

An aerial photograph of a rural area in Preble County, Ohio. The image shows a mix of agricultural fields, some with distinct furrows, and several clusters of buildings, likely farmsteads or small communities. A prominent road or highway runs diagonally across the upper portion of the image. The overall scene is a typical rural landscape.

**Preble County Commissioners**

**Access Management Regulations**

**Preble County, Ohio**

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## **Authority**

Preble County is authorized by Chapter 5552 of the Ohio Revised Code to adopt Access Management Regulations for the county and township roads in Preble County.

## **Purpose**

These Access Management Regulations are adopted for the purposes of promoting traffic safety and efficiency, maintaining proper traffic capacity and traffic flow, reducing vehicular accident frequency, minimizing the future expenditure of public revenues, and improving the design and location of access connections to county and township roads while at the same time providing necessary and reasonable ingress and egress to properties along those roads.

The regulations establish the standards necessary to properly manage access to county and township roads in Preble County and to satisfy the purpose of Chapter 5552 of the Ohio Revised Code.

## **Implementation and Administration**

The effective date of these regulations is January 5, 2006. The Preble County Engineer, or his designee, is responsible for implementing and administering these regulations. In addition to the procedures contained herein, the Preble County Engineer may develop other procedures to further the implementation of these regulations.

## **Applicability**

These regulations shall apply to all access connections to county and township roads constructed on or after January 5, 2006. These regulations shall also apply to all existing access connections whenever the land use classification of the access classifications of such existing access connections change or whenever the existing access is upgraded by reconstruction, relocation or modification, or expansion.

These regulations do not apply to the original approval of platted lots (major subdivisions) governed by the Subdivision Regulations. They do not apply to minor subdivisions approved without a plat under the procedure contained in Section 711.131 Ohio Revised Code (and to any lot or parcel not otherwise subject to regulations under Chapter 711 of the Ohio Revised Code).

## **Definitions**

**Access Classification:** A classification system that defines driveways according to their purpose and use:

- Minimum Volume (MV) driveway
  - field drive
  - utility drive
  
- Very Low Volume (VLV) driveway
  - farm drive
  - single family residence drive
  - single family common access drive serving 5 or fewer residences
  - multi-family residence drive serving five or fewer residential units
  - walking, jogging, biking or equestrian trails
  
- Low Volume (LV) driveway
  - less than 100 trip ends in the peak hour
  
- Medium Volume (MV) driveway
  - 100 or more but less than 200 trips in the peak hour
  
- High Volume (HV) driveway
  - 200 or more trips ends in the peak hour

**Access Connection:** Any connection to a road or street which permits access to or from the road or street by vehicles, equipment, cars, trucks, buses, motorcycles, bicycles, pedestrians, horses, etc. for the purpose of crossing the road or street or accessing the road or street. An access connection may be a road, street, driveway, trail, etc.

**Driveway:** An access connection. The terms driveway and access connection mean the same and may be used interchangeably. The driveway includes the driveway base, surface, shoulders, curbs, etc., and the culvert under the driveway.

**Lot Split Approval:** The process of approving Minor Subdivisions (Lot Splits) in accordance with the Subdivision Regulations as authorized by Ohio Revised Code 711.131.

**Peak Hour:** The largest number of vehicles passing over a designated section of a street during the busiest 60-minute period within a 24-hour period.

**Road Classification:** A ranking system for roadways used to determine the appropriate degree of access management regulation in order to promote public safety and congestion prevention. For the purpose of these regulations, see the Preble County Thoroughfare plan. (See Attached Appendix "B")

**Stopping Sight Distance (SSD):** The distance required by a driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the roadway becomes visible. Stopping Sight Distance shall be as defined in the most recent edition of the Location and Design Manual of the Ohio Department of Transportation. (See attached Appendix “A”)

**Subdivision Regulations:** The most recent edition of the Subdivision Regulations of Preble County as enacted and amended by the Preble County Board of Commissioners.

**Technical Design Standards:** The most recent edition of the Technical Design Standards of the Preble County Engineer as authorized by the Subdivision Regulations.

**Trip Ends:** A single or one-directional vehicle movement with either the origin or the destination inside a study area. A vehicle leaving the highway and entering a property is one trip, and the vehicle leaving the property is a second trip.

**Upgrade:** Includes any reconstruction, or modification, or expansion of existing use, with which a minimum 12”x40’ for Ag. and 12”x24’ for Res. is required and is subject to Engineer approval.

### **Preliminary Access Approval**

Prior to any lot split approval or prior to the transfer of any applicable lot which is not subject to a lot split approval, the Preble County Engineer shall issue a preliminary access approval. The preliminary access approval will indicate those locations along the lot for which access approval shall be issued with the lot split approval or within seven days following the submission of all the information required by these regulations. The Preble County Engineer may choose to not issue a preliminary access approval in situations when access is not desired or when provisions for access may be determined at a later date.

For preliminary access approval or for access permit issuance when no preliminary access approval was required, the Preble County Engineer may require the following information be shown by a registered engineer or surveyor on either a survey plat or other accurate drawing:

1. Distances from the side property lines to the nearest adjacent driveways and their use.
2. Location of any driveways across from the property and their use.
3. Location of any driveways on the property and their use.
4. Available sight distance (SSD) and required sight distance (SSD).
5. Required driveway spacing.
6. Location of proposed driveways, if known.
7. Other information as required by the Preble County Engineer.
8. Intersection site distance

## **Access Permits**

Prior to the issuance of a building permit or prior to the construction of a driveway in those situations not requiring a building permit, the Preble County Engineer shall issue an access permit. The permit will be for access at a location for which a preliminary access approval was previously granted or at a location that is otherwise in conformance with these regulations. In those situations where no preliminary access approval was issued, the Preble County Engineer may require submission of the Preliminary Access Approval information.

Permits issued may include interim or temporary permits and shall prescribe the limitations or conditions of the permit as well as the access classification. New permits are required whenever the land use classification or the access classifications of existing driveways change or whenever existing driveways are upgraded.

For Minimum Volume and Very Low Volume driveways, access permits shall be issued with the building permit or within ten days following approval of all information required by these regulations.

For all other driveway classifications, access permits shall be issued within thirty days following approval of all information required by these regulations or by the Preble County Engineer.

Any access permit which is not approved and issued or is not disapproved within the above time frames shall be deemed approved and shall be issued in accordance with the information submitted.

An access permit fee shall be established by the Board of Commissioners to cover the cost of administering these regulations and shall accompany the access permit application.

Access permits shall expire if the driveway is not constructed within 1 year of the date of access permit issuance. The County Engineer may grant 1 year extensions.

## **Variations and Appeals**

The Preble County Board of Appeals shall hear and decide variations to these regulations in accordance with the standards of this Article. It may also hear appeals where it is alleged that the Preble County Engineer made an error in any order, requirement, decision or determination in the enforcement of these access management regulations.

Variations may be granted administratively by the Preble County Engineer for Minimum Volume and Very Low Volume driveways or by the Board of Appeals for all classes of

driveways. Variances are appropriate if not contrary to the public interest where, owing to special conditions, a literal enforcement of the regulations will result in unnecessary hardship, and such that the spirit of the regulations will be observed and substantial justice done.

In granting of variances, the Preble County Engineer and the Board of Appeals shall consider all relevant matters including, but not limited to, the following:

1. Not granting the variance would deny all reasonable access.
2. Granting the variance would endanger the public safety.
3. The hardship was self-created.
4. Granting the variance would hinder traffic safety or the proper operation of the public road.
5. Granting the variance would be consistent with the purpose of these regulations.
6. All feasible access options have been considered.
7. Physical constraints, existing driveway spacing, current legal or advisory speed limits, etc.

The Preble County Engineer may require applicants for variances to provide evidence of unique or special conditions that make the strict application of these regulations impractical or impossible. Such evidence may include:

1. Indirect or restricted access cannot be obtained.
2. No engineering or construction solutions can be applied to mitigate the condition.
3. No alternative access is available.

### **Enforcement**

For any driveway that has been installed contrary to these regulations, the County Engineer shall notify the property owner. The notification shall identify the problem with the driveway and establish a 15-day period for the property owner to correct the problem. This time period may be extended at the Engineer's discretion.

Pursuant to Section 5552.99 of the Ohio Revised Code, whoever violates an access management regulation adopted under Section 5552.02 of the Ohio Revised Code, shall be fined not more than \$500.00 for each offense. Each day of violation is a separate offense. This is in addition to other remedies as provided by law, including, but not limited to, an action for declaratory judgment, injunction, etc.

## **Standards**

The arrangement, character, extent, width, grade, and location of all access connections shall conform with these regulations and shall be considered in their relation to existing and planned roads, streets and driveways, topographical conditions, and public convenience and safety and the proposed uses of the land to be served by such access connections.

1. The requirements of these regulations vary depending on the road classification as shown on the Road Thoroughfare Plan contained as Appendix "B".
2. The provisions of any existing or future Access Management Plan prepared for a specific road or portion of a road shall apply. The applicable requirements of the Subdivision Regulations and the Technical Design Standards shall also apply.

### **3. Minimum Volume Driveways**

New driveways or driveway upgrades shall be located no closer than 25 feet from an existing or proposed driveway and no closer than 80 feet from an existing or proposed road or street. New driveways or driveway upgrades shall be located no closer than 495 feet from an existing or proposed driveway serving the same parcel or serving contiguously-owned parcels.

### **4. Very Low Volume Driveways**

- a. Along Major Collector Roads: No new driveways or driveway upgrades shall be permitted along a Major Collector Road from parcels or contiguously-owned parcels where access is available or can be made available from a lower classification road or street or from a common access driveway.

Where new driveways or driveway upgrades along a Major Collector Road are permitted, they shall be located no closer than 495 feet from an existing or proposed driveway or from an existing or proposed road or street. No more than one driveway shall be permitted per parcel or per contiguously-owned parcels.

- b. Along Minor Collector Roads: No new driveways or driveway upgrades shall be permitted along a Minor Collector Road from parcels or contiguously-owned parcels, except in agricultural land use classifications, where access is available or can be made available from a lower classification road or street.

Where new driveways or driveway upgrades along a Minor Collector Road are permitted, they shall be located no closer than 360 feet from an existing or proposed driveway or from an existing or proposed road or street. No more than one driveway shall be permitted per parcel or per contiguously owned parcels, except in agricultural land use classifications, subject to the discretion of the Engineer.



- c. Along Local Roads: No more than one driveway or driveway upgrade shall be permitted along a Local Road from parcels or contiguously-owned parcels, except in agricultural use classifications, subject to the discretion of the Engineer.

Where new driveways or driveway upgrades along a Local Road are permitted, they shall be located no closer than 250 feet from an existing or proposed driveway or from an existing or proposed road or street.

- d. Along Collector Streets: No more than one driveway or driveway upgrade shall be permitted per parcel or per contiguously-owned parcels, except in agricultural use classifications, subject to the discretion of the Engineer.

New driveways or driveway upgrades shall be located no closer than 40 feet from an existing or proposed driveway or no closer than 120 feet from an existing or proposed road or street.

- e. Along Local Streets: No more than one driveway or driveway upgrade shall be permitted per parcel or per contiguously-owned parcels, except in agricultural use classifications, subject to the discretion of the Engineer.

New driveways or driveway upgrades shall be located no closer than 25 feet from an existing or proposed driveway or no closer than 80 feet from an existing or proposed road or street.

**Low, Medium and High Volume Driveways:**

- a. Along Major Collector Roads: No new driveways or driveway upgrades shall be permitted along a Major Collector Road from parcels or contiguously-owned parcels where access is available or can be made available from a lower classification road or street or form a common access driveway.

Where new driveways or driveway upgrades along a Major Collector Road are permitted, they should be located no closer than 495 feet from an existing or proposed driveway or from an existing or proposed road or street, subject to the Engineer's approval. No more than one driveway shall be permitted per parcel or per contiguously-owned parcels, unless otherwise approved by the Engineer.

For new driveways or driveway upgrades that will warrant traffic signals, the spacing from the nearest existing or proposed signalized intersection shall be no closer than 2640 feet or from the nearest existing or proposed un-signalized intersection shall be no closer than 1320 feet.

Turn lanes shall be installed at all intersections where traffic signals are planned or when required by the County Engineer.

- b. Along Minor Collector Roads: No more than one driveway or driveway upgrade should be permitted per parcel or per contiguously-owned parcel unless 1) the parcel is located at an intersection of two Minor Collector roads or at an intersection of a Minor Collector road and a Local road and one of the two driveways is “right in/right out only” and is located on a minor Collector or 2) the driveway spacing is at least 360 feet and one of the two driveways is “right in/right out only”, subject to the Engineer’s approval.

New driveways or driveway upgrades along a Minor Collector road should be located no closer than 360 feet from an existing or proposed road or street or from an existing or proposed driveway, unless otherwise approved by the Engineer.

For new driveways or driveway upgrades that will warrant traffic signals, the spacing from the nearest existing or proposed signalized intersection should be no closer than 1760 feet or from the nearest existing or proposed un-signalized road or street intersection shall be no closer than 880 feet, unless otherwise approved by the Engineer.

Turn lanes shall be installed at all intersections where traffic signals are planned or when required by the County Engineer.

- c. Along Local Roads: No more than one driveway or driveway upgrade should be permitted per parcel or per contiguously owned parcels except that two driveways may be allowed if one of the two driveways is “right in/right out” and the driveway spacing is at least 250 feet, unless otherwise approved by the Engineer.

New driveways or driveway upgrades along a Local road should be located no closer than 250 feet from an existing or proposed road or street or from an existing or proposed driveway, unless otherwise approved by the Engineer.

For new driveways or driveway upgrades that will warrant traffic signals, the spacing from the nearest existing or proposed signalized intersection should be no closer than 1320 feet or from the nearest existing or proposed un-signalized road or street intersection shall be no closer than 660 feet, unless otherwise approved by the Engineer.

Turn lanes shall be installed at all intersections where traffic signals are planned or when required by the County Engineer.

- d. Along Local and Collector Streets: Driveways and driveway upgrades should meet the requirements for Local Roads, unless otherwise approved by the Engineer.

<b>Road Classification</b>	<b>Minimum Volume Driveways</b>	<b>Very Low Volume Driveways</b>	<b>Low, Medium, &amp; High Volume Driveways (with no traffic signal)</b>	<b>Low, Medium, &amp; High Volume Driveways (with traffic signal)</b>
<b>Major Collector</b>	25' from ex. or prop. Dr., 80' from ex. or prop. Rd./St., 495' from ex or prop. Dr. serving same or contiguously owned parcel	None where access can be made from lower classification Rd./St., 495' from ex. or prop. Dr./Rd./St., No more than 1 per parcel or contiguously owned parcel	None where access can be made from lower classification Rd./St., 495' from ex. or prop. Dr./Rd./St., No more than 1 per parcel or contiguously owned parcel	2640' from nearest ex. or prop. signalized intersection, 1320' from nearest ex. or prop. un-signalized intersection
<b>Minor Collector</b>	same	None where access can be made from lower classification Rd./St., 360' from ex. or prop. Dr./Rd./St., no more than 1 per parcel or contiguously owned parcel	No more than 1 per parcel or contiguously owned parcel, For exception see standards, 360' from ex. or prop. Dr./Rd./St.	1760' from nearest ex. or prop. signalized intersection, 880' from nearest ex. or prop. un-signalized intersection
<b>Local Roads</b>	same	No more than 1 per parcel or contiguously owned parcel, 250' from ex. or prop. Dr./Rd./St.	No more than 1 parcel or contiguously owned parcel, For exception see standards, 250' from ex. or prop. Dr./Rd./St.	1320' from nearest ex. or prop. signalized intersection, 660' from nearest ex. or prop. un-signalized intersection
<b>Collector Streets</b>	same	No more than 1 per parcel or contiguously owned parcel, 40' from ex. or prop. Dr., 120' from ex. or prop. Rd./St.	Same as Local Roads	Same as Local Roads
<b>Local Streets</b>	same	No more than 1 per parcel or contiguously owned parcel, 25' from ex. or prop. Dr., 80' from ex. or prop. Rd./St.	Same as Local Roads	Same as Local Roads

Turn Lanes shall be installed at all intersections where traffic signals are planned or when required by the County Engineer

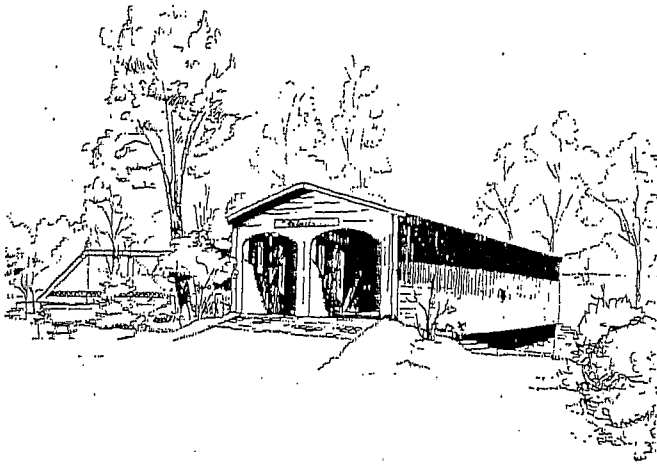
Abbreviations: Dr. = Drive; Rd. = Road; St. = Street; ex. = existing; prop. = proposed

Where authorized in these regulations, these standards may be varied at the discretion of the Engineer.

## General

- a. All driveways or driveway upgrades shall meet or exceed the requirements of these regulations. The location of all access connections shall permit adequate horizontal and vertical sight distance as specified in the Technical Design Standards based on the stopping sight distance for the legal speed limit at the location of the driveway.
- b. Common access driveways and/or cross access or through access easements may be required and are permitted to satisfy the requirements of these regulations. Proposed common access driveways and/or cross access or through access easements shall be in accordance with the Common Access Drive Regulations in the Technical Design Standards.
- c. Existing driveways that do not conform with these regulations shall be considered nonconforming driveways and shall be brought into conformance with these regulations under the following conditions:
  1. When new access permits are requested,
  2. When driveway upgrades are proposed,
  3. When significant increases in trip generation are planned for the driveway,
  4. If the use served by the nonconforming driveway discontinues for a consecutive period of 2 years, or
  5. As major road improvements take place at the discretion of the County Engineer,
  6. When there is a change of use of the property access.
- d. To the greatest extent possible developments shall incorporate unified access and circulation systems. Where a proposed development abuts to and connects, through internal circulation, to an existing subdivision or development which has access to a Collector or Local Road, the proposed development shall, when necessary, upgrade the intersection at the Collector or Local Road and the existing subdivision's or development's access to the Collector or Local Road.
- e. Whenever a new driveway or driveway upgrade is permitted, the property owner (s) shall eliminate all pre-existing non-conforming driveways upon completion of the new driveway or driveway upgrade as required by the County Engineer. No new driveways or driveway upgrades shall be permitted for parcels or contiguously owned parcels where access rights have been previously extinguished or acquired by a governmental body.
- f. Property owners are required, at their expense, to install driveways in accordance with these regulations, the requirements of the County Engineer, and any construction plans for the driveways, which have been approved by the County Engineer.

- g. The County Engineer shall require a Traffic Impact Study for any Medium volume or High Volume driveway and may require, at his discretion, a Traffic Impact Study for any Low Volume driveway. The Traffic Impact Study shall be prepared in accordance with the requirements of the County Engineer.
- h. Based on a Traffic Impact Study or the requirements of the Technical Design Standards and the County Engineer, the County Engineer may impose requirements such as: 1) addition of left and right turn lanes, 2) minimum and maximum widths and turning radii for driveways, 3) increased “throat” lengths between the public road and parallel driveways or parking areas, 4) restricting turning movements at driveways, 5) denying direct access, 6) installation or modification of traffic signals, 7) consolidating driveways, 8) requiring common access driveways, 9) closing driveways.
- i. The County Engineer may take into account physical restraints, existing driveway spacing, current legal or advisory speed limits and other issues if approving deviations from the standards set for minimum, very low, medium and high volume driveways.



J. Stephen Simmons  
P.E., P.S.  
Preble County Engineer

To: Preble County Commissioners

From: J. Stephen Simmons  
Preble County Engineer

Date: March 4, 2005

Re: Recommendation for Preble County Access Management Fee Schedule

The following is a recommended fee structure and schedule for different classification of driveway permits as outlined in the Preble County Access Management Regulations:

<u>Drive Classification</u>	<u>Fee</u>
Minimum Volume Driveway	\$0.00
Very Low Volume Driveway	\$0.00
Low Volume Driveway	\$25.00
Medium Volume Driveway	\$50.00
High Volume Driveway	\$100.00

If there are any questions, please do not hesitate to ask.

Thanks



# **Appendixes A&B**

## **Sight Distance Definition**

As taken from the most current ODOT Location and Design Manual Vol. 1 – Road Design

### **201 Sight Distance**

#### **201.1 General**

A primary feature in design of a highway is the arrangement of the geometric elements so that sufficient sight distance is provided for safe and efficient operation. The three most important sight distance considerations are: distance required for stopping, distance required for operation at intersections and distance required for passing vehicles.

Stopping Sight Distance (SSD) is the distance a motorist should be able to see ahead so that he will be able to stop from a given design speed, short of an obstruction or foreign object.

Intersection Sight Distance (ISD) is the distance a motorist should be able to see other traffic operating on the intersected highway so that he can enter or cross the highway safely.

Passing Sight Distance (PSD) is the distance a motorist should be able to observe oncoming traffic on a two-lane, two-way road so that he can pass a vehicle safely.

Decision Sight Distance (DSD) is also discussed in this section.

#### **201.2 Stopping Sight Distance (SSD)**

This distance includes the driver's perception-reaction distance and the distance traveled while the brakes are applied. The total distance traveled varies with initial speed, the brake reaction time and the coefficient of friction for wet pavements and average tires. Two initial speed conditions are assumed for determining the distance needed to stop. One speed condition assumes that cars operate at a reduced speed during wet conditions. In recognition of this assumption, the average running speed for low-volume conditions was used in calculating the minimum stopping sight distances in Figure 201-1.

The other speed condition assumes no speed reduction during wet pavement conditions and the distances computed under this condition are referred to as preferred stopping sight distance in Figure 201-1.



Figure 201-1 lists the various distances needed to stop a vehicle from a given design speed for both preferred and minimum stopping sight distance. The designer should attempt to provide the distances listed in the preferred column, whenever possible. The minimum values may be used if necessary when upgrading existing facilities and in restricted areas

### **201.21 Exceptions to Stopping Sight Distance**

Whenever the minimum stopping sight distance cannot be provided, written documentation giving the reasons for the recommended design must accompany the line, grade and typical section review transmittal. The actual design speed corresponding to the actual stopping sight distance provided (using minimum criteria) shall be indicated in the project plans for each horizontal and vertical curve which does not meet criteria.

### **201.22 Horizontal Sight Distance**

The sight distance on horizontal curves may be restricted by obstructions on the inside of a curve, such as bridge piers, buildings, median barriers, guardrail, cut slopes, etc. Figure 201-2 shows the relation of sight distance, horizontal curvature, and obstruction offset. In using this figure, the designer should enter the required stopping sight distance from Figure 201-1 and the degree of curvature or radius. Where these two lines intersect, the offset of the obstruction needed to satisfy the sight distance requirements may be read from the curved lines.

Where the horizontal sight distance is restricted by a cut slope in the inside of the curve, the offset shall be measured to a point on the cut slope that is at the same elevation as the roadway. This would allow a line of sight, which is 3.5 feet above the roadway to pass over a cut slope with 2.0 feet of vegetative growth and view a 6 inch object on the far side.

### **201.3 Intersection Sight Distance (ISD)**

When a motorist attempts to enter or cross a highway, he should be able to observe the traffic at a distance that will allow him to make his desired movement safely. The distance required varies with the speed of traffic on the main highway and whether the driver is entering or crossing. Figure 201-3 lists the distance required for a car entering from a crossroad to make a left turn onto the main highway while clearing traffic approaching from the left. ISD should be obtained whenever possible. Since this is not always possible, it should be noted that ISD is considered secondary to providing adequate stopping sight distance on the mainline.

### **201.31 Vertical ISD**

Also shown on Figure 201-3 are “K” curvature rates for crest vertical curves based on ISD. The “K” rates are derived using the height of eye as 3.50 feet and height of object (vehicle) as 4.25 feet. Appropriate equations are shown on Figure 201-3.

If a road or drive intersection occurs on or near a crest vertical curve, the length of curve should be at least as long as that calculated from the “K” rate for ISD or the “K” rate for stopping sight distance, whichever is greater.

In some areas, the sight distance will be limited due to projections above the pavement surface, such as raised medians, curb, and sidewalks. An illustration of this type of obstruction is shown in Figure 201-4, Diagram B, where the left sight distance is limited by a portion of the bridge abutment. Locations such as this should be checked graphically and corrected by lengthening the vertical curve, eliminating the obstruction or moving the intersection.

### **201.32 Horizontal ISD**

The horizontal controls for ISD are applied as shown in Figure 201-4. The waiting vehicle is assumed to be 10 feet off of the through road edge of pavement. The left edge of the moving vehicle on the through road is assumed to be 9 feet from the edge of pavement. The design speed of the through road is used to select the appropriate ISD length shown in Figure 201-3 and also Table A of Figure 201-4.

When the through road is on tangent, the distance the waiting vehicle at the intersection must be from an obstruction (Clearance B) for various distances from the pavement (Offset A) and for various design speeds, is provided by Table A of Figure 201-4. For instance, if the parapet of a structure is located 10 feet off the edge of pavement and the design speed is 60 miles per hour, the intersection must be located so that the waiting vehicle is 225 feet from the end of the structure. Since Diagram A on Figure 201-4 is for a tangent condition, a graphical solution will be required when the through roadway is curved.

### **201.33 Effect of Guardrail**

When a guardrail is required at an intersection and is located such that a driver cannot see over it, the guardrail should be offset 15 feet as shown in Diagram C of Figure 201-4. To return the guardrail to its normal location, the appropriate flare ratio for the design speed can be found in Table A.

## **201.4 Passing Sight Distance (PSD)**

Figure 201-3 lists the distance required for passing an overtaken vehicle at various design speeds. These distances are applicable to two-lanes roads only. It is important to provide adequate passing sight distance for as much of the project length as possible to compensate for missed opportunities due to oncoming traffic in the passing zone.

Figure 201-3 also contains “K” curvature rates for crest vertical curves based in passing sight distance. The “K” rates are derived using a 3.50 feet height of eye and a 4.25 feet height of object. Appropriate equations are included on Figure 201-3.

## **201.41 Available Passing Sight Distance**

On 2-lane highways with design hourly volume (DHV) exceeding 400, the designer should investigate the effect of available passing sight distance on highway capacity using the procedures contained in the 1985 TRB “Highway Capacity Manual”. In particular, the designer should select the level of service to be used for design in accordance with Figure 301-1.

If the available passing sight distance restricts the capacity from meeting the design level of service, adjustments should be made to the profile to increase the available passing sight distance. If, after making all feasible adjustments to the profile, capacity is still restricted below the design level of service due to the lack of sufficient passing sight distance, consideration should be given to providing passing lane sections or constructing a divided multi-lane facility.

## **201.5 Decision Sight Distance (DSD)**

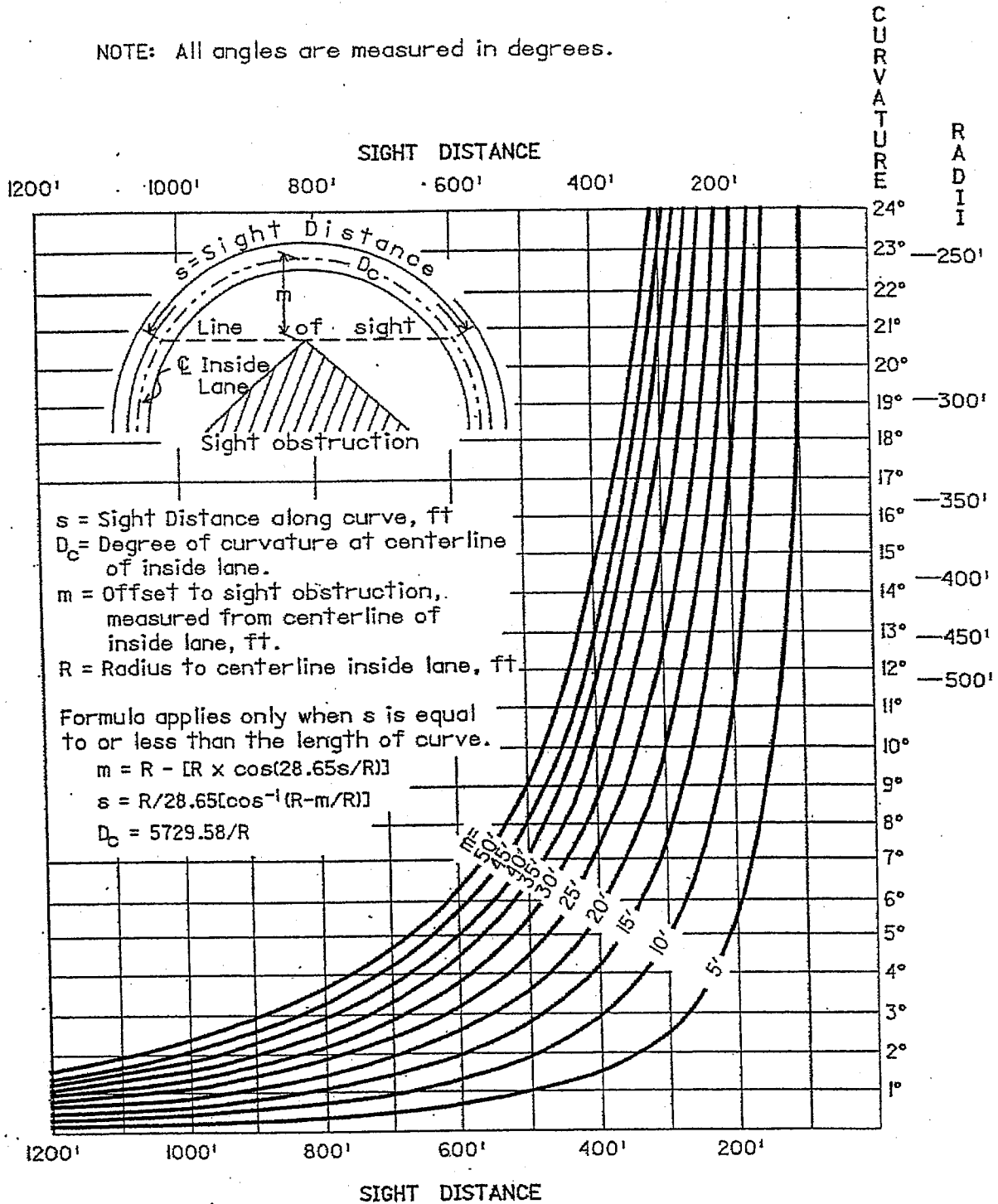
Stopping Sight Distances are usually sufficient to allow reasonably competent and alert drivers to come to a hurried stop under ordinary circumstances. However, stopping sight distances may not provide sufficient visibility distances for drivers when information is difficult to perceive, or when unexpected maneuvers are required. In these circumstances, decision sight distance provides the greater length needed by drivers to reduce the likelihood for error in either information reception, decision making, or control actions.

The following are examples of locations where it is desirable to provide decision sight distance: exit ramps; diverging roadway terminals; intersection stop bars; changes in cross section such as toll plazas and lane drops; and areas of concentrated demand where there is apt to be “visual noise” whenever sources of information compete, as those from roadway elements, traffic, traffic control devices, and advertising signs.

A range of decision sight distance values that will be applicable to most situations is presented in Figure 201-5. If the feature under consideration occurs on a crest vertical curve, the “K” value shown in Figure 201-5 may be used to determine the desirable length of vertical curve. If it is not feasible to provide these recommended distances because of horizontal or vertical constraints, consideration should be given to providing the preferred stopping sight distance in Figure 201-1 and to using suitable traffic control devices for providing advance warning of the unexpected conditions that are likely to be encountered.

<b>HORIZONTAL SIGHT DISTANCE</b>	<b>201-2 E</b>
<b>REFERENCE SECTION</b>	
<b>201.2.1</b>	

NOTE: All angles are measured in degrees.



When a combination of spirals, tangents and/or curves are present, the horizontal sight distance should be determined graphically.

# STOPPING SIGHT DISTANCE

## 201-1 E

REFERENCE SECTION  
201.2 & 201.2.1

HEIGHT OF EYE 3.50'

HEIGHT OF OBJECT 2.00'

$$SSD = 1.47Vt + 1.075V^2 \div a$$

*SSD* = stopping sight distance, ft;  
*t* = brake reaction time, 2.5s;  
*V* = design speed, mph;  
*a* = deceleration rate, 11.2ft/s<sup>2</sup>

DESIGN SPEED (mph)	DESIGN SSD (feet)	DESIGN SPEED (mph)	DESIGN SSD (feet)
20	115	45	360
21	120	46	375
22	130	47	385
23	140	48	400
24	145	49	415
25	155	50	425
26	165	51	440
27	170	52	455
28	180	53	465
29	190	54	480
30	200	55	495
31	210	56	510
32	220	57	525
33	230	58	540
34	240	59	555
35	250	60	570
36	260	61	585
37	270	62	600
38	280	63	615
39	290	64	630
40	305	65	645
41	315	66	665
42	325	67	680
43	340	68	695
44	350	69	715
45	360	70	730

Note: For design criteria pertaining to Collectors and Local Roads with ADT less than 400, please refer to the AASHTO Publication, Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400).

MINIMUM PASSING AND  
INTERSECTION SIGHT DISTANCE

201-3

REFERENCE SECTION  
201.3, .31, .32 & 201.4

DESIGN SPEED	MINIMUM SIGHT DISTANCE			
	PASSING		INTERSECTION	
	MPSD	K-CREST VERT.CURV	MISD	K-CREST VERT.CURV
70	2500	2030	950	300
65	2300	1720	875	250
60	2100	1430	825	220
55	1950	1230	750	185
50	1800	1050	700	160
45	1650	890	625	125
40	1500	730	575	110
35	1300	550	500	80
30	1100	400	450	65
25	950	300	375	45
20	800	210	300	30

HEIGHT OF EYE 3.50'

HEIGHT OF OBJECT 4.25'

$$K = S^2 / 3093 \text{ (Rounded)}$$

$$S < L: L = KA, S = 55.61 \sqrt{K}$$

$$S > L: L = 2S - (3093/A), S = 1546.36/A + L/2$$

Where: S=Minimum Passing or Intersection Sight Distance

L=Length of Crest Vertical Curve

A=Algebraic Difference in Grades (%)

<b>MINIMUM PASSING SIGHT DISTANCE</b>	<b>201-3 E</b>
	REFERENCE SECTION 201.4

HEIGHT OF EYE 3.50'

-

HEIGHT OF OBJECT 3.50'

DESIGN SPEED (mph)	PASSING SIGHT DISTANCE (PSD)	
	Minimum PSD (ft.)	K-CREST VERT. CURV
20	710	180
25	900	289
30	1090	424
35	1280	585
40	1470	772
45	1625	943
50	1835	1203
55	1985	1407
60	2135	1628
65	2285	1865
70	2480	2197

Using: S = Minimum Passing Sight Distance  
L = Length of Crest Vertical Curve  
A = Algebraic Difference in Grades (%), Absolute Value  
K = Rate of Vertical Curvature

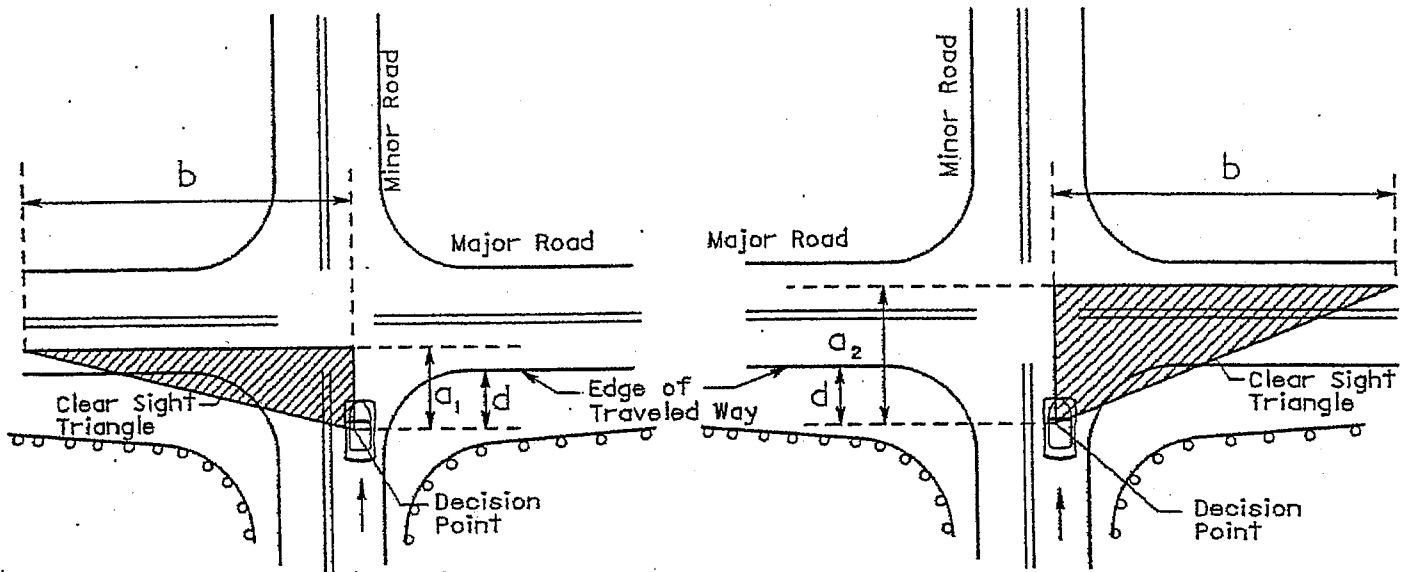
- For a given design speed and an "A" value, the calculated length "L" =  $K \times A$

- To determine "S" with a given "L" and "A", use the following:

For  $S < L$ :  $S = 52.92 \sqrt{K}$ , where  $K = L/A$

For  $S > L$ :  $S = 1400/A + L/2$

<h1 style="margin: 0;">INTERSECTION SIGHT TRIANGLES</h1>	<h2 style="margin: 0;">201-4 E</h2> <p style="margin: 0;">REFERENCE SECTION 201.3.1 &amp; 201.3.3</p>
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Sight Triangle for Viewing  
Traffic Approaching from the Left

Sight Triangle for Viewing  
Traffic Approaching from the Right

DIAGRAM A - SIGHT TRIANGLES

- $a_1$  = The distance, along the minor road, from the decision point to 1/2 the lane width of the approaching vehicle on the major road.
- $a_2$  = The distance, along the minor road, from the decision point to 1 1/2 the lane width of the approaching vehicle on the major road.
- $b$  = Intersection Sight Distance
- $d$  = The distance from the edge of the traveled way of the major road to the decision point. The distance should be a minimum of 14.4' and 17.8' preferred.

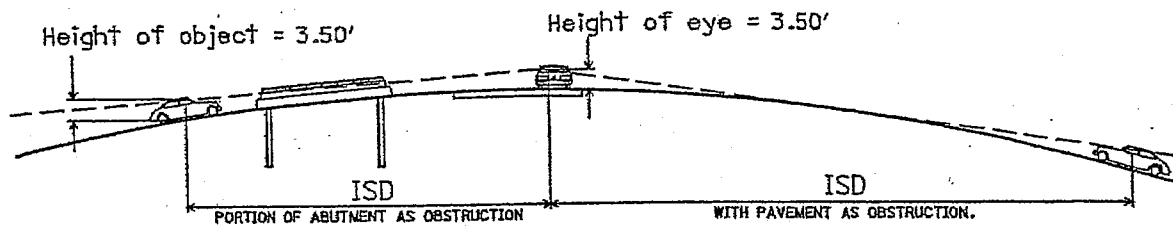


DIAGRAM B - VERTICAL COMPONENTS (Sec. 201.3.3)



<b>INTERSECTION SIGHT DISTANCE</b>	<b>201-5 E</b>
REFERENCE SECTION 201.3, 201.3.1, 201.3.2 & 201.3.3	

(See Following Page for Additional Figures & Notes)

HEIGHT OF EYE 3.50'

HEIGHT OF OBJECT 3.50'

DESIGN SPEED (mph)	Passenger Cars Completing a Left Turn from a Stop (assuming a $t_g$ of 7.5 sec.)		Passenger Cars Completing a Right Turn from a Stop or Crossing Maneuver (assuming a $t_g$ of 6.5 sec.)	
	ISD (ft.)	K-CREST VERT. CURVE	ISD (ft.)	K-CREST VERT. CURVE
15	170	10	145	8
20	225	18	195	14
25	280	28	240	21
30	335	40	290	30
35	390	54	335	40
40	445	71	385	53
45	500	89	430	66
50	555	110	480	82
55	610	133	530	100
60	665	158	575	118
65	720	185	625	140
70	775	214	670	160

If ISD cannot be provided due to environmental or R/W constraints, then as a minimum, the SSD for vehicles on the major road should be provided.

$$ISD = 1.47 \times V_{major} \times t_g$$

ISD = intersection sight distance (ft.)

$V_{major}$  = design speed of major road (mph)

$t_g$  = time gap for minor road vehicle to enter the major road (sec.)

Using: S = Intersection Sight Distance  
 L = Length of Crest Vertical Curve  
 A = Algebraic Difference in Grades (%), Absolute Value  
 K = Rate of Vertical Curvature

- For a given design speed and an "A" value, the calculated length "L" =  $K \times A$

- To determine "S" with a given "L" and "A", use the following:

For  $S < L$ :  $S = 52.92 \sqrt{K}$ , where  $K = L/A$

For  $S > L$ :  $S = 1400/A + L/2$

Note: For design criteria pertaining to Collectors and Local Roads with ADT less than 400, please refer to the AASHTO Publication, Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT  $\leq$  400).

<b>INTERSECTION SIGHT DISTANCE</b>	<b>201-5 E</b>
	REFERENCE SECTION 201.3, 201.3.1, 201.3.2 & 201.3.3

(Continued Figures &amp; Notes)

		Time Gaps	
		Design Vehicle	Time gap(s) at design speed of major road ( $t_g$ )
(A)	Left Turn from a Stop	Passenger car	7.5 sec.
		Single-unit truck	9.5 sec.
		Combination truck	11.5 sec.
(B)	Right Turn from a Stop or Crossing Manuever	Passenger car	6.5 sec.
		Single-unit truck	8.5 sec.
		Combination truck	10.5 sec.

A. Note: The ISD & time gaps shown in the above tables are for a stopped vehicle to turn left onto a two-lane highway with no median and grades of 3 % or less. For other conditions, the time gap must be adjusted as follows:

For multilane highways:

For left turns onto two-way highways with more than two lanes, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.

For minor road approach grades:

If the approach grade is an upgrade that exceeds 3 %, add 0.2 seconds for each % grade for left turns.

B. Note: The ISD & time gaps shown in the above tables are for a stopped vehicle to turn right onto a two-lane highway with no median and grades of 3 % or less. For other conditions, the time gap must be adjusted as follows:

For multilane highways:

For crossing a major road with more than two lanes, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane to be crossed and for narrow medians that cannot store the design vehicle.

For minor road approach grades:

If the approach grade is an upgrade that exceeds 3 %, add 0.1 seconds for each % grade.

<b>DECISION SIGHT DISTANCE</b>	<b>201-6 E</b>
	REFERENCE SECTION
	201.5

HEIGHT OF EYE 3.50'

HEIGHT OF OBJECT 2.00'

DESIGN SPEED (mph)	DECISION SIGHT DISTANCE (ft)				
	AVOIDANCE MANEUVER				
	A	B	C	D	E
30	220	490	450	535	620
35	275	590	525	625	720
40	330	690	600	715	825
45	395	800	675	800	930
50	465	910	750	890	1030
55	535	1030	865	980	1135
60	610	1150	990	1125	1280
65	695	1275	1050	1220	1365
70	780	1410	1105	1275	1445

The Avoidance Maneuvers are as follows:

- A - Rural Stop
- B - Urban Stop
- C - Rural Speed/Path/Direction Change
- D - Suburban Speed/Path/Direction Change
- E - Urban Speed/Path/Direction Change

Decision Sight Distance (DSD) is calculated or measured using the same criteria as Stopping Sight Distance; 3.50 ft eye height and 2.00 ft object height.

Use the equations on Figures 201-2, 203-3, and 203-6 to determine the DSD at vertical and horizontal curves.

MAXIMUM CENTERLINE DEFLECTION WITHOUT HORIZONTAL CURVE	202-1
	REFERENCE SECTION 202.1

DESIGN SPEED	MAX. DEFLECTION *
25	5° 30'
30	3° 45'
35	2° 45'
40	2° 15'
45	1° 15'
50	1° 15'
55	1° 00'
60	1° 00'
65	0° 45'
70	0° 45'

\* ROUNDED TO NEAREST 15'

Based on the following formulae:

Design Speed 45 MPH or over:  $\tan \Delta = 1.0/V$

Design Speed under 45 MPH:  $\tan \Delta = 60/V^2$

Where V = Design Speed

Where  $\Delta$  = Deflection Angle

GUIDE FOR SELECTION OF DESIGN LEVELS OF SERVICE	301-1
	REFERENCE SECTION 301.11

MINIMUM LEVEL OF SERVICE				
AREA AND TERRAIN / LOCALE				
FUNCTIONAL	RURAL			URBAN AND SUBURBAN
CLASSIFICATION	LEVEL	ROLLING	HILLY	
INTERSTATE, OTHER FREEWAYS AND EXPRESSWAYS	B	B	B	C
ARTERIAL	B	B	C	C
COLLECTOR	C	C	D	D
LOCAL	D	D	D	D

A - Free flow, with low volumes and high speeds.

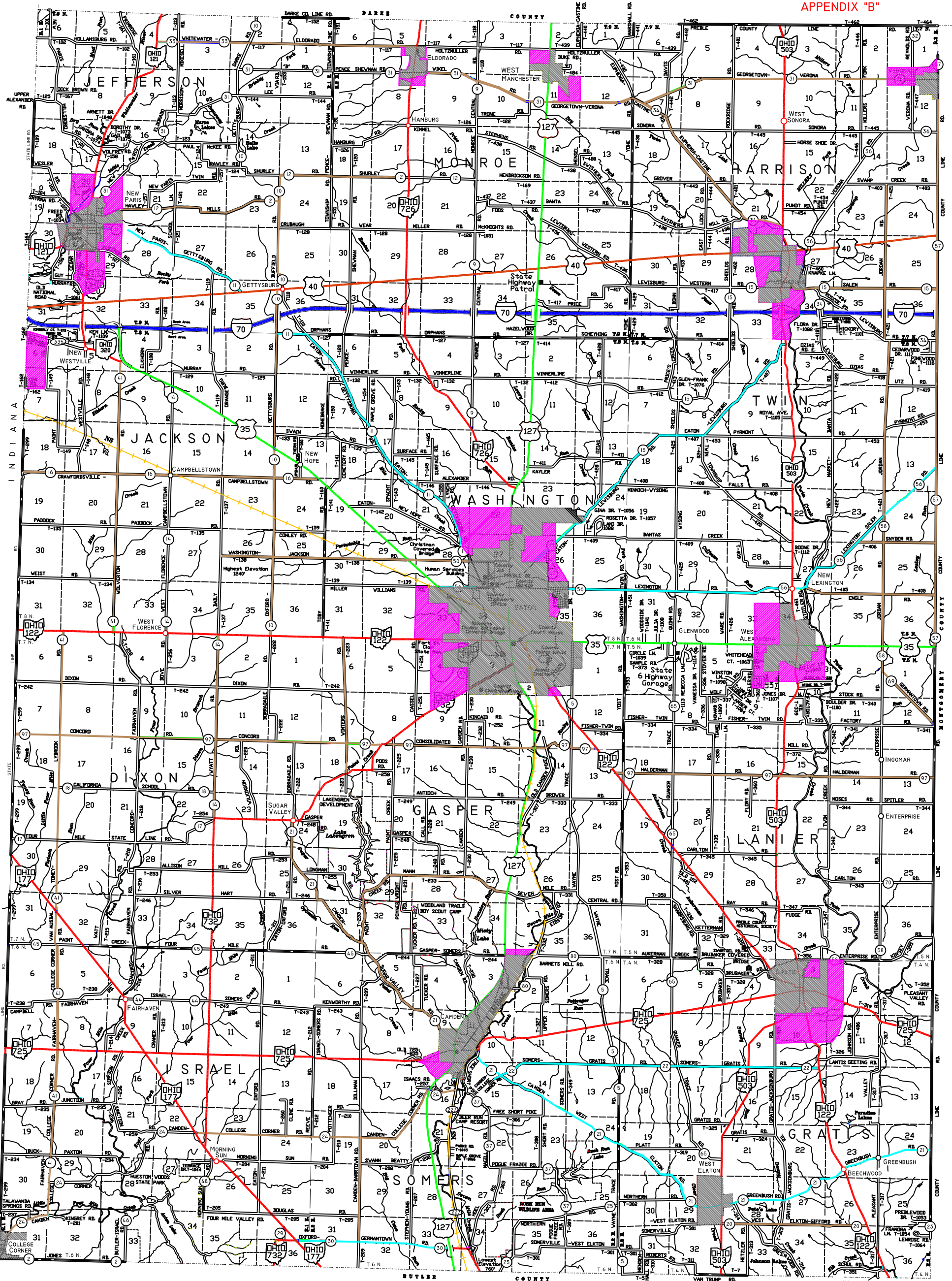
B - Stable flow, speeds beginning to be restricted by traffic conditions.

C - In stable flow zone, but most drivers are restricted in freedom to select own speed.

D - Approaching unstable flow, drivers have little freedom to maneuver.

E - Unstable flow, may be short stoppages.

F - Forced or breakdown flow.



December, 2000



PREBLE COUNTY THOROUGHFARE AND LAND USE PLAN

LEGEND

- Principal Arterial
- Minor Arterial
- Major Collector
- Major Collector (Local)
- Minor Collector
- Local
- Active Railroad
- Incorporated Areas
- Urban Transitional Areas