

	<b>Bowling Green, Kentucky</b> <b>Stormwater Best Management Practices (BMPs)</b> <b>Sediment Management Practices (SMPs)</b>	<b>SMP-01</b>
	<b>Activity: Check Dams (CD)</b>	
<b>PLANNING CONSIDERATIONS:</b>  <b>Design Life:</b> 6 – 12 months  <b>Acreage Needed:</b> Minimal  <b>Estimated Unit Cost:</b> Low  <b>Monthly Maintenance:</b> 30-40% of Installation		
	<div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: auto;">CD</div>	
	<b>Target Pollutants</b>	
	<div style="display: flex; justify-content: space-around;"> <span>Significant ♦</span> <span>Partial ♦</span> <span>Low or Unknown ♦</span> </div>	
	<div style="display: flex; justify-content: space-between; font-size: small;"> <div>Sediment ♦ Oil &amp; Grease ♦</div> <div>Heavy Metals ♦ Bacteria &amp; Viruses ♦</div> <div>Nutrients ♦ Floatable Materials ♦</div> <div>Oxygen Demanding Substances ♦ Construction Waste ♦</div> <div>Toxic Materials ♦</div> </div>	
<b>Description</b>	Check dam are use to reduce the velocity of concentrated stormwater flows, small temporary constructions are built across swale or drainage ditch. Check dams reduce erosion and promotes sedimentation within the ditch line.	
<b>Suitable Applications</b>	<ul style="list-style-type: none"> <li>➤ Check dams are <u>not</u> to be used in streams and rivers. However, should be used in swales or ditch lines.</li> <li>➤ Check dams are a temporary or permanent means of protection against erosion during the establishment of vegetative lining.</li> <li>➤ Installation of erosion-resistant lining is not practical to use for short length of service for temporary ditches or channels.</li> </ul>	
<b>Approach</b>	<ul style="list-style-type: none"> <li>➤ <b>Stone Check Dams (CD-S)</b> A stone check dam is intended to be used on a small drainage areas (up to one (1) acre or less). These dams are constructed with large aggregate (#1 or #2 stone with a minimum size of 1.5").</li> <li>➤ <b>Rock Check Dam (CD-R)</b> Rock check dams are intended for larger drainage areas than the stone check dams (areas up to 5 Acres or less). Rock check dams utilize small rip-rap such as KTC Channel Lining Class III. Smaller rock should be used on the upstream side to reduce the velocity of flow through the device. Attention should be given to placement of rock as to minimize large void areas</li> <li>➤ <b>Sandbag Check Dams (CD-SB)</b> Sandbags with sand or aggregate fill may be used to perform the function of a check dam. The placement of bags should be staggered as to provide stability.</li> </ul>	

**Design Criteria** The following design criteria should be used:

- **Drainage Areas:** Stone check dam (1 acre or less), Rock check dam (5 acres or less)
- **Spacing:** Two or more check dams should be used for areas greater than one acre. The maximum spacing should be determined by keeping the toe of the upstream dam equal to the spill over elevation of the downstream dam (See [Table SMP-01-01](#) or attached nomograph).
- **Dimensions:** All check dams should be 36" or less in height. The overflow point should be at least 6" lower than the outer edges. Front and back slopes shall be 2:1. The designer should take into consideration potential impacts due to impounded water (see Detail [SMP-01](#)).
- **Key-in:** Rock check dams should utilized a 6" key-in techniques to aid in stabilization during peak flows.

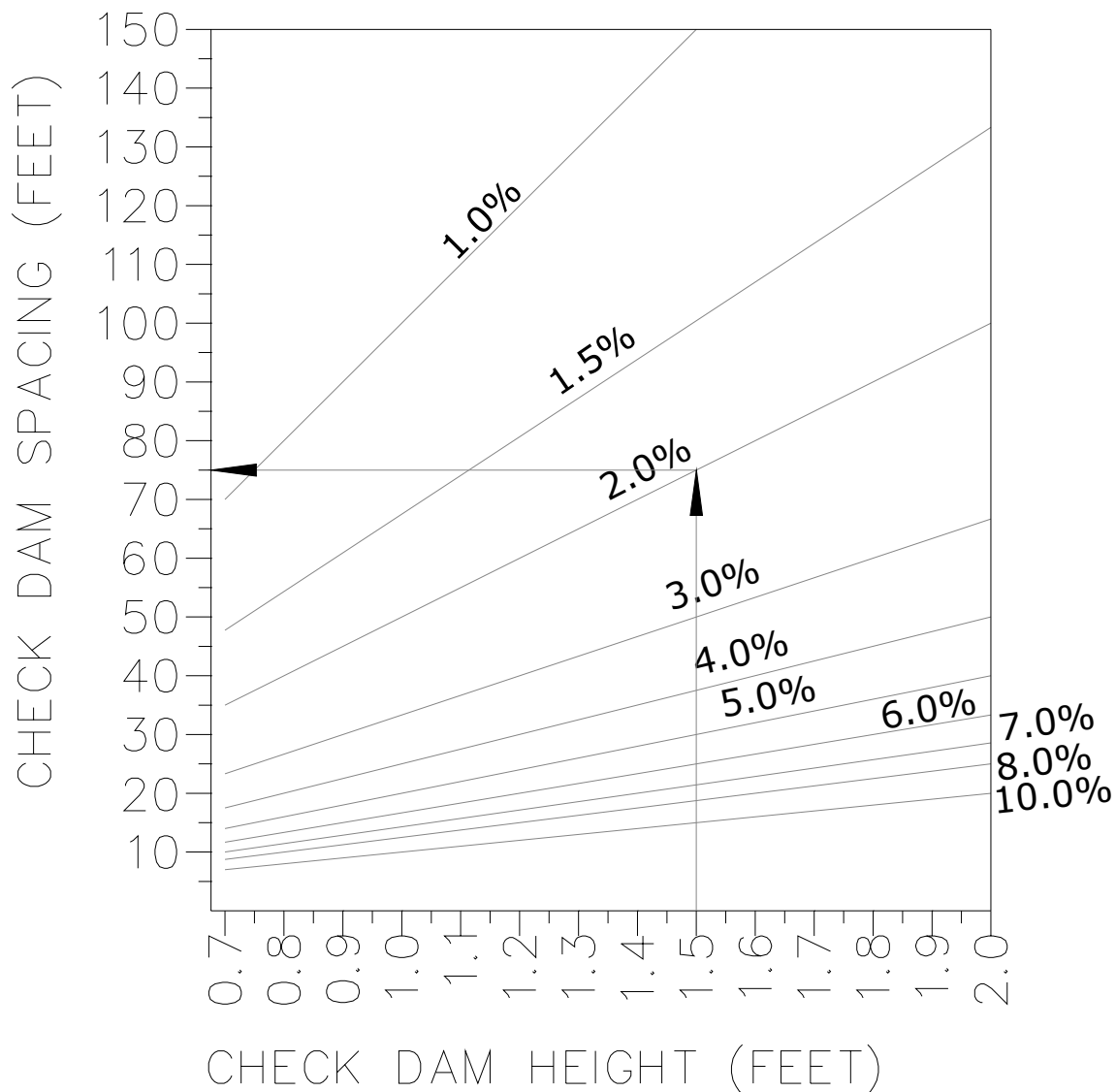
**Table SMP-01-01  
Spacing for Silt Check Dams**

Ditch slope	Silt check dam spacing	Additional information
30%	10 ft.	Calculated for 3' high silt check dams.
20%	15 ft.	
15%	20 ft.	
10%	35 ft.	Center of dam should be 6" lower than sides
5%	55 ft.	
3%	100 ft.	
2%	150 ft.	Use 5" – 10" rock, stone bags, or commercial products.
1%	300 ft.	
0.5%	600 ft.	

**Table SMP-01-02  
Rock Sizing for Ditch Liners**

Flow Velocity	Average Rock Diameter
6 ft. per second	5 inches
8 ft. per second	10 inches
10 ft. per second	14 inches
12 ft. per second	20 inches

Activity: Check Dams	SMP-01
<b>Installation Procedures</b>	<p>Installation procedure is as follows:</p> <ul style="list-style-type: none"> <li>➤ Excavate key-way (if required).</li> <li>➤ Place geotextile (if required).</li> <li>➤ Place check dam material to specified dimensions/elevations.</li> <li>➤ A sump may be provided immediately upstream of the check dam to capture sediment.</li> <li>➤ If grass is planted to stabilize the ditch or swale, the check dam should be removed when vegetation is stabilized.</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>➤ Sediment shall be removed before it reached one-half of the devices original height.</li> <li>➤ Any lose or displaced stone should be repaired to the original specifications.</li> </ul>
<b>Inspection Checklist</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Stone meets specified sizes.</li> <li><input type="checkbox"/> Check dam spans the entire width of the channel.</li> <li><input type="checkbox"/> Dimensions/elevations are as specified.</li> <li><input type="checkbox"/> Filter fabric on upstream face is keyed into the bed (if applicable).</li> <li><input type="checkbox"/> Check dams are to be removed when vegetation is stabilized.</li> <li><input type="checkbox"/> Sediment is maintained less than one-half of the original height.</li> <li><input type="checkbox"/> Sites with rain accumulation of 0.5" should be checked within 24 hours.</li> </ul>

**NOMOGRAPH PROCEDURE**

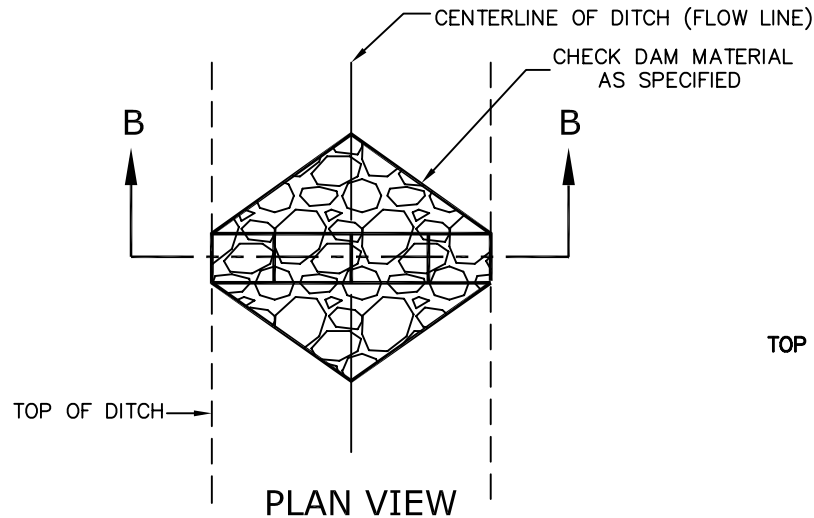
1. DRAW LINE VERTICALLY FROM HEIGHT VALUE ON "X" AXIS UPWARD UNTIL IT INTERSECTS DIAGONAL DITCH GRADE LINE AT THE APPROPRIATE GRADE VALUE.
2. FROM THE POINT OF INTERSECTION WITH GRADE LINE, DRAW LINE HORIZONTALLY UNTIL THE LINE INTERSECTS WITH "Y" AXIS (SPACING).
3. DETERMINE SPACING VALUE.

**EXAMPLE**

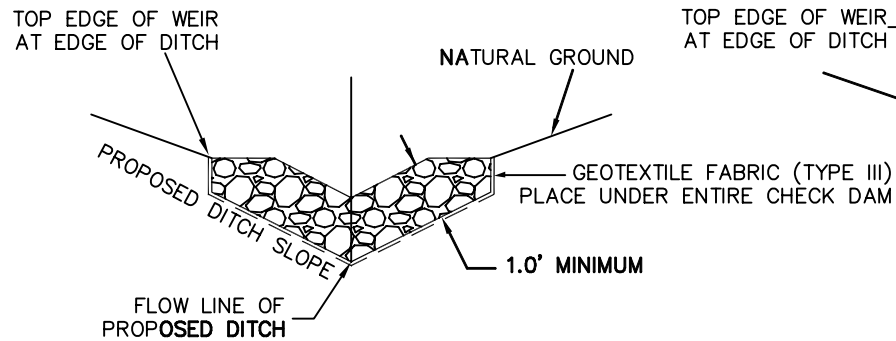
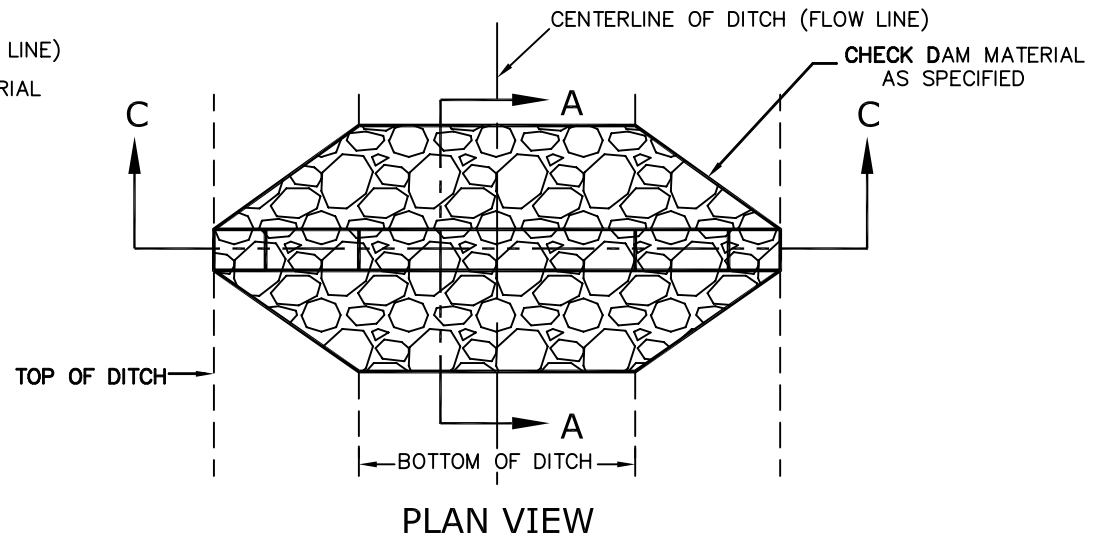
GIVEN: CHECK DAM HEIGHT = 18" (1.5')  
DITCH GRADE = 2%

SOLUTION: CHECK DAM SPACING = 75 FEET

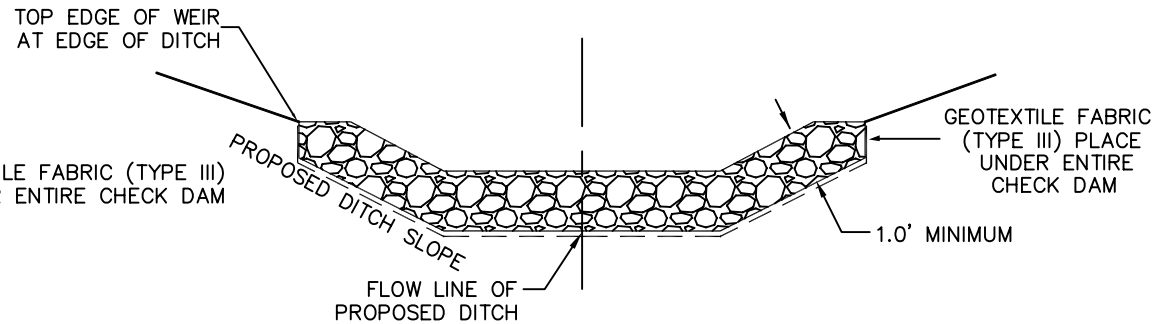
## DETAIL FOR "V" DITCH



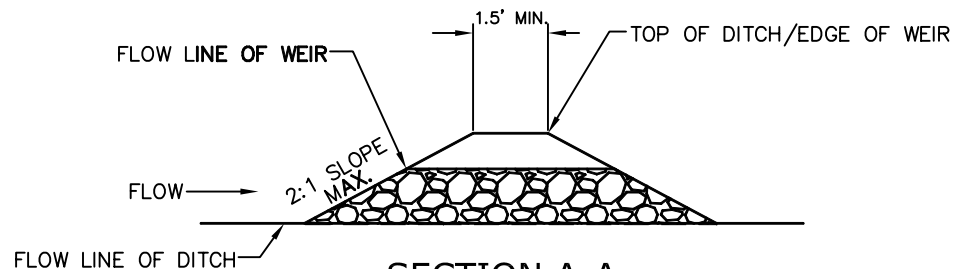
## DETAIL FOR TRAPEZOIDAL DITCH



### SECTION B-B



### SECTION C-C



### SECTION A-A

SOURCE: LOUISVILLE MSD & TDEC



City of Bowling Green

Public Works Planning and Design  
1011 College Street  
Bowling Green, Kentucky 42101

CHECK DAM  
(CD-S, CD-R, CD-SB)

STANDARD DRAWING NO. SMP-01-01

APPROVED BY: \_\_\_\_\_ DIRECTOR OF ENGINEERING \_\_\_\_\_ DATE \_\_\_\_\_

## ROCK DITCH CHECK

### When and Where to Use It:

A rock ditch check should be installed in steeply sloped swales, or in swales where adequate vegetation cannot be established. Rock ditch checks should be used only in small open channels. Rock ditch checks should not be placed in waters of the commonwealth (unless approved by state authorities).

### Installation:

Excavate keyway (if required).

A geotextile fabric shall be installed over the soil surface where the rock ditch check is to be placed.

Acceptable materials for check dams are as follows:

- Stone Check Dam (CD-S): KTC No. 1 or No. 2 (with minimum size of 1.5")
- Rock Check Dam (CD-R): KTC Class III Channel Lining
- Sand Bag Check Dam (CD-SB): Polypropylene bags filled with KTC No. 57 or approved equal

Rock ditch checks should not exceed a height of 2-feet at the centerline of the channel.

Rock ditch checks should have a minimum top flow length of 2-feet.

Stone should be placed up the channel banks prevent water from cutting around the ditch check.

The rock must be placed by hand or mechanical placement (no dumping of rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the check is lower than the edges.

The maximum spacing between the dams should be such that the toe of the upstream check is at the same elevation as the top of the downstream check.

### Inspection and Maintenance:

Inspect rock ditch checks every seven (7) calendar days and within 24-hours after each rainfall event that produces 1/2-inches or more of precipitation. Inspect for sediment and debris accumulation. Inspect ditch check edges for erosion and repair promptly as required.

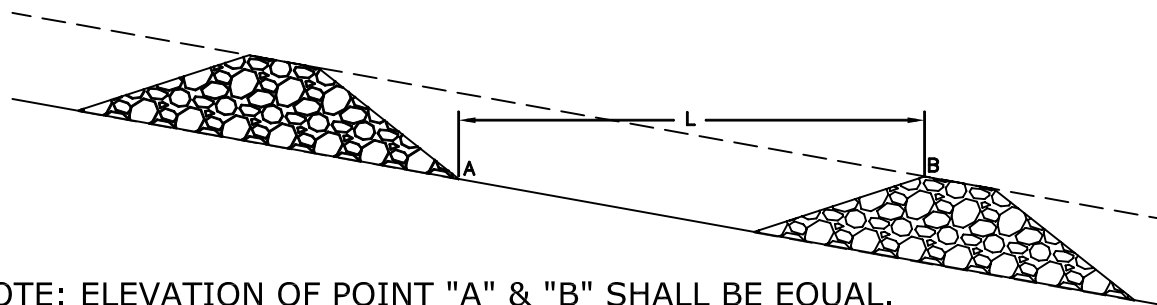
Sediment should be removed when it reaches 1/2 the original check height.

In the case of grass-lined ditches and swales, rock ditch checks should be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4 %.

After construction is complete, all stone should be removed if vegetation will be used for permanent erosion control measures.

The area beneath the rock ditch checks should be seeded and mulched immediately after rock check dam removal.

### DETAIL FOR CHECK DAM SPACING



*SOURCE: LOUISVILLE MSD & TDEC*



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Public Works Planning and Design  
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**CHECK DAM  
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STANDARD DRAWING NO. **SMP-01-02**

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