

Vehicle Counter – Site Test

This test will confirm that the Vehicle Counter equipment at the site is fully operational, per manufacturer’s specifications, prior to network connectivity.

Vehicle Counter: General Information

Project Number: _____	Project Name: _____
Project Stationing: _____	Date of Test: _____
Device Name: _____	Manufacturer: _____
Serial #: _____	Model #: _____
Username (If Required): _____	Password (If Required): _____
Communication Method: _____	IP Address: _____
Subnet Mask: _____	Inspector: _____

Vehicle Counter: General Requirements

Requirement	Pass	Fail	Notes
Verify location of Vehicle Counter installation is as per the plans. Latitude: _____ Longitude: _____	<input type="checkbox"/>	<input type="checkbox"/>	
Verify height of pole and mounting height of Vehicle Counter	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that NHDOT-approved Vehicle Counter hardware is installed.	<input type="checkbox"/>	<input type="checkbox"/>	

Vehicle Counter: AC Power – Device Specific

Requirement	Pass	Fail	Notes
Verify voltage in Vehicle Counter load center is within +/- 5% of 120 VAC.	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that the manufacturer’s recommended power/communication cable is being used and is of adequate length.	<input type="checkbox"/>	<input type="checkbox"/>	

Vehicle Counter: Calibration

Requirement	Pass	Fail	Notes
Follow the directions on the accompanying Test sheets			
Complete Vehicle Counter Operations Test for Volume.	<input type="checkbox"/>	<input type="checkbox"/>	
Complete Vehicle Counter Operations Test for Speed.	<input type="checkbox"/>	<input type="checkbox"/>	

Overall Vehicle Counter Site Test: Pass Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

Vehicle Counter – Communications & Systems Test

This test will confirm that the installed equipment is fully operational utilizing New Hampshire’s Traffic Data Management System (TDMS) at the NHDOT BOT.

Vehicle Counter: General Information

Project Number: _____	Project Name: _____
Project Stationing: _____	Date of Test: _____
Device Name: _____	Manufacturer: _____
Serial #: _____	Model #: _____
Username (If Required): _____	Password (If Required): _____
Communication Method: _____	IP Address: _____
Subnet Mask: _____	Inspector: _____

Vehicle Counter: Prerequisites*

Requirement	Pass	Fail	Notes
Contractor has coordinated with the BOT, and has established connectivity to the Vehicle Counter unit from the BOT.	<input type="checkbox"/>	<input type="checkbox"/>	
Contractor has verified all device components are configured with supplied IP’s, VLANs, configurations, and interface login credentials, and has properly labeled all ports in device web interfaces.	<input type="checkbox"/>	<input type="checkbox"/>	
Contractor must be ready, with all necessary parties and preparation, to start the testing at the designated start time.	<input type="checkbox"/>	<input type="checkbox"/>	

*-Failure to meet any of the prerequisite requirements shall be grounds for immediate testing termination

Vehicle Counter: Communications			
Requirement	Pass	Fail	Notes
If wireless communications is utilized, document the signal strength. _____dB	<input type="checkbox"/>	<input type="checkbox"/>	
Verify communications to the Vehicle Counter (Ping).	<input type="checkbox"/>	<input type="checkbox"/>	
Verify device status appears on New Hampshire's TDMS.	<input type="checkbox"/>	<input type="checkbox"/>	
Generate a manual communications failure at the Vehicle Counter cabinet and verify TDMS and manufacturer software display the error. Verify the Vehicle Counter responds after communications have been restored.	<input type="checkbox"/>	<input type="checkbox"/>	
Verify TDMS regains communication to the Vehicle Counter after power has been disconnected in the field for 2 minutes then restored.	<input type="checkbox"/>	<input type="checkbox"/>	

Vehicle Counter: Central Control

Requirement	Pass	Fail	Notes
Perform a full diagnostic scan TDMS and manufacturer software and confirm no errors shown.	<input type="checkbox"/>	<input type="checkbox"/>	
Disconnect power to the device and verify a power supply error is displayed in TDMS and manufacturer software. Verify the error no longer exists after power is restored.	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that correct volume data is being communicated to the BOT from the Vehicle Counter. Data must be identical to those collected in the field by the device.	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that correct speeds are being communicated to the BOT from the Vehicle Counter. Data must be identical to those collected in the field by the device.	<input type="checkbox"/>	<input type="checkbox"/>	
Verify that correct vehicle class are being communicated to the BOT from the Vehicle Counter. Data must be identical to those collected in the field by the device.	<input type="checkbox"/>	<input type="checkbox"/>	
Log into all site device component web interfaces. Verify no errors reported in the software or in web interfaces. Verify web interfaces display all information needed for remote monitoring of device status. Verify all ports are properly addressed and labeled in interfaces.	<input type="checkbox"/>	<input type="checkbox"/>	

Overall Vehicle Counter Systems Test: Pass Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

Vehicle Counter Operations Test – Volume

Site: _____

Date: _____ Time: _____

Objective

To verify and demonstrate the functionality and accuracy of volume for the detector locations.

Prerequisites

Detector and cabinet installation must be complete. Lane must be open to traffic. BOT inspector must be present during testing.

Test Equipment

A stopwatch and traffic count board.

Success Criteria

Volume obtained from each detector for each lane of traffic will be within +/- 10 percent of each sample size. Sample size will be ten minutes, or 50 vehicles, whichever comes first. Traffic will be running at typical free-flowing speed and condition.

Test Instructions

1. Record the observed actual hand count volume and detector counts for ten minutes, or 50 vehicles, whichever comes first.
2. Record the lane number according to the proximity of the device. Closest lane to the device is lane #1.
3. Record the volume of vehicles detected by the sensor over the test period.
4. Subtract hand count volume from detector count volume and then divide by the hand count volume. Multiply by 100 to get the percent accuracy.
5. Indicate pass if result is +/- 10 percent.
6. Adjust sensitivity and repeat if percent accuracy is out of range.

Vehicle Counter: Volume Test Results								
Lane #	1	2	3	4	5	6	7	8
Test Duration (min:sec)								
Observed Hand Count Volume								
Detector Count Volume (from Laptop)								
% Accuracy = $(100 \times (\text{detector count} - \text{hand count}) / (\text{hand count}))$								
Pass or Fail (Pass if accuracy is < +/- 10%*)								
Sensitivity Setting								

*-Or per the manufacturers specifications.

Overall Vehicle Counter Volume Test: Pass Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

Vehicle Counter Operations Test – Speed

Site: _____

Date: _____ Time: _____

Objective

To verify and demonstrate the functionality and accuracy of speed for detector locations.

Prerequisites

Detector and cabinet installation must be complete. Lane must be open to traffic. BOT Inspector must be present during testing.

Test Equipment

A calibrated radar gun, a stopwatch, 2-way radios, and a laptop.

Procedure

1. Ensure that Detector unit is functioning, and that rolling average speed is being recorded.
2. Set the interval on the detector unit to 3 minutes.
3. Record the individual speeds of 16 consecutive vehicles using radar gun. If measuring consecutive vehicles is not possible, measure speeds for as many vehicles in the lane as possible, for 16 vehicles or 3 minute time period, whichever comes first.
4. Simultaneously to recording the 16th vehicle, or completing the 3 minute time period, immediately record the current Detector Mean Speed as indicated at that moment by the Detector unit.
5. Compute the mean (Average) speed of the 16 vehicles, based on radar gun readings.
6. Compute the Modified Radar Gun Mean Speed (= radar gun mean speed / cosine theta), if needed, if radar gun is not shooting head-on at vehicles.
7. Compare the Modified Radar Gun Mean Speed to the Detector Mean Speed. Pass if difference < 5 mph. If test does not pass, adjust the sensitivity of the sensor and retest.
8. Repeat for each lane.

Overall Vehicle Counter Speed Test: Pass Fail

Inspector Name: _____ Organization: _____ Signature: _____

Witness Name: _____ Organization: _____ Signature: _____

Date: _____

Vehicle Counter: Speed Test Results								
Lane #	1	2	3	4	5	6	7	8
Vehicle 1 Radar Speed (mph)								
Vehicle 2 Radar Speed (mph)								
Vehicle 3 Radar Speed (mph)								
Vehicle 4 Radar Speed (mph)								
Vehicle 5 Radar Speed (mph)								
Vehicle 6 Radar Speed (mph)								
Vehicle 7 Radar Speed (mph)								
Vehicle 8 Radar Speed (mph)								
Vehicle 9 Radar Speed (mph)								
Vehicle 10 Radar Speed (mph)								
Vehicle 11 Radar Speed (mph)								
Vehicle 12 Radar Speed (mph)								
Vehicle 13 Radar Speed (mph)								
Vehicle 14 Radar Speed (mph)								
Vehicle 15 Radar Speed (mph)								
Vehicle 16 Radar Speed (mph)								
Radar Gun Mean Speed (mph)								
Cosine Theta								
Modified Radar Gun Mean Speed (mph)								
Detector Mean Speed (mph)								
% Accuracy = $(100 * \text{Radar Mean Speed} - \text{Detector Mean Speed}) / \text{Radar Mean Speed}$								
Pass or Fail (Pass if % Accuracy < +/- 10%)								
Sensitivity Setting								
Does Controller Properly Record Occupancy?								