

## Traffic Count Guidelines

The purpose of these guidelines is to help planning staff expedite the traffic count request process in scopes of work for planning projects. While the major elements of this paper are in the Analysis Procedure Manual (APM) Sections 3.3 and 4.4, additional guidance is necessary for staff to limit recent quality, scope, and budget issues with count requests in plans and projects. This paper is intended to be a standalone document, but the contents will also be used to refine the APM.

- *These guidelines cover the count types, counting time windows, count location selection, and count requests. These guidelines do not cover every possibility or combination of elements, but are intended to help generate a reasonable count list for the draft scope.*
- *These guidelines are intended to be a starting point for conversation between the grant/project manager and Transportation Planning Analysis Unit (TPAU)/Region staff.*
- *How many counts of what type is dependent on the plan goals and objectives which are based on the local jurisdiction's needs. A draft scope with a completed objective section is critical for efficient use of time, money and data for all involved parties.*
- *The level of count detail required will be dictated by the level of detail in the plan. For example, Transportation System Plans (TSP) will be less detailed than a TSP Refinement Plan.*
- *Traffic counts and the related analysis is only one tool in the "toolbox" for identifying transportation improvement needs. For example, connectivity (all modes) can be just as important even if traffic volumes are low. Again, the context of the plan/project, its goals and objectives, and its final products will drive the data and analysis needs.*

### **Count Types & Durations**

#### **Intersection Classification Counts**

Intersection Classification counts provide vehicle classification (cars, pickups, buses, trucks, etc) data in addition to the individual vehicle movements. These counts are typically 16-hours in duration, so average daily traffic (ADT) and other relationships can be created. These counts are used at signalized intersections, intersections that may become signalized, and other important major intersections, such as interchange ramp terminals. A 16-hour count is needed where detailed turn movements and requirements exist such as multiple peak periods, truck classifications, signal warrants, air quality and/or noise studies in environmental documents. Typical count costs are variable depending on travel, duration, and other specifics, but are around \$1,100.

## Peak Period Counts

Peak Period counts capture the individual vehicle movements at a location. These counts are typically used to capture the in/out turning movements at driveway accesses or to count all movements at minor or unsignalized intersections that are not being considered for signalization. Generally, separate truck percentages are not available. Peak Period counts cannot be used to create daily traffic volumes or perform any signal warrant work. Use of turning movement counts are limited to counting in a single peak period. Typical peak periods are morning (6:00 AM – 9:00 AM), mid-day (11:00 AM – 1:00 PM), and evening (3:00 PM – 6:00 PM). A three-hour count is a typical duration to capture the peak hour. For count durations of more than four hours or when more than one peak period is needed, it is more practical to collect a 16-hour count. Count durations less than three hours make it difficult to capture the peak hour and should be avoided. Typical count costs are variable depending on travel, duration, and other specifics, but are in the \$600 range.

## Road Tube Counts

Road tube counts are often employed when the details provided by intersection counts are not needed or practical given the data needs. These count individual vehicles only or can be setup to capture vehicle classifications. These counts are used to capture mid-block volumes on streets and for segment volumes on most highways and interchange ramps. Road tubes are subject to vandalism or damage, and should not be done where vehicles may stop on the tube (in congested areas or near intersections) or cross the tube at an angle (near intersections or driveways) because under or over-counting may occur. Tubes are also susceptible to be damaged on roadways with speeds at or above 40 mph, and for safety reasons, cannot be placed on high-volume expressways and freeways. Road tube counts are typically done in a 48-hour format so an entire 24-hour period can be obtained. A 7-day count can also be done if daily fluctuations over a week are necessary to be captured and are only done on roadway segments. Typical road tube count costs are around \$200.

## Other Sources of Count/Volume Information

- *Frequently, existing count sources are overlooked so these should be reviewed before completing the first draft of the count list. This can, in some cases, substantially reduce the number of new counts and the number of SOW review iterations.*

Besides obtaining new counts there are some other sources of count information which may be used to reduce the overall new count requirement needs. ODOT has a large quantity of traffic volume data and previously collected counts. Before any new counts are ordered, the Transportation System Monitoring (TSM) Unit should be contacted to determine if any previous usable counts are available for the study area.

In general, counts in the study area should be three years old or less than but a number of factors affect whether existing counts can be used or if new counts are needed:

- Older counts between three and five years old can sometimes be used if they are the correct type and no significant changes, such as new roads or developments, have occurred to influence traffic flows.
- A newer count may not accurately represent the traffic flows on a roadway section even if less than the three years old if recent development has occurred within or near the study area since the count was taken.

State Highway vehicle classification information is available through the TSM Unit's Internet page at: <http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml>.

With this information, the daily and hourly volumes can be obtained along with truck classifications which will substantially reduce the need for 48-hour road tube counts.

While 16-hour counts at an interchange ramp terminal are preferable, the ramp volume diagrams in the Transportation Volume Tables and on the TSM Unit webpage can be used to substitute if a count is not available and intersection turn movements or intersection operations are not desired. Free-flow ramp volumes (i.e. between two Interstate highways) can be obtained from the diagrams if a 48-hour tube count is not available or practical.

In addition, some counties (i.e. Deschutes) and larger cities (i.e. Medford, Portland) may have traffic counting programs in place. The TSM Unit webpage also has links to many of these jurisdiction's Internet traffic data pages. These counts are typically daily volumes and can be used to supplement the local system and can reduce the need for 48-hour road tube counts. Sometimes intersection counts are available, but differing classification breakdowns and durations from ODOT standards can make these difficult to use except for a source for local peak period counts.

### **When to Count**

For most traffic studies, the 30<sup>th</sup> highest hour volumes (30 HV) should be used to represent future volumes. The 30HV is the target hour based on the concept that we don't want to design to the absolute highest hour of the entire year, but we want to design to meet most of the needs. Solutions in plans and projects need to be done to the 30HV to be consistent with accepted analysis methods and for comparisons with mobility standards.

To get a typical traffic mix of the 30 HV for the analysis, the counts should be taken as close to the likely 30<sup>th</sup> highest hour as possible. This typically requires collecting counts on a weekday afternoon (usually in summer) in most larger urban areas, but may include weekends for high recreation areas (the coast or Central Oregon), or areas experiencing lunch hour peaks or high reverse direction flows during the day. In fully developed portions of Metropolitan Planning Organization (MPO) areas, the 30<sup>th</sup> highest hour is generally assumed to be represented by the weekday afternoon peak hour. Outside of

fully developed MPO areas, a seasonal adjustment will be required to convert the counts to 30 HV.

- *Count timing is critical especially if the SOW will not be complete until after October.*

Seasonal adjustments should not be more than 30% because the traffic flow characteristics are most likely NOT represented by the count information. A seasonal adjustment greater than 30% indicates that the count was taken at the wrong time of year. Turn movement patterns may be so different they cannot be adequately represented by a seasonal adjustment. Below are some typical target ranges for areas to keep seasonal adjustments to less than 30%. If unknown, please refer to Section 4.4 in the Analysis Procedure Manual or contact the Transportation Planning Analysis Unit (TPAU) for advice.

- Coastal or summer recreational areas should be counted during the traditional summer period (Memorial Day to Labor Day).
- Outside of coastal/recreational areas, most areas can be counted from March to October.
- Larger MPO areas or commuter-based corridors can be counted most months, but should generally avoid December to February as these are the lowest traveled months, have a number of holidays, and have the most weather-related problems.
- Winter recreation areas (i.e. Mt. Hood area) should be counted in the December to February timeframe to capture the peak periods.
- Recreational areas may require counting on the weekends.

Other counting considerations include:

- Road tube count placement is limited from April to October because of studded tire damage potential.
- In general, days potentially influenced by state or federal holidays or other significant events (such as local festivals) that may alter normal traffic patterns should be avoided.
- It is also common to avoid Monday and Friday counts when weekday data is desired, as the trip characteristics on these days generally differ from the remainder of the week.
- Consideration should also be given to the presence of generators such as schools and major employers or attractions that experience significant peaks in generated trips that may or may not occur during the other peaks because of shift changes or event scheduling.
- In agricultural areas, truck traffic may be highly seasonal and have a substantial impact on the system. Counts may have to be timed carefully to balance the overall peak months with the harvest periods.
- In the Portland Metro area, while infrequent, there may be times when additional counts must be collected for the time period beyond the weekday peak hour to ensure the following hour meets the adopted 2-hour mobility standard. This is

generally only necessary when the operational threshold for the second hour of the peak period is lower than the threshold for the first hour of the peak period and the analysis shows the first hour operating below its threshold, but above the threshold for the second hour.

### **Where to Count**

Vehicle count locations should be identified in the project SOW, and should be determined based on the needs of the subject plan or project. Planning efforts that are expected to generate potential highway projects within three years will require more detailed counts than a standalone or long-range plans, such as TSP's.

- *It is important to correspond with the local jurisdiction and TPAU/Region Traffic to make sure that count needs cover the system to be analyzed at the appropriate level of detail and address areas of concern.*
- *The grant/project manager should meet with TPAU/Region Traffic staff to discuss traffic count requirements after the objective section of the SOW (or project prospectus) is completed as this section provides the context for the plan/project.*
- *For TGM grants, it is usually more efficient to arrange a meeting with the appropriate TPAU staff to go over multiple studies at once.*
- *While differences of opinion may exist on the number and type of counts versus the available budget, remember that the ultimate goal will be to have enough data to answer the questions, address the needs, and cover the level of detail in the plan/project as described by the project objectives and the local jurisdiction(s). TPAU/Region Traffic staff and the regional/TGM planners will need to come to an agreement whether that will be to increase the data collection budget and/or to change the number/type of counts.*

**County Transportation System Plan (TSP)** – The arterial and major collector system needs to be documented (counted). It is generally unnecessary to count lower functional class roads as these usually carry very little traffic, and possibly are unpaved unless the county government wants a specific roadway included because of operational concerns. Analysis at the County level is more system-based with a higher emphasis on ADT rather than peak hour and many of the analysis tools require ADT as an input.

- Need to have at least ADT-level count coverage of the arterial and major collectors. Acceptable previously taken counts may exist at the state or local level.
- Major arterial intersections with other arterial and major collector intersections should be counted where operational concerns exist. State highway segments (between major intersections) should use the TSM Unit's vehicle classification data to capture volumes and truck classifications.
- The TSM Unit's ramp volume diagrams (where available) should be used to capture any free-flow ramp connections.
- County arterials and major collectors should have at least a 48-hour classification tube count performed so truck traffic can be captured and ADT can be calculated.

- Peak period counts should be obtained at signalized intersections, unsignalized highway to highway junctions, and county arterial – highway intersections. If this is a TSP Update, refer to the old TSP to find the critical intersections that should be counted.

**City Transportation System Plan (TSP)** – The arterial and collector system needs to be documented (counted). It is generally unnecessary to count lower functional classes unless the roadway is area-significant, provides an alternate path for trips to bypass congested areas (as in a parallel local street), or the local government has previously identified operational concerns. Analysis at the City level is more centered on the peak periods and individual facilities/intersections which require more detail.

- Need to have at least ADT-level count coverage of the arterial and collectors. Acceptable previously taken counts may exist at the state or local level.
  - Major cities (i.e. MPO's) need to have at least the arterial system counted.
  - Medium cities (10,000 – 49,999 pop.) need to have the arterial and representative/significant collectors counted.
  - Small cities (<10,000 pop.) need to have the arterial and significant collectors counted.
- Major arterial intersections with other arterial and significant collector intersections should be counted. Peak period counts should be obtained at minor arterial/collector signalized intersections, unsignalized highway to highway junctions, city arterial – highway intersections, and major private development accesses (i.e. regional shopping mall). If this is a TSP Update, refer to the old TSP to find the critical intersections that should be counted.
  - Significant collectors extend across the city for a considerable distance, are a direct route, or extend outside the city.
  - If multiple signals exist, it is not necessary to have a count at every one, but a reasonable representation of the system needs to be counted.
  - Bracketing peak period counts with 16-hour counts is an acceptable practice. Each major roadway should have truck traffic captured on it in at least one location.
  - Sixteen-hour counts should be obtained at interchange ramp terminals and signalized major arterial intersections. The TSM Unit's ramp volume diagrams (where available) should be used to capture any free-flow ramp connections.
- State highway segments (between major intersections) should use the TSM Unit's vehicle classification data to capture volumes and truck classifications.
- City arterials and collectors should have at least a 48-hour tube count performed so ADT can be calculated. Larger cities may already have this count data.
- If detailed refinement plans and/or actual highway (STIP) projects are expected out of the TSP within three years *and plan to use the TSP data*, then the counted major intersections should be 16-hour counts with the lesser unsignalized intersections or access points using peak period counts.

**Interchange Area Management Plan (IAMP)** – The roadway system needs to be counted within at least a half-mile radius of the interchange. Analysis at the IAMP level can be close to a project-level of detail (see project section) depending on whether it is standalone or not:

- If the IAMP is part of a project, then the IAMP should be using the project counts and volumes and no new counts should be necessary unless the counts are very old (greater than three to five years). It may be necessary to obtain a few “check counts” to see if volumes are substantially different before replacing all or most of the counts.
- If the IAMP is a standalone plan but it is anticipated that a project may occur within three years, then there needs to be a project-level count request.
- If the IAMP is a standalone plan but no project is anticipated within three years:
  - Major arterial intersections with other arterial and major collector/collector intersections should be counted.
  - Sixteen-hour counts should be obtained at the ramp terminal intersections, other arterial/arterial intersections, or unsignalized intersections that may need to be signalized.
  - Peak period counts should be obtained at other existing signalized and unsignalized intersections and unsignalized intersections.
  - If multiple signals exist, it is unnecessary to have 16-hour counts at every one. Bracketing peak period counts with 16-hour counts is an acceptable practice. Each major roadway should have truck traffic captured on it in at least one location.
  - Most, if not all, driveway accesses should be counted with peak period counts as many of these will be rerouted to new connections.
  - State highway segments (between major intersections) should use the TSM Unit’s vehicle classification data to capture volumes and truck classifications.
  - The TSM Unit’s ramp volume diagrams (where available) should be used to capture any free-flow ramp connections.

**Refinement/Management/Facility Plans**– The arterial and collector system needs to be counted within the defined study area limits. It is generally not necessary to count lower functional classes unless the roadway is area-significant, provides an alternate path for trips to bypass congested areas (as in a parallel local street), or the local government has previously identified operational concerns.

- If it is anticipated that a project may occur within three years, then a project-level count request is needed.
- If no project is anticipated within three years:
  - Major arterial intersections with other arterial and major collector/collector intersections should be counted.
  - Facilities parallel to the subject arterial should be counted.
  - Longer roadway sections without intersections should use road tube counts.

- Sixteen-hour counts should be obtained at signalized intersections and major unsignalized intersections (i.e., ramp terminals, four-way stops) to capture truck traffic or where larger scale improvements may be needed.
- Bracketing peak period counts with 16-hour counts is an acceptable practice. Each major roadway should have truck traffic captured on it in at least one location.
- Unsignalized intersections or major accesses should be counted with peak period counts.
- If an Interstate Highway or statewide expressway exists in the study area, the mainline shall be counted by direction between interchanges in addition to any interchange ramp terminals. Road tube counts may be necessary to capture movements on ramps or connections.

**Local Street Network (LSN) /Downtown Plan** – These kinds of plans are generally trying to identify new roadway or multimodal connections to control congestion on the state highway or make limited improvements in the downtown area. The arterial and collector system need to be counted. It is generally not necessary to count lower functional classes unless the roadway is the only access to a neighborhood, provides an alternate path for trips to bypass congested areas (as in a parallel local street), or the local government has previously identified operational concerns. Larger numbers of peak period counts may be necessary with a few 16-hour counts at major intersections.

- Major arterial intersections with other arterial and collector intersections should be counted.
- Sixteen-hour counts should be obtained at signalized intersections and major unsignalized intersections (i.e., ramp terminals, four-way stops) to capture truck traffic or where larger scale improvements may be needed.
- If multiple signals exist, it is unnecessary to have 16-hour counts at each one. Each major roadway should have truck traffic captured on it in at least one location.
- Unsignalized intersections or major accesses should be counted with peak period counts.
- Bracketing peak period counts with 16-hour counts is an acceptable practice. Each major roadway should have truck traffic captured on it in at least one location.
- State highway segments (between major intersections) should use the TSM Unit's vehicle classification data to capture volumes and truck classifications.
- The TSM Unit's ramp volume diagrams should be used to capture any free-flow ramp connections.

**Pedestrian Plans/ Trail Plans** – Generally, counts are only needed if the state highway system will be affected by removing or narrowing through travel lanes or if new crossings are to be added. Count requirements in the lane reduction areas should follow the LSN/Downtown Plan recommendations above.

Plans with proposed mid-block trail crossings of state highways or local arterials should have a 48-hour classification road tube count performed at the crossing location. Plans

with existing pedestrian crossings (formally defined or not) and the number of crossing pedestrians is desired, then the crossing count should be replaced with a 16-hour video classification count.

**Traffic Impact Studies (TIS)** - For TISs, the analysis area and study intersections are typically selected from estimates of anticipated impacts from added traffic based on site trip generation and distribution, and existing intersection operations. Count requests need to be developed with the guidance of the Region Access Management Engineer or appropriate region staff and the Development Review Guidelines.

- Sixteen-hour counts should be obtained at major unsignalized intersections (i.e., ramp terminals, four-way stops) to capture truck traffic; obtain the basis for signal warrants, or where larger scale improvements may be needed.
- Signalized intersections may use a 16-hour count or a peak period count depending on the particular study area.
- If multiple signals exist, it is not necessary to have 16-hour counts at each one. Bracketing peak period counts with 16-hour counts is an acceptable practice. Each major roadway should have truck traffic captured on it in at least one location.
- Unsignalized intersections and accesses should be counted with peak period counts.
- The Interstate/expressway/highway mainline shall be counted by direction in addition to any interchange ramp terminals. Road tube counts may be necessary to capture movements on ramps or connections.

**Projects** - For most other project types the analysis area and study intersections are selected by considering the problem that is being addressed by the project and the information that is required to fully assess the problem and propose appropriate solutions. Project analysis is needed to support roadway and intersection control improvements, pavement and bridge design, air quality, and noise mitigation.

- Sixteen-hour classification counts should be obtained at signalized intersections and major unsignalized intersections (i.e., ramp terminals, four-way stops) to capture truck traffic or where larger scale improvements may be needed.
- Truck classification data needs to be captured on each roadway segment in the study area.
- Minor unsignalized intersections and accesses should be counted with peak period counts.
- Significant driveway accesses should be counted as many of these will be rerouted to new connections.
- If an Interstate Highway or grade-separated highway exists in the study area, the mainline shall be counted by direction between interchanges in addition to any interchange ramp terminals. Road tube counts may be necessary to capture movements on ramps or connections.

## **How to Request Counts**

When ordering counts, the request must contain the name of the contact person (requestor), the person to whom the data will be sent, the locations, time periods, dates, types of counts and collection methods must be clearly communicated to those conducting the counts. Figure 1 shows a sample count request letter from an actual project. Note that the different count types are grouped into separate sections. The count request also lists any special requests, count intervals, count time windows (start and finish dates) and an expense account charge number. A map showing the count locations, durations and other special requirements should also be provided to help eliminate misunderstandings since often times the text is separated from the map. Figure 2 shows a sample map that goes along with Figure 1. Note that the special requests and intervals are repeated on the figure and a legend is provided showing the different count types.

When ordering intersection counts, be sure to specify the duration and type for each location. Fifteen-minute intervals must be specified for at least the standard morning, noon and evening peak periods in 16-hour counts. Peak period counts should always be done in 15-minute intervals. It is not required, but very helpful if 48-hour road tube counts are counted in 15-minute intervals as well.

Specify the latest acceptable date by which the count is needed for analysis. Keep in mind that it can take at least five weeks from the date of the request date to get the count scheduled (not including weather restrictions) and then another three to four weeks to have the count processed, recorded and distributed. Therefore, counts need to be requested about nine weeks ahead (or more if weather is a factor) of when they will be needed for the analysis work.

Count requests should be sent to the Region Traffic Manager and a courtesy copy (cc) to the TSM Unit to alert them that these counts are requested and need to be scheduled. If Region does not have the resources to do the count, it will be contracted out to a consultant. Region requires the same information/format for a consultant to do the work. In addition, most of the raw counts are processed into a readable format in the TSM Unit before being released to the requestor. The TSM Unit needs know what counts are out there so staff resources can be allocated. The TSM Unit coordinates the counting schedules of all Region traffic counting staff. Keeping the TSM Unit in the loop allows for these counts to be added to the count databases which can limit counting needs by others and help limit project delays.

**Figure 1: Sample Count Request Letter**

**STATE OF OREGON**

**INTEROFFICE MEMO**

**Department of Transportation  
Transportation Development Branch**  
Mill Creek Office Park  
555 13th Street NE, Suite 2  
Salem, Oregon 97301-4178  
(503) 986-4110 FAX (503) 986-4174

File Code:

Date: October 13, 2003

**TO: Ray Lapke,  
Region 3 Traffic Operations Supervisor**

**FROM: Peter L. Schuytema, P.E., Sr. Transportation Analyst  
Transportation Planning Analysis Unit (TPAU)**

**SUBJECT: Count Request: Allen Creek Road – Fairgrounds Road Project**

This is to request the following counts for the Allen Creek Road – Fairgrounds Road project in Grants Pass. The following are 16-hour, manual, turn movement, and full federal classification counts:

- US 199 & Allen Creek Road
  - US 199 & Redwood Avenue
  - US 199 & Ringuette Street
  - US 199 & OR 238/OR 99
  - **OR 99 (6<sup>th</sup>) & West Park Street**
  - **OR 99 (6<sup>th</sup>) & East Park Street**
  - **OR 99 (6<sup>th</sup>) & Lewis Avenue**
  - OR 99 (7<sup>th</sup>) & East Park Street
  - Allen Creek Road & Albertson’s southern access (signalized)
  - Allen Creek Road & Redwood Avenue
  - Fairgrounds Road & Union Avenue
  - Ringuette Street & Union Avenue
  - Ringuette Street & West Park Street
- Need to be counted at the same time

In addition, four (4) directional 48-hour tube counts are requested at the following locations:

- US 199 eastbound to northbound off-ramp

- OR 238 northbound off-ramp
- US 199 westbound connection to Redwood Avenue
- Redwood Avenue westbound-to-eastbound (US 199) U-turn connection at US 199/Redwood Avenue intersection

Lastly, one (1) 3-hour turn movement driveway count (3-6 PM) is requested at the following location:

- Allen Creek Road & Albertson's northern access (right-in-right-out)

The counts should be taken with the standard expanded 15 minute intervals (7-9 AM, 11 AM -6 PM). The intersections of OR 99 (6<sup>th</sup>) with Lewis, West Park, and East Park Streets must be counted all at the same time in order to capture all of the moves properly.

If the Region 3 count schedule allows counting in November, any counts done need to be completed no later than November 21<sup>st</sup>. No counting shall occur in the week of November 9<sup>th</sup> (Veteran's Day Holiday). All remaining counts need to be started no earlier than March 1<sup>st</sup>, 2004 and completed no later than March 31<sup>st</sup>, 2004. The EA to use is PE000716-011-J12. A map showing the count locations is attached. If you have any questions, please call me at (503) 986-4110.

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cc: Gretchen Harvey, Transportation Systems Monitoring Unit  
Debbie Timms, Region 3  
Irene Toews, Transportation Planning Analysis Unit  
Dorothy Upton, Transportation Planning Analysis Unit

Attachment

Figure 2: Sample Count Request Map

