



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

June 7, 2022

SUBJECT: FAP Route 631 (IL 102)
Project STP-KAZS(886)
Section (109N,110N)RS-3,SW
Kankakee County
Contract No. 66L88
Item No. 156, June 17, 2022 Letting
Addendum A

NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

1. Revised page ii of the Table of Contents to the Special Provisions.
2. Revised pages 13-14 and 18-27 of the Special Provisions.

Prime contractors must utilize the enclosed material when preparing their bid and must include any changes to the Schedule of Prices in their bid.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Jack A. Elston'.

Jack A. Elston, P.E.
Bureau Chief, Design and Environment

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REMOTE-CONTROLLED VIDEO SYSTEM

Description. This work shall consist of furnishing and installing a Remote-Controlled Video System as specified herein.

- a) The Remote-Controlled Video System shall be installed in the proposed traffic control cabinet at the intersection of IL 102 and Career Center Rd/Briarcliff Ln, IL 102 and WM Latham Sr Dr, IL 102 and Stratford Dr, and IL 102 and Brown Blvd/Oak Run Dr as shown on the plan details. The cellular or any other reliable interconnectivity router shall provide secure internet connectivity for the video cameras, controller, MMU (conflict monitor), UPS, and all other devices in the new controller cabinet.

This cellular or any other reliable interconnectivity service data plan shall also include unlimited hotspot service for the area covering the State of Illinois.

The Remote-Controlled Video System shall include a PTZ camera and shall be mounted on a mast arm with the extension bracket if needed, using the manufacturer's guidelines. The PTZ camera shall have great visibility for all 4 directions and the traffic signal cabinet.

- b) The Remote-Controlled Video System shall be downloaded and given access to nine (9) tablets, nine (9) laptops, and three (3) desktops controlled at the IDOT, District 3 office in Ottawa, Illinois. These devices shall have access to all video cameras and be able to watch all intersecting legs and a separate PTZ camera in real time, with real-life pictures of the roadway, vehicles, and signal controller cabinet. The Remote-Controlled Video System shall view all District 3 existing and proposed PTZ cameras in one window on each device.
- c) The Remote-Controlled Video System shall be run on a cellular or any other reliable interconnectivity based communication system and be able to monitor active signal timing and data, red flash, open/closed cabinet door, along with the battery backup alarms during power failure from the district three devices. The Remote-Controlled Video System shall also provide detector information and the most current timing software, so the State of Illinois can change timings in the controller from any District 3 devices. All alert alarms shall be automatically emailed to three (3) District 3 personnel as specified and all major alert alarms shall be texted to three (3) District 3 personnel. The ten (10) District 3 personnel shall have the ability to change text or email alerts by themselves when needed at any time.
- d) The Remote-Controlled Video System shall have a ten (10) year warranty and a ten (10) year paid cellular or any other 10-year paid reliable interconnectivity service plan which would be used for cellular or any other reliable interconnectivity data for the three (3) tablets, three (3) laptops, and three (3) desktops . The Illinois Department of Transportation shall not have to pay for any cellular or any other reliable interconnectivity service plans or data until after the end of the ten (10) year plan. The plan should have unlimited data, roaming charges, and minutes for all incoming and outgoing connections. The ten (10) year paid cellular or any other 10-year paid reliable interconnectivity service plan shall also have unlimited and uninterruptible streaming video capabilities. The start date of the warranty and paid cellular or any other reliable interconnectivity service plan

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shall not begin until the Remote-Controlled Video System has been approved by the Engineer.

- e) The Remote-Controlled Video System shall include six (6) licenses with the latest software which shall be downloaded on three (9) existing laptops, (9) tablets and (3) desktops. located at the Illinois Department of Transportation in Ottawa, Illinois. The three (3) licenses shall be used to remotely access all video cameras, controllers, MMU (conflict monitor), UPS, and all other devices in the new controller cabinet at the proposed traffic signal at IL 102 and Career Center Rd/Briarcliff Ln, IL 102 and WM Latham Sr Dr, IL 102 and Stratford Dr, and IL 102 and Brown Blvd/Oak Run Dr.
- f) The Remote-Controlled Video System shall also include three (9) Timing Software licenses which shall be downloaded on the three (9) existing laptops, (3) tablets and (3) desktops at the Illinois Department of Transportation in Ottawa, IL.
- g) The contractor shall provide two (2) days of training by a factory representative on the software for up to ten (10) District 3 personnel and anyone else they invite. A ten (10) year software maintenance and update shall be provided for all three (9) Remote-Controlled Video System licenses and for the three (9) Timing Software licenses. All warranty documentation/procedures and contact information to whom to contact about warranty repairs shall be presented on training day.

Basis of Payment. This work shall be paid at the contract unit price per each for REMOTE CONTROLLED VIDEO SYSTEM, which price shall be payment in full for all labor and materials for all items described above for the REMOTE-CONTROLLED VIDEO SYSTEM.

TEMPORARY TRAFFIC SIGNAL INSTALLATION (SPECIAL)

Description. This work shall consist of furnishing a portable traffic signal to be used while replacing existing traffic signal mast arms and poles when proposed traffic signal mast arms and poles cannot be placed behind existing traffic signals mast arms and poles.

The portable traffic signal shall be wirelessly operated by the existing traffic signal controller and fully monitored by the existing traffic signal cabinet's Malfunction Management Unit (MMU).

The portable traffic signal shall have a mast arm displaying the same number of signal heads as the existing traffic signal mast arm and pole being replaced. All signal heads on the portable traffic signal shall have back plates.

If the existing mast arm and pole being replaced has emergency vehicle detection, the portable traffic signal shall be capable of providing emergency vehicle detection and communicating this detection to the existing traffic signal controller.

Method of Measurement: This work shall be measured for payment on a lump sum basis.

Basis of Payment. This work shall be paid for at the contract unit price L SUM for TEMPORARY TRAFFIC SIGNAL INSTALLATION (SPECIAL).

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(4) The entire flexible pipe shall be covered with grout to a min. of 6" from the wall of the drainage structure on both the inside and outside of the structure. The grout shall also seal the void around the connection to the satisfaction of the Engineer.

(c) Excavated materials shall be replaced and compacted to the satisfaction of the Engineer. Any remaining voids shall be filled with controlled low-strength material, according to section 593 of the Standard Specifications for Road and Bridge Construction.

Basis of Payment. This work will be paid for the at contract unit price per each for DRAINAGE STRUCTURE REPAIR which price shall include all labor, materials and equipment to complete the work as described herein.

VIDEO VEHICLE DETECTION SYSTEM

This specification sets forth the minimum requirements for a video detection system that shall detect an advance vehicle on a roadway by processing video images, and that provides vehicle presence, traffic flow data, event alarms, and full-motion video for real-time traffic control and management systems.

The Video Vehicle Detection System shall be used at the traffic signal at the intersection of IL 102 and Career Center Rd/Briarcliff Ln, IL 102 and WM Latham Sr Dr, IL 102 and Stratford Dr, and IL 102 and Brown Blvd/Oak Run Dr as shown on the plan details. The Video Vehicle Detection System shall be the latest version of the industry standards and shall take the place of the existing detector loops.

The Video Vehicle Detection System shall have a 10-year paid cellular service plan or any other 10-year paid reliable interconnectivity service plan which would be used for cellular or interconnectivity data. The Illinois Department of Transportation (IDOT) shall not have to pay for any cellular or any other 10-year paid reliable interconnectivity service plans or data until after the end of the 10-year plan. The plan should have unlimited data, roaming charges, and minutes for all incoming and outgoing connections. The 10-year paid cellular or any other 10-year paid reliable interconnectivity service plan shall also have unlimited and uninterrupted streaming video capabilities. This cellular or any other 10-year paid reliable interconnectivity service data plan shall also include unlimited hotspot service for the area covering the State of Illinois. This cellular or any other 10-year paid reliable interconnectivity service plan should be the same plan as the Remote-Controlled Video System cellular or any other 10-year paid reliable interconnectivity plan.

The start date of the paid cellular service plan shall not begin until the Video Vehicle Detection System is approved by the Resident Engineer.

After the new system is up and running, the Video Vehicle Detection System shall include removing all existing detector wire from handhole, conduit, poles, and controllers due to installation of new cameras. Before removal, the contractor shall inform the City Engineer and District 3 Bureau of Operations, Traffic Signal Section.

The Video Vehicle Detection system also includes removing all detector harnesses, detector amplifier racks, amplifier detector loop panels and any other detector loop items inside controller cabinet. The amplifiers shall remain the property of the State of Illinois and the remaining detector loop items and wires shall be disposed of as outlined in the specification book.

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The Video Vehicle Detection System shall include removing the existing nonfunctional handholes which are the ones that have existing detector loop cables only. The removal of existing handholes shall be according to section 895 of the Standard Specifications for Road Construction.

The contractor shall provide two (2) days of training by a factory representative on the software for up to ten (10) people.

The Video Vehicle Detection System shall provide remote access to nine (9) tablets, nine (9) laptops, and three (3) desktops at the IDOT District 3 office in Ottawa, Illinois. All devices shall have access to all video cameras to be able to watch or change detector loops placement, type, and size at all intersecting legs.

The Video Vehicle Detection System shall be capable of communicating with the Centrac's Advance Traffic Management System and the Tactic's Advance Traffic Management System. The Video Detection System shall work wirelessly to the new controller placed inside the new traffic signal cabinet.

The video camera shall provide real life pictures of the roadway and vehicles.

The manufacturer shall recommend the height and location of the video camera so the proper detection zones will detect and monitor all legs from ten (10) feet in front of the stop bar until 600 feet in advance of the stop bar. The Video Vehicle Detection System shall use as many cameras as needed to provide and monitor the proper detection for all legs. The video camera or cameras shall either be mounted on the luminaire arm, the mast arm, or a six (6) foot extension on the mast arm.

The Video Detection System shall include a monitor (minimum size of 12" by 12") with mouse and keyboard inside the cabinet so the maintainer can monitor the detector loops in each direction. Make sure the traffic signal cabinet is big enough to provide comfortable room for the monitor.

The complete system shall also include an 18 AWG 3 conductor unshielded 600V cable. The video detection system shall also include a 6-foot video detection pipe extension mounted on all mast arms to withstand 100 mph wind. See plan drawings on traffic signal plan sheets at IL 102 and Career Center Rd/Briarcliff Ln, IL 102 and WM Latham Sr Dr, IL 102 and Stratford Dr, and IL 102 and Brown Blvd/Oak Run Dr as shown on the plan details.

System Hardware. The video detection system shall be comprised of two major hardware components: a video sensor and a communications interface panel. An optional wired input/output card shall be available for certain cabinet types.

Video Sensor. The video detection system shall include a video sensor that integrates a high-definition (HD) camera with an embedded processor for analyzing the video and performing detection.

Camera and Processor.

- The camera shall be a color CMOS imaging array.
- The camera shall have HD resolution of at least 720p (1280x720 pixels).
- The camera shall include a minimum 10X optical zoom.
 - It shall be possible to zoom the lens as required to satisfy across-the-intersection detection objectives, including stop line and advance detection.
 - It shall be possible to zoom the lens remotely from the TMC for temporary traffic surveillance operations or to inspect the cleanliness of the faceplate.

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- The camera shall have direct, real-time iris and shutter speed control by the integrated processor.
- The processor shall support H.264 video compression for streaming output.

Video Sensor Enclosure Assembly.

- The camera and processor shall be housed in a sealed IP-67 enclosure.
 - The faceplate of the enclosure shall be glass and shall have hydrophilic coating on the exterior surface to reduce debris accumulation and maintenance.
 - The faceplate shall have a thermostatically controlled indium tin oxide (ITO) heater applied directly on the interior surface to keep the faceplate clear of condensation, snow, ice, and frost.
- An adjustable aluminum visor shall shield the faceplate from the sun and extraneous light sources.
- An integral aiming sight shall assist in aiming the camera for the detection objectives.
- A removable rear cap and cable strain relief shall seal the power connection.
 - The rear cap shall be tethered to the enclosure to avoid dropping the cap during installation.
 - The rear cap shall be fastened to the body of the video sensor with a single, captive bolt.
- The rear cap and enclosure shall include Gore breathers to equalize internal and external pressure while preventing moisture from entering the camera.
- The sensor shall be self-supporting on the manufacturer's mounting brackets for easier fastening during installation.
 - It shall be possible to rotate the field-of-view 360° without changing the angle of the visor.

Power and Communications.

- Power and communications for the video sensor shall be carried over a single three conductor cable.
 - Termination of the three-conductor cable shall be inside the rear cap of the enclosure on a three-position, removable Phoenix terminal block. Each conductor shall be attached to the Phoenix plug via a screw connection.
- The video sensor shall operate normally over an input voltage range of 89 to 265 VAC at 50 or 60 Hz.
- Power consumption shall be no more than 16 watts typical.
- No supplemental surge suppression shall be required outside the cabinet.
- All communications to the video sensor shall be broadband-over-power via the same three-conductor cable that powers the unit. Coaxial cable shall not be required.

Communications Interface Panel. The video detection system shall include an interface panel in the traffic cabinet that manages communications between the video sensors, the traffic management center, a maintenance technician, and the traffic cabinet itself.

Video Sensor Connection.

- The communications interface panel shall provide connection points for four video sensors.
 - Each sensor connection shall be a 3-pole terminal block, which supplies power and broadband-over-power communications to the sensor.
 - The broadband-over-power communications shall provide a throughput of 70 to 90 Mbps.
 - The broadband-over-power connection shall support at least 1,000 feet of cabling to the video sensor.

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- Each video sensor connection shall include a power switch.
- There shall be an LED for each video sensor to indicate the state of the power to the sensor and an LED for each video sensor to indicate the status of communications.
- Each video sensor connection shall contain a resettable fuse.
- Each video sensor connection shall provide high-energy transient protection.
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Traffic Management Center (TMC) Communications.

- An Ethernet port shall be provided to connect to a remote Traffic Management Center (TMC).
 - The TMC connection shall support 10/100/1000 Mbps Ethernet communication.
 - The communications interface panel shall proxy all network requests that arrive on the TMC connection to avoid unwanted network traffic from reaching the broadband-over-power network between the communications interface panel and the video sensors.
 - All communications to the video detection system through the TMC connection shall be to a single IP address.
 - The system shall be able to provide Full HD quality video through its WAN port for use in streaming video back to the TMC or any remote location.

Local User Communications.

- A wired Ethernet port shall be provided to connect the technician at the cabinet to the video detection system for setup and maintenance purposes.
 - The maintenance port shall support 10/100/1000 Mbps Ethernet communication.
 - All communications to the video detection system through the maintenance port shall be to a single IP address.
 - The maintenance port shall support DHCP to automatically assign an IP address to the user's computer.
- An 802.11g Wi-Fi access point shall allow wireless connection to the video detection system at the cabinet for setup and maintenance purposes.
 - All communications to the video detection system through the Wi-Fi access point. shall be to a single IP Address.
 - The Wi-Fi access point shall support DHCP to automatically assign an IP Address to the user's computer.
 - The Wi-Fi access point shall include a dipole, omnidirectional antenna.
 - A momentary pushbutton shall allow the user to turn the Wi-Fi access point on or off.
 - The Wi-Fi access point shall turn itself off automatically after a period of inactivity from connected devices.
 - An LED shall indicate when the Wi-Fi access point is enabled.
 - The Wi-Fi access point shall operate simultaneously with the wired maintenance port and with the TMC connection.
 - The Wi-Fi access point shall require a password for connection by a user's computer. The default password shall be changeable.

Traffic Controller Connection. The communications interface panel shall provide one (1) connection to communicate to the traffic controller through the cabinet.

- The traffic controller connection shall support a TS2 Type 1 compatible SDLC interface.
 - The traffic controller connector shall be a 15-pin female metal shell D sub-miniature type connector to support a standard NEMA TS2 or TEES SDLC cable.
 - The traffic controller connection shall support a protocol interface to SDLC-capable traffic controllers (NEMA or TEES).
 - The traffic controller connection shall support the NEMA TS2 SDLC protocol to include up to 64 detector outputs and 32 inputs.

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- The traffic controller connection shall be able to connect to a wired input/output card, which supports wired I/O in cabinets without a SDLC capable controller.
 - The wired I/O data communications link shall support at least 24 outputs and 16 inputs.
- It shall be possible to connect and use both SDLC communications and communication to the wired input/output card simultaneously.

USB Ports.

- The communications interface panel shall include two USB 2.0 ports.
 - If a communications interface panel fails to start and run due to a software or operating system failure, it shall be possible to reinstall all system and application software from a USB memory stick without necessitating removal of the communications interface panel from the cabinet.
 - Video recording of up to 2 cameras simultaneously shall commence automatically when an appropriately configured USB memory stick is installed in either USB port.

Power.

- The communications interface panel shall accept input voltage in the range of 89-265 VAC, 50/60 Hz power from the transient-protected side of the cabinet.
- The communications interface panel shall be protected by two slow blow fuses. Spares shall be attached to the panel.

Wired Input/Output Card. The video detection system shall support an optional wired input/output card that communicates with the communications interface panel for real-time detection states and other I/O to the traffic controller. The card may reside in a standard detector rack or shelf-mount enclosure with power module.

The optional wired input/output card shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack or Caltrans TEES Input File.

- The card shall occupy two slots of the detector rack.
- The card shall provide four detector outputs on its rear-edge connector.
- A front connector shall provide communication to the communications interface panel.
- A front connector shall allow 16 inputs and 24 contact-closure detector outputs for wiring into the cabinet.
 - A front panel LED for each of the 16 inputs and 24 outputs shall indicate the state of the input or output.
- The wired input/output card shall support optional expansion cards in other slots. Each expansion card shall support 4 outputs to the back edge of the card.
- The wired input/output card shall support optional harnesses for connection to Input Files or C1, C4, C11, and C12 ports to support Type 170 or Type 2070 controllers.

System Software. The video detection system shall include management software for configuration, monitoring and data collection purposes.

Management Software.

- Management software shall be a Windows-based application.
 - The software shall be compatible with latest Windows operating systems (OS).
 - The software shall communicate with the video detection system via Ethernet.
- The management software shall automatically determine all video sensors and communications interface panels available on the local network and populate a list of all devices.

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- The management software shall provide a means to add video sensors and communications interface panels on routed networks by the communications panel's WAN IP address.
- The management software shall provide the user a means to name individual video sensors and communications interface panels.
- The management software shall provide a means for the user to zoom the camera optics while viewing a live video stream.
- The management software shall provide a means for the user to easily calibrate distances in the field of view to create a 3-dimensional mapping of the complete field of view.
- The management software shall provide the user a means to create 4-sided detection zones in the field of view using either a still snapshot or live video.
 - The management software will overlay an outline of each detection zone over the background image.
 - It shall be possible for the user to place detection zones anywhere in the field of view for stop line detection and/or advance detection.
 - It shall be possible for the user to set the desired color of both the "on" and "off" states of the overlay for individual detection zones.
 - It shall be possible for the user to alter the size and shape of any previously created zone.
 - It shall be possible for the user to click and drag any of the 4 sides of a zone and the system will automatically scale the length of the side consistent with the 3-dimensional field of view.
 - It shall be possible for the user to move an entire zone without automatic rescaling.
 - It shall be possible for the user to create a new zone by selecting an existing zone and duplicating it on either the left or right side or specifying a new zone behind (for advance) with a specific length and distance back from selected zone.
 - It shall be possible for the user to easily rotate a zone by selecting any of its four corners and dragging to rotate it.
 - It shall be possible to easily flip the zone direction 180 degrees from its current orientation.
 - It shall be possible for the user to name each zone uniquely.
 - It shall be possible for the user to assign each zone to detect vehicles, to detect bicycles, or to detect both, and to specify different outputs for each type.
 - It shall be possible for the user to specify the output of a zone as a presence, pulse, or snappy type output (presence during red and pulse during green signal phase state).
 - The pulse output shall be usable for both approaching and receding traffic.
 - The pulse output shall have a user programmable duration from 100 to 400 ms.
 - It shall be possible for a zone to have multiple output types (presence, pulse, snappy) on separate output channels.
 - It shall be possible for the user to tie the presence outputs of multiple zones as well as signal phase state together with AND/OR Boolean logic.
 - It shall be possible for the user to assign the same output to multiple zones such that the output will be on if any of the zones are detecting a vehicle or bicycle.
 - It shall be possible for the user to assign a single zone to more than one output such that if a vehicle or bicycle is detected, all the assigned outputs shall be turned on.
 - The management software shall be capable of creating at least 99 detection zones per video sensor.
- It shall be possible for the management software to retrieve all configuration parameters from video sensors or communications interface panels.
 - It shall be possible for the user to save all the settings for a video sensor or a communications interface panel to a laptop file.
 - The management software shall provide a means to read or import all the settings from a previously saved configuration file for a video sensor or a communications interface panel.
- The management software shall be able to download a new version of the application software into a communications interface panel and its attached video sensors. Revised June 7, 2022

- The management software shall provide a screen to monitor operation of a video sensor.
 - The monitoring screen shall include a live video stream from the video sensor with at least HD 1280x720 pixel resolution.
 - The monitoring screen shall show indications of detection in real time by changing the color of the detection zone.
 - It shall be possible for the user to configure different indications for vehicle detections vs. bicycle detections when both are configured for the same zone.
 - The monitoring screen shall include the following optional, configurable objects. It shall be possible for the user to size and position them anywhere on the screen and to change the color and size of text.
 - An indication of when either a zone or an output is on or off, along with a user-configurable name for that indicator, applicable to any zone or output type.
 - The current time in the video sensor.
 - A user-configurable title or name.
 - The version number of the video sensor software.
 - Configurable text as defined by the user.
 - Undo/Redo functions shall be available for operations during detection zone setup and programming.
 - It shall be possible for the user to turn the overlay graphics on or off with a single setting.
- The management software shall provide a screen to monitor operation of the intersection with a quad-view video stream from the communications interface panel.
 - The quad-view video stream shall have a resolution of at least HD 1280x720 pixels, where each of the sensor videos comprising the quad-view shall be at least 640x360 pixels.
 - It shall be possible for the user to configure the order that the sensor videos appear in the quad-view.
 - The real-time quad-view video stream shall be capable of displaying the overlay graphics for all four sensors simultaneously.
- While monitoring the video of a single video sensor or of the quad-view, it shall be possible for the user to request a "snapshot" or single-frame image to save to a named file on a laptop.
- While monitoring the video of a single video sensor or of the quad-view, it shall be possible for the user to record a period of the video to save to a named file on a laptop.

System Functionality. The video detection system shall provide the following features and functionality.

Detection Performance.

- The video detection system shall detect the presence of vehicles in defined zones and turn on the assigned output when the vehicle is present in the zone.
 - Stop Line Detection
 - For detection zones placed at the stop line, the probability of not detecting the presence of a vehicle shall be 1% or less when aggregated over a 24-hour period when the video sensor is installed and configured properly.
 - For detection zones placed at the stop line, the probability of falsely detecting a vehicle that is not present shall be 3% or less when aggregated over a 24-hour period when the video sensor is installed and configured properly.
 - Advance Detection
 - It shall be possible to place advance detector zones such that the farthest point of the zone is up to 600 feet from stop bar. Advance detector zone placement shall include 2-3 car lengths of field-of-view beyond the farthest point of the zone.

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- Receding Zones
 - The video detection system shall be capable of detecting receding vehicles in day or night conditions when the video sensor is installed and configured properly.
- To ensure statistical significance for the above detection performance specifications, the data shall be collected over 24-hour time intervals (so as to avoid a single lighting condition) and will contain a minimum of one hundred (100) vehicles per lane. The calculations of detection performance will not include turning movements where vehicles do not pass through the detectors, vehicle lane-change anomalies, or where they stop short or stop beyond the combined detection zones.

Failsafe Mode.

- The video detection system shall provide three (3) failsafe options during optical contrast loss. The default shall be maximum recall. The end-user may also choose to use minimum recall or fixed recall in which a user-defined number of seconds may be implemented to hold call during green.
- The video sensor shall continuously monitor the overall contrast in the video. If the overall contrast falls below a preset level (such as caused by dirty faceplate, severe glare, extreme fog, or temporary ice/snow on the faceplate), the sensor shall enable the chosen failsafe mode. When sufficient contrast is restored in the video, the sensor will exit the failsafe mode.
- The communications interface panel shall continuously monitor the connectivity status of the attached video sensors. If any video sensor goes offline due to either electrical failure or internal software failure, the communications interface panel shall enable the failsafe mode for that video sensor. If the video sensor comes back online, failsafe mode shall end.

Data Collection.

- The video detection system shall automatically collect and store traffic flow data in non-volatile memory for later retrieval and analysis. No additional hardware or software shall be necessary. Data functionality shall include the following:
 - Data shall be collected automatically for all zones created by the user once the learn period is complete and normal detection is active. No further setup shall be required.
 - Vehicle counts per zone.
 - Vehicle turning movements independent of zone.
 - Vehicle average speeds.
 - Vehicle lengths.
 - Detection statistics with the on/off timestamps when zones were activated.
 - Detection actuation statistics for whether a zone was triggered by a vehicle or a bicycle.
- The management software shall be able to retrieve collected data over a specified period of time or for all currently stored data and save into a standard CSV file.
- The sensor hardware shall include up to 8GB of memory storage capacity for data collection.
- Data Download Types
 - Options shall be provided for downloaded data in the form of a .csv file for Raw data, Binned data, Detections and Zone Status as defined below:
 - Raw Data - Includes time stamped Zone statistics for vehicle or bike actuations and average speed as well as time stamped Exiting Vehicle Statistics which include volume, turning movement direction, speed and length for vehicles exiting each zone.
 - Binned Data - Pre-binned data with bin time set by the user down to as little as 1 minute. Data shall include volume, occupancy, turning movement counts and speed for vehicles for each zone.
 - Detections - Date/time stamped data regarding vehicles exiting zones including type of object (vehicle or bike), speed, length, and direction of movement (through, left, right).

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- Zone Status – Date/Time stamped indications of whether a vehicle or bicycle actuated a zone and the average speed of all objects in the zone.
- Remote Data Interface
 - Data including counts, turning movements, speed, and length, as well as zone names, sensor status, and video snapshots shall be available to remote systems via remote communication to the system using an Applications Programming Interface (API). This API shall consist of a set of GET commands embedded in HTTP protocol. The resulting data returned shall be in JSON format.

Operations Log.

- The communications interface panel and each video sensor shall maintain a time-stamped operations log of routine and special events in non-volatile memory for later retrieval and analysis.

Time Synchronization.

- The video detection system and management software shall provide three methods to synchronize the time of day clocks in the communication interface panel and the video sensors, as follows:
 - Manual time synchronization operation by the user, which sets the time to the current time on the laptop where the management software is running.
 - A configuration setting to allow the communications interface panel to automatically obtain time from the NEMA TS2 protocol on the SDLC channel and broadcast it to the video sensors.
 - A configuration setting to allow the communications interface panel to automatically obtain time from up to five Network Time Protocol (NTP) sources and broadcast it to the video sensors.

Video Streaming.

- In addition to the ability to view video streams in the management software, it shall be possible to view video from individual sensors or to view the quad-view from the communications interface panel using a third-party video player application on a Microsoft Surface Laptop 4 or equivalent, smartphone or laptop computer.
- Video bitrate is user-definable between 100 Kbps-5000 Kbps. The default shall be 2048 Kbps. All bitrates shall provide 30 fps.

Installation and Setup. The video detection system hardware shall be designed for flexible, fast, and easy installation and setup.

It shall be possible to mount the video sensor on an intersection pole, mast arm, or luminaire arm.

No special tools or extra equipment, other than a laptop for configuration, will be required.

Once all hardware is installed, connected and functional, it shall be possible to configure the video detection system for a typical 4-approach, 8-phase intersection in 15 minutes or less.

Warranty, Service, and Support

The video detection system shall be provided with the following warranty, service, and support options.

Warranty.

- The manufacturer shall warrant the video detection system and three (3) devices for a minimum of ten (10) years, along with ten (10) years of software maintenance and upgrades.

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Service.

- Ongoing software support by the manufacturer will include software updates of the video sensor, communications interface panel, and management software. These updates will be provided free of charge during the warranty period. The manufacturer will maintain a program for technical support and software updates following expiration of the warranty period. This program will be available to the contracting agency in the form of a separate agreement for continuing support.

Support.

- A quick-start guide, installation guide, application notes, and other materials shall be available from the manufacturer to assist in product installation and setup for various applications. In addition, training online or in person shall be available.
- Training shall be available to personnel of the contracting agency in application design, operation, setup, and maintenance of the video detection system.
- Manufacturer shall provide a tech support website, support email address and a 1-800 number for technical support.

Basis of Payment. This work will be paid for at the contract unit price EACH for VIDEO VEHICLE DETECTION SYSTEM, which price shall be payment in full for all labor and materials for all items described above for VIDEO VEHICLE DETECTION SYSTEM.

PERMANENT TRAFFIC SIGNAL TIMING

Description. This work shall consist of developing and implementing appropriate traffic signal timings for the specified intersection at the traffic signal turn-on.

All timings and adjustments necessary for this work shall be preformed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for IDOT District 3. The Contractor shall contact the Traffic Signal Engineer for a listing of approved Consultants.

The following tasks are associated with PERMANENT TRAFFIC SIGNAL TIMING:

- a) The Consultant shall conduct on-site implementation of the traffic signal timings for the permanent traffic signal turn-on.
- b) The Consultant shall be responsible for making fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
- c) The Consultant needs to calculate and implement new pedestrian, yellow and red clearances according to MUTCD and District 3 policies. The Consultant shall provide clearance calculations for the Traffic Signals Engineer to review.
- d) "Zero out" all density times.
- e) Confirm all detection is "non-locking"
- f) Upload signal timings to District 3 Traffic Signal Laptop.

Basis of Payment. The work shall be paid for at the contract unit price EACH for PERMANENT TRAFFIC SIGNAL TIMING, which shall be payment in full for performing all work described herein per intersection.

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