# Short Count Factoring Guide

June 2019



Washington State Department of Transportation

#### **Appendix Three**

Axle correction factors can be derived from classification counts that provide both the number of vehicles (units) and the number of axles passing the count site. The factor is calculated by dividing the total number of vehicles by the total number of two-axle equivalents (i.e., the number of axles divided by two). If the local agency has access to vehicle classification counts within its jurisdiction, these should be used to calculate axle correction factors. Two-axle equivalent volume data should be adjusted to estimated vehicle volume data through the application of an axle correction factor derived from one or more counts conducted nearby or at a location with similar characteristics. If an appropriate factor is unavailable, one may be used from the table below, which provides statewide average daily axle correction factors by functional class of highway.

#### Average Axle Correction Factors by Functional Class of Highway (Source Data From 2016 Through 2018)

<u>Code</u>	Description	Factor
R1	Interstate, Rural	0.85
R2	Principal Arterial Freeway, Rural	0.89
R3	Other Principal Arterial, Rural	0.91
R4	Minor Arterial, Rural	0.90
R5	Major Collector, Rural	0.94
R6	Minor Collector, Rural	N/A
R7	Local Access, Rural	N/A
U1	Interstate, Urban	0.91
U2	Principal Arterial Freeway, Urban	0.95
U3	Other Principal Arterial, Urban	<mark>0.95</mark>
<mark>U4</mark>	Minor Arterial, Urban	0.95
U5	Major Collector, Urban	0.96
U6	Minor Collector, Urban	N/A
U7	Local Access, Urban	N/A

If a count location can be matched to a functional class for which the table provides a factor, that value should be used. Counts conducted on a rural functional class 6 or 7 highway should be factored using the value closest to 1.00 provided for a rural functional class. Counts conducted

on an urban functional class 6 or 7 highway should be factored using the value closest to 1.00 provided for an urban functional class. The exceptions to these guidelines are that: 1) if a count location, whether urban or rural, exists within an urbanized area as defined by the U.S. Census Bureau then an urban factor should be employed; and 2) if a count location is within a city with a population of less than 10,000, but not within an urbanized area, then a rural factor should usually be used.

Note that because the factors provided in the table above are based on both weekday and weekend source data, discretion is recommended regarding their use when a count to be factored is not representative of all days of the week. The importance of this is illustrated by the table beginning on the next page, which provides axle correction factors from WSDOT permanent traffic recorders. As can be seen, weekday and weekend factors are often significantly different. It is suggested that local agencies utilize the factor information below to supplement their counting programs whenever applicable.

### Appendix Four Seasonal Factors for Midweek Counts

WSDOT uses data from permanent traffic recorders to generate monthly average weekday traffic to annual average daily traffic conversion factors. These factors are then used to estimate AADTs based on AWDTs from short duration counts. Although the weekday data used to generate the factors comes only from Tuesdays, Wednesdays and Thursdays, the factors are generally applicable to 48-hour or longer counts conducted between noon on Monday and noon on Friday.

Whenever possible, short duration count data should be adjusted using factors from a nearby permanent traffic recorder installed at a location with similar traffic patterns. However, due to the high cost of PTR installation and maintenance, WSDOT does not have an applicable PTR for every short duration count location on the state highway system. To address this issue, average factors are produced from groups of PTRs with similar seasonal traffic volume trends and definable commonalities in relation to functional classification of roadway, geographic area and/or traffic features (such as a relatively high proportion of recreational travel). The factors from a given group can then be considered applicable to short count locations that have characteristics consistent with those that define the group.

The seasonal factor groups currently used by WSDOT are:

GR-01: Urban Interstate
GR-02: Urban Non-Interstate
GR-03: Rural, Non-Recreational Interstate
GR-04: Rural Central Mountain (Moderate Recreational Influence)
GR-05: Rural, Non-Interstate, Non-Recreational West
GR-06: Rural, Non-Interstate East (Agricultural Influence)
GR-07: Rural, Non-Interstate, Non-Recreational Northeast
GR-08: Rural, Non-Interstate, Non-Recreational Southeast
GR-09: Rural Central Mountain (Strong Recreational Influence)
GR-10: Recreational West

GR-01 and GR-02 represent urban interstate and urban non-interstate highway locations respectively. GR-03 represents rural interstate highway locations, with the exception of the section of Interstate 90 passing through the central mountain region of the state. GR-04 and GR-09 represent this central mountain region, with the latter reflective of highways with an extremely high summertime traffic volume peak due to recreational travel. GR-05 represents typical rural locations in the western part of the state, while GR-10 reflects western locations that are much

more influenced by summertime recreational traffic. GR-06 represents rural locations in the east of the state strongly influenced by seasonal agriculture-related traffic. GR-08 represents rural southeastern locations with much less seasonal variation (such long-haul truck routes). Finally, GR-07 represents typical rural locations in the northeast of the state.

The table below provides monthly seasonal factors for each of these groups. To use them, multiply the AWDT from a short duration count by the pertinent group's factor for the month in which the count was conducted.

	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GR-01	1.03	1.02	0.97	0.97	0.94	0.93	0.94	0.92	0.95	0.98	0.99	1.02
GR-02	1.00	0.99	0.95	0.94	0.91	0.91	0.92	0.91	0.93	0.94	0.97	1.01
GR-03	1.22	1.17	1.06	1.03	1.01	0.95	0.93	0.91	0.99	1.04	1.06	1.12
GR-04	1.79	1.66	1.45	1.33	1.13	0.95	0.86	0.88	1.02	1.14	1.27	1.48
GR-05	1.17	1.17	1.07	1.02	0.97	0.92	0.87	0.87	0.95	1.02	1.07	1.12
GR-06	1.39	1.30	1.13	1.08	1.02	0.92	0.89	0.87	0.96	1.03	1.10	1.25
GR-07	1.19	1.14	1.06	0.99	0.90	0.87	0.82	0.84	0.89	0.92	1.05	1.15
GR-08	1.13	1.08	1.01	0.97	0.92	0.91	0.92	0.90	0.91	0.94	1.02	1.10
GR-09	2.04	1.98	2.01	1.86	1.36	1.08	0.83	0.91	1.08	1.42	1.86	1.54
GR-10	1.49	1.44	1.25	1.15	1.06	0.92	0.76	0.75	0.93	1.16	1.26	1.38

#### 2018 AWDT to AADT Conversion Factors by Group

Under ideal circumstances, seasonal factors that are specific to the locality a short duration count was conducted in should be employed. However, for most local agencies these will not be available. If so, seasonal factors calculated for the general area in which the agency is located should be used<sup>3</sup>. If no localized factors are available, those provided in the table above can be utilized, although the following guidelines for their use are suggested. Group GR-02 should be used for all count locations within the boundaries of an urbanized area as defined by the U.S.

<sup>&</sup>lt;sup>3</sup> Monthly traffic volume statistics from individual continuous traffic count locations monitored by the WSDOT Transportation Data, GIS, and Modeling Office are available through the Traffic Data Geoportal (<u>https://www.wsdot.wa.gov/mapsdata/tools/trafficplanningtrends.htm</u>) and may be useful in generating these area-specific factors.

Census Bureau, as well as within cities that are outside of an urbanized area but that have populations greater than 10,000. For cities of 5,000 to 10,000 people that are not in an urbanized area, the appropriate factor group will be determined by an examination of the character of local development; if the area is fairly compact and densely populated, GR-02 is likely appropriate; if not, one of the rural groups GR-05 through GR-08 is probably applicable. For all other counts (i.e., those conducted in unincorporated, non-urbanized areas or in cities with populations below 5,000 that are outside of urbanized areas), one of the groups GR-05 through GR-10 should be chosen based on geographic area and the proportion of annual traffic volume represented by traffic in the summer months.

#### **Appendix Five**

If an estimate of the AADT for a section of highway that has not been counted in the current year is needed, and an estimate of the previous year's AADT for the section is available, a growth factor should be applied in order to estimate the current AADT. As noted in Section Three, if a data source is available that is representative of the specific locality, such as a historical set of local traffic counts, growth rates should be calculated from this data source and used. Otherwise, the growth rates given in the table below should be employed. The table provides growth rates by the same groups used for seasonal factors. The instructions given in Appendix Four regarding how to determine which seasonal factor group is most appropriate for a given count location should also be followed when deciding upon an appropriate factor group in relation to growth rates.

## **Growth Rate by Factor Group**

(2017 to 2018)						
Factor <u>Group</u>		Growth <u>Rate</u>				
GR-01		1.0093				
GR-02		<mark>1.0141</mark>				
GR-03		1.0267				
GR-04		1.0306				
GR-05		1.0313				
GR-06		1.0355				
GR-07		1.0266				
GR-08		1.0324				
GR-09		1.0240				
GR-10		1.0397				

The following is the Federal Highway Administration's vehicle classification scheme.

- Motorcycles (Optional) All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handlebars rather than steering wheels. This category includes motorcycles, motor scooters, mopeds, motor-powered bicycles, and three-wheel motorcycles. This vehicle type may be reported at the option of the State.
- Passenger Cars All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.
- 3. Other Two-Axle, Four-Tire Single Unit Vehicles All two-axle, four-tire vehicles, other than passenger cars. Included in this classification are pickups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, carryalls, and minibuses. Other two-axle, four-tire single-unit vehicles pulling recreational or other light trailers are included in this classification. Because automatic vehicle classifiers have difficulty distinguishing class 3 from class 2, these two classes may be combined into class 2.
- 4. Buses All vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. Modified buses should be considered to be a truck and should be appropriately classified.
- 5. **Two-Axle, Six-Tire, Single-Unit Trucks** All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, et cetera, with two axles and dual rear wheels.
- 6. **Three-Axle Single-Unit Trucks** All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, et cetera, with three axles.
- 7. Four or More Axle Single-Unit Trucks All trucks on a single frame with four or more axles.
- 8. Four or Fewer Axle Single-Trailer Trucks All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit.
- 9. **Five-Axle Single-Trailer Trucks** All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.

- 10. **Six or More Axle Single-Trailer Trucks** All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.
- 11. Five or fewer Axle Multi-Trailer Trucks All vehicles with five or fewer axles consisting of three or more units, one of which is a tractor or straight truck power unit.
- 12. **Six-Axle Multi-Trailer Trucks** All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.
- 13. Seven or More Axle Multi-Trailer Trucks All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.

**NOTE:** In reporting information on trucks the following criteria should be used:

- a. Truck tractor units traveling without a trailer will be considered single-unit trucks.
- b. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit.
- c. Vehicles are defined by the number of axles in contact with the road. Therefore, "floating" axles are counted only when in the down position.
- d. The term "trailer" includes both semi- and full trailers.