VEHICLE DETECTION SYSTEM – TRUCK PARKING DETECTION SYSTEM (REV 11-20-25)

SUBARTICLE 660-2.1 is deleted and the following substituted:

660-2.1 General: Meet the following requirements:

Traffic Data Detection System- Microwave* .....Section 995
Vehicle Detector- Microwave* 995-2.4
Traffic Data Detection System- Video* ....Section 995
Vehicle Detector- Video* 995-2.3
Traffic Data Detection System- LiDAR* ....Section 995
Vehicle Detector- LiDAR* ....Section 995
Vehicle Loop Detector* 995-2.2
Wireless Magnetometer Assembly* 995-2.5
Automatic Vehicle Identification* 995-2.6
Wrong Way Vehicle Detection Systems*................. 995-2.7
Truck Parking Detection Systems*.......................... 995-2.9
Loop Sealant* 995-3
Highlighted Signs*... 995-15
Hardware and Fittings... 603-2.4
Galvanizing 962-11
*Use products listed on the Department's APL.

SUBARTICLE 660-2.2.1 is expanded by the following:

660-2.2.1.5 Truck Parking Detection System (TPDS): A TPDS monitors an outdoor parking lot and produces data that indicates which spaces are occupied by vehicles and which spaces are available. Provide TPDS central software and sensors as shown in the Plans. Provide TPDS cameras that support the communication links shown in the Plans and are compatible with any camera operating software indicated in the Contract Documents.

ARTICLE 660-3 is expanded by the following new Subarticle:

660-3.9 Truck Parking Detection System (TPDS) Installation: Install in accordance with the Contract Documents, manufacturer's recommendations, and as directed by the Engineer. The system must use existing Department and maintaining agency networks for data transfer between field equipment and systems, including cloud-hosted services. Ensure field devices and systems do not allow unauthorized access to local networks from inbound Internet connections. Coordinate the integration of field equipment with existing or new TPDS central software as required. Coordinate all system configuration parameters including IP addressing, default gateway, VLAN schema, and firewall rules with the Department and maintaining agency staff.

ARTICLE 660-4 is expanded by the following new Subarticle:

660-4.5 Truck Parking Detection System: Verify detection accuracy at installed field sites using a method in accordance with 995-2.14. Compare sample data collected from the detection system with ground truth data collected by human observation. Submit a test plan for the field acceptance test (FAT) to the Engineer a minimum of 30 calendar days before commencement of testing for review and approval; tests cannot commence or be scheduled until test plans are approved by the Engineer. For each testing phase, test plans must include descriptions of test procedures; test form with areas for test result recording, test conductor, and witness signatures; pass/fail criteria; and test schedule. The test plan must include a detection accuracy test for each location in the project.

ARTICLE 660-6 is deleted and the following substituted:

660-6 Method of Measurement.

The quantity to be paid will be the plan quantity for each inductive loop detector and per assembly for loop assembly completed and accepted.

The quantity to be paid will be the plan quantity for each MVDS, VVDS, WMDS, AVI, WWVDS, LiDAR VDS, or TPDS completed and accepted.

The highlighted signs for a WWVDS will be paid for in accordance with Section 700. Only one WWVDS will be paid per location (e.g., ramp or road segment), regardless of the number of signs.

ARTICLE 660-7 is deleted and the following substituted:

660-7 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section including furnishing, placement, and testing of all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages and firmware, supplies, support, personnel training, shop drawings, warranty documentation, and incidentals necessary for a complete and accepted installation.

Payment will be made under:

Item No. 660-1	Inductive Loop Detector - each.
Item No. 660-2	Loop Assembly – per assembly.
Item No. 660-3	Vehicle Detection System - Microwave - each.
Item No. 660-4	Vehicle Detection System - Video - each.
Item No. 660-5	Vehicle Detection System - Wireless Magnetometer - each.
Item No. 660-6	Vehicle Detection System - AVI - each.
Item No. 660-7	Vehicle Detection System - WWVDS - each.
Item No. 660-8	Traffic Data Detection System - Microwave - each.
Item No. 660-9	Traffic Data Detection System - Video - each.
Item No. 660-10	Vehicle Detection System – LiDAR – each.
Item No. 660-11	Traffic Data Detection System – LiDAR – each.
Item No. 660-12	Vehicle Detection System - TPDS - each.

TRAFFIC CONTROL SIGNAL AND DEVICE MATERIALS – TRUCK PARKING DETECTION SYSTEM
(REV 11-20-25)

SUBARTICLE 995-2.9 is deleted and the following substituted:

995-2.9 Truck Parking Detection Systems (TPDS):

995-2.9.1 General: The TPDS shall provide real time detection data and detector health status information to the Department's SunGuide® software and be capable of the following:

1. Detecting vehicle presence within each parking space. The system shall classify completely occupied and partially occupied parking spaces as unavailable.
2. Detecting vehicles within Class 2 through Class 13 as defined by the FHWA.
3. Detecting vehicles in all outdoor lighting and weather conditions.
4. Sending data automatically at regular intervals and upon request using Ethernet communications. The data shall include facility attributes (e.g., facility ID, descriptive name, etc.), the status of each parking space (e.g., available or unavailable), the total number of spaces available, and the total number of spaces occupied in the parking lot.
5. The TPDS shall support the SunGuide software requirements listed in the Supplemental TPDS SunGuide Requirements document published on the Department's State Traffic Engineering and Operations Office website at the following URL: https://www.fdot.gov/traffic/Traf-Sys/Product-Specifications.shtm.

995-2.9.2 TPDS Sensors: Sensors shall be provided or recommended by the TPDS manufacturer and may include multiple technology types. The TPDS shall not use wireless magnetometer assemblies for vehicle detection. The TPDS shall be capable of using fixed TPDS cameras meeting 995-2.9.2.1 and high definition PTZ IP cameras that meet the requirements of 996-2.

995-2.9.2.1 TPDS Cameras: Fixed TPDS cameras shall be compliant with the Code of Federal Regulations Section 200.216 Prohibition on certain telecommunications and video surveillance services or equipment https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200/subpart-C/section-200.216 and meet the following requirements:

1. 1920 x 1080 minimum resolution.
2. H.264 video compression.
3. 3x motorized optical zoom or availability of multiple fixed lens models that provide field of view sufficient for TPDS.
4. Enclosure constructed of aluminum and UV stabilized polycarbonate that provides IP65 protection.
5. Weatherproof 10/100 RJ45 network interface.
6. Camera uses PoE power and power supply is included.
7. Aluminum mounting bracket is included.
8. All settings can be configured with a web browser.
9. Supports password protected user accounts.
10. Supports snapshots at configurable intervals.
11. Supports unicast and multicast RTSP video streams.
12. Operating temperature range of -20 to 50°C.
13. Operating humidity range of 0-90%, noncondensing.

TPDS cameras shall produce clear, detailed, and usable video images of the areas, objects, and other subjects visible from the camera location under all lighting and weather conditions. Video produced by the camera shall be true, accurate, and free from any image defect that negatively impacts image quality or TPDS operation.

995-2.9.3 TPDS Software: The truck parking detection system shall include a central software application that collects and presents real-time parking availability data for all parking lots monitored. Provide TPDS software unless otherwise shown in the Plans. Coordinate TPDS software with the Department. The software shall include a graphical user interface (GUI) that can be accessed using a web browser approved by the Department. The GUI shall allow system users to access information by selecting an icon on a scalable map of parking locations and drilling down to more detailed menus and information once a location is selected. The central software shall be able to securely reside and operate on an on-premises FDOT server meeting manufacturer requirements as well as a cloud-based host.

Systems using image processing shall be capable of displaying the on/off state of detection zones overlaid on images processed. The system user interface shall be capable of displaying snapshots of the last image processed from each camera along with detection status overlays for a user-defined period.

995-2.9.4 Configuration and Management: The truck parking detection system shall be provided with software that allows local and remote configuration and monitoring and shall meet the following criteria.

1. Allows a user to edit previously defined configuration parameters.

2. Retains its programming in nonvolatile memory and the detection system configuration data can be saved to a computer and restored from a saved file. All communication addresses shall be user programmable.

3. The system includes an open API and associated technical documentation available to the Department at no cost that that provides detailed descriptions of how the TPDS can be integrated with third-party software and systems.

995-2.9.5 System Security: Truck parking detection systems shall be provided with a Cyber Security Plan that describes security for all system interfaces.

995-2.10 Vehicle Presence Detection System Performance Requirements: Presence detectors shall provide a minimum detection accuracy of 98% and shall meet the requirements for modes of operation in NEMA TS2. Advance presence detectors shall meet detection accuracy requirements when located at variable distances in advance of the stop line, including 300 feet.

995-2.10.1 Vehicle Presence Detection Accuracy: To verify conformance with the accuracy requirements in this Section and as a precondition for listing on the APL, sample data collected from the vehicle detection system will be compared against ground truth data collected during the same time by human observation or by another method approved by the FDOT Traffic Engineering Research Laboratory (TERL). Ensure sample data is collected over several time periods under a variety of traffic conditions. Weight each data sample to represent the predominant conditions over the course of a 24-hour period. Samples will consist of 15- and 30-minute data sets collected at various times of the day. Representative data periods and their assigned weights are provided in Table 995-2.

Table 995-2 Data Collection Periods			
Period	Intended To Represent	Duration	Weight
Early morning (predawn) [EM]	12:30 a.m. – 6:30 a.m.	15 minutes	24
Dawn [DA]	15 minutes before sunrise to 15 minutes after sunrise	30 minutes	2
AM Peak [AMP]	7:00 a.m. – 8:00 a.m.	15 minutes	4
Late AM Off-Peak [LAOP]	8:00 a.m. – 12:00 p.m.	15 minutes	16
Noon [NO]	12:00 p.m. – 1:00 p.m.	15 minutes	4
Afternoon Off-Peak [AOP]	1:00 p.m. – 5:00 p.m.	15 minutes	16
PM Peak [PMP]	5:00 p.m. – 6:00 p.m.	15 minutes	4
Dusk [DU]	15 minutes before sunset to 15 minutes after sunset	30 minutes	2
Night [NI]	6:30 p.m. - 12:30 a.m.	15 minutes	24
Total Sum of Weights			96

For example, the sample gathered for the Late AM Off-Peak period is intended to represent typical traffic conditions between 8:00 a.m. and 12:00 p.m. Since the sample period's duration is 15 minutes and the actual period of time represented is 4 hours, the multiplication factor or weight assigned is 16, the number of 15-minute intervals in a 4 hour period. Specific times used to capture data for DA shall be adjusted as needed to capture 30 minutes of data that includes darkness, dawn, and daylight. Times for DU shall be adjusted as needed to capture 30 minutes of data that includes daylight, dusk, and darkness.

995-2.10.2 Calculation of Vehicle Presence Detection Accuracy: Determine individual lane presence detection accuracy per period by subtracting cumulative error time from the total time monitored, divided by total time, expressed as a percentage.

Within the equation in 995-2.10.2.1, "EM" represents the early morning period. The variable "i" represents a detector or detection zone and could vary from 1,…, N, where "N" is the total number of detectors observed. Substitute other detector numbers and periods as necessary to determine accuracy for all detectors during each period (i.e., dawn, AM peak, late AM off peak, etc.).

Variables used in the following equations are identified as follows:

PA = Presence detection accuracy

TT = Total time

CET = Cumulative Error Time (duration of all false and missed calls)

N=Total number of detectors observed

995-2.10.2.1 Early Morning Vehicle Presence Detection Accuracy for a Single Detector Expressed as a Percentage:

$$PA_{EM,det_i} = \frac{TT_{EM,det_i} - CET_{EM,det_i}}{TT_{EM,det_i}} \, x100$$

where:

$PA_{EM,\det_i}$ = Presence detection accuracy of detector *i* during the early morning period.

$TT_{EM,\det_i}$ = Total time that detector *i* was monitored (for instance, the 15-minute minimum duration specified in Table 995-2 for the early morning period).

$CET_{EM,\det_i}$ = Cumulative time that detector *i* was in an error state (indicating a detection with no vehicle present or not indicating a detection when vehicle present) during the monitoring period using human observation or another method approved by the Engineer.

The period accuracy will be the arithmetic mean of all individual detector accuracies.

In the equation in 995-2.10.2.2, "EM" represents the early morning period and "*N*" is the total number of detectors tested. Substitute other periods as necessary to determine the accuracy for each period (i.e., dawn, AM peak, late AM off-peak, etc.).

995-2.10.2.2 Early Morning Vehicle Presence Detection Accuracy for All Detectors Expressed as a Percentage:

$$PA_{EM} = \left(\frac{\sum_{i=1}^{N} PA_{EM,\det_i}}{N} \right)$$

Where:

PA_{EM} = Average accuracy of all detectors during the early morning.

$PA_{EM,\det_i}$ = Accuracy of detector *i* during early morning.

Calculate the roadway segment accuracy over all periods using the equation in 995-2.10.2.3.

995-2.10.2.3 Total Vehicle Presence Detection Accuracy for All Detectors Expressed as a Percentage:

$$PA_{Total} = \frac{\left[PA_{EM}x24 + PA_{DA}x2 + PA_{AMP}x4 + PA_{LAOP}x16 + PA_{NO}x4 + PA_{AOP}x16 + PA_{PMP}x4 + PA_{DU}x2 + PA_{NI}x24\right]}{96}$$

Where:

PA_{Total} =Accuracy for all detectors for all periods

PA_{EM} = Accuracy of all detectors during early morning traffic conditions

PA_{DA} = Accuracy of all detectors during dawn traffic conditions

PA_{AMP} = Accuracy of all detectors during AM peak traffic conditions

PA_{LAOP} = Accuracy of all detectors during late AM off-peak traffic conditions

PA_{NO} = Accuracy of all detectors during noon traffic conditions

PA_{AOP} = Accuracy of all detectors during afternoon off-peak traffic conditions

PA_{PMP} = Accuracy of all detectors during PM peak traffic conditions

PA_{DU} = Accuracy of all detectors during dusk traffic conditions

PA_{NI} = Accuracy of all detectors during night traffic conditions

ARTICLE 995-2.10 is deleted and the following substituted:

995-2.11 Traffic Data Detection System Acceptance Requirements:

995-2.11.1 Data Accuracy: The vehicle detection system shall be capable of meeting the minimum total roadway segment accuracy levels of 95% for volume, 90% for occupancy, and 90% for speed for all lanes, up to the maximum number of lanes that the device can monitor as specified by the manufacturer.

To verify conformance with the accuracy requirements in this Section and as a precondition for listing on the APL, sample data collected from the vehicle detection system will be compared against ground truth data collected during the same time by human observation or by another method approved by the TERL. Sample data shall be collected over several time periods under a variety of traffic conditions. Weight each data sample to represent the predominant conditions over the course of a 24-hour period. Samples shall consist of 15- and 30-minute data sets collected at various times of the day. Representative data periods and their assigned weights are provided in Table 995-2.

995-2.11.2 Calculation of Volume Accuracy: Determine individual lane volume accuracy per period by subtracting from 100 percent the absolute difference of the total volume measured by the detector and the ground truth volume measurement, divided by the ground truth volume measurement, expressed as a percentage.

In the equation in 995-2.11.2.1, "EM" represents the early morning period. The subscript "*i*" represents a lane at the detection zone on the roadway segment and could vary from 1,…, N, where "N" is the maximum number of lanes being detected. Substitute other lane numbers and periods as necessary to determine the accuracy for each lane during each period (i.e., dawn, AM peak, late AM off-peak, etc.).

Variables and subscripts used in the equations below are identified as follows:

VT = Total volume
VD = Vehicle detection data (in this case, count data)
GT = Ground truth measurement
VA = Volume accuracy

995-2.11.2.1 Early Morning Volume Accuracy for a Lane Expressed as a Percentage:

$$VA_{EM,\ln_i} = 100 - \frac{\left|VT_{EM,VD,\ln_i} - VT_{EM,GT,\ln_i}\right|}{VT_{EM,GT,\ln_i}} x100$$

Where:

VA_{EM,ln_i} = Volume accuracy for early morning traffic conditions in the i th lane.

VT_{EM,VD,ln_i} = Total volume for the 15-minute early morning period using the vehicle detector in the i th lane.

VT_{EM,GT,ln_i} = Total volume for the 15-minute early morning period in the i th lane using human observation or another method approved by the Engineer.

The period volume accuracy will be the arithmetic mean of the lane volume accuracy over all lanes.

In the equation in 995-2.11.2.2, "EM" represents the early morning period and "*N*" is the total number of lanes of detection on the roadway segment under test. Substitute other periods as necessary to determine the accuracy for each period (i.e., dawn, AM peak, late AM off-peak, etc.).

995-2.11.2.2 Early Morning Volume Accuracy Expressed as a Percentage:

$$VA_{EM} = \left(\frac{\sum_{i=1}^{N} VA_{EM,\ln_i}}{N} \right)$$

Where:

VA_{EM} = Average volume accuracy for early morning traffic conditions for all lanes.

VA_{EM,ln_i} = Volume accuracy for early morning traffic conditions in the i th lane.

Calculate the total volume accuracy over all periods using the equation in 995-2.11.2.3.

995-2.11.2.3 Total Volume Accuracy Expressed as a Percentage:

$$VA_{Total} = \frac{\left[VA_{EM}x24 + VA_{DA}x2 + VA_{AMP}x4 + VA_{LAOP}x16 + VA_{NO}x4 + VA_{AOP}x16 + VA_{PMP}x4 + VA_{DU}x2 + VA_{NI}x24\right]}{96}$$

Where:

VA_{Total} = Volume accuracy for all lanes for all periods

VA_{EM} = Volume accuracy for early morning traffic conditions

VA_{DA} = Volume accuracy for dawn traffic conditions

VA_{AMP} = Volume accuracy for AM peak traffic conditions

VA_{LAOP} = Volume accuracy for late AM off-peak traffic conditions

VA_{NO} = Volume accuracy for noon traffic conditions

VA_{AOP} = Volume accuracy for afternoon off-peak traffic conditions

VA_{PMP} = Volume accuracy for PM peak traffic conditions

VA_{DU} = Volume accuracy for dusk traffic conditions

VA_{NI} = Volume accuracy for night traffic conditions

995-2.11.3 Calculation of Speed Accuracy: For computing the accuracy of the detector speed measurement, the average speed readings obtained from the detection system are compared to ground truth values.

The equation in 995-2.11.3.1 represents the ground truth average speed computation procedure for a particular lane during a specific time period. The equation in 995-2.11.3.2 represents the average speed computation procedure for a particular lane during a specific time period using data gathered from the detection system.

In the equations in 995-2.11.3.1 and 995-2.11.3.2, the time period described is the early morning period, represented by "EM", and the subscript "k" represents a vehicle traveling on the roadway and could vary from 1,…, K, where "K" is the total number of vehicles in lane i during the time period under consideration. The subscript "i" represents a lane in a roadway and could vary from 1,…, N, where "N" is the total number of lanes of detection on the roadway segment. Substitute other lanes and periods as necessary and compute the accuracy for each lane for all time periods.

Variables and subscripts used in the equations below are identified as follows:

SA = Speed accuracy
S = Speed of an individual vehicle
K = Total number of vehicles in lane during time period
veh = Vehicle

995-2.11.3.1 Early Morning Average Ground Truth Speed:

$$S_{Avg,EM,GT,\ln_i} = \frac{1}{K}\sum_{k=1}^{K} S_{EM,GT,\ln_i,veh_k}$$

Where:

SA_{Avg,EM,GT,ln_i} represents the average ground truth vehicle speed for the i^{th} lane during the early morning period.

S_{EM,GT,ln_i,veh_k} represents the ground truth speed for the k^{th} vehicle in the i^{th} lane during the early morning period using human observation or another method approved by the Engineer.

995-2.11.3.2 Early Morning Average Vehicle Detector Speed:

$$S_{Avg,EM,VD,\ln_i} = \frac{1}{K}\sum_{k=1}^{K} S_{EM,VD,\ln_i,veh_k}$$

Where:

S_{Avg,EM,VD,ln_i} represents the average speed recorded by the vehicle detector for the i^{th} lane during the early morning period.

S_{EM,VD,ln_i,veh_k} represents the speed for the k^{th} vehicle in the i^{th} lane during the early morning period using the vehicle detector.

Determine lane speed accuracy per period by subtracting from 100 percent the absolute difference of the average lane speed measured by the detector and the average lane ground truth speed, divided by the average lane ground truth speed, expressed as a percent.

In the equation in 995-2.11.3.3, “EM” represents the early morning period. The subscript “*i*” represents a lane of detection on a roadway and could vary from 1,…,N, where “N” is the total number of lanes of detection on the roadway segment. Substitute other lanes as necessary to determine the accuracy for each period (i.e., dawn, AM peak, late AM off-peak, etc.).

995-2.11.3.3 Early Morning Lane Speed Accuracy Expressed as a Percentage:

$$SA_{Avg,EM,\ln_i} = 100 - \frac{\left|S_{Avg,EM,VD,\ln_i} - S_{Avg,EM,GT,\ln_i}\right|}{S_{Avg,EM,GT,\ln_i}} \times 100$$

Where:

SA_{Avg,EM,ln_i} represents the average speed accuracy during early morning traffic conditions for all vehicles that traveled in lane i of the roadway segment.

The period speed accuracy will be the arithmetic mean of the lane speed accuracy, computed using the equation in 995-2.11.3.3, over all lanes.

In the equation in 995-2.11.3.4, “EM” represents the early morning period. The subscript “i” represents a lane of detection on a roadway and could vary from 1,…, N, where “N” is the maximum number of lanes on the roadway segment. Substitute data as necessary to determine the accuracy for each period (i.e., dawn, AM peak, late AM off-peak, etc.).

995-2.11.3.4 Early Morning Speed Accuracy Expressed as a Percentage:

$$SA_{EM} = \left(\frac{\sum_{i=1}^{N} SA_{Avg,EM,\ln_i}}{N} \right)$$

Where:

SA_{EM} represents the average speed accuracy during early morning traffic conditions for all lanes of detection on the roadway segment.

Calculate detector speed accuracy for the roadway segment over all periods using the equation in 995-2.11.3.5.

995-2.11.3.5 Total Roadway Segment Accuracy Expressed as a Percentage:

$$SA_{Total} = \frac{[SA_{EM}x24 + SA_{DA}x2 + SA_{AMP}x4 + SA_{LAOP}x16 + SA_{NO}x4 + SA_{AOP}x16 + SA_{PMP}x4 + SA_{DU}x2 + SA_{NI}x24]}{96}$$

Where:

SA_{Total} = Speed accuracy for all lanes for all periods
SA_{EM} = Speed accuracy for early morning traffic conditions
SA_{DA} = Speed accuracy for dawn traffic conditions
SA_{AMP} = Speed accuracy for AM peak traffic conditions
SA_{LAOP} = Speed accuracy for late AM off-peak traffic conditions

SA_{NO} = Speed accuracy for noon traffic conditions
SA_{AOP} = Speed accuracy for afternoon off-peak traffic conditions
SA_{PMP} = Speed accuracy for PM peak traffic conditions
SA_{DU} = Speed accuracy for dusk traffic conditions
SA_{NI} = Speed accuracy for night traffic conditions

ARTICLE 995-2.11 is deleted and the following substituted:

995-2.12 Probe Data Detection System Performance Requirements: Probe data detectors shall establish a unique and consistent identifier for each vehicle detected and the time and location that the vehicle was detected and shall provide the following:

1. A minimum match rate of 5% for probe data detection systems that match upstream and downstream detection of the same vehicle
2. A minimum total roadway segment speed and travel time accuracy level of 90%. Verify system performance over several time periods under a variety of traffic conditions as described in 995-2.9.1.

995-2.12.1 Calculation of Match Rate: Match rate is the percentage of the total vehicle population of a road segment that is detected and matched at consecutive probe data detection sites.

995-2.12.1.1 Early Morning Match Rate Expressed as a Percentage:

$$MR_{EM} = 100 - \frac{\left|M_{EM,VD} - V_{EM,GT}\right|}{V_{EM,GT}} \times 100$$

Where:

MR_{EM} = Match Rate for early morning.

$M_{EM,VD}$ = Number of matched detections between two probe vehicle detection sites (typically a pair of sites at each end of a roadway segment) during early morning.

$V_{EM,GT}$ = Total volume of vehicles that pass the detection area for the 15-minute early morning period using human observation or another method approved by the Engineer.

ARTICLE 995-2.12 is deleted and the following substituted:

995-2.13 Wrong Way Vehicle Detection System Accuracy: To verify conformance with the accuracy requirements in this Section and as a precondition for listing on the APL, sample data collected from the WWVDS will be compared against ground truth data collected during the same time by human observation or by another method approved by the TERL.

WWVDS accuracy testing shall be performed under controlled conditions at the TERL facility. The wrong way vehicle detection system must be capable of meeting a true positive detection accuracy of 100% using a sample size of 100 wrong way vehicle runs. Sample data shall be collected over several time periods under a variety of conditions. System operation will be monitored for 72 hours. The wrong way vehicle detection system shall not exceed one false positive per 24-hours during the monitoring period.

Wrong way vehicle detection systems for monitoring traffic on interstate travel lanes must be capable of meeting a true positive detection accuracy of 90% using a sample size of 30 wrong way vehicle runs. Sample data shall be collected over several time periods under a variety of conditions. System operation will be monitored for 72 hours. Wrong way vehicle detection systems that monitor interstate travel lanes shall not exceed one false positive per 24-hours during the monitoring period.

995-2.13.1 Calculation of WWVDS System Accuracy: Determine true positive detection accuracy by dividing the number of valid wrong way vehicle detections by the number of vehicles.

995-2.13.1.1 Wrong Way Vehicle Detection System Accuracy expressed as a Percentage:

$$TPDA = \frac{WWVD}{N} \; x \; 100$$

Where:

TPDA = True Positive Detection Accuracy

WWVD = Number of Wrong Way Detections reported by system

N = Total number of wrong way vehicle runs

ARTICLE 995-2 is expanded by the following new Subarticle:

995-2.14 Truck Parking Detection System Performance Requirements: To verify conformance with the accuracy requirements in this Section and as a precondition for listing on the APL, the truck parking detection system will be evaluated by the TERL. The truck parking detection system shall meet a minimum system detection accuracy of 95% during a performance evaluation conducted over two 15-hour (6:00 p.m. to 9:00 a.m.) sessions.

995-2.14.1 Calculation of Truck Parking Detection System Accuracy:

$$PA_{det_i} = \frac{TT_{det_i} - CET_{det_i}}{TT_{det_i}} \; x100$$

Where:

PA_{det_i} = Presence detection accuracy of detector *i* during the observation period.

TT_{det_i} = Total time that detector *i* was observed.

CET_{det_i}= Cumulative time that detector *i* was in an error state (indicating a detection with no vehicle present or not indicating a detection when vehicle present) during the monitoring period using human observation or another method approved by the Engineer.

The truck parking detection system accuracy is the arithmetic mean of all individual parking space presence detector accuracies.