



2023 Annual Township Meeting Agenda



- 11:30 Registration
- 11:45 Lunch Provided
- 12:00 Pledge, Introduction & Elected Official Welcome
- 12:30 County Engineer's Presentation (Part 1)
- 12:55 Break
- 1:00 County Engineer's Presentation (Part 2)
- 1:25 Questions and General Discussion
- 1:30 Adjourn



Presentation Topics

Part 1:

County Engineer Duties

Request for Engineering Assistance

Roadway Grant Assistance Program (RGAP)

Road Salt

Force-Account Updates

Part 2:

Development Information



County Engineer Duties

O.R.C. § 5543.01 General Powers and Duties of Engineer

County Engineer shall have general charge of...

- Construction, reconstruction, resurfacing or improvement of roads by boards of township trustees

County Engineer shall supervise the construction, reconstruction, resurfacing and improvement of...

- Public roads by boards of trustees under 5571.01, 5571.06, 5571.07, 5571.15, 5573.01 to 5.73.15, 5575.02 to 5575.09, and 5577.01.



Request for Engineering Assistance

Please submit a Request for Engineering Assistance (REA) form to Doug Riedel

Form signed by majority of board of trustees

- or -

Signed by Township Administrator with consent of majority of board of trustees

Form REA
Revised November 2014
Page 1

OFFICE USE ONLY

REQUEST FOR ENGINEERING ASSISTANCE



Delaware County Engineer's Office
50 Channing Street
Delaware, Ohio 43015

Date: _____ Township: _____

The Board of Township Trustees hereby requests the County Engineer's engineering assistance as follows:

Road Name: _____ Road #: _____

Location: _____ miles _____ N _____ S _____ E _____ W _____ of _____ (nearest intersection)

or address # _____ or between _____ and _____ (roads).

ROADWAY/TRAFFIC SAFETY:

- Speed limit study
- Intersection traffic study
- Sight distance study
- Guardrail or barrier study

CULVERTS:

- Culvert safety inspection
- Culvert hydraulic analysis (pipe sizing)
- Force-account estimate
- County construction of township culvert

ROADWAY PLANNING AND MAINTENANCE:

- Pavement resurfacing or repair (attach road list)
- Roadway widening or other improvement study
- Sidewalk or curb ramp study
- OPWC funding application

DITCH/DRAINAGE:

- Ditch maintenance or cleanout

OTHER (describe below)

Include a brief description of what the Township is requesting. If there are multiple locations, list them below:

County Engineer is asked to respond to the following person who will be the point of contact in reference to this request:

Name: _____ Title: _____
Address: _____ City: _____ Zip: _____
Phone: _____ Fax or email: _____

Township Trustee _____ Date _____
Township Trustee _____ Date _____
Township Trustee _____ Date _____
Township Administrator* _____ Date _____

A minimum of two Trustee signatures is required.
* A copy of resolution requesting engineering assistance by the Board along with this form signed by Township Administrator is acceptable.

Mail, email or fax the signed and completed form to:
Delaware County Engineer's Office
Attn: Doug Riedel, P.E.
50 Channing Street
Delaware, OH 43015
Fax: 740-833-2399
Email: driedel@co.delaware.oh.us

See instructions on the following pages for more information



Roadway Grant Assistance Program

Roadway Grant Enhancement Program (RGAP) established by the County Commissioners September 9, 2019

3:1 match for local contribution by city, village or township with majority of its population in Delaware County

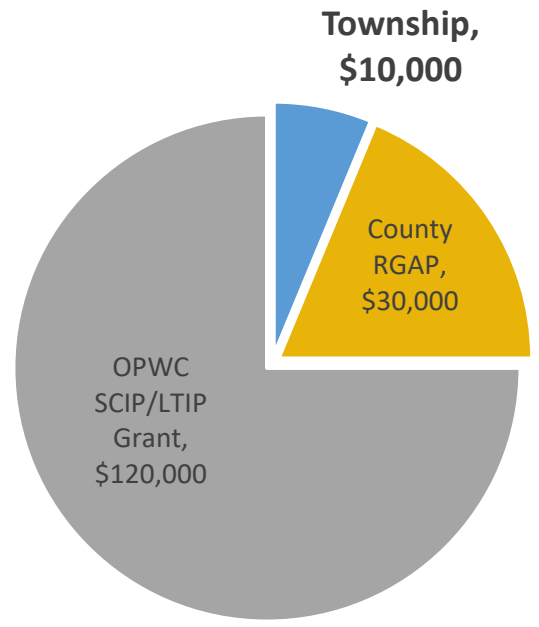
RGAP grants are capped at \$150,000 per agency, per year



RGAP Examples

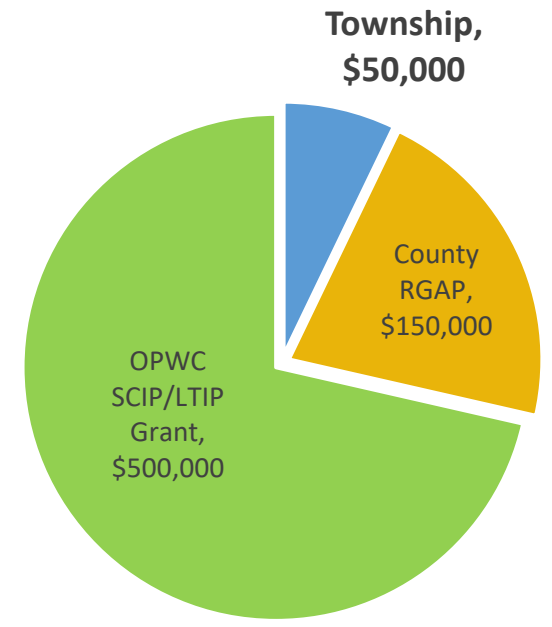
Example 1:

\$160,000 resurfacing project



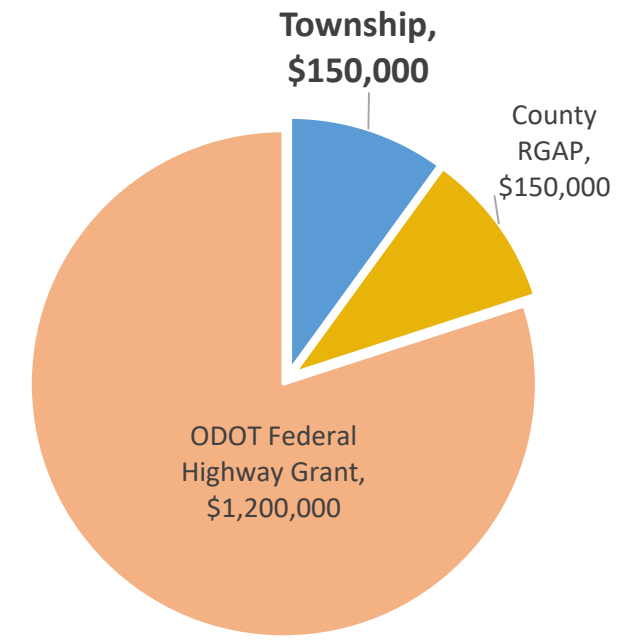
Example 2:

\$700,000 reconstruction project



Example 3:

\$1.5 million road widening





Road Salt

Salt prices for townships through May 2024 (Cargill):

- 100% Salt \$69.49/ton
- SG21 (2:1 salt:grit) \$55.62/ton
- SG11 (1:1 salt:grit) \$48.58/ton
- Brine \$0.24/gallon

10,000+ tons in county inventory as of November 2023 with 7,000 more under contract for delivery this winter

- Delaware - US Route 42 North 4,000+ tons
- Berkshire Township - Rome Corners 3,000+ tons
- Liberty Township - Sawmill Parkway 3,000+ tons



Township Road Maintenance

Authority for Township Roads

Force Account Updates

Township Road Maintenance

Road Maintenance Requirements



Authority for Township Roads

O.R.C. § 5571.01 Road Improvements

A board of township trustees may construct, reconstruct, resurface, or improve any public road or part thereof under its jurisdiction...

O.R.C. § 5571.02 Control and Maintenance of Township Roads

The board of township trustees shall have control of the township roads of its township ... and shall keep them in good repair.



Force Account Updates

What is Force Account?

- A County Engineer or a Board of Township Trustees may maintain, construct or reconstruct roads, culverts and bridges with its own crews and forces up to a certain dollar threshold.

Force Account limits were increased June 30, 2023 by House Bill 23

- Includes an annual increase indexed to the ODOT construction cost index starting in 2024



New Force Account Limits (2023)

| | Force Account Limit |
|--|------------------------------|
| County Engineer (O.R.C. 5543.19) | |
| Construction or reconstruction of roads (includes widening and resurfacing) | \$70,000 per centerline mile |
| Construction, reconstruction, improvement, maintenance or repair of bridges | \$232,000 total cost |
| Township Trustees (O.R.C. 5575.01) | |
| Maintenance and repair of roads | |
| <i>May award contract without competitive bidding, or proceed by force account if under...</i> | \$105,000 total cost |
| <i>Must request force account assessment form from county engineer if over...</i> | \$35,000 total cost |
| Construction or reconstruction of roads | |
| <i>Must invite, receive and open bids if over...</i> | \$35,000 per centerline mile |
| <i>Must request force account assessment form from county engineer if over...</i> | \$11,666 per mile |



Township Road Maintenance

Section 5575.01 Maintenance and repair of roads by contract or force account

(A) In the maintenance and repair of roads, the board of township trustees may proceed either by contract or force account, but, unless the exemption specified in division (C) of this section applies, if the board wishes to proceed by force account, it first shall cause the **county engineer** to complete the force account assessment form developed by the auditor of state under section [117.16](#) of the Revised Code. Except as otherwise provided in sections [505.08](#) and [505.101](#) of the Revised Code, when the board proceeds by contract, the contract shall, if the amount involved exceeds one hundred five thousand dollars, be let by the board to the lowest responsible bidder after advertisement for bids once, not later than two weeks, prior to the date fixed for the letting of the contract, in a newspaper of general circulation within the township. If the amount involved is one hundred five thousand dollars or less, a contract may be let without competitive bidding, or the work may be done by force account. Such a contract shall be performed under the supervision of a member of the board or the township road superintendent.



Township Road Maintenance

Section 5575.01 Maintenance and repair of roads by contract or force account

(B) Before undertaking the construction or reconstruction of a township road, the board shall cause to be made by the county engineer an estimate of the cost of the work, which estimate shall include labor, material, freight, fuel, hauling, use of machinery and equipment, and all other items of cost. If the board finds it in the best interest of the public, it may, in lieu of constructing the road by contract, proceed to construct the road by force account. Except as otherwise provided under sections [505.08](#) and [505.101](#) of the Revised Code, where the total estimated cost of the work exceeds thirty-five thousand dollars per mile, the board shall invite and receive competitive bids for furnishing all the labor, materials, and equipment and doing the work, as provided in section [5575.02](#) of the Revised Code, and shall consider and reject them before ordering the work done by force account. When such bids are received, considered, and rejected, and the work is done by force account, the work shall be performed in compliance with the plans and specifications upon which the bids were based.



Township Road Maintenance

Section 5575.01 Maintenance and repair of roads by contract or force account

(C) Force account assessment forms are not required under division (A) of this section for road maintenance or repair projects or under division (B) of this section for road construction or reconstruction projects of less than one-third of the applicable force account limit.

(D) On the first day of July of every year beginning in 2024, the threshold amounts established in divisions (A) and (B) of this section shall increase by an amount not to exceed the lesser of five per cent, or the percentage amount of any increase in the department of transportation's construction cost index as annualized and totaled for the prior calendar year. The director of transportation shall notify each appropriate county engineer of the increased amount.

(E) All force account work under this section shall be done under the direction of a member of the board or the township road superintendent.



Road Maintenance Requirements

Obstructions in the Right of Way

Roadside Drainage

Bridges and Culverts

Curve Signs

Sign Maintenance

Winter Road Maintenance



Obstructions in the Right of Way

O.R.C. § 5571.14 Object Bounding Township Road May Be Declared Public Nuisance

(A) A board of township trustees or township highway superintendent may determine that an object bounding any township road and located wholly or in part on the land belonging to the road interferes with snow or ice removal from, the maintenance of, or the proper grading, draining, or dragging of the road, causes the drifting of snow on the road, or in any other manner obstructs or endangers the public travel of the road. Work must be for a public necessity (i.e. public safety, nuisance, interference with public road maintenance or improvement, creates damage to public road)

Trustees or the Road Superintendent may order the object removed, and the owner of the object shall remove it within 30 days



Obstructions in the Right of Way

O.R.C. § 5543.14 grants specific authority for removing trees and brush:

... the board of township trustees may trim or remove any and all trees, shrubs, and other vegetation growing in or encroaching onto the right-of-way of the township roads of its township, as is necessary in the engineer's or board's judgment to facilitate the right of the public to improvement and maintenance of, and uninterrupted travel on, county and township roads.

... board [of township trustees] is not required to compensate the abutting landowner for trimming or removing such trees, shrubs, and other vegetation as is necessary to facilitate these rights.



Roadside Drainage

O.R.C. § 5571.15 Trustees May Improve Roads Without Petition

- Section (B) authorizes the board to “improve the drainage of water from the surface of the road” by majority vote
- Ditches drain the “surface of the road”
- Roadside ditches are also considered part of the roadway and are subject to the various road improvement and maintenance statutes



Who is responsible for standing water in roadside ditches?



Roadside Drainage

No authorization in Ohio Law for townships to:

- Improve drainage on private property adjacent to the road, except where the road itself is creating the issue
- Make drainage improvements beyond those related to a public road
- Intervene in private property drainage problems or disputes





Bridges and Culverts

Structures on Township Roads

- Bridge – Span or diameter greater than 10 feet (County)
- Culvert – Span or Diameter of less than 10 feet (Township)
- County participates in Township Culvert projects
- Need advance notice to include your culvert in our budget – **August 1** of prior year





Winter Road Maintenance

O.R.C. § 5571.08 Snow Removal

...the board of township trustees **shall** cause all the township roads within the township to be kept free from obstruction by snow.





Break Time



Development Information

Zoning vs. Platting

Typical Residential Subdivision Process

Development Exactions

Hybrid Single-Family Condos

Rental Communities

Cluster Mailbox Units



Zoning vs. Platting

What is Zoning?

Townships are authorized under Chapter 519 of the ORC to regulate by resolution...

- Location, height, bulk, number of stories and size of buildings.
- Setbacks and uses of buildings.
- Uses of land for trade, industry, residence, recreation or other purposes.



Zoning vs. Platting

What is Platting?

In the unincorporated areas, county planning commissions or regional planning commissions created pursuant to Chapter 711 & 713 of the ORC can regulate “platting” or subdivision of land, meaning the division of any tract into a lot under 5 acres.

- A plat is simply a map showing property lines which becomes the official legal description for any newly created lots within those boundaries.



Zoning vs. Platting

For cities and villages: Platting and zoning approvals usually combined under a Planning and Zoning Department.

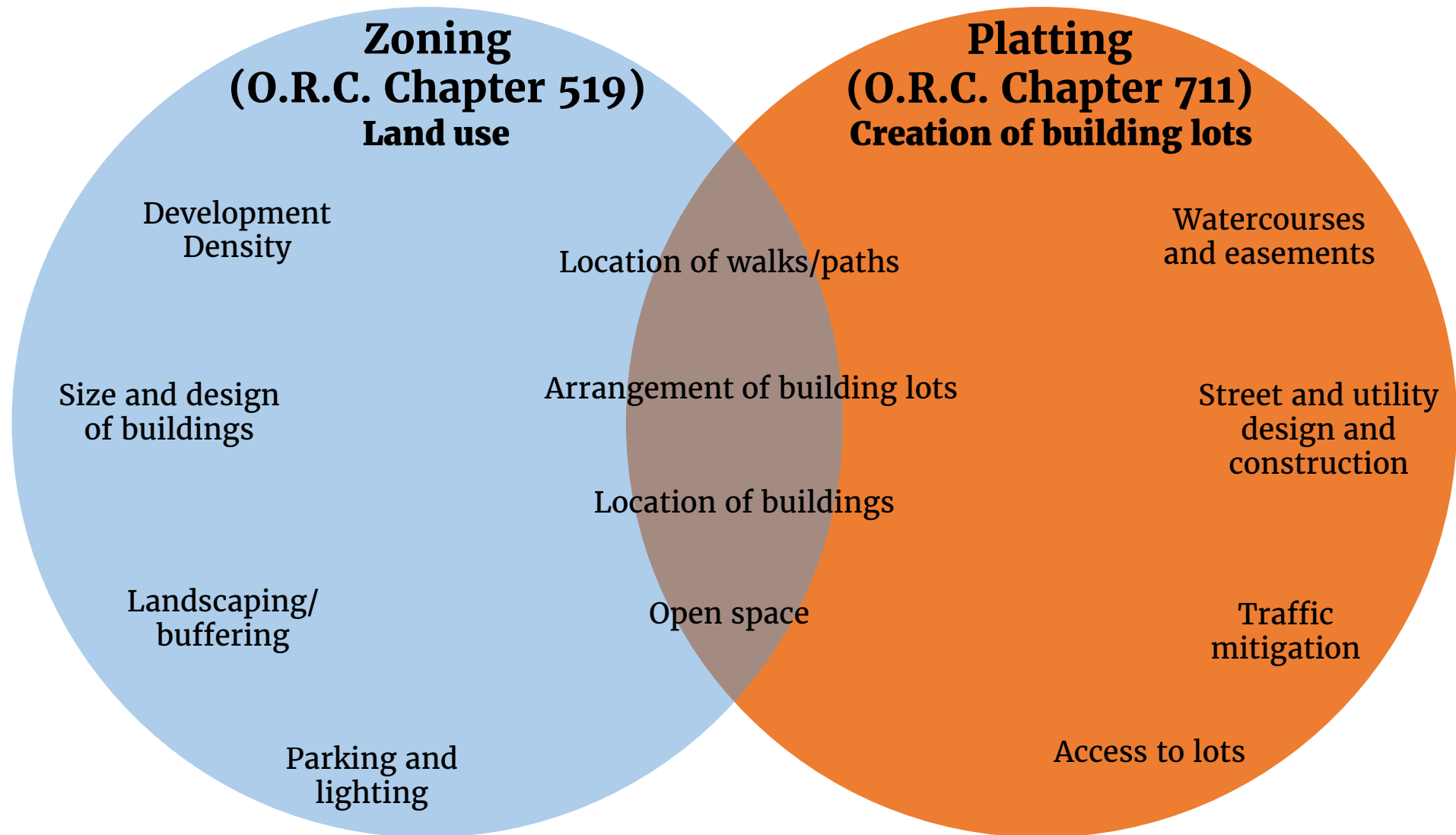
- Municipal corporations can adopt any law by ordinance that doesn't conflict with Ohio Law (Home Rule).

For counties and townships: Can only perform functions authorized by Ohio Law. Separate statutory authority exists for platting and zoning.

- Townships may adopt zoning code (O.R.C. 519)
- Regional Planning/Platting Commission (O.R.C. 711/713)



Zoning vs. Platting





Zoning vs. Platting

What can a planning commission regulate through platting?

- Requirement to construct streets or other improvements to serve new building lots.
- Arrangement of streets and other public improvements.
- Open spaces for traffic, utilities, access for firefighting apparatus, recreation, light, air and avoidance of congestion of population...



Zoning vs. Platting

County Engineer's Duties Relating to Platting?

O.R.C. Section 713.26

County Engineer shall assist the planning commission within the scope of county engineer's statutory duties involving roads, bridges, drainage and land surveying...

- Street design and construction
- Traffic studies
- Drainage, erosion and sediment control
- Subdivision plat accuracy



Typical Residential Subdivision Process

Zoning

RPC Sketch
Plan and
Zoning Review



Township
Zoning Board
Approval



Township
Trustee
Approval

Engineering/ Construction/ Platting

Preliminary/Final
Engineering



Street and sewer
construction



Plat Approval

Developer
One Year
Maintenance



Punchlist



Commissioners
Accept Public
Improvements



What Can Be Required of Developers?

Scope of local authority relating to requiring improvements (“exactions”) as a condition of platting has been litigated many times.

In general, any improvement required by a local agency as a condition of platting/subdividing must...

- Have essential nexus to a legitimate government interest (e.g. public safety, traffic flow, etc.)
- Provide some benefit to the platted lots
- Be roughly proportional to the projected impact of the development, both in nature and extent



Traffic Studies for New Developments

When are traffic studies required?

- Developments within platted subdivisions
- New roads or driveways on existing public roads

Who prepares and pays for the study?

- The developer or owner of the property
- Often started pre-zoning during “due diligence” phase

Who reviews the study?

- County Engineer staff or county’s engineering consultant

What standards and methodology are used?

- DCEO, like most agencies, uses Institute of Transportation Engineers (ITE) trip generation methodology



Traffic Studies for New Developments

What can be required?

- Pavement widening and ditch setback along existing frontage
- Turn lanes in/out of the development
- Upgrades to the adjacent road and nearest major intersection(s)
 - May be in the form of a proportional contribution toward a planned future county or township upgrade.
- Limited access (i.e. no driveways) collector streets on certain high traffic streets inside the development -
 - Examples: Walker Wood Blvd., Highland Lakes Ave., Mount Royal Ave.



Traffic Studies for New Developments

What can't be required?

- Upgrades where there is no measurable degradation caused by the development or the upgrade isn't proportional and/or directly attributable to the impact:
 - Examples: Can't require a small subdivision to build a new 4-lane highway, or can't stop a subdivision because it creates a small additional delay at a nearby intersection
- "Impact fees" or a fixed-fee for new trips added to the road network (there is no enabling legislation in the ORC for this):
 - Some states do have legislation allowing impact or "capacity fees" based on number of new trips from a development
- Prohibition of access:
 - Unless access right has already been purchased by the public the development must be given road access of some kind



Summary

Local agencies walk a fine line with development exactions:

Legitimate authority to protect public health, safety & welfare

vs.

Unconstitutional taking without compensation

County Engineer is authorized to review traffic studies under Regional Planning's platting authority and/or under access to an existing public road.

Scope of traffic study must be consistent with legal principles involving platting of new lots or new/revised access to public roadways.



Hybrid Single-Family Condos

What are these?

- Subdivision with platted fee-simple lots that can be sold to a buyer prior to construction of the home
- Requirement in the subdivision plat to file condominium documents prior to occupancy
- Everything else looks similar to a typical single-family subdivision



Why do developers do this?

- Achieves higher density due to small setbacks
- Save money with narrower streets and thinner pavement section



Hybrid Single-Family Condos

Important considerations for the drives/streets:

- Long-standing DCEO requirement to construct private streets to public standards in any platted development
- However... condominiums are statutorily exempt from platting (R.C. 5311.02) meaning DCEO and RPC cannot require that the neighborhood drives to conform to street standards or any other platting regulation
- To-date, developers have built these condo drives nearly to road standards but with notable differences
 - Narrower curb to curb width (23 feet vs. 27 feet)
 - Thinner pavement section (10-inch vs. 12-inch)
 - Narrower “right of way” (30 feet vs. 50 feet)
 - Sharper curves (75-foot radius vs. 250-foot radius)



Hybrid Single-Family Condos

Advantage for Townships:

- No township obligation for maintenance of streets
 - These drives don't meet the public street design requirements and DCEO won't be able to recommend future conversion to public streets

Disadvantages/Concerns for Townships:

- Future resident complaints to township that they are paying township road levy but receiving no benefit
- Failure of Condo Association to maintain streets
- Fire and EMS response if neighborhood allows parking on both sides of the street
 - Enforcement?



Rental Communities

Private “drives” versus private “streets”

- **Fee-simple lots:** If the development is subdivided into building lots with frontage on the new streets and the owner/developer wishes to maintain these streets as private (e.g. gated) this is still considered a *Subdivision* under O.R.C. 711.011, These would be considered private streets and must be built to public road standards.
- **Apartments:** A commercial lot with multiple buildings is considered to have commercial driveways, and the drives must only comply with township zoning requirements
- **Condominiums:** Specifically exempted from subdivision regulations (i.e. platting) by O.R.C. 5311.02 and the drives must only comply with township zoning requirements



Cluster Mailbox Units

Now being required by USPS in most single-family neighborhoods.

DCEO is working with Regional Planning Commission to develop standards for implementation.

- Ensure adequate on-street stopping area in both directions
- Provide ADA accessible curb ramps
- Avoid placing in front of homes (place along open spaces)
- Place strategically for most pickups inbound to neighborhood in afternoon





Questions?

Chris Bauserman, PE, PS
County Engineer

Rob Riley, PE, PS
Chief Deputy Engineer

Doug Riedel, PE
Township Engineer

Lee Bodnar
Administrator

We've moved!

Delaware County Engineer
1610 S.R. 521
P.O. Box 8006
Delaware, OH 43015-8006

Phone: 740-833-2400
delcoeng@co.delaware.oh.us



Other Information

State Infrastructure Funding Opportunities

Cooperative Purchasing Information

Residential Development Information

Zoning vs. Platting

Pavement Maintenance Concepts



State Infrastructure Funding Opportunities

Ohio Public Works Commission (OPWC Programs)
ODNR Clean Ohio Program and State Capital Bill



State Infrastructure Funding

OPWC Programs (SCIP, LTIP & Small Government)

- \$11-12 million available for grants in Round 38 (SFY 2025)
- Covers up to 90% of project cost but maximum points are achieved when grant request is <75%
- Typically maximum award is \$500,000

Other considerations for maximum points:

- Reconstruction and safety projects score higher than resurfacing
- Roads currently in poor condition score higher
- Projects on busy roads (high ADT) score higher
- Projects that are ready to construct score higher
- Smaller grant requests score higher



State Infrastructure Funding

For Paths and Trails:

- ODNR Clean Ohio Trail Fund (COTF) & Recreational Trail Program (RTP)
 - COTF provides up to 75% of project cost (\$500,000 max)
 - \$6.25 million provided annually statewide
- RTP provides up to 80% of project cost (\$150,000 max)
 - \$1.5 million provided annually statewide
 - This is a federal program and requires additional environmental study documentation
- State Capital Bill – contact your state legislators
 - Funding appropriated in capital bill and assigned to ODNR for oversight of grant
- Delaware County Commissioners – Trail Assistance program
 - Contact Scott Sanders, Regional Planning Commission



Cooperative Purchasing

County Road Improvement Program
State Purchasing Contracts



County Road Improvement Program

Combined competitively bid contract for County and Township paving and surface treatments

County commissioners will award the county work to the lowest and best bidder per O.R.C. 307.90

Townships **must** award to the same bidder to participate in the Program. Each township holds a separate contract with the Contractor.

Contract advertised in March; awarded in April or May

All curb ramps must be ADA compliant prior to commencing work under this contract!



County Cooperative Purchasing

Delaware County Cooperative Purchasing Contracts available to townships:

To be awarded in January:

- Curb and Sidewalk Construction
- Guardrail installation
- Tree Clearing
- Pavement Markings

To be awarded in March/April:

- Hot-mix Asphalt Material
- Liquid Asphalt Materials (emulsions for chip sealing)
- Cold Mix



State Purchasing Contracts

Ohio Department of Administrative Services

- Vehicles
- Equipment
- Furnishings
- Various Materials

ODOT Contracts

- Guardrail
- Sign Boards
- Pipe/Culvert Slip Lining
- Crack sealing



Pavement Maintenance Concepts

Infrastructure Assets

Pavement is Most Valuable Part

Pavement Condition Index

Pavement Maintenance Concepts

Preventive Maintenance Concepts

Worst First or Preservation Approach?



Infrastructure Assets

Roads are typically the most valuable asset of a political subdivision

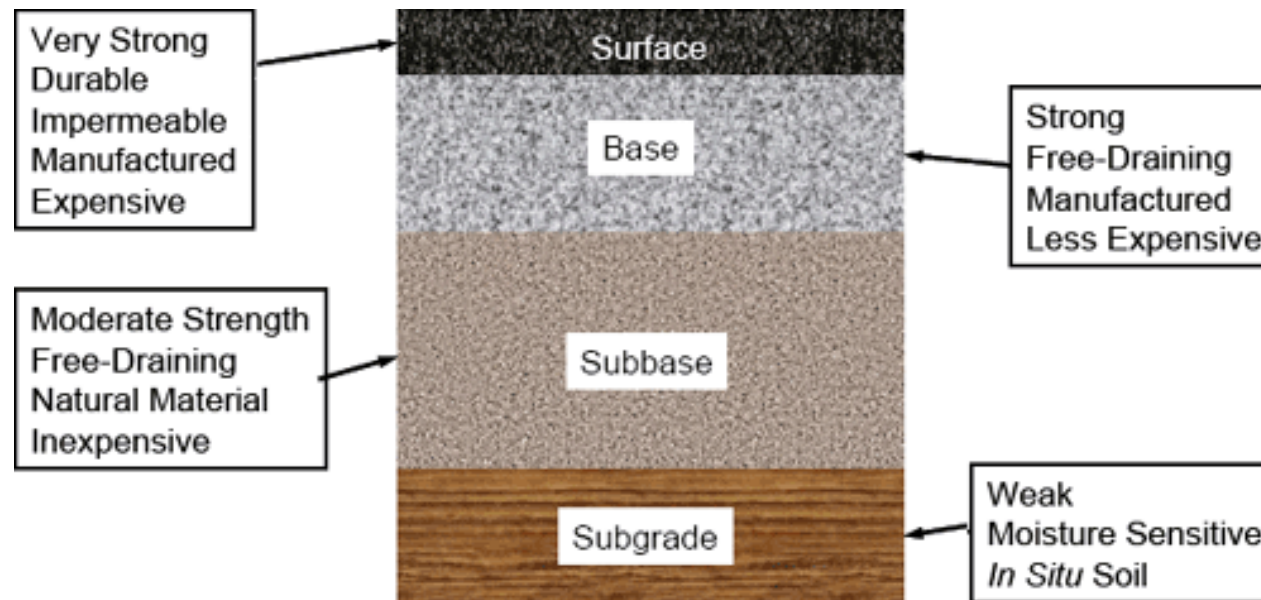
A typical 2-lane road is worth \$1.2 to \$3.0 million per mile depending on width, type of drainage system and topography

| Component | Typical % of Total Road Cost |
|---|------------------------------|
| Pavement and road base | 30-40% |
| Drainage system (storm sewers/ditches) | 15-30% |
| Major structures (bridges, retaining walls) | 0-25% |
| Safety devices (guardrails, barriers, lighting) | <5% |
| Traffic control (signs, signals) | <5% |
| Right of Way (land, easements) | 10-25% |



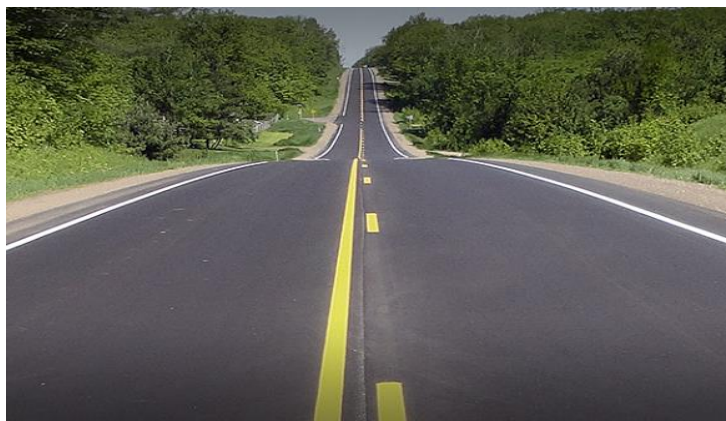
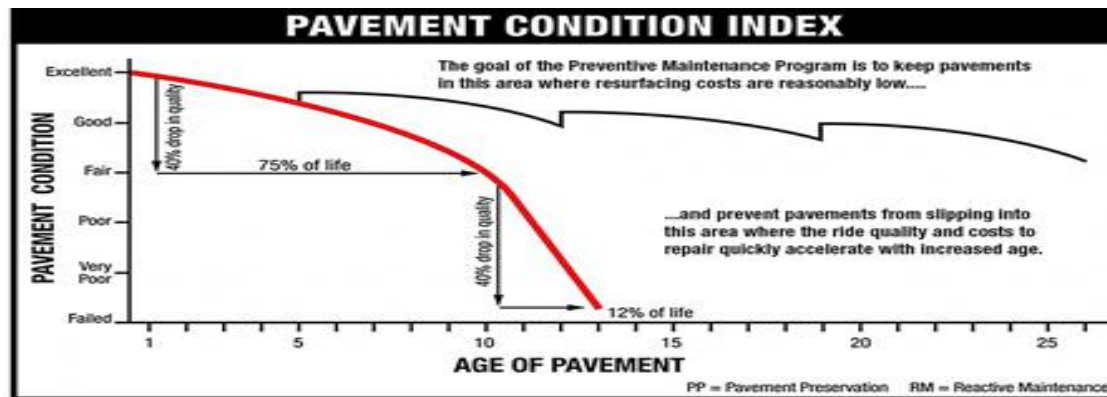
Pavement is Most Valuable Part

For a 2-lane road the pavement section is typically in the range of \$400,000 to \$1,000,000 per mile








Pavement Condition Index





Pavement Maintenance Concepts

| | PCI | REPRESENTATIVE PAVEMENT SURFACE | REPAIR ALTERNATIVE | MAINTENANCE PRIORITY |
|-----------------------|----------|--|---|---|
| ROUTINE MAINTENANCE | 86 - 100 | 90  | Pavements with PCIs above 85 will benefit from routine maintenance actions, such as periodic crack sealing, periodic joint resealing, or patching. | Medium Priority |
| PAVEMENT PRESERVATION | 56-85 | 65  | Pavements with a PCI of 56 (65 for PCC pavements) to 85 may require pavement preservation, such as a surface treatment, thin overlay, or PCC joint resealing. | High Priority – don't let these fall into the red or it will cost big \$\$\$ |
| MAJOR REHABILITATION | 0 - 55 | 25  | Pavement allowed to deteriorate below a PCI of 55 (65 for PCC) will require costly reconstruction to restore it to operational condition. | Low Priority – for roads that have already failed, replace pavement only when budget allows |



Worst First or Preservation Approach?

Don't fall into the "worst first" paving trap... once a road is "too far gone" keep it patched as cheaply as possible until you have the money to properly rehabilitate or rebuild it

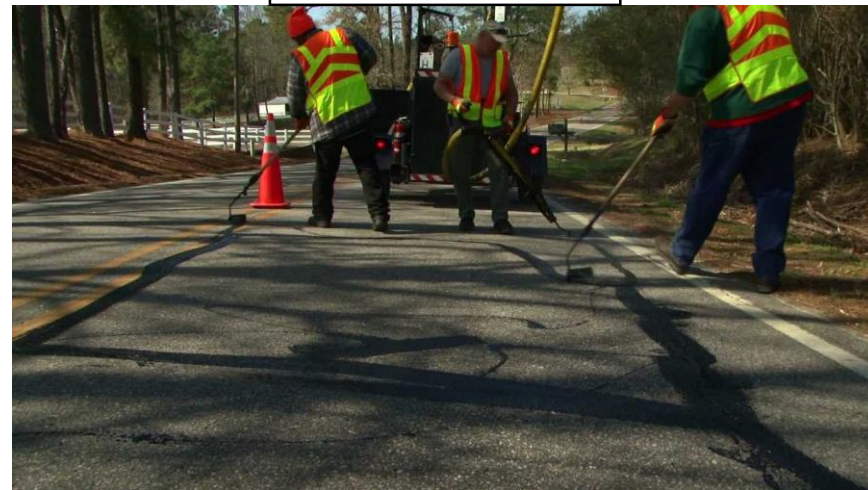
A thin overlay or mill & fill on a pavement that's lost its structural resilience will only last a fraction of the expected lifespan

Spend your money first on preserving your good roads

PCI = 15



PCI = 85





Worst First or Preservation Approach?

Worst first paving example (\$ per SY)

- Asphalt mill and fill at year #12 (\$10)
- Asphalt mill and fill at year #20 (\$10)
- Replace/major rehab at year #28 (\$25)

Maintenance over 28 years (\$0.71) +
replacement cost at 28 years (\$0.89) =

= Total annualized cost **\$1.60/SY**

Pavement preservation example (\$ per SY):

- Rejuvenate at year #2 (\$1.05)
- Crack seal at year #6 (\$0.75)
- Asphalt mill and fill at year #14 (\$10)
- Rejuvenate at year #16 (\$0.90)
- Crack seal at year #20 (\$0.75)
- Asphalt mill and fill at year #24 (\$10)
- Microsurface at year #32 (\$2.50)
- Replace/major rehab at year #38 (\$25)

Maintenance over 38 years (\$0.69)

+ replace cost at 38 years (\$0.66)

= Total annualized cost **\$1.35/SY (16% less)**



Traffic Control Devices

New Federal Rule for Pavement Markings
Pavement Marking Requirements
Marking Options
Sample Striping Maintenance Plan
Traffic Sign Maintenance
Curve Signs



New Federal Rule for Pavement Markings

New federal requirements on pavement marking retroreflectivity

Retroreflectivity = amount of light reflected back to driver

By 2026, all road maintenance agencies must have a method in place to manage pavement markings

Options:

- 1. Measure reflectivity (time consuming and expensive)
- 2. Systematic replacement (more manageable)



Pavement Marking Requirements

Federal Manual on Uniform Traffic Control Devices (MUTCD) updated September 6, 2022 to add requirements relating to pavement marking retroreflectivity.

Minimum retroreflectivity of 50 mcd/m²/lx:

- Edge lines, center lines and channelizing lines must comply
- On roads with speed limit 35 mph and over
- On roads with ADT of 6,000 vehicles per day or more
- Not required for transverse and crosswalk lines, arrows, words and symbols



Pavement Marking Requirements

So what does all of this mean:

You need to have a plan in place to maintain your markings on these roads before September 2026.

How are you going to do it?

- Measure retroreflectivity of all markings and replace as needed; or
- Systematic replacement based on estimated lifespan of markings?

DCEO advises a systematic replacement schedule based on the estimated lifespan of the markings.

- What you lose in possibly replacing a marking “too early” is offset by not having the added expense of annual monitoring



Marking Options

Item 642 – Traffic Paint

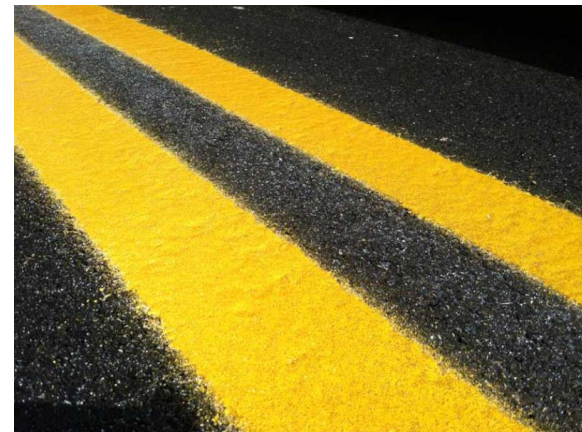
- Cheapest
- Shortest life span

Item 644 – Thermoplastic (Extruded)

- Most expensive
- Longest life span
- Marking outlasts the retroreflectivity

Item 648 – Spray Thermoplastic

- Costs more than paint
- Lasts a little longer than paint



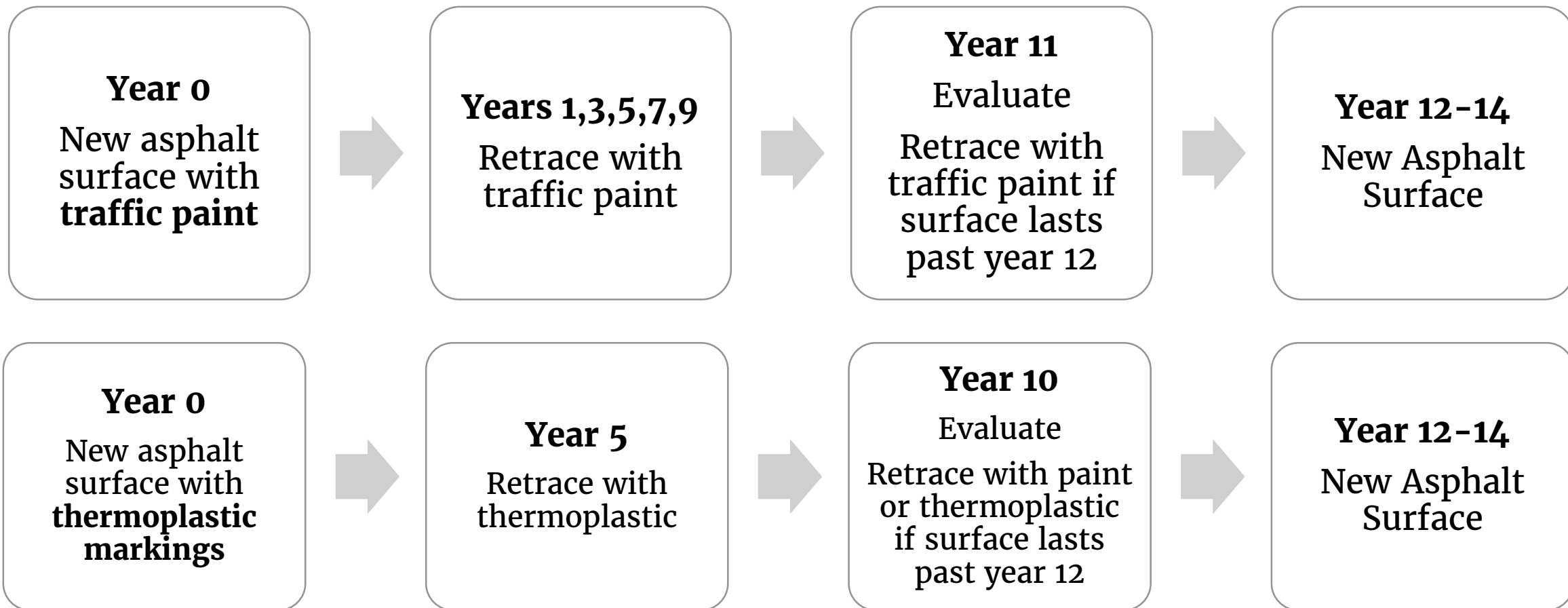


Marking Options

| Marking Type | Estimated Life on Brand New Pavement (years) | Estimated Life on Older Pavement (years) | Centerline Price Per Mile | # of Applications in 12 Years | Centerline Mile Cost for 12 Years |
|------------------------------|--|--|---------------------------|-------------------------------|-----------------------------------|
| Item 642 Traffic Paint | 1 | 2 | \$1,050 – 1,150 | 7 | \$7,500 – \$8,250 |
| Item 644 Thermoplastic | 5 | 5 | \$5,800 – 6,400 | 3 | \$17,500 – \$19,500 |
| Item 648 Spray Thermoplastic | 2-3 | 3 | \$1,800 – 2,000 | 5 | \$9,300 – \$10,500 |



Sample Striping Maintenance Plan





Traffic Sign Maintenance

You must have a management method in-place to maintain minimum sign retroreflectivity (since June 13, 2014)

- Systematic replacement at a certain interval (e.g. 10 years) is an acceptable type of maintenance method!

All regulatory signs (stop, yield and black & white signs)

- Stop, yield, speed limit, lane control, etc.

All warning signs (yellow/black and orange/black signs)

- Curve and intersection ahead signs, advisory speed, etc.

All street name signs (only certain colors are allowed)

- White lettering with either green, blue or brown background
- Black lettering with white background



Curve Signs

Ohio MUTCD requires curve signs for roads with ADT over 1000 vehicles/day

What does that mean???

- All curves which require warning signs must comply with the OMUTCD
- If the advisory speed is 10 mph under the posted speed, curve signs are required
- Chevrons required if difference is 15 mph
- Roads with under 1000 vehicles per day are exempt from the requirement; however, signing is still recommended!

