

# Article 5

## STREET DESIGN AND CONSTRUCTION STANDARDS

### Standards

#### 500 General

These Regulations shall control the manner in which the road system is arranged on the land to permit the safe, efficient, and orderly movement of traffic; to meet, but not exceed, the needs of the present and future population; to have a simple and logical pattern; to respect natural features and topography; and to present an attractive streetscape.

The County Engineer may require a traffic impact study, or the like, on any proposed subdivision to ensure the proposed subdivision achieves compliance with minimum traffic engineering standards and best management practices. The results of the traffic impact study, or the like, shall be approved by the County Engineer, incorporated into the proposed subdivision, and approved by the Planning Commission. Also, all curb cuts to minor or major subdivisions shall be reviewed and approved by the County Engineer. In addition, all streets shall extend to stub to the adjacent property line per the County Engineer, unless a variance is approved by the Planning Commission.

#### 501 Conformity to Development Plans and Zoning

No subdivision shall be approved unless the area to be subdivided has frontage on and access from an existing street on the adopted Belmont County Thoroughfare Plan, or any public Township street unless such street is an existing State, County, or Township highway, road, or street shown upon a plat approved by the Planning Commission and recorded in the County Recorder's office. Such street or highway must be suitably improved as required by these Regulations.

#### 502 Street Design

##### a. Arterial Streets

All arterial streets shall be designed using Ohio Department of Transportation Standards (Location and Design Manual and Construction and Maintenance Standards). Average Daily Traffic is typically in excess of 4,000 vehicles per day. Arterials are further designated as principal and minor arterials. The proposed arterial street shall conform to the higher standard of either the traffic study, or as shown on the adopted Belmont County Thoroughfare Plan. The County Engineer shall determine these standards after a complete review of the project. Approval of the Final Plat (pre-development) shall not be granted until a review of the proposed arterial street(s) is completed.

b. Collector Streets

Collector streets are designated as major collector and minor collector. Design standards for collector streets shall be based on the Construction and Material Standards. ADT's typically range from 400 to 2,000 vehicles per day in residential areas.

c. Local Streets

The County Engineer shall consider the entrance street of subdivision a collector, with respect to pavement width to the first intersection or a specified length as determined necessary. Left turn storage on all entrance streets shall be at least 100 feet with a 50-foot divergent taper. Longer storage length shall be as established by a traffic study. A minimum pavement width of 36 feet to accommodate turn lanes is required for all entrance streets (curbed and non-curbed). The pavement length provided on the final plat must be pre-approved by the County Engineer. Curb and gutter shall be provided for all entrance street intersections within existing County, Township, or State Highways, if the entrance street is curbed. The curb shall terminate at the end of the radius and taper to 0" in height at both curb ends. The minimum taper length is 10-feet. For non-curbed streets, a modified shoulder section shall be used. Local streets have been subdivided into four main sub-classifications: through, cul-de-sac, loop and low volume/low density streets.

1. Through and cul-de-sac standards: See the Geometric Design Tables in Section 503
2. Loop street standards: See the Geometric Design Tables in Section 503 In addition, the following requirements must be met:
  - a) Standard pavement thickness shall achieve compliance with Section 510.
  - b) Used only with curb and gutter streets.
  - c) Maximum parallel tangent or curved segment shall not exceed 500 feet in length.
  - d) The maximum approach tangent or curved segment from a local, collector, or arterial street shall not exceed 500 feet in length.
  - e) Alternative loop shapes may be permitted provided the total length of the loop street does not exceed 1300 feet (measured along the centerline from centerline of the intersecting street).
  - f) Approach or parallel centerline curves shall meet the minimum centerline radius as set forth in the Geometric Design Tables in Section 503.
  - g) Minimum centerline radius for centerline curve between approach segment and parallel segment shall be 75 feet. The inside pavement edge and right-of-way line shall be concentric. The outside pavement and right-of-way radii shall be 35 feet and 46.5 feet respectively. The Township shall provide written approval of the proposed radii. Regardless of the radii chosen, a minimum pavement slope of 0.02 is required.

- h) The minimum pavement width shall be 27 feet face-to-face of curb.
- i) The waterline shall be located on the inside of the loop.
- j) Only two intersecting points shall be permitted, no eyebrows or common access drives are allowed.
- k) Minimum right-of-way width is per the Geometric Design Tables in Section 503; additional utility and drainage easements shall be required along each side of the street.
- l) Minimum centerline radius:
  1. Angles between 80 and 100 degrees - 75-foot radius.
  2. Angles less than 80 degrees or more than 100 degrees.

3. Low Volume/Low Density Local Streets:

- a) A maximum ADT of 150 vehicles per day is permitted (15 lot maximum).
- b) See Geometric Design Tables in Section 503 for minimum pavement widths.
- c) Chip seal streets with an open ditch section are permitted if they are accessed from an existing chip seal street per the County Engineer.
- d) Eight (8)-foot graded shoulder (non-curbed streets only).
- e) Used on a modified loop street or cul-de-sac with no extensions to adjacent parcels of undeveloped lands.
- f) A minimum right-of-way is required per the Geometric Design Tables in Section 503 with required easements provided for drainage and utilities.
- g) Written approval by the appropriate Township(s) Board of Trustees (with a copy sent to the County Engineer).
- h) All other local street standards are applicable.
- i) A permanent T-turnaround is acceptable. The T-turnaround may be used as a driveway access.

d. Parkways/Boulevards

Designs for parkways and boulevards shall be submitted for County Engineer review and approval as part of the Preliminary Plan submittal. The design engineer is encouraged to contact the County Engineer during the preliminary design phase to discuss the design parameters for the proposed parkway or boulevard.

e. Traffic Expansion Factor

The traffic count on any street being designed within Belmont County, except local and permanent dead-end streets, shall be expanded to comply with the County Engineer's recommendation. The traffic count on any street being designed within

Belmont County, except local and permanent dead-end streets, shall be expanded for a twenty (20) year growth period. Proposed traffic expansion factors must be submitted to the County Engineer for approval. An explanation of the assumptions used to establish the factors shall be provided. The County Engineer will review area growth with the Planning Commission and advise the owner if the proposed factors are acceptable. The actual traffic expansion factor used must be approved in writing by the County Engineer.

f. Residential Vehicle Demand Factor

An ADT demand for street design shall be taken to be ten (10) vehicles per dwelling unit per day for residential subdivisions in determining the street classification. Non-residential subdivisions ATD demand for street design shall be determined by typical engineering standards to achieve best management practices. Additional vehicles due to other related factors must also be taken into account when determining traffic demands.

g. Terrain Classification

The definitions of terrain classification within Belmont County are as follows:

- i. Level: grade range of 0 to 5 percent, and
- ii. Rolling: grade range of 5 to 10 percent, and
- iii. Hillside: grade over 10 percent

Terrain classifications pertain to the general character of the existing ground within the road right-of-way, or that affects the proposed alignment and profile of the roadway.

When a proposed project has both level and rolling terrain classifications, the classification used for each street shall be consistent with the statement above. When in conflict the more restrictive classification shall be used. The terrain classification shall be clearly marked on the typical section. The County Engineer shall approve the proposed terrain classification prior submission of any plans and approvals.

h. Development Density

For the purposes of these Regulations, residential development density is defined as the total number of dwelling units divided by total combined area of dwelling units and street right-of-way in acres. Reserves, open spaces, and other non-building lots shall not be used in the calculation of development density. The development density shall be clearly shown on the title sheet.

- i. Low Density: 1 or fewer dwelling units per acre (density is

defined above)

ii. Medium Density: 1.1 to 3.0 dwelling units per acre (density is defined above)

iii. High Density: more than 3.1 dwelling units per acre (density is defined above)

i. Design Speeds

The design speeds shown in the Geometric Design Tables in Section 503 of these Regulations shall be used unless the County Engineer approves a variance.

j. Right-of-Way Widths

The minimum right-of-way widths for all public streets are shown in the Geometric Tables in Section 503. This minimum width shall be increased where and to the extent the County Engineer deems it necessary for topographic, construction, and drainage features.

k. Right-of-Way and Work Limit Clearing

The limits of the area to be cleared are to be defined in the final plat and associated construction drawings. It is not the intention of this clearing requirement to cause the removal of trees or other natural features that do not impact the design and safety of the proposed street. Trees or other natural features that are to remain in the right-of-way or work limits shall be clearly identified in the final plat and associated construction drawings. Townships may enact their own standards for obstructions in the right-of-way of roads to be maintained by the Township.

l. Vertical Alignment

The minimum length of curve shall conform to the requirements of the ODOT Location and Design (L & D) Manual, current edition. A minimum profile grade of 0.5% is required for all curb and gutter streets.

m. Horizontal Alignment

A minimum tangent length of one hundred (100) feet is required between reverse curves on all arterial and collector streets. A minimum tangent length of fifty (50) feet is required on local, commercial, and industrial streets. Minimum radii for horizontal curves are provided in the Geometric Design Tables in Section 503. The County Engineer reserves the right to increase the minimum tangent length between reverse curves, when necessary, in order to provide a safe and efficient roadway.

n. Pavement Width

The pavement widths for each type of street and type of use are shown in the Geometric Design Tables in Section 503. These widths shall be the minimum widths allowed. Pavement widths shall be increased where the County Engineer deems necessary in order to conform to the traffic and parking requirements of the area. Pavement width on curb and gutter type streets are measured from face to face of curb. Pavement widths for arterial streets shall be approved by the County Engineer.

o. Medians and Boulevards

When medians are proposed, the minimum pavement widths do not include a curb offset for these medians. The County requires a minimum 2-foot offset from the face of curb or edge of median. This requirement is for any arterial, collector, commercial, or industrial street. Minimum pavement widths for boulevard sections shall comply with current Regulations and Township requirements for emergency vehicles. Parking limitations on boulevard sections are subject to County Engineer and Township approval. ODOT Type 6 curb is not permitted.

p. Shoulders

Shoulder width is measured from the edge of the pavement to the point where the shoulder slope intersects the foreslope. When used, guardrail offset from the edge of pavement shall comply with the ODOT L&D Manual, current edition. A two-foot paved shoulder (minimum) shall be required on all non-curbed arterial, industrial, and commercial streets. A two-foot (minimum) treated aggregate shoulder may be required on non-curbed streets, as determined by the County Engineer. A two-foot treated aggregate shoulder shall be required on existing road system as determined necessary by the County Engineer. The County Engineer shall determine the composition of all paved or treated aggregate shoulders.

q. Side and Ditch Slopes

Side and ditch slopes shall be shown on the typical sections. Side and ditch slopes shall conform to the requirements of the County Engineer.

Modified ditch sections (using a perforated pipe and a ditch section) may be required in some Townships. The developer must contact the Township regarding their requirements for open ditch roads. The County Engineer will encourage the use of a modified ditch section, if site conditions indicate a typical ditch section would drain poorly.

r. Sidewalks, Bike Paths, Pedestrian Crossings, and Handicap Ramps

Sidewalks and/or bike paths may be required as part of the Township or Planning Commission's recommendations. The developer shall check with the Township regarding their sidewalk requirements. Sidewalks or bike paths must be located a

minimum of 1'-0" outside the point where the ditch backslope intersects the existing ground on open ditch roadways. All sidewalk or bike paths should be located within a dedicated easement and/or public right-of-way. Sidewalk locations for curb and gutter streets are outlined in the Geometric Design Tables in Section 503.

When sidewalks and/or bike paths are proposed as part of the subdivision, the curbs shall be dropped or removed by a curb-cut method at the locations shown in the plans for the handicap ramps. The sidewalk, bike path, and/or handicap ramp adjacent to the curb shall comply with current Americans with Disabilities (ADA) requirements and these Regulations. Six curb ramps are required for all 3-way (T-type) intersections, and 8 curb ramps are required for all 4-way intersections. Ramps shall be located perpendicular to the curb. If the ramp is located within a radial section, the ramp shall be located perpendicular to the tangent of the curve at that point. Ramps shall be located to prevent leading users into the intersection and oncoming vehicular traffic. The curb detailing shall be modified to accommodate a flush surface at the gutter pan near all handicap ramps, using a maximum slope of 1.38%. Sidewalks, bike paths and handicap ramps that are a part of a no-load entrance street, or in areas where access to the street is not permitted (e.g. open space areas, etc.), shall be constructed as part of the street improvements. All necessary sidewalk, bike path, handicap ramp and pedestrian crossing details (e.g., school crossing signs, crosswalk markings, signals, etc.) shall be included on the construction drawings.

s. Curb Drops

Pre-designed curb drops for drives shall not be permitted. Curb-cut methods for establishing dropped curbs are permitted.

t. Street Access Restriction

When required by the County Engineer, based upon projected ADT's and other safety considerations, direct access to lots along a collector or arterial street shall be prohibited. Arterial and collector streets have a secondary function to service abutting land use. Therefore, the County Engineer has established a street access restriction to avoid direct access to abutting properties and lots from collector, and especially, arterial streets.

All access points to arterial and collector streets shall require the approval of the County Engineer. In addition, access points for local streets within high traffic volume areas (e.g., commercial, multi-family, industrial, etc.) shall be approved by the County Engineer.

u. Variances

These Regulations have been developed based on the standard and/or traditional road, bridge, and subdivision design. Variances may be granted when proven engineering practices show these Regulations cannot be obtained. Intended

variances shall be submitted during the Preliminary Plan process. These variance requests shall be submitted in writing, if approved by the County Engineer and/or Board of County Commissioners, documented (showing approval date) on the title sheet of the final plat and associated construction drawings. All variances must have the written approval of the County Engineer. Variances are to be considered on a project-by-project basis. Any approved variances are not to be considered as precedent for future projects.

v. Parking Restrictions

When one side parking restrictions are required or planned, the parking restriction shall occur on same side as the location of the fire hydrant(s).

w. Miscellaneous

Underdrains shall outlet into structures for curb and gutter streets, and at the low point of the roadway profile for all open ditch streets. Precast reinforced concrete outlets are required for all Type F outlets. The pipe material for Type F outlets must comply with County Engineer standards.

Profile grade is defined as the top of curb for all curb and gutter streets, and the top of centerline of pavement for all open ditch streets. All arterial and major collector streets using curb and gutter sections shall comply with the ODOT L&D Manual, current edition (Type 2 Curb with a 9-inch-thick gutter pan is required). All minor rural and minor urban collector streets using a curb and gutter section shall use a 6-inch-thick gutter pan. For all open-ditch streets the fire hydrant must be located 8-feet from the edge of pavement.



## 503 GEOMETRIC DESIGN TABLES

<b>TABLE 5-1 SHOULDER AND DITCH UP TO 400 ADT LOCAL STREET DESIGN STANDARDS FOR THROUGH STREETS &amp; CUL-DE-SACS</b>			
<b>ITEM</b> (Reference)	<b>STANDARDS</b> [in feet, unless otherwise shown]		
Right-of Way Width**	Fifty feet (50') minimum, Sixty feet (60') mandatory for sites with sidewalks, bike paths, etc.		
Minimum Cul-de-Sac Radius (R/W)	Forty feet (40')		
Minimum Cul-de-Sac Radius	Thirty feet (30') when fully paved		
Development Density	Low (D ≤ 1 Lots/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High (> 3 Lots /Acre)*
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	N/A*
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	25 MPH	20 MPH	20 MPH
Minimum Centerline Radius	200 feet	110 feet	100 feet
Minimum Sight Distance	See 504 E (125' SSD; 200' Intersection)		
Maximum Grade	7 Percent	11 Percent	16 Percent
Maximum Grade of Cul-de-Sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width	18'	18'	18'
Min. Shoulder Width	4 - feet		
Min. Shoulder Width w/ Guardrail	7 - feet		
Min. Clear Zone (from EOP)	6 - feet (may be reduced by variance based on circumstances / terrain / etc.)		
Sidewalk Width	5 - feet		
<p>*Belmont County will not accept shoulder &amp; ditch roadways directly serving residential driveways in high development density. In those instances, curb and/or gutter are required. Through roads/collectors may utilize open section with managed access.</p> <p>**40 feet of right-of-way may be permitted for 15 lot or less subdivisions per the County Engineer.</p>			

**TABLE 5-2 SHOULDER AND DITCH (400 ADT to 2,000 ADT)  
MINOR COLLECTOR STREET DESIGN STANDARDS  
FOR THROUGH STREETS & CUL-DE-SACS**

<b>ITEM (Reference)</b>	<b>STANDARDS [in feet, unless otherwise shown]</b>		
Right-of Way Width	Fifty feet (50') minimum, Sixty feet (60') mandatory for sites with sidewalks, bike paths, etc.		
Minimum Cul-de-Sac Radius (R/W)	Fifty-Five feet (55')		
Minimum Cul-de-Sac Radius	Forty-Five feet (45') when fully paved		
Development Density	Low (D ≤ 1 Lot/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High ( > 3 lots /Acre)*
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	N/A*
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	30 MPH	25 MPH	25 MPH
Minimum Centerline Radius	335' feet	200 feet	200 feet
Minimum Sight Distance	See 504 E (155' SSD; 280' Intersection)		
Maximum Grade	7 Percent	11 Percent	15 Percent
Maximum Grade of Cul-de-Sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width	22'	22'	20'
Min. Shoulder Width	6 - feet		
Min. Shoulder Width w/ Guardrail	9 - feet		
Min. Clear Zone (from EOP)	7 - feet (may be reduced by variance based on circumstances / terrain / etc.)		
Sidewalk Width	5 - feet		
*Belmont County will not accept shoulder & ditch roadways directly serving residential driveways in high development density. In those instances, curb and/or gutter are required. Through roads/collectors may utilize open section with managed access.			

**TABLE 5-3 SHOULDER AND DITCH (2,000 ADT to 4,000 ADT)  
MAJOR COLLECTOR STREET DESIGN STANDARDS  
FOR THROUGH STREETS & CUL-DE-SACS**

<b>ITEM (Reference)</b>	<b>STANDARDS [in feet, unless otherwise shown]</b>		
Right-of Way Width	Sixty feet (60') minimum		
Minimum Cul-de-Sac Radius (R/W)	Fifty-Five feet (55')		
Minimum Cul-de-Sac Radius	Forty-Five feet (45') when fully paved		
Development Density	Low (D ≤ 1 Lot/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High (> 3 lots /Acre)*
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	N/A*
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	35 MPH	30 MPH	30 MPH
Minimum Centerline Radius	510' feet	335 feet	335 feet
Minimum Sight Distance	See 504 E (200' SSD; 335' Intersection)		
Maximum Grade	7 Percent	10 Percent	14 Percent
Maximum Grade of Cul-de-Sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width	24'	24'	22'
Min. Shoulder Width <sup>1</sup>	8 - feet		
Min. Shoulder Width w/ Guardrail	11 - feet		
Min. Clear Zone (from EOP)	12 - feet (may be reduced by variance based on circumstances / terrain / etc.)		
Sidewalk Width	5 - feet		
*Belmont County will not accept shoulder & ditch roadways directly serving residential driveways in high development density. In those instances, curb and/or gutter are required. Through roads/collectors may utilize open section with managed access.			
<sup>1</sup> 2'-0" of graded shoulder shall be sealed aggregate berm.			

**TABLE 5-4 CURB & GUTTER UP TO 400 ADT  
LOCAL STREET DESIGN STANDARDS  
FOR THROUGH STREETS & CUL-DE-SACS**

ITEM (Reference)	STANDARDS [in feet, unless otherwise shown]		
Right-of Way Width	Fifty feet (50') Minimum, Sixty feet (60') mandatory for sites with Sidewalks, Bike paths, etc.		
Minimum Cul-de-Sac Radius (R/W)	Forty feet (40')		
Minimum Cul-de-Sac Radius	Thirty feet (30') when Fully Paved		
Development Density	Low (D ≤ 1 Lots/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High (> 3 Lots /Acre)
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	750 feet
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	25 MPH	20 MPH	20 MPH
Minimum Centerline Radius	200 feet	110 feet	100 feet
Minimum Sight Distance	See 504 E (125' SSD; 200' Intersection)		
Maximum Grade	7 Percent	11 Percent	16 Percent
Maximum Grade of Cul-de-Sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width*	34'	32'	30'
Min. Back of Curb Berm Width	6' desired; 3'		
Min. Bank of Berm Width w/Sidewalk	7 - feet		
Min. Clear Zone (Without Parking from Curb Face)	1.5 - feet		
Sidewalk Width**	5 - feet		

\*Minimum pavement widths include on-street parking. If requesting reduction in minimum roadway widths via "No On-Street Parking" signage, three full size 9'x18' parking spaces must be demonstrated on each and every residential parcel exclusive of any garage parking. A site plan must be developed for structures and driveways showing this requirement is met outside of the R/W. The absolute minimum allowable roadway widths (face of the curb to face of curb w/ no on-street parking) are as follows: Level Terrain- 26'; Rolling Terrain- 24'; Hillside Terrain- 22'. Residential parking lane width assumed 7-feet wide.

\*\*Where sidewalk abuts on-street parking, the sidewalk shall be widened thru buffer strip to the back of curb for a 7 ft minimum width (8ft desirable). Low volume (<400ADT) roadways are exempt from this rule.

**TABLE 5-5 CURB & GUTTER (400 ADT to 2,000 ADT)  
MINOR COLLECTOR STREET DESIGN STANDARDS  
FOR THROUGH STREETS & CUL-DE-SACS**

ITEM (Reference)	STANDARDS [in feet, unless otherwise shown]		
Right-of Way Width	Fifty Feet (50') minimum, Sixty feet (60') mandatory for sites with sidewalks, bike paths, etc.		
Minimum Cul-de-Sac Radius (R/W)	Fifty-Five feet (55')		
Minimum Cul-de-Sac Radius	Forty-Five feet (45') when fully paved		
Development Density	Low (D ≤ 1 Lots/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High (> 3 Lots /Acre)
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	750 feet
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	30 MPH	25 MPH	25 MPH
Minimum Centerline Radius	335 feet	200 feet	200 feet
Minimum Sight Distance	See 504 E (155' SSD; 280' Intersection)		
Maximum Grade	7 Percent	11 Percent	15 Percent
Maximum Grade of Cul-de-Sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width*	36'	34'	32'
Min. Back of Curb Berm Width	6' desired 3'		
Min. Bank of Berm Width w/Sidewalk	9 - feet		
Min. Clear Zone (Without Parking from Curb Face)	4.0 - feet		
Sidewalk Width**	5' minimum with 2' minimum buffer strip		
*Minimum pavement widths include on-street parking. If requesting reduction in minimum roadway widths via "No On-Street Parking" signage, three full size 9'x18' parking spaces must be demonstrated on each and every residential parcel exclusive of any garage parking. A site plan must be developed for structures and driveways showing this requirement is met outside of the R/W. The absolute minimum allowable roadway widths (face of the curb to face of curb w/ no on-street parking) are as follows: Level Terrain- 26'; Rolling Terrain- 24'; Hillside Terrain- 22'. Residential parking lane width assumed 7-feet wide.			
**Where sidewalk abuts on-street parking, the sidewalk shall be widened thru buffer strip to the back of curb for a 7 ft minimum width (8ft desirable). Low volume (<400ADT) roadways are exempt from this rule.			

**TABLE 5-6 CURB & GUTTER (2,000 ADT to 4,000 ADT)  
MAJOR COLLECTOR STREET DESIGN STANDARDS  
FOR THROUGH STREETS & CUL-DE-SACS**

ITEM (Reference)	STANDARDS [in feet, unless otherwise shown]		
Right-of Way Width	Sixty feet (60') minimum		
Minimum Cul-de-Sac Radius (R/W)	Fifty-Five feet (55')		
Minimum Cul-de-Sac Radius	Forty-Five feet (45') when fully paved		
Development Density	Low (D ≤ 1 Lots/Acre)	Med. (1 < D ≤ 3 Lots/Acre)	High (> 3 Lots /Acre)
Maximum Length of Dead-End Street	1,500 feet	1,000 feet	750 feet
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	35 MPH	30 MPH	30 MPH
Minimum Centerline Radius	510 feet	335 feet	335 feet
Minimum Sight Distance	See 504 E (200' SSD; 335' Intersection)		
Maximum Grade	7 Percent	10 Percent	14 Percent
Maximum Grade of Cul-de-sac Bulb (along centerline of traveled lane)	3 Percent	5 Percent	7 Percent
Min. Pave Width*	38'	36'	34'
Min. Back of Curb Berm Width	6' Desired; 3'		
Min. Bank of Berm Width w/Sidewalk	11 - feet		
Min. Clear Zone (Without Parking from Curb Face)	6.0 - feet		
Sidewalk Width**	5' minimum with 4' minimum buffer strip		
*Minimum pavement widths include on-street parking. If requesting reduction in minimum roadway widths via "No On-Street Parking" signage, three full size 9'x18' parking spaces must be demonstrated on each and every residential parcel exclusive of any garage parking. A site plan must be developed for structures and driveways showing this requirement is met outside of the R/W. The absolute minimum allowable roadway widths (face of the curb to face of curb w/ no on-street parking) are as follows: Level Terrain- 26'; Rolling Terrain- 24'; Hillside Terrain- 22'. Residential parking lane width assumed 7-feet wide.			
**Where sidewalk abuts on-street parking, the sidewalk shall be widened thru buffer strip to the back of curb for a 7 ft minimum with (8ft desirable). Low volume (<400ADT) roadways are exempt from this rule.			

**TABLE 5-7  
HOMESTEAD (FAMILY) PROVISION SUBDIVISION  
DESIGN STANDARDS**

<b>ITEM (Reference)</b>	<b>STANDARDS</b> [in feet, unless otherwise shown]		
Right-of Way Width	Fifty feet (50') minimum, Sixty feet (60') mandatory if any potential for further subdivision in future.		
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>	<b>Hillside</b>
Minimum Design Speed	25 MPH	25 MPH	25 MPH
Minimum Centerline Radius	198 feet	198 feet	198 feet
Minimum Sight Distance	See 503 E (125' SSD; 115' Intersection)		
Maximum Grade	7 Percent	11 Percent	16 Percent
Min. Pave Width	15'	15'	15'
<b>W/SHOULDERS</b>			
Min. Shoulder Width	2 – feet		
Min. Shoulder Width w/Guardrail	5 - feet		
Min. Clear Zone (from EOP)	6 - feet (may be reduced by variance based on circumstances / terrain / etc.)		
Maximum Number of Lots	5		
Minimum Lot Size	5,000 square feet or per General Health District		
Maximum Length of Roadway	2,000-feet		
Pavement Material / Thickness	Engineered pavement calculations must be supplied with request for Family Subdivision indicating acceptable structural support for local traffic and emergency service vehicles (i.e. ambulance & fire trucks)		
Centerline Location	Centerline of the R/W will be the construction baseline of the roadway		
<p>Note: The goal of this standard is to allow family-owned land to be subdivided and passed down to surviving family members (see Section 302 f) . No more than 5 new parcels of land can be created using this standard. In addition, this standard requires the roadway to be privately owned and maintained per a private street maintenance agreement approved by the Planning Commission. Language stating thus must accompany the deed/plat of every new parcel created utilizing this standard.</p>			

**TABLE 5-8  
COMMERCIAL AND INDUSTRIAL STREET  
DESIGN STANDARDS**

ITEM (Reference)	STANDARDS [in feet, unless otherwise shown]	
Classification	Curbed	Uncurbed
Design Speed (Design Speed subject to approval of the County Engineer at the Preliminary Plan Phase)	25 MPH (min.) 35 MPH - Preferred	25 MPH (min.) 35 MPH - Preferred
Right-of-way width (These widths are guidelines. The design engineer is responsible to establish right-of-way adequate to construct and maintain the proposed typical section, including required bike paths, etc.)	60 to 80 feet	70 to 90 feet
Number of Traffic Lanes – Total number of traffic lanes to be determined from approved traffic study	2 to 4	2 to 4
Width of Traffic Lanes (Minimum)	12 feet	12 feet
Curb offset- Curbed Streets Shoulder Width – Uncurbed Streets (Gutter Pan Counts toward Requirement)	0-feet – 25 mph 2-foot – 35 mph	2-foot paved – 25 mph 4-foot paved – 35 mph
Width of Curb Parking Lane	8 feet	8 feet
Type of Curb	Vertical Face with a 2-0” wide gutter pan (8” thick)	N/A

Note to designer: Center line and edge line shall be striped on all commercial and industrial streets.

Source: U.S. Department of Transportation, U.S. National Highway Functional Classification and Needs Study Manual, 1970



## 504 INTERSECTION DESIGN

### a. Angle of Intersection

Streets should be laid out to intersect at right angles and no street shall intersect any other street at an angle of less than seventy-five (75) degrees. Current ADA requirements shall be checked for all street intersections between 75 and 90 degrees to ensure compliance.

### b. Number of Allowable Intersecting Streets

Three-way (T-type) intersections are encouraged and in no event shall an intersection containing streets in excess of four (4) be approved.

### c. Offset Intersections

Intersection offsets shall comply with the requirements of Table 5-9. These requirements apply to each subclassification of road (the same criteria apply for both a minor collector; minor arterial and major arterial, etc.).

### d. Intersection Grades, Elevations, and Pavement Thickness

All intersections shall be designed to comply with current ADA requirements and these Standards, including but not limited to, minimum and maximum grades for all intersecting streets, location of curb ramps outside the midpoint of the intersection radius, and locations of all utilities so that they do not conflict with the curb ramp. Storm structures shall be offset a minimum of 4-feet from all ADA curb ramps.

Curb and gutter streets shall provide storm structures at all low points within the intersection. Elevations shall be provided at a twenty-five (25) foot minimum spacing along the intersection radii. Pavement thickness at all intersections shall use the thicker pavement section through the radius return point on all streets, including those streets where a thinner pavement section is permitted.

### e. Sight Distances

1. Intersection Sight Distance (ISD): Intersection sight distance shall be in accordance with ODOT's Location and Design Manual, current edition. In order to maintain the required "clear" sight distance free of obstacles, the County Engineer shall restrict the height of embankments, locations of buildings, landscaping and screen fencing, etc., in this area. At an intersection with a collector, arterial or existing County/Township Road, a 90-foot clear sight distance triangle shall be provided. No landscaping, embankment, or feature greater than 24-inches in height shall be permitted within this triangle.

An exhibit showing this clear sight distance triangle shall be included in the construction drawings, and certified by a registered professional engineer prior to the acceptance of the street by the County.

2. Stopping Sight Distance (SSD): Stopping sight distance shall be in accordance with ODOT's Location and Design Manual, current edition.
3. Sight Distance Requirements: The controlling sight distance requirement shall be as set forth in Table 5-9. The classification of the intersecting streets shall be as determined by the County Engineer. These requirements apply to each subclassification of road (the same criteria apply for both a rural minor collector and an urban minor collector; minor arterial and major arterial, etc.). Intersections within the subdivision that access an existing County or Township Road shall be designed to meet the intersection stopping distance as established in ODOT's Location and Design Manual, current edition. In no case shall an intersection be designed to less than the minimum requirements.
4. Roadway Profile/Height of Object: The height of object shall be determined for the current roadway profile, and for a future roadway profile, assuming a profile increase of six (6)-inches to account for future overlay(s). All necessary modifications shall be made to the plans in order to provide the required sight distance. These modifications shall include, but not be limited to, profile changes on the existing County/Township Road, removal of obstructions within the R/W to provide adequate sight distance triangle, etc. The County Engineer must approve in writing any proposed modifications as part of the Preliminary Plan approval. These modifications shall be incorporated in the construction drawings.

<b>TABLE 5-9 SITE DISTANCE</b>	
INTERSECTING STREET Classification/Classification	CONTROLLING SIGHT DISTANCE
Local/Local	SSD
Local/Collector	ISD / SSD*
Local/Arterial	ISD
Collector/Collector	ISD
Collector/Arterial	ISD
Arterial/Arterial	ISD

\*A minimum of a 35-mph design speed shall be used for SSD for the collector street.

## **505 TEMPORARY AND PERMANENT TURN-AROUND**

- a. A temporary turn-around shall be required when the end of the road in question is greater than 250 feet from the nearest intersection or per the County Engineer. No portion of the temporary turn-around shall be used as a driveway for any of the lots on the stub street. Language to this effect shall be listed on the final plat for the subdivision.
  
- b. Where a temporary turnaround is used, it shall be provided with a temporary easement covering the portion of the turnaround that extends beyond the normal right-of-way limits. Such temporary easements shall be automatically vacated for the use of the abutting property owner when said temporary turn-around is no longer needed for public use.
  
- c. Permanent turnarounds shall not be permitted without written approval by the County Engineer except for low-volume/low-density roads. All permanent turnarounds shall be approved on the final construction drawings and shall be constructed per the County Engineer.

**TABLE 5-10  
INTERSECTION DESIGN GUIDELINES**

ITEM (Reference)	STANDARDS [in feet, unless otherwise shown]	
Approach Speed	25 M.P.H.	
Sight Distance	ODOT L&D Manual Current Edition	
Intersection Angle	75 Degrees – Minimum 90 Degrees – Preferred	
Minimum Curb Radius Local –Local	30 feet (35 feet without curb)	
Local – Collector	35 feet	
Collector- Arterial	40 feet	
Arterial – Arterial	50 feet	
Commercial & Industrial	50 feet	
Median Nose – Distance from the Intersection	Shall not extend beyond the radius return of the approach to the intersection.	
<b>Minimum Centerline Offset of Adjacent T type Intersections*</b>		
Local – Local	150 feet	
Local – Collector	200 feet	
Collector – Collector	350 feet	
Intersection on Arterials	Based on a detailed traffic study or current County Standards	
<b>Terrain Classification</b>	<b>Level</b>	<b>Rolling</b>
Vertical Alignment within intersection Area	Must comply with current ADA Requirements	Must comply with current ADA Requirements
Minimum Tangent Length Approaching Intersection (Each leg)	50 feet	30 feet

\*Note to designer: For signalized intersections, roundabouts, etc., other design solutions beyond the above minimum centerline offset standards may be required.

## **506 Bridges, Culverts Over 6-Foot Span and Special Structures**

All bridges, culverts over 6-foot span and special structures shall be designed using current AASHTO specifications and the current ODOT Bridge Design Manual, ODOT Location and Design Manual, associated standard drawings, etc. The County Engineer shall determine the types of special structures that need to be designed to these standards. A minimum of an HS25-44 loading shall be used for all structures, unless a special loading (for example, permit loading) is required by the County Engineer. Pedestrian traffic, bicycle traffic, and other safety considerations shall be considered in the design.

## **507 Street Lighting**

The County Engineer shall approve all street lighting details (e.g., poles, luminaries, conduit, etc.). These details shall be included in the final plat and associated construction drawings. The subject Township shall be contacted to determine if street lighting is required, and who will be responsible for future maintenance including energy cost, etc. The subject drawing shall be prepared by a lighting professional.

## **508 Street Signs**

All necessary street name signs and locations are to be included in the construction drawings. These details shall be provided on the same plan sheet as the traffic control devices, pavement markings, etc. The street name signs are to be installed prior to opening any street to traffic. The standards for the street name signs shall be in accordance with the requirements of the County Engineer. All special street sign installations are to be maintained by the developer or a homeowners/commercial association. All street name signs to be used shall be approved for use by the County Engineer and/or Township. Street signs (including bases) at the entrance to a subdivision from a County, Township, or State highway (within County or State right-of-way) shall be designed to current FHWA and ODOT standards.

## **509 Traffic Control Devices and Pavement Markings**

The construction drawings shall include all necessary traffic control signs, devices, and pavement markings, etc. These items shall be designed to meet the requirements of the current edition of the ODOT Manual of Uniform Traffic Control Devices (MUTCD). These details shall be provided on a separate plan sheet in the construction drawings.

All striping shall comply with these Regulations, using ODOT specifications for all arterial, major, and minor collectors, and local (residential, commercial, industrial, etc.) roads. Thermoplastic striping shall be used for all minor urban collector and local (residential, commercial, industrial, etc.) roads. Pavement striping for existing County/Township Road widenings must match the existing striping at the project limits.

The developer is required to provide speed limit signs on existing County, Township, or State Highways where the proposed subdivision entrance street(s) intersects the public highway. These signs shall state the posted speed limit for the intersecting County, Township, or State Highway.

Speed limit signs shall be placed on all subdivision streets. Spacing of signs shall comply with the ODOT MUTCD, current edition. School zone signs (e.g., pavement markings, cross walks. signs, etc.) shall be provided for all subdivision streets located within school zone limits as defined in the ODOT MUTCD. No parking signs shall be provided, if required, based on street width. A concrete right-in/right-out island (pork chop) shall be included with the final construction drawings, if required as part of the approved traffic study. These traffic control signs, devices, and pavement markings shall be installed prior to the County accepting the public improvements. The County Engineer shall approve the final stop sign locations. Stop signs shall not be located on any street signs.

## **510 Pavement Design**

This section specifies the pavement design criteria to be used in determining minimum pavement composition and thickness. All pavement materials and construction shall conform to these Regulations including any supplemental specifications, unless the County Engineer determines that additional requirements are needed for a particular project. In the case of any question as to the required street classification, pavement composition, construction and materials specifications, the County Engineer shall make the final determination.

### **a. Soil Supporting Strength**

The subgrade strength California Bearing Ratio (CBR value) shall be determined by a testing laboratory using current ASTM standards. The County also permits the assumption of poorest soil conditions. For Belmont County, a CBR value equal to 2.9, Modulus of Subgrade Reaction (K) equal to 100, or Soil Support Value (SSV) equal to 2.7 may be assumed. The soil supporting CBR value used in the design shall be clearly shown on the typical section for each street. The CBR value shall be determined for each street in the proposed subdivision.

Some sites may require additional strengthening in order to provide an adequate subbase for the proposed pavement section. In those cases, the County Engineer may require the use of a subgrade reinforcing material. Determination of the need for subgrade reinforcing shall be based on evaluation of soils testing for the site. Pavement reinforcing may be required by the County Engineer to insure adequate pavement strength. A contingency quantity and plan notes for the pavement and subgrade reinforcing material shall be included in the construction drawings. The County Engineer shall give final approval of the need, type, and quantity of subgrade and/or pavement reinforcing required.

b. Traffic and Equivalent Loading

Pavement design shall be based on equivalent daily 18,000-pound single axle application. Actual or estimated traffic counts shall be required for each street. All residential local streets shall be designed using 5 % trucks at full legal load per lane per day for a thirty (30) year design period. All local commercial and industrial, major and minor collector, and principal and minor arterial streets shall be designed based on an approved traffic study that is to include the percentage of trucks for a thirty-year design period. The County Engineer shall approve the percentage of trucks used for local commercial and industrial, major and minor collector, and principal and minor arterial streets.

To account for design uncertainties a reliability factor of 85% ( $Z_R = -1.037$ ) shall be used. In addition, the minimum allowable standard deviation  $S_O$  for flexible pavement is 0.44 and for rigid pavement is 0.34. Design calculations shall be based on current AASHTO design methods and submitted with a copy of the indicated soil test for written approval by the County Engineer. Sites that contain schools and/or embedded commercial or industrial sites will need to account for the increased traffic loading(s) due to these special uses (vs. conventional residential traffic loading).

c. Material Coefficients

The following coefficients for various types of materials shall be used with current AASHTO design equations for all minor rural collector, major collector, and major and minor arterial streets:

<b>TABLE 5-11 MATERIAL COEFFICIENTS</b>		
<b><u>ITEM*</u></b>	<b><u>MATERIAL</u></b>	<b><u>Coefficient</u></b>
Item 448 (Surface and Intermediate Course), and Item 301	Asphalt Concrete	0.35
Item 304	Aggregate Base	0.14

\*Per ODOT Construction and Materials Specifications, Current Edition

d. Allowable and Minimum Pavement Composition

In lieu of an AASHTO Engineered Pavement Design, the following pavement design for residential local and minor collector streets may be used. These designs have been developed using the AASHTO pavement design methods for flexible and rigid pavements. If the pavement sections shown in this section are used, an internal traffic study is not required for pavement design, but the ADT values must

be provided on the plans for each street. Under no circumstances shall a pavement composition have an SN of less than 2.66. Pavement designs submitted shall not include the surface course layer (448) as part of the strength computations.

On any projects with paving operations occurring after October 31 (or per the County Engineer), the surface course layer shall not be placed until the following construction season. This will not keep the subdivision from conditional acceptance of public improvements by the Board of County Commissioners, if all the other development requirements achieve compliance.

<b>TABLE 5-12 BELMONT COUNTY RESIDENTIAL PAVEMENT DESIGN CRITERIA</b>					
		<b>Local Streets</b>		<b>Major and Minor Collector Streets</b>	
Design formul a symbol	Description	Flexible	Rigid	Flexible	Rigid
	Design Life	30 years			
	Percent of Trucks	5%		5%	
ESAL's (E18) or (W 18) in ESAL/ Vehicle	18-kip Equivalent Single Axle Loads	0.0134	0.0179	0.0155	0.0216
ZR	Standard normal deviate	85 % Reliability Factor = (-1.037)			
SO	Standard error	0.44	0.34	0.44	0.34
S'c	Modulus of rupture	N/A	650 psi	N/A	650 psi
PSI	Difference in serviceability index	2.2		1.95	
pt	Design terminal serviceability index	2		2.25	



Di	i <sup>th</sup> layer thickness	0.161	1.1	0.161	1.1
J	Load transfer coefficient	N/A	4.2	N/A	4.2
Mr	Resilient Modulus	2700	N/A	2700	N/A
k	Modulus of subgrade reaction (pci)	N/A	100	N/A	100
CBR		2.9			

The County Engineer permits the following pavement compositions for use in Belmont County without further design calculation.

The shaded area of Table 5-13 represents the “Minimum Pavement Composition” permitted for use on residential local and minor urban collector streets regardless of subsurface conditions or other design factors.

**TABLE 5-13  
PAVEMENT COMPOSITION**

Street Classification	Flexible Pavement Composition	Rigid Pavement Composition (Requires Written Approval by Township Trustees)
<b><u>Minimum Pavement Composition SN=2.66</u></b>		
Residential Local ADT ≤ 200	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 3 inches of 301 on 4 inches of 304 SN = 2.66	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 5 inches of 305 4 inches of 304

Residential Local ADT > 200 but ≤ 1500	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 6 inches of 301 on 4 inches of 304 SN = 3.71	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 6 inches of 305 4 inches of 304
Major and Minor Collector ADT >1500 but ≤ 3500	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 7.5 inches of 301 on 4 inches of 304 SN = 4.24	1 ½ inches of 448 Surface Course on 1 ½ inches of 448 Intermediate Course on 8 inches of 305 4 inches of 304
All Local Commercial, Local Industrial, Major and Minor Collector with ADT > 3500, and Major and Minor Arterials	Pavement Design Based on Traffic Volumes, Type of Development, etc. Pavement design must be approved in writing by the County Engineer.	
Chip seal streets with ditch section only (subdivisions with 15 lots or less)	4 inches of 304 5 inches of 301 Double chip seal at 1 inch	

**Notes:**

1. A prime coat (Item 408) (0.40 gallons per square yard) may be required between Item 304 and Item 301 at the discretion of the County Engineer in the field.
2. A tack coat (Item 407) (0.10 gallons per square yard) between Item 305 and Item 402 Intermediate Course may be required at the discretion of the County Engineer in the field.
3. Minimum asphalt concrete thickness for any flexible pavement with aggregate base shall be three (3”) on all Local Streets, four (4”) on all Major and Minor Collector Streets with ADT’s > 3500, and all Arterial Streets.
4. Item 448 Asphalt concrete surface course shall be not less than 1.5 inches nor more than 1.75 inches in thickness.

e. Soil Tests

If the developer desires to perform soil testing rather than assuming a CBR value of 2.9, a meeting shall be held with the County Engineer and the design engineer prior to the Preliminary Plan process. Soil testing shall be furnished for a minimum of every 1,000 square yards of pavement surface and in all low areas, with a minimum of one test per street. Additional testing may be required at the discretion of the County Engineer. These tests shall be made at the design subgrade elevation and to a minimum depth of five (5) feet below the design subgrade elevation. The test shall include the following:

1. Soil samples at subgrade elevation and depth by boring.
2. Moisture determination and maximum dry weight of soil.
3. AASHTO classification and group index for each sample.
  - a. Liquid limit
  - b. Plastic limit
  - c. Plasticity index
4. Mechanical analysis of the subgrade soil.
5. Laboratory CBR values as determined by ASTM D1883

The CBR value(s) shall be approved at the Preliminary Plan phase. The Final Plan shall not be submitted without the written acceptance of these CBR value(s).

f. Chip Seal Streets

Chip seal streets with an open ditch section on subdivisions with 15 lots or less are permitted if they are accessed from an existing chip seal street and shall be approved and constructed per the County Engineer.

**511 County Engineer's Time Frame and Approval**

All streets eligible for final acceptance of public improvements by the Board of County Commissioners shall be open for public use for a minimum period of eighteen (18) months prior to the final travel surface application as specified. This requirement can be waived with proper compaction of stone base courses per the County Engineer

The Developer shall supply to the County Engineer all weight slips or tickets pertaining to stone and asphalt that were involved in the road construction.

## **512 Street Vacation**

The Planning Commission shall not recommend the vacation of any street if such vacation will adversely affect the proper functioning of the existing street system or any future street plan prepared by, or approved by, the County. The procedure to vacate a street or alley may be found in *Ohio Revised Code* Section 5553.01.

## **513 Streets for Commercial Subdivisions**

Streets serving business developments and accessory parking areas shall be planned to connect with arterial streets so as not to generate traffic on local streets. The intersection of driveways from parking areas with arterial or collector streets shall be located so as to cause the least possible interference with traffic movement on the streets, and shall be located not less than one hundred (100) feet from the intersection of an arterial or collector street with any other street, and shall be spaced not less than two hundred (200) feet from each other. The Planning Commission may require marginal access streets to provide maximum safety and convenience.

## **514 Streets for Industrial Subdivisions**

Collector streets for industrial subdivisions shall be planned to serve industrial areas exclusively, and shall connect with arterial streets so that no industrial traffic will be directed into any residential streets. The intersections of service streets from parking areas, with arterial or collector streets shall not be less than one hundred (100) feet from the intersections of the arterial or collector street with any other street. Streets shall be planned to be extended to the boundaries of any adjoining land planned for industry, except if severe physical conditions prevent this or if the Planning Commission finds such extension is not in accord with the approved plan of the area.

## **515 Monuments, Markers, and Pins**

Monuments shall be set at all subdivision corners and iron pins at lot corners. The County Engineer may require other monuments or iron pins to be set in the subdivision. For lot corners, reinforcing bars 5/8" x 30" are acceptable. Other types of markers may be used if approved by the County Engineer. Subdivision corner and benchmark monuments shall be encased with concrete at least 6" in diameter and 30" in depth.

All monuments and iron pins shall be identified on the final plat and associated construction drawing, and shall be in place at the time the roads and other improvements are inspected for final acceptance by the County Engineer and the Board of County Commissioners.

## **516 Street Improvements**

All streets and thoroughfares shall be graded to their full width, including side slopes, and improved in conformance with the standards given or referred to in these Regulations. These standards are considered minimum and are subject to change where deemed necessary. All materials and construction procedures shall be in accordance with the current Construction and Materials Specifications (CMS) of the State of Ohio Department of Transportation or per the County Engineer.

## **517 Open Ditches and Slopes**

Open ditch construction for roadside drainage shall be permitted in low density areas and constructed according to Ohio Department of Transportation specifications. Minimum depth of ditches shall be two (2) feet below the edge of pavement, and one (1) foot minimum at top of hill and toe of bank. All ditches shall be protected against erosion. Curlex or approved equal shall be used in ditches up to 2.5%, sod or rip-rap shall be used in the bottom and sides of ditches up to 5%, and tile or paved gutters shall be used in ditches over 5%.