

DGLVR Webinar

DGLVR Standard Details

4/16/20

Starts at 9am



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For audio via phone: 646-876-9923



Q&A

You asked: 02:25 PM

Can you think of an example question?

Steven Michael Bloser answered: 02:25 PM

No, I can't!

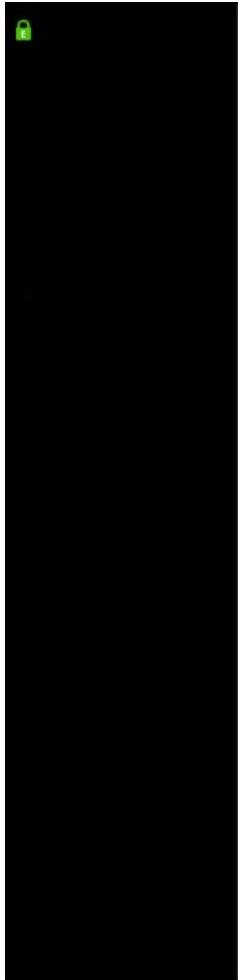
Please input your question...

Send Anonymously

Send

Note you can ask a question anonymously

Q&A



Audio Settings ^

Chat Raise Hand **Q&A** Leave Meeting

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Slide # 2

DGLVR Standard Details

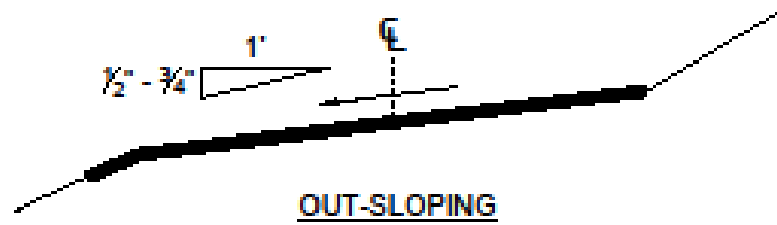
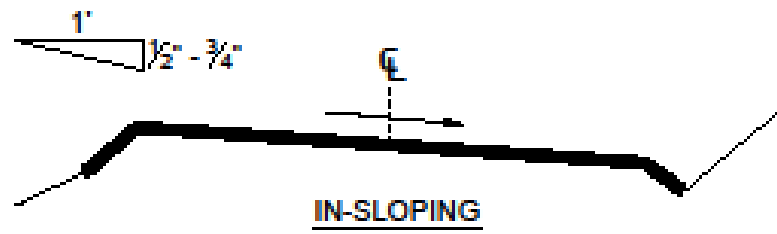
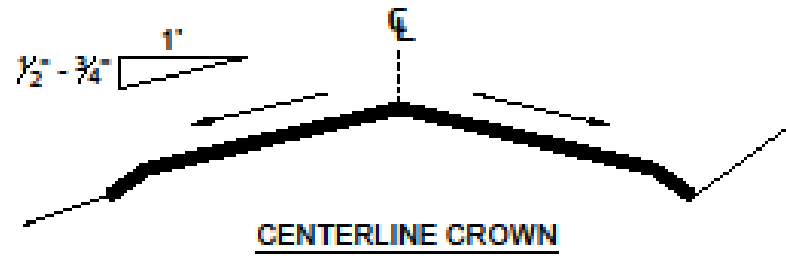
Background:

- **Standard Details**
 - Details for commonly used DGLVR Practices
 - Road Crown
 - Cross Pipe
 - Through-the-Bank Pipe
 - Cross Pipe and Through-the-Bank Pipes
 - Raising the Road Profile
 - French Mattress
 - Underdrain
 - Stone Sump
- Details located on the CDGRS Website
<https://www.dirtandgravel.psu.edu/general-resources/standard-detail-sheets>

DGLVR Standard Details

PDF Details

- Forms with text boxes
 - Road Crown
 - Cross Pipe
 - Through-the-Bank Pipe
 - Cross Pipe and Through-the-Bank Pipes
 - Raising the Road Profile



NOTE:

1. SLOPE OF CROWN IS FOR GRAVEL ROAD DRIVING SURFACES.

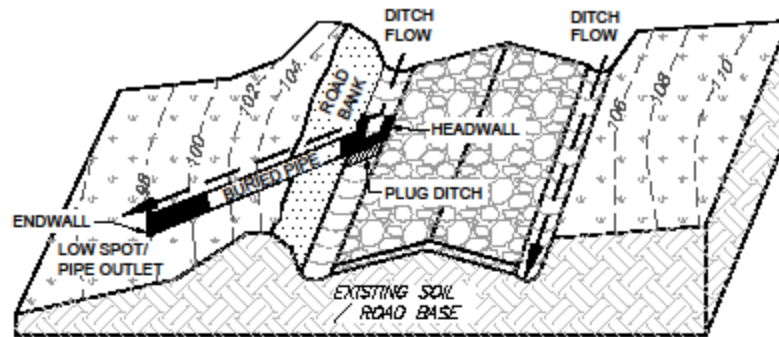


FIG. A

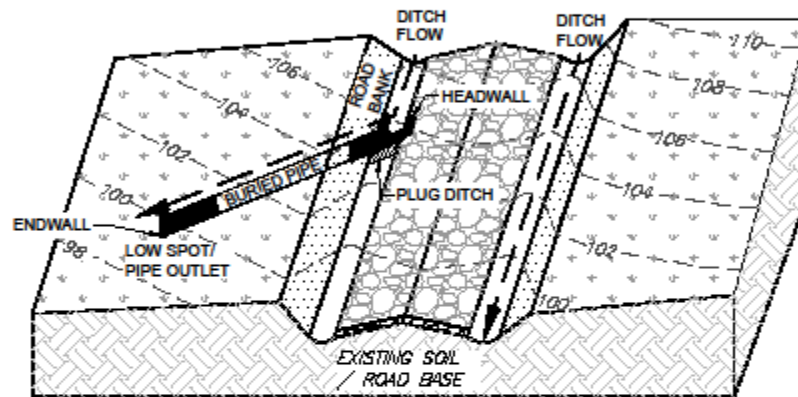
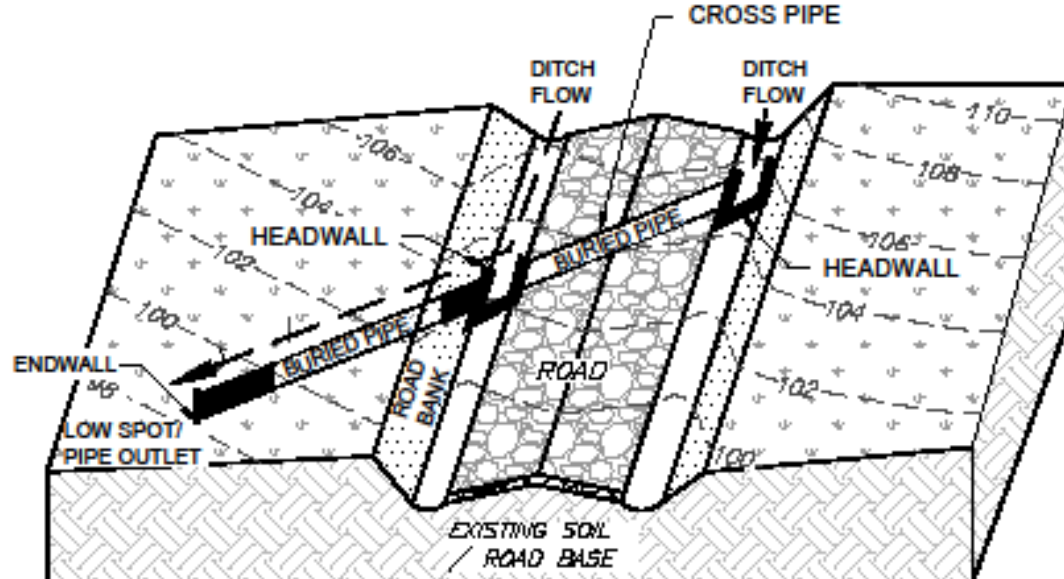


FIG. B

NOTES:

1. FIGURE A - A "THROUGH-THE-BANK" PIPE USED TO OUTLET THROUGH A HIGH BANK OR BERM.
2. FIGURE B - "THROUGH-THE-BANK" PIPE INSTALLATION ON AN ENTRENCHED ROAD LOCATED ON A SLOPE.
3. ALWAYS CHECK GRADES AND ELEVATIONS WITH A LEVEL OR SURVEY EQUIPMENT PRIOR TO STARTING INSTALLATION.
4. PIPES MAY APPEAR TO RUN UP-SLOPE, ESPECIALLY ON STEEPER ROADS AND SLOPES. CHECK GRADES MULTIPLE TIMES DURING INSTALLATION TO ENSURE POSITIVE DRAINAGE. PROVIDE MIN. 2% SLOPE ON PIPES.
5. "THROUGH-THE-BANK" PIPES DO NOT NEED THE SAME AMOUNT OF COVER OR COMPACTION AS CROSS-PIPES SINCE TRAFFIC WILL NOT CROSS THEM. PLACE ENOUGH MATERIAL OVER PIPE TO ANCHOR THE PIPE AND TO ESTABLISH VEGETATION GROWTH. EXCAVATED TRENCH MATERIAL MAY BE USED AS PIPE COVER MATERIAL.
6. OUTLET PIPE ON EXISTING GROUND ELEVATION. DO NOT EXCAVATE A TAIL DITCH. INSTALL HEADWALLS & PLUG THE DITCH DOWNSLOPE OF THE PIPE INLET IMMEDIATELY AFTER PIPE INSTALLATION.
7. THROUGH THE BANK PIPES CAN OFTEN BE INSTALLED WITHIN THE RIGHT-OF-WAY WHERE WATER WILL FLOW AWAY FROM THE ROAD.
8. LANDOWNER PERMISSION IS REQUIRED FOR WORK PERFORMED OUTSIDE OF THE RIGHT-OF-WAY.
9. CONTACT PA ONE-CALL A MINIMUM OF 3 DAYS PRIOR TO START OF ANY EARTHMOVING ACTIVITIES.

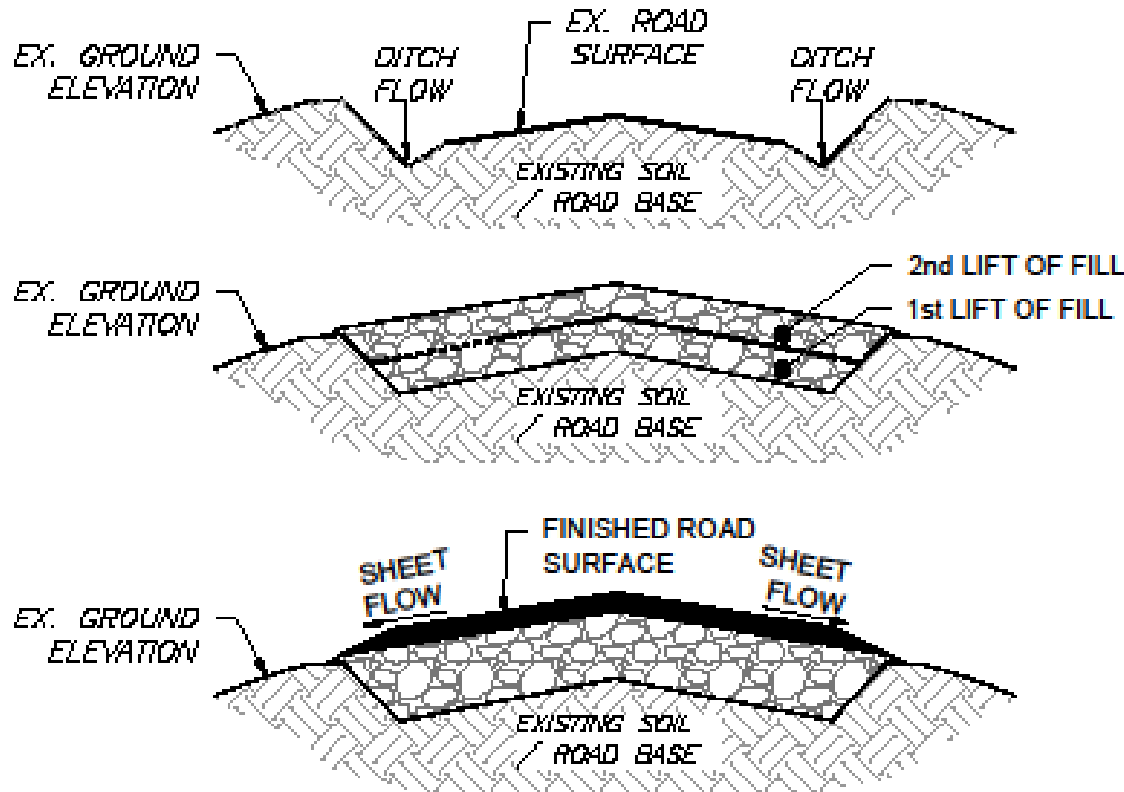
STATION #	PIPE DIAMETER	PIPE LENGTH



NOTES:

1. ALWAYS CHECK GRADES AND ELEVATIONS WITH A LEVEL OR SURVEY EQUIPMENT PRIOR TO STARTING INSTALLATION. A SHALLOW CROSS PIPE INSTALLATION WITH IMPORTED PIPE COVER MAY HELP ATTAIN NECESSARY FALL TO THE BANK PIPE OUTLET.
2. PIPES MAY APPEAR TO RUN UP-SLOPE, ESPECIALLY ON STEEPER ROADS AND SLOPES. CHECK GRADES MULTIPLE TIMES DURING INSTALLATION TO ENSURE POSITIVE DRAINAGE. PROVIDE MIN. 2% SLOPE ON PIPES.
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6. LANDOWNER PERMISSION IS REQUIRED FOR WORK PERFORMED OUTSIDE OF THE RIGHT-OF-WAY.
7. CONTACT PA ONE-CALL A MINIMUM OF 3 DAYS PRIOR TO START OF ANY EARTHMOVING ACTIVITIES.

STATION #	CROSS PIPE DIAMETER	CROSS PIPE LENGTH	THROUGH THE BANK PIPE DIAMETER	THROUGH THE BANK PIPE LENGTH



NOTES:

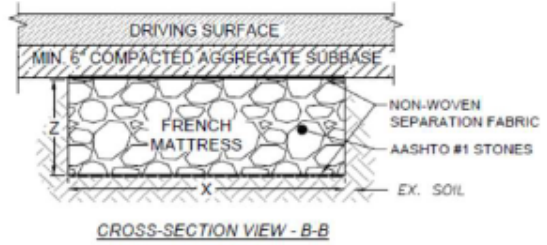
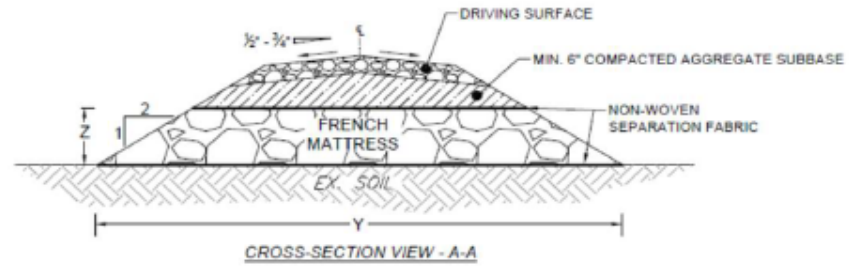
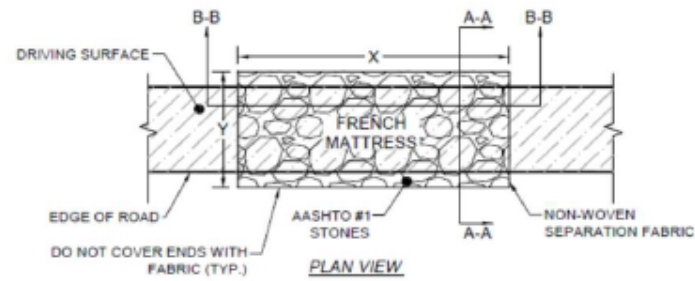
1. PREPARE THE EXISTING ROAD SURFACE TO RECEIVE FILL BY CREATING PROPER CROWN AND GRADING OUT DITCHES AND DEPRESSIONS WITHIN THE ROADWAY.
2. PLACE FILL MATERIAL IN 8" TO 12" LIFTS. PLACE FILL MATERIAL WITH 4%-6% CROWN.
3. COMPACT EACH LIFT WITH A MINIMUM 10-TON VIBRATORY ROLLER.
4. GEO-TEXTILE MAY BE USED BETWEEN LIFTS AND/OR PLACED ON THE EXISTING ROAD SURFACE TO PROVIDE STRENGTH TO THE ROAD BASE IF POOR SUBBASE IS PRESENT. GEOTEXTILE MAY CONSIST OF NON-WOVEN FABRIC AND/OR GEOGRIDS.
5. FILL MATERIAL MAY CONSIST OF NATIVE SHALE, ROCK, MINING SPOILS, BANK RUN GRAVEL, CONCRETE OR DEMOLITION WASTE, TIRE SHREDS, GROUND GLASS, OR OTHER CLEAN MATERIALS. SOME MATERIALS MAY REQUIRE PERMITS OR SPECIAL HANDLING. CONFIRM ALL REQUIREMENTS PRIOR TO START OF PROJECT.
6. RAISE THE ROAD SURFACE TO AN ELEVATION ABOVE THE SURROUNDING TERRAIN TO RESTORE NATURAL DRAINAGE PATTERNS.

AVERAGE DEPTH OF FILL: _____ FT. ESTIMATED FILL REQUIRED: _____ TON

DGLVR Standard Details

Excel Details:

- French Mattress
 - Underdrain
 - Stone Sump
-
- Forms will calculate estimate stone amounts (tons).
 - Use same formulas as the Materials Calculator



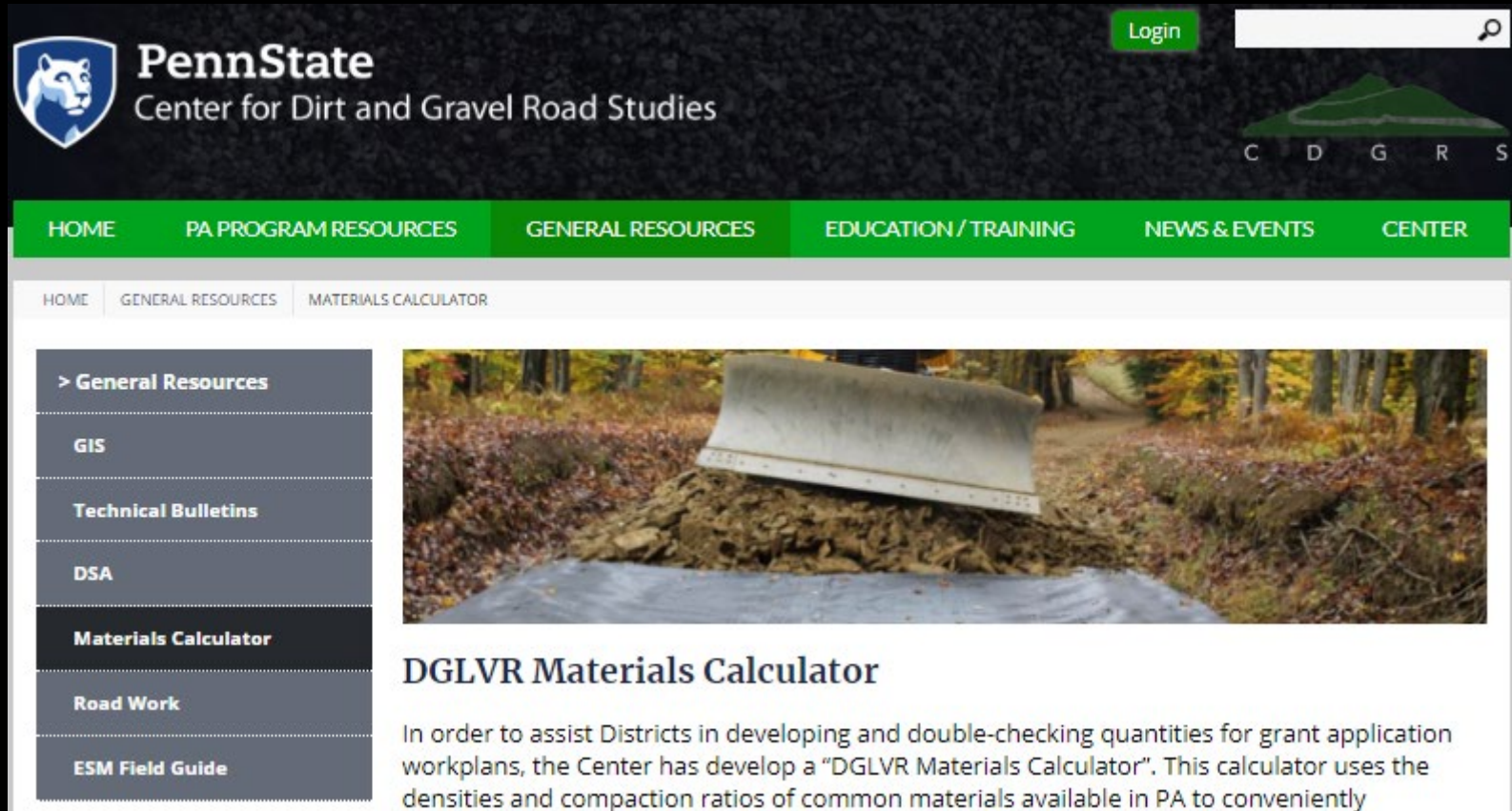
NOTES:

1. AASHTO #1 STONES SHALL BE CLEAN AND FREE OF FOREIGN MATERIAL.
2. OVERLAP SEPARATION FABRIC SEAMS A MINIMUM OF 2 FEET.
3. DO NOT COVER ENDS OF MATTRESS WITH SEPARATION FABRIC.
4. ENDS OF MATTRESS SHALL EXTEND A MINIMUM OF 2 FEET PAST EDGE OF THE ROAD.
5. INSTALL PENNDOT CLASS 1 NON-WOVEN FABRIC.
6. TO MOVE WATER THROUGH THE ROAD, THE BASE OF THE FRENCH MATTRESS MAY BE EXCAVATED WITH A 1% - 2% CROSS SLOPE.
7. CONTACT PA ONE-CALL A MINIMUM OF 3 DAYS PRIOR TO START OF ANY EARTHMOVING ACTIVITIES.

STATION #	LENGTH	WIDTH	DEPTH	TONS OF STONE
				0
-				0
-				0
-				0

DGLVR Materials Calculator

To help DGLVR participants do material estimating



The screenshot shows the website for the PennState Center for Dirt and Gravel Road Studies. The header includes the PennState logo, the text "PennState Center for Dirt and Gravel Road Studies", a "Login" button, and a search bar. Below the header is a navigation menu with tabs for "HOME", "PA PROGRAM RESOURCES", "GENERAL RESOURCES", "EDUCATION / TRAINING", "NEWS & EVENTS", and "CENTER". The "GENERAL RESOURCES" tab is selected, and a sub-menu shows "HOME", "GENERAL RESOURCES", and "MATERIALS CALCULATOR". The "MATERIALS CALCULATOR" sub-menu is expanded, showing options for "General Resources", "GIS", "Technical Bulletins", "DSA", "Materials Calculator" (which is highlighted), "Road Work", and "ESM Field Guide". The main content area features a photograph of a bulldozer blade on a pile of dirt in a wooded area. Below the photo is the heading "DGLVR Materials Calculator" and a paragraph of text: "In order to assist Districts in developing and double-checking quantities for grant application workplans, the Center has develop a 'DGLVR Materials Calculator'. This calculator uses the densities and compaction ratios of common materials available in PA to conveniently

- Details located on the CDGRS Website
 - <https://www.dirtandgravel.psu.edu/general-resources/dglvr-materials-calculator>

DGLVR Materials Calculator

DGLVR Materials Calculator

In order to assist Districts in developing and double-checking quantities for grant application workplans, the Center has developed a "DGLVR Materials Calculator". This calculator uses the densities and compaction ratios of common materials available in PA to conveniently **determine aggregate, stone, and fill estimates for project needs.** By entering the length, width, and depth of stone or fill desired, the calculator will generate an estimate of the amount of loose (as shipped) material for your job such as shale fill for roads, DSA for road surface, or stone for a mattress or underdrain. You can specify a compacted/finished material depth or a loose/tailed depth when entering the dimensions. However, the estimates generated will always appear as cubic yards of loose material and US tons as-shipped (loose). A cost estimate can be generated by providing a known price per ton in your region or from a particular supplier.

The calculator also has a "custom material" option that will let you specify the density and compaction ratio of material not in the list. This option can be used when estimates are desired for a material that is not found on the existing list and when the volume to weight conversion factor is known for the material, or for when the standard conversion factor for a listed material does not correspond to your particular source.

The volume to weight conversion factors used for the calculator are averages from across PA, based on observations by Center field staff. Actual conversion factors will vary by region and specific suppliers. Since the conversion factors for the common materials are not editable, use the "custom material" option where you have more accurate conversion factors for your area.

“...to conveniently determine aggregate, stone, and fill estimates for project needs.”

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A cost estimate can be generated by providing a known price per ton in your region or from a particular supplier.

DGLVR Materials Calculator

Length: feet ✓

Width: feet ✓

Depth: inches ✓

Compaction: Loose Compacted

Material: ▼

Tonnage per cubic yard: tons

Price per ton (optional): \$

CALCULATE

Insert dimensions
In feet and inches

And select if these
Dimensions are loose
Or compacted

DGLVR Materials Calculator

Length: feet

Width: feet

Depth: inches

Compaction: Loose Compacted

Material:

Tonnage per cubic yard:

Price per ton (optional):

- PennDOT 2A
- Please Select
- DSA
- PennDOT 2A
- PennDOT 2RC
- AASHTO 57 (PennDOT 2B)
- AASHTO 1 (PennDOT 4) 1.4
- AASHTO 3 (PennDOT 3A)
- AASHTO 8 (PennDOT 1B)
- R-3 to R-6
- Gabion
- Shale
- Fill Dirt
- Topsoil
- Asphalt (base, binder and top)
- Custom Material

Select from list of
Common PA Road
Materials

OR

DGLVR Materials Calculator

Length: feet

Width: feet

Depth: inches

Compaction: Loose Compacted

Material: ▼

Tonnage per cubic yard:

Price per ton (optional):

- Please Select
- DSA
- PennDOT 2A**
- PennDOT 2RC
- AASHTO 57 (PennDOT 2B)
- AASHTO 1 (PennDOT 4) 1.4
- AASHTO 3 (PennDOT 3A)
- AASHTO 8 (PennDOT 1B)
- R-3 to R-6
- Gabion
- Shale
- Fill Dirt
- Topsoil
- Asphalt (base, binder and top)
- Custom Material

OR

Choose a Custom Material



DGLVR Materials Calculator

Length: feet

Width: feet

Depth: inches

Compaction: Loose Compacted

Material:

Tonnage per cubic yard: tons

Price per ton (optional): \$

CALCULATE

Results

Estimated cubic yards of material needed (loose): **533.33 yd³**
Estimated tons of material needed (loose/as shipped): **826.67**
Estimated total material cost: **\$11,862.67**

Length: feet

Width: feet

Depth: inches

Compaction: Loose **Compacted**

Compacted Percentage: %

Material:

Tonnage per cubic yard: tons

Price per ton (optional): \$

CALCULATE

Results

Estimated cubic yards of material needed (loose): **711.11 yd³**
Estimated tons of material needed (loose/as shipped): **1,102.22**
Estimated total material cost: **\$15,816.89**

DGLVR Materials Calculator

Length: feet

Width: feet

Depth: inches

Compaction: Loose Compacted

Compacted Percentage: %

Material:

Tonnage per cubic yard: tons

Price per ton (optional): \$

CALCULATE

Results

Estimated (loose) cubic yards of material needed (loose): **666.67**
yd³

Estimated tons of material needed (loose/as shipped): **866.67**

Custom Material option

Can adjust the Compaction %

Can adjust the volume to weight conversion factor

Use this option when you want to calculate for a material not found on the provided list

or

When your local source of a listed material has different properties

DGLVR Materials Calculator

Length: feet

Width: feet

Depth: inches

Compaction: Loose Compacted

Material:

Tonnage per cubic yard: tons

Price per ton (optional): \$

CALCULATE

Live Demonstration

Material Estimating Know How

For Fill, Road Base, and Road Surface Material:

For fill, aggregate, and topsoil, know the required amount needed, including:

- in-place volume (compacted)
- the as-shipped volume (loose)
- the tonnage (as invoiced)
- Shale often hauled by the truckload (typical tri-axle truck will hold 12-14 yd³ or 20-23 tons of material).



Material Estimating Know How

Don't overlook the effect of compaction

If you are not sure of the volume lost to compaction (the compaction %), a good thumb rule is a material will lose 25% of its volume when compacted.



Material Estimating Know How



Pipe Backfill

Another rule of thumb is to add $\frac{1}{2}$ triaxle load of aggregate (2A or 2RC) to your estimate for each crosspipe installed or replaced.

This is approximately 10-12 tons.

Material Estimating Know How

Surface Drainage Features

Add two triaxle loads of aggregate of preferred fill (approx. 45 tons) for each planned grade break or broad-based dip.



Material Estimating Know How

Drainage Pipe

On hillslopes, be sure to use effective angle on your crosspipe installations ($\sim 30^\circ$). Figure the angle when estimating length needed and round to the nearest $\frac{1}{2}$ stick. (i.e. – 20', 30' 40', 50', etc.)



Material Estimating Know How

Geotextile

Figure ft² needed

- Length x Width (don't forget top, bottom and side for some practices)
- Don't forget a 2' overlap at seams

Geotextile comes in standard 5,400 ft² rolls. The wider the material, the shorter the roll. 12 ½' wide roll is 432' long. 15' wide roll is 360' long. 17 ½' wide roll is 309' long.



Material Estimating Know How

Wall Stone

One typical pallet of landscape/
Retaining wall stone will build
2 headwalls and 2 endwalls, or
is needed for every 2 crosspipes
in your plan.



Material Estimating Know How



Don't Forget

Transitions, Driveway Aprons,
seed, mulch, etc.

And it never hurts to add a 10%-15%
contingency factor to your estimates

THANKS! SEE YOU NEXT TUESDAY
4/21, 9am: Coronavirus DGLVR Impacts Update

- **Questions for Tuesday?**
- **Ideas or Request for Future Webinars?**