INTRODUCTION

With the advent of automation, the acquisition, transmission, storage, analysis, and presentation of traffic data has changed over the years. The Traffic Monitoring System (TMS) in DelDOT is substantially different from what it was just a short time ago. Division of Planning uses High Desert's Jackalope and International Road Dynamic's software to retrieve and analyze traffic data collected in the field. The use of these two programs ensures that the Traffic Count Program is in compliance with the principles of 'Truth-in-Data' reporting required by the Federal Highway Administration and conforms to all federal reporting standards. This report contains traffic data for all roadway segments under DelDOT's jurisdiction, which represents approximately 90% of all roadways in the State of Delaware. The details of the collection process, analysis, and reporting of traffic data, along with other features relevant to traffic monitoring, are outlined in this document.

HIGHWAY NETWORK

Highways and Streets have been grouped into functional classes or systems as required by the Federal Highway Administration. The Functional Classification Systems are based on traffic characteristics and the function that each roadway serves as part of the entire network. The Functional Classification Map can be found in the home page of the Vehicle Volume Summary under the Diurnal Distribution Tables link. The Highway Network for each of the three counties are continually updated as required by the Federal Highway Administration.

TRAFFIC DATA COLLECTION AND DEVICES

Automatic Traffic Recorder or ATR Stations

The Automatic Traffic Recorders or ATR stations are devices that collect either traffic volume data, class data or in some instances both. They are permanently installed throughout the Road Inventory network covering all traffic pattern groups and functional classifications except on municipal streets. These ATR stations, along with their identification numbers and the functional classifications have been listed on the following pages.

Equipped with loop detectors, these ATR stations count the number of all vehicles passing through each location, continuously throughout the year, and transmit the recorded data to traffic monitoring computers which is then processed and reviewed for accuracy.

Weight In Motion station or WIM's

Weight In Motion stations or WIM's are specializes Automatic Traffic Recorders devices that collect traffic volume, class and vehicle weight data. These devices are also permanently installed throughout the Road Inventory network covering all traffic pattern groups as required by federal law. These WIM stations, along with their identification numbers and the functional classifications have also been listed on the following pages.

Wavetronix Device

Wavetronix Traffic Detection Devices are sensors used for collecting vehicle volumes and class with the reliability of radars and the advantages of being a non-intrusive detection system. Wavetronix are used to collect data along segments of roads where high traffic volumes make it impossible to use pneumatic tubes or prevents the installation of Automatic Traffic Recorders (ATR).

System Detectors

System Detectors are devices located at traffic intersections throughout the state used for collecting volume only data using in-pavement loop sensors. These devices are highly reliable and were added to Delaware's Traffic Counts program in 2022.

Traffic Pattern Group (TPG)

Six groups have been established to represent the traffic characteristics of all roads on Delaware's Road Inventory network. These Traffic Pattern Groups, ranging from TPG 1 through TPG 8 along with the permanent counting stations covered by each TPG are reflected in the Traffic Pattern Group table shown

below. The Functional Classification for state-maintained roads can be found in Delaware's Gateway Interactive Map and under the Diurnal Tables page located in the Vehicle Volume Summary page.

ATR DISTRIBUTION ACROSS TRAFFIC PATTERN GROUPS (TPG)

TPG	TYPE ROUTE	STATION WIM CLASS VOLUME TOLL SYSTEM DETECTORS WAVETRONIX
1	Interstate, Freeways & Expressways	T8000 T8001 T8002 8004 81042 KD0035 ND0024 ND0027 ND0028 ND0029 ND0030 ND0032 ND0034 ND0075 ND0077 ND0078 ND0090 ND0091 ND0097 ND0104 ND0106 ND0120 ND0124 ND0128 ND0147 ND0148 ND0194 ND0224 ND0228 ND0232
2	Urban Non-Local	8015 T8052 T8055 8061 8096 K109 K110 K001P K169 K242 N483 N531 ND0004
4	Urban Local	N374 N358 N382 N359
5	Rural Arterials	8053 8068 8074 8085 8088 8095 S133 S113 N033P N293 K220 K295 KD0011
7	Rural Minor Collectors	8065 8066 8098 S248 S247
8	Recreational	8075 8084 8076 S338 S115 S124 S232 S275 S137 SD0007

AUTOMATIC TRAFFIC RECORDERS (ATR) AND WEIGHT IN MOTION (WIM)

Types of data collected:
Volume: Volume only
Class: Volume and Vehicle Class
WIM: Weight, Volume and Vehicle Class

ID	LOCATION	GROUP_	FUNC_CLASS	TYPE
8000	I-95 Toll Plaza	Urban	Interstate	**Tolls**
8001	I-295 Delaware Memorial Bridge	Urban	Interstate	**Tolls**
8002	Biddle's Corner Toll Plaza	Urban	Interstate	**Tolls**
8004	I-495 Boulevard Body Shop	Urban	Interstate	**WIM**
8005	DE 9 Near I-295	Urban	Minor Arterial	**RETIRED**
8011	US 202 @ Widener Coll Rocky Run Pkwy	Urban	Other Princ Art	**RETIRED**
8012	Foulk & Simon Road	Urban	Minor Arterial	**RETIRED**
8013	Limestone Road & Arundel Dr.	Urban	Other Princ Art	**RETIRED**
8014	DE 2 East of Newark (Windy Hills)	Urban	Other Princ Art	**RETIRED**
8015	US 40 Pleasant Valley	Urban	Other Princ Art	**WIM**
8016	US 301 N of Hoober Equipment	Rural	Princ Arterial	**RETIRED**
8017	DE 896 & DE 71	Rural	Princ Arterial	**RETIRED**
8018	DE 1 N Wm. Roth Bridge	Rural	Princ Arterial	**RETIRED**
8019	DE 9 & Reedy Point Bridge	REC	Major Collector	**RETIRED**
8020	DE 4 Christiana Pkwy.	Urban	Other Princ Art	**RETIRED**
8021	DE 273 (Nottingham RD) MD Line	Urban	Minor Arterial	**RETIRED**
8022	DE 7 (Limestone Rd.) PA Line	Urban	Other Princ Art	**RETIRED**
8023	DE 52 (Kennett Pike) PA Line	Rural	Volume	**RETIRED**
8024	NC 427 N of NC 429	Rural	Local Road	**RETIRED**
8026	DE 7 S. OF Little Baltimore	Urban	Other Princ Art	**RETIRED**
8028	US 13 S of Old St. Georges Bridge	Rural	Minor Arterial	**RETIRED**
8030	US 202 & P.A. Line	Urban	Other Princ Art	**RETIRED**
8031	DE 92 Naamans Rd @ 202	Urban	Other Princ Art	**RETIRED**
8033	Boyd's Corner Rd. @ US 301	U R	Other Princ Art	**RETIRED**

8034	US 13 @ NC 14	U R	Princ Arterial	**RETIRED**
8035	NC 14 @ US13	U R	Princ Arterial	**RETIRED**
8036	US 13 & Smyrna Rest Area	Pred Rec	Minor Arterial	**RETIRED**
8037	DE 1 & Paddock Road	Rural	Princ Arterial	**RETIRED**
8038	I-95 near DE 92	Urban	Interstate	**RETIRED**
8039	I-495 near DE 92	Urban	Interstate	**RETIRED**
8040	US 13 & Dover Downs	Urban	Other Princ Art	**RETIRED**
8041	K 88 N of K 337	Rural	Major Collector	**RETIRED**
8042	K 195	Urban	Major Collector	**RETIRED**
8043	DE 8 West of Dover	Urban	Other Princ Art	**RETIRED**
8044	DE 9 & K 12	REC	Major Collector	**RETIRED**
8045	K 11 & DE 9	REC	Major Collector	**RETIRED**
8046	DE 1 & DE 6	Rural	Other Princ Art	**RETIRED**
8047	DE 1 & DE 42	Rural	Other Princ Art	**RETIRED**
8048	Scarborough Road	Urban	Minor Arterial	**RETIRED**
8049	Puncheon Run Connector	Urban	Other Princ Art	**RETIRED**
8050	DE 10 E of State Rd.	Rural	Major Collector	**WIM**
8051	Dover Toll Plaza	Urban	Other Princ Art	**Tolls**
8052	Denney's Road Toll Plaza	Urban	Minor Arterial	**Tolls**
8053	Tower Hill Rd, State Fair	Rural	Princ Arterial	**VOLUME/CLA**
8054	US 13 N. of Cheswold	Rural	Minor Arterial	**RETIRED**
8056	MIA/POW	Urban	Minor Arterial	**RETIRED**
8060-61	US 13 @ Bay Rd Split	Urban	Princ Arterial	**RETIRED**
8062	US 113 & DE 1	Urban	Other Princ Art	**RETIRED**
8064	RT6 at the De/Md line	Rural	Other Princ Art	**RETIRED**
8065	RT330 at the De/Md line	Rural	Princ Arterial	**VOLUME**
8066	DE 10 Near Drapers Mill Rd.	Rural	Princ Arterial	**VOLUME**
8067	DE 12 Bernite Mill Rd. near Maryland Line	Rural	Princ Arterial	**RETIRED**
8068	DE 14 Burrswille near Knife Box Rd.	Rural	Princ Arterial	**VOLUME**
8069	DE 404 Wooden Hawk	Pred Rec	Other Princ Art	**RETIRED**
8070	DE 36 Between S 207 & S 620	Urban	Major Collector	**RETIRED**

8071	DE 404 West of Bridgeville	Pred Rec	Other Princ Art	**RETIRED**
8072	US 13 S of DE 16	Rural	Princ Arterial	**RETIRED**
8073	DE 18 W of Georgetown	REC	Other Princ Art	**RETIRED**
8074	US 113 S of Georgetown	Rural	Princ Arterial	**WIM**
8075	DE 1 S of DE 16	Pred Rec	Other Princ Art	**WIM**
8076	DE 1 N of Ocean Outlets	REC	Other Princ Art	**WIM**
8077	DE 1 Fenwick	Pred Rec	Other Princ Art	**RETIRED**
8078	DE 54 W of Fenwick	REC	Major Collector	**RETIRED**
8079	US 13 & SC 534	Rural	Princ Arterial	**RETIRED**
8080	DE 16 W of Greenwood	REC	Major Collector	**RETIRED**
8081	DE36 W of DE 16	REC	Major Collector	**RETIRED**
8082	US 113 Georgetown	Rural	Princ Arterial	**RETIRED**
8083	DE 16 E of S 44	Pred Rec	Major Collector	**RETIRED**
8084	DE 9 E of Harbeson	Pred Rec	Minor Arterial	**VOLUME**
8085	DE 20 E of MD Line	REC	Minor Arterial	**VOLUME**
8086	DE 9 Hardscrabble	REC	Major Collector	**RETIRED**
8087	US 13 N of DE 54 Delmar	REC	Other Princ Art	**RETIRED**
8088	US 113 N of Selbyville	REC	Other Princ Art	**VOLUME**
8089	DE 24 Love Creek Bridge	Pred Rec	Major Collector	**RETIRED**
8090	DE 26 Assawoman Bridge	Pred Rec	Minor Arterial	**RETIRED**
8091	DE 1 Barratts Chapel	Rural	Other Princ Art	**RETIRED**
8092	DE 1 & 10 St.	Pred Rec	Other Princ Art	**RETIRED**
8093	DE 18 E. OF MD LINE	Pred Rec	Other Princ Art	**RETIRED**
8094	US 113 S of 625 Lincoln	REC	Minor Arterial	**RETIRED**
8095	US 113 Ellendale	REC	Minor Arterial	**WIM**
8096	US 13 Bridgeville Police	Rural	Other Princ Art	**WIM**
8097	DE 1 N of Indian River	Pred Rec	Other Princ Art	**RETIRED**
8098	DE 54 near De/Md line	Rural	Other Princ Art	**VOLUME**
8099	DE 1 N Fenwick New	Pred Rec	Other Princ Art	**RETIRED**
8140	Sussex 26 near Maryland Line	Rural	Other Princ Art	**RETIRED**
81042	NC I-95	Rural	Other Princ Art	**WIM**

Wavetronix devices

Data collected: Volume and Limited Class

ND016	I-95
ND024	I-95
ND027/028	I-95
ND029	I-95
ND0104	I-95
ND0106	I-95
ND0151	I-95
ND030	I-95
ND031/067	I-95
ND032	I-95
ND075	I-95
ND077	I-95
ND087	I-95
ND090	I-95
ND091	I-95
ND097	I-95
ND0120	I-495
ND0124	I-495
ND0128	I-495
ND0147/0148	I-495
ND034	I-495
ND078	I-495
ND0194	US301
ND0224	US301
ND0228	US301
ND0232	US301

System Detectors

Data Collected: Volume

System Detectors	Direction	Station Number	Location
K109	South	3617	S Dupont Highway
K110	North	3617	US13 S Dupont Highway
K001P	South	8040	US13 S Dupont Highway
K169	North	8040	US13 S Dupont Highway
K242	Bi-Directional	0991	N/S, US13 Dupont Highway
N483	South	0699	Summit Bridge Road
N531	North	0699	Summit Bridge Road
N374	West	0070	Kirkwood Highway
N358	East	0070	Kirkwood Highway
S133	South	2109	US113 Dupont Blvd
S113	North	2109	US113 Dupont Blvd
N033P	North	0041	Kennett Pike SR52
N293	South	0041	Kennett Pike SR52
K220	North	0909	US13 S Dupont Highway
K295	South	0909	US13 S Dupont Highway
S248	North	6201	US13 S Dupont Highway
S247	South	6201	US13 S Dupont Highway
S338	West	8084	US9 Lewes Georgetown Highway
S115	East	8084	US9 Lewes Georgetown Highway
S124	West	6239	Lighthouse Road
S232	East	6239	Lighthouse Road
S275	South	1985	SR1 Coastal Highway
S137	North	1985	SR1 Coastal Highway

Growth Factors

The Annual Average Daily Traffic or AADT of each station not counted during the calendar year of 2023 was created by applying the growth factors relating to each Traffic Pattern Group or TPG. These growth factors are created by using permanent traffic counting stations that collect a minimum of eight months of data during the year being reported in each traffic pattern group. The 2023 growth factors are shown below.

TPG:	**1**	**2**	**4**	**5**	**7**	**8**
Growth Factor:	**0.998**	**1.002**	**0.976**	**1.038**	**1.010**	**0.832**

Short Term Count Program

There were 3,562 roadway segments on the Road Inventory network of DelDOT in 2023. Of these, there are 76 segments where permanent stations were operational, accurate hour-by- hour traffic volume data were continuously recorded throughout the year, processed, and analyzed. For the remaining 3,484 links, the annual traffic data was calculated using short-term traffic count or estimated by applying growth factors.

The Short-Term Counts Program has recently been revised, allowing for complete coverage of the road inventory network on a three to six years cycle. The advent of this schedule of traffic data collection requirements insures accurate data on all roadway segments in the Road inventory network. On average, there are approximately 900 short- duration counts performed annually. Short term counts are performed for a one-week period. Pneumatic rubber hoses, which count axles and not vehicles are used in the short-term count portion of the traffic counts program. This allows for both volume and class to be collected. Since the number of axles in motor vehicles are variable, appropriate Axle Correction Factors (ACF) are applied to convert the counted axles into the number of vehicles.

Furthermore, the Average Daily Traffic or ADT is calculated after the period of one week is counted. To estimate the AADT, Seasonal Adjustment Factors are applied to count for traffic variations over the course of the year.

K and D Factors

K is the proportion of AADT on a roadway segment or link during the Design Hour, which is the hour in which the 30th highest hourly traffic flow of the year takes place. The Design Hourly Volume of a roadway segment or link is its 30th highest hourly traffic volume of the year in vehicles per hour and is denoted by DHV.

Thus the **K** factor is given by,

DHV = **K** * AADT

D is the proportion of DHV occurring in the heavier direction and is called the Directional Split.

Thus **D** $\geq$ 0.5

The Directional Design Hourly Volume, denoted by DDHV, is given by, DDHV = **D** * DHV

To determine the K and D values of a roadway segment or link, the first course of action is to obtain its TPG. Having known the TPG of the roadway segment or link, its K and D values can be determined for 2023.

NOTE: Both short term counts and ATR data was used to produce the K and D factors.

Traffic Pattern Group	K-Factor	D-Factor	Truck % Average	
			SINGLE UNIT	COMBO UNIT
1	9.1	56.6	7.4	6.3
2	10.8	56.2	5.0	2.6
4	13	57.6	N/A	N/A
5	11.4	57.6	N/A	N/A
7	14.0	57.4	N/A	N/A
8	9.7	55.8	4.2	0.7

AADT

TRAFFIC VOLUME DATA

As explained in the foregoing, the AADT has been determined for each of the 3,562 segments of the Road Inventory network. As of 2022 the traffic counts data was made available through an interactive map created by DelDOT called **Gateway**. Each segment will include 10 years of historical data, inventory road numbers, mile points and road names among other information concerning each specific segment of road. A link to DelDOT's Gateway interactive map and instructions on how to use the map are available on the Vehicle Volume Summary home page.

CLASS DATA

Vehicle classification data is collected only from specific permanent counters throughout the state and is available upon request. The class data is classified in accordance with the current FHWA Vehicle Classification scheme, which includes 13 vehicle classes. It is important to note that not all permanent counters collect class data and the Wavetronix devices bundle those 13 vehicle classes into three class bins based on vehicle length and not axle spacing.