as described in this specification. The CPM project schedule shall be prepared using the Precedence Diagram Method (PDM). The Contractor shall create and maintain the schedule using Primavera Project Manager 5.x or above or Primavera Contractor 4.1 or above. For construction contracts under \$300K and project durations 90 days or less, the project schedule can be created and maintained in Microsoft Project software. The observance of the requirements herein is an essential part of the work to be done under the contract. No direct compensation will be allowed for fulfilling these requirements, as such work is considered subsidiary to the various bid items of the contract.

PERSONNEL

The Contractor shall provide an individual, referred to hereafter as the Scheduler, to create and maintain the Project Schedule. The Scheduler shall be proficient in Critical Path Method (CPM) analysis as demonstrated through certification from Project Management Institute (PMI), Association for the Advancement of Cost Engineering (AACE) or possess sufficient experience to be

able to perform required tasks on the specified software and be able to prepare and interpret reports from the software. The Scheduler shall be made available for discussion or meetings when requested by the City.

PROJECT SCHEDULE

1. GENERAL:

At least twenty (20) calendar days prior to the pre-construction conference, the Contractor shall submit a Project Schedule, which shall show the sequence and interdependence of activities required for complete performance of the work. All schedule submittals shall be in the electronic form to include PDF plots of the schedule, a PDF plot defining the Critical Path and two week look-ahead, and include the native Primavera file format. The Contractor shall submit the schedule to the Web-portal and Project Manager via electronic mail, CD-Rom, floppy disc, or any other electronic media acceptable to the City. The City will review the Project Schedule within twenty (20) calendar days for compliance with the specifications and notify the Contractor at the pre-construction conference of its acceptability. No work shall begin until the City has accepted the Project Schedule.

2. SEQUENCE:

The Project Schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the work. The purpose of

the City requiring the Project Schedule shall be to:

- a. Ensure adequate planning during the execution and progress of the work in accordance with the allowable number of calendar days and all milestones.
- b. Assure coordination of the efforts of the Contractor, City, Utilities and others that may be involved in the project and that activities are included in the schedule highlighting coordination points with others,
- c. Assist the Contractor and City in monitoring the progress of the work and evaluating proposed changes to the contract, and
- d. Assist the City in administering the contract time requirements.

3. ACTIVITIES:

Each activity on the Project Schedule shall include:

- a. An activity number utilizing an alphanumeric designation system that is agreeable to the City;
- b. Concise description of the work represented by the activity; and
- c. Activity durations in whole work days with a maximum of twenty (20) work days. Durations greater than twenty (20) work days may be used for non-construction activities (mobilization, submittal preparation, curing, etc.), and other activities mutually agreeable between the City and Contractor.

The Contractor shall provide to the City a legend for all abbreviations. The activities shall be coded so that organized plots of the

Project Schedule may be produced. Typical activity coding includes traffic control phase, location and work type. Show an estimated production rate per working day for each work activity. Activity durations shall be based on production rates shown.

4. WORK DURATION AND RESOURCES:

The schedule layout shall be grouped by Project and then by Work Breakdown Structure (WBS) for organizational purposes. The original and remaining duration shall be displayed. The grouping band will, by default, report work days planned. One additional level of effort activity shall be added to the schedule as a “time calculator” with a seven-day calendar without holidays. The calculation of their days will show up in the duration columns in Primavera.

If specified by general note, the Contractor shall plan and incorporate major resources into the Project Schedule. Major resources are defined as crews and equipment that constrain the Contractor from pursuing available work. The resources shall accurately represent the Contractor's planned equipment and manpower to achieve the productivity rates specified above.

Work shall be scheduled based upon the Contractor's standard work week utilizing the appropriate calendar assignments in Primavera software. If the Contractor's initial baseline plan is to perform the Work on a six or seven-day work week, then the appropriate calendar in Primavera must be used and the Engineer must be notified in writing through the Submittal process. This does not affect the total calendar days allotted by the contract.

Assign working calendars for the days you plan to work. Designate all City holidays (12) as non-working days (holidays). For dates beyond the current calendar year assume that

the City holidays are the same as the current calendar year.

Seasonal weather conditions shall be considered and included in the Project Schedule for all work influenced by temperature and/or precipitation. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions. Average historical weather data is available through the National Oceanic and Atmospheric Administration (NOAA). These effects will be simulated through the use of work calendars for each major work type (i.e., earthwork, concrete paving, structures, asphalt, drainage, etc.). Project and work calendars should be updated each month to show days actually able to work on the various work activities.

Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float time in the Project Schedule is a shared commodity between the City and the Contractor.

Only City responsible delays in activities that affect milestone dates or the contract completion date, as determined by CPM analysis, will be considered for a time extension.

5. OTHER REQUIREMENTS:

Code and organize all work by Work Breakdown Structure (WBS). An example WBS will be provided by the City.

Percent complete type shall be Duration Percent Complete.

Duration type shall be Fixed Units

Submittals shall be included in the schedule with a logical tie to what each drives.

Proposed Change Orders shall be added the schedule identifying it as a Proposed Change Order. This task must be linked to the schedule with logical ties and approved by the City. Upon approval of Change Order, task will be renamed identifying work performed and Change Order number and resources will be added to the task.

Constraints are limited to project start, project finish, material delivery, and use on Submittals. If a schedule requires additional constraints, then an explanation shall accompany the schedule Submittal.

The schedule shall include activity milestones for material delivery.

Default progress is disallowed.

If work is performed out of sequence, then an explanation must be included in the project narrative.

JOINT REVIEW, REVISION AND ACCEPTANCE

Within twenty (20) calendar days of receipt of the Contractor's proposed Project Schedule, the City shall evaluate the schedule for compliance with this specification, and notify the Contractor of its findings. If the City requests a revision or justification, the Contractor shall provide a satisfactory revision or adequate justification to the satisfaction of the City within seven (7) calendar days. If the Contractor submits a Project Schedule for acceptance, which is based on a sequence of work not shown in the plans, then the Contractor shall notify the City in writing, separate from the schedule submittal.

The City's review and acceptance of the Contractor's Project Schedule is for conformance to the requirements of the

contract documents only. Review and acceptance by the City of the Contractor's Project Schedule does not relieve the Contractor of any of its responsibility for the Project Schedule or of the Contractor's ability to meet interim milestone dates (if specified) and the contract completion date, nor does such review and acceptance expressly or by implication warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Contractor's Project Schedule. In the event the Contractor fails to define any element of work, activity or logic and the City review does not detect this omission or error, such omission or error, when discovered by the Contractor or City shall be corrected by the Contractor at the next monthly schedule update and shall not affect the project completion date.

Acceptance by the City of a Baseline or project update schedule that exceeds contractual time does not alleviate the Contractor from meeting the contractual completion date.

Payment may be delayed until acceptable baseline or updated schedule is received and accepted by the City.

UPDATES

The Project Schedule shall be updated on a monthly basis. The Project Schedule update shall be submitted one week prior to the pay application submittal. The Contractor shall meet with the City each month at a scheduled update meeting to review actual progress made through the Data Date of the schedule update as determined by the Project Manager. The review of progress will include dates activities actually started and/or completed, the percentage of work completed, the remaining duration of each activity started and/or completed, and the amount of work to complete with an analysis of the relationship

between the remaining duration of the activity and the quantity of material to install over that given period of time with a citation of past productivity. The monthly schedule update shall include a progress narrative explaining progress, identifying progress made out of sequence, defining the Critical Path, identification of any potential delays, etc. The Project Schedule Narrative template will be required for the narrative.

The project schedule update layout shall be grouped by Project, then WBS. The layout shall include the following columns:

- a. Activity ID
- b. Activity Description
- c. Original Durations
- d. Remaining Durations
- e. Start and Finish Dates
- f. Baseline Start and Finish Dates
- g. Total Float
- h. Performance Percent Complete
- i. Display logic and target bars in the Gantt bar chart view

PROJECT SCHEDULE REVISIONS

If the Contractor desires to make major changes in the Project Schedule, the Contractor shall notify the City in writing and submit the proposed schedule revision. The written notification shall include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule. Major changes are hereby defined as those that may affect compliance with the contract requirements or those that change the critical path. All other changes may be accomplished through the monthly updating process without written notification.

TIME IMPACT ANALYSIS

The Contractor shall notify the City when an impact may justify an extension of contract time or adjustment of milestone dates. This notice shall be made in writing as soon as

possible, but no later than the end of the next estimate period after the commencement of an impact or the notice for a change is given to the Contractor. Not providing notice to the City within twenty (20) calendar days after receipt will indicate the Contractor's approval of the time charges as shown on that time statement. Future consideration of that statement will not be permitted and the Contractor forfeits his right to subsequently request a time extension or time suspension unless the circumstances are such that the Contractor could not reasonably have knowledge of the impact by the end of the next estimate period.

When changes are initiated or impacts are experienced, the Contractor shall submit to the City a written time impact analysis describing the influence of each change or impact. A "time impact analysis" is an evaluation of the effects of changes in the construction sequence, contract, plans, or site conditions on the Contractor's plan for constructing the project, as represented by the schedule. The purpose of the time impact analysis is to determine if the overall project has been delayed, and if necessary, to provide the Contractor and the City a basis for making adjustments to the contract.

A time impact analysis shall consist of one or all of the steps listed below:

1. Establish the status of the project before the impact using the most recent project schedule update prior to the impact occurrence.
2. Predict the effect of the impact on the most recent project schedule update prior to the impact occurrence. This requires estimating the duration of the impact and inserting the impact into the schedule update. Any other changes made to the schedule including modifications to the

calendars or constraints shall be noted.

3. Track the effects of the impact on the schedule during its occurrence. Note any changes in sequencing, and mitigation efforts.
4. Compare the status of the work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the status of the work during and after the effects of the impact are over (Step 3). Note that if an impact causes a lack of access to a portion of the project, the effects of the impact may extend to include a reasonable period for remobilization.

The time impact analysis shall be electronically submitted to the City. If the Project Schedule is revised after the submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the City the need for any modification to its time impact analysis. One (1) copy of each time impact analysis shall be submitted within fourteen (14) calendar days after the completion of an impact. The City may require Step 1 and Step 2 of the time impact analysis be submitted at the commencement of the impact, if needed to make a decision regarding the suspension of contract time. Approval or rejection of each time impact analysis by the City shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary.

MEASUREMENT and PAYMENT

Project Schedule will not be measured or paid for directly, but shall be included in the unit price bid for the items of construction in which the operations occur.

PROJECT SCHEDULE NARRATIVE

PROJECT NAME:	
CONTRACTOR NAME:	
PERIOD ENDING:	
SUBMITTAL DATE:	
PREPARED BY:	

Evaluation Summary	
NTP:	
Data Date:	
Contractual Completion Date:	
Current Scheduled Completion Date:	
Previous Period Scheduled Completion Date:	
Contract Calendar Days:	

Yes	No	
		Contractor has included both a hard copy (pdf) and the native Primavera file format?
		Project calendars have been updated to reflect actual charged working days for the progress period, according to the contract time statement?
		Schedule update reflects approved change orders for the progress period?
		Have any major changes been made to the schedule? <i>(A major change is defined as those that may affect compliance with the contract requirements or those that change the critical path. If yes, written notification is required to include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule.)</i> If yes, provide details in Section 3 & 5 below.
		Are any delays included in this schedule submittal for which the Contractor intends to submit a Time Impact Analysis (TIA) for a claim delay? If yes, provide details in Section 6 below.

1. Identify general progress for the update period.
2. Identify work performed out of sequence and provide an explanation for the reason.

3. Describe any changes made to the project's logic and the reason for the change(s).
4. Identify any new constraints used and provide an explanation for their use.
5. Define the critical path of the project, including any changes from the previous update.
6. Identify any delays that have occurred for the progress period, the reason for the delay, and current status.
7. Identify any potential delays and possible mitigation efforts.
8. Other comments.

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008

1. Item 526 Field Office.....2 Pages

General

1. None

Standard Specifications

1. Delete Item 526 – Field Office (*dated June 2008*) in its entirety and replace with Item 526 – Field Office (*dated June 2010*) shown on the attached document.

ITEM

526 FIELD OFFICE

526.1. DESCRIPTION: *This item shall govern the erection or furnishing of a building to be used by the inspection force as a Field Office where the total contract amount (including Joint Bid Utilities) is one million dollars or greater.*

526.2. EQUIPMENT:

- A. General.** Furnish facilities after the receipt of the notice to proceed and before beginning physical work on the project. Provide field offices of the type specified near the worksite at a location acceptable to the Engineer. The Contractor may make use of permanent buildings or rental space meeting the requirements for field offices instead of portable buildings if approved. Maintain and clean the field office bi-weekly until the City accepts the project. Furnish other equipment as required.
- B. Damage.** Immediately repair or replace the facility if it is damaged in any manner. Payment for repair will be made at no cost to the City.
- C. Right-Of-Way.** When facilities are allowed in the right of way, remove buildings and other facilities and restore the right of way before project acceptance.
- D. Parking and Fencing.** Provide 6" compacted gravel parking area for the sole use of at least 2 City-owned vehicles. Situate the area near the field office at a location acceptable to the Engineer. Maintain the parking area until the project is completed and restore the area to a condition acceptable to the Engineer upon project completion. Enclose the field office and the parking area with a 6-ft. chain-link fence, a top-mounted 3-strand barbed wire, and a 12-ft. gate.
- E. Field Office.**

Provide field offices with roofs, floors, doors, and screened windows. The building shall be a minimum of 10 feet by 16 feet by 8 feet high with not less than three glass windows and one door. Ensure the floor has an impervious floor covering.

Ensure that the field office is weatherproof, piped for potable water, and electrically wired by certified personnel. Furnish and install adequate outlets, lighting, air conditioning, heating, and ventilation.

Provide a partitioned rest room furnished with rest room supplies, a lavatory and a flush toilet connected to a sewer or septic tank. A portable toilet may be used when approved by the Engineer.

Provide secured and controlled access to the field office through the use of security measures such as bars, alarms, or security fencing. Furnish steps to the building if deemed necessary by the Engineer.

Provide workbenches and tables at least 3 ft. wide and 6 ft. long, chairs, and filing cabinets in the quantity acceptable to the Engineer. Provide solar screens, blinds, or shades if deemed necessary by the Engineer.

Provide a telephone and service unless otherwise directed.

Provide all of the following in accordance with the requirements therein:

- computers (laptop or desktop) meeting the minimum requirements of Item 1000, “Web Portal” or as designated on the plans,
- printer scanner, and
- Internet service. The Internet service must be a provided on a line separate from required phone service.
- Digital camera with memory card 2GB or greater and appropriate software.

526.3. MEASUREMENT: No measurement will be made under this item.

526.4. PAYMENT: No payment will be made under this item. The Field Office and items listed above are not a pay item and shall remain the property of the contractor after completion of this project.

526.5. BID ITEM:

N/A

Update: November 2013

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED NOVEMBER 2013

1. Item 804 New Tree & Shrub Planting and Maintenance.....4 pages

General

1. None

Standard Specifications

1. Adding Item 804 – New Tree & Shrub Planting and Maintenance Specifications (dated November 2013) in its entirety.

ITEM

804 New Tree & Shrub Planting and Maintenance

804.1 DESCRIPTION: *This item shall govern the procedure for selecting planting and maintaining trees and other vegetation to be used as enhancements or for mitigation on a construction project*

804.2 SELECTION OF TREES:

- A. Size-grading of trees is in accordance with the Texas Association of Nurseryman Grades and Standards. Following is a summary (caliper is measured by a “slot” type caliper, “pincer” type caliper or a diameter tape):
- B. For Shade trees caliper takes precedence. Caliper is measured at 6 inches above soil level in the pot ground for trees up to and including 4 inch caliper size, and 12 inches above the ground for larger trees
- C. For flowering trees, height takes precedence for trees up to 6 feet in height and then caliper
- D. Trees will be a minimum of 2 inch caliper and/or 6 feet in height unless specified.
- E. Trees will be straight, single trunked unless specified or approved.
- F. Trees will be containerized/boxed /balled and burlaped/b&b
- G. No species substitution unless authorized
- H. Trees will be free of insect and diseases with a well-developed rootball no girdling roots
- I. For palm trees, measurement will be by overall height or trunk height and will specify to species or to type; palmate or pinnate
 - If a tree transplant or ball and burlap is approved or specified, it must have been grown out in a nursery for at least 2 growing seasons and ball size must comply with ANSI

804.3 PLANTING:

- A. Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage
- B. Depth of the excavated area is to be the same as the length of the root ball so that the top of the root flare is at the ground surface level. Minimum depths shall be measured from finished grade
- C. Width of excavation must be a minimum of 3 times the diameter of the root ball.
- D. Loosen hard subsoil in bottom of excavation
- E. Fill excavation for tree/plant with water and allow it to percolate out before planting.
- F. Use excavated parent soil material in the backfill mixture at a ratio of 70:30 with the soil amendment as specified in item 802. Particle size of backfill material must be less than 4 inch diameter

- G. Saturate with water when the pit or bed is half full of backfill and again when full.
- H. Cover excavation area with mulch as specified in item 802
- I. Water to prevent soil from drying out
- J. Plants will be rejected if the ball of earth surrounding roots has been disturbed or damaged prior to or during installation. Replacement tree/plant to be of equal or better quality
- K. Control growth of weeds. Apply a glyphosate type (Round-up 41%) herbicide in the excavated area in accordance with manufacture's label instructions

804.4 QUALITY ASSURANCE:

- A. All tree installation work shall be performed by a single firm specializing in tree transplanting work, with a minimum of 3 years experience in the acceptable performance of similar work to that specified. The firm performing the work shall have the following minimum certifications.
- B. Texas Nurseryman & Landscape Association (TNLA) certification
- C. Be licensed for application and use of pesticides
- D. Meet state requirements for insurance
- E. Must be bonded

804.5 TREE MAINTENANCE POST TRANSPLANTATION:

WATERING THE TREE:

- A. The key to newly planted tree survival is providing adequate water
- B. Contractor shall water the newly planted trees weekly until the end of the one-year warranty. Contractor shall provide a schedule and method of watering the trees to the City for the project
- C. Initially, a newly planted tree needs to be properly watered with an adequate amount to pack the soil, to remove root-drying air and to moisten the root ball.
- D. On adequately draining soils, 5 gallons of initial water should be enough.
- E. Fast draining soils may need more frequent watering than a slow draining soil.
- F. Critical period to provide adequate water during the annual growing season, between late spring and autumn
- G. Use of Gatorbags is acceptable method of irrigation. Follow prescribed irrigation schedule for proper establishment

804.6 MULCHING THE TREE:

- A. Mulching a newly planted tree ensures that moisture is available to roots over time and reduces grass competition
- B. Good mulch (organic materials like leaves, bark, needles and fine wood chips) should ring the tree base (over the critical root zone) but never touch the trunk of the tree. Use local/native hardwood mulch. No fertilizer is necessary when quality composted mulch is used
- C. Maintain the mulch level with no more than 4 inches of material over the roots; mulch should not touch the trunk of the tree. A 3' to 6' minimum radius of mulch should be placed around the tree (the wider the better)

804.7 STAKING THE TREE:

- A. Not all newly planted trees need staking to remain standing straight. Stake only if the root ball is unstable or the tree trunk is bending. Use only loosely-tied wide straps (recommend use of 'Chain-Lock' staking system) and limit the number of straps to a minimum for support
- B. Use tree stakes only when needed. Every tree does not require automatic staking.
- C. Inspect all stakes and straps during spring and autumn for loose fit and alter to prevent trunk damage. All straps should be removed after the first or second year

804.8 INSPECTING TREE HEALTH:

- A. Checking a tree's health should be done by a certified arborist, a Landscape Architect or registered Landscape Professional an expert. Things that can be done to alert of tree health problems
- B. When inspecting a tree consider the following:
- C. Is the current year's growth much less than past years' growth? Although fast growth does not necessarily mean good health, a dramatic reduction in growth rate may be an indication of poor health
- D. Are there dead limbs, odd colors on leaves and bark or a patchy canopy. These tree symptoms can be the first indicators that a tree is unhealthy and should be inspected in detail
- E. Remember that planting a healthy tree in the beginning is the best way to assure its future health

804.9 PRUNING THE TREE:

- A. Prune only critical branches that are either dead or broken after planting. Remove multiple leaders to leave only one central stem. (may be best to postpone pruning to avoid transplanting shock due to loss of leaves)
- B. Prune only critical branches and/or eliminate extra leaders in the tree's first year. Prune lightly in Year 2 or 3

804.10 REPLACEMENT:

- A. Any dead trees or shrubs during the warranty period shall be replaced by the contractor at no cost to the city
- B. At the end of the one-year warranty, any tree or shrub that is not in good condition as determined by the city arborist and project manager shall be replaced by the contractor at no cost to the city

804.11 MEASUREMENT:

Tree installations will be measured by the number and size of trees/plants (cost should include installation, warranty, mulch, irrigation/gatorbags, monitoring/treatments as needed, staking, etc.)

804.12 PAYMENT:

Payment shall be made per each of the type and size of tree specified on the bid proposal

804.13 BID ITEM:

Item 804 – New Tree & Shrub Planting and Maintenance

SPECIAL PROVISIONS

All work shall conform to the 2008 Edition of the “Standard Specifications for Construction” published by the City of San Antonio and these Special Provisions.

ITEM 308. DRILLED SHAFTS AND UNDER-REAMED FOUNDATIONS

An additional 2” schedule 40 PVC stub out shall be installed at each pole foundation. Stub outs shall be one-foot in length and appropriately capped below grade for future use. This shall be subsidiary to item 308.1 “Drilled Shafts”.

ITEM 600. TRAFFIC SIGNAL GENERAL CONDITIONS

The Contractor shall be responsible for obtaining all permits required to complete the project

All work shall comply with the City of San Antonio Right of Way Ordinance and the Utility Excavation Criteria Manual.

The Contractor is responsible for maintaining and repairing all underground irrigation systems within the project limits.

Barricades, signs, and traffic handling shall be considered subsidiary to other items. All temporary traffic control devices shall be installed per the City of San Antonio “Barricade and Construction” standards and the Texas Manual on Uniform Traffic Control Devices (TMUTCD). The Contractor shall be responsible for setting, maintaining, and removing all barricades and temporary traffic control devices.

ITEM 618. CONDUIT

Proposed conduit shown under existing street pavement and driveways shall be installed by horizontal, directional bore. No trenching or conventional jacking or drilling shall be permitted except as allowed by the Engineer.

Conduits installed under roadways, driveways, or any other areas where it is possible for vehicles to drive presently or with future development shall be placed at a minimum depth of 30 inches.

Conduit installed from the electrical service source to the meter pedestal or cabinet shall be paid under item 618, “Conduit”, per linear foot of the type and size required by the utility company. The bid price shall be full compensation for the electrical wiring, covering and barricading the trench, off-site storing of backfill material and any other incidentals required for a safe environment while the conduit is being inspected by the utility company.

ITEM 624. GROUND BOXES

The installation of the traffic signal ground box in new controller cabinet foundation shall be subsidiary to item 655.1, Type 332 Controller Foundation.

ITEM 628. ELECTRICAL SERVICES

The Contractor is responsible for coordinating with CPS Energy to obtain the electrical service permit and required electrical connections.

The Contractor shall supply and install the address in permanent numbers and letters to the street side of the service enclosure. Said address shall also be recorded and given to the City Inspector for the City's records.

The Contractor shall be responsible for paying all fees and obtaining the permits required to install the electrical service.

ITEM 633 BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL

Battery backup system (BBS) shall be installed in an above ground cabinet attached to the side of the controller cabinet. All necessary equipment shall be subsidiary to item 633.1.

ITEM 680. INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

The project shall consist of furnishing and installing all materials and equipment required for a complete traffic signal installation. Upon project completion, fully operational traffic signal systems will be required. Items required but not shown on the plans are the responsibility of the Contractor and shall be subsidiary to the applicable bid item.

Until the project is completed and accepted, the Contractor will be responsible for the maintenance of the traffic signals. The Contractor shall ensure that all elements of the traffic signals remain in operation at his expense. The Contractor shall complete any repairs to the traffic signals within four hours after notification. The City of San Antonio shall retain the responsibility of the operation of the traffic signals.

The locations shown on the plans for signal pole foundations, controller foundations, conduit and other items may be varied to meet local conditions, subject to prior approval by the Engineer. The Contractor shall be responsible for adjustments in project construction, which may be necessary because of conflict with utilities.

Final adjustment of heads, as required by the Engineer, shall be done by the Contractor and shall be subsidiary to the various bid items.

All traffic signal equipment installed shall maintain a minimum clearance of 8' radius from neutral overhead electrical lines and 10' radius from primary overhead electrical lines. Additional clearance requirements shall be as directed by the electrical utility company.