

Check Dams

DEFINITION

Rock Check Dams are small dams constructed where runoff is concentrated in an intermittent drainage way or gully. Check dams are used to trap sediment generated from adjacent areas or the gully itself and to increase infiltration when suitable soils are present. By reducing runoff velocity they reduce erosion and help mitigate flow peaks.

CONDITIONS WHERE CHECK DAMS ARE APPLIED

Check dams are not effective in well-defined stream channels and shall be limited to use in open channels and gullies. Rock Check Dams are not effective on gully channel slopes greater than 20%. As a practical measure, Rock Check Dams should be less than 10 m wide, limiting the channel width to somewhat less than that.

CONSTRUCTION

Rock used must be hard, compact grained, free from cracks and durable.

The height of check dams shall be kept below 1.5 meters. The center of the dam shall be at least 0.25 meters lower than the sides. The base of the dam shall be keyed into the channel bottom to a depth of 60 centimeters. The ends of the dam shall be keyed into the channel sides a minimum of 1.25 meters.

Typical Stone Check Dam



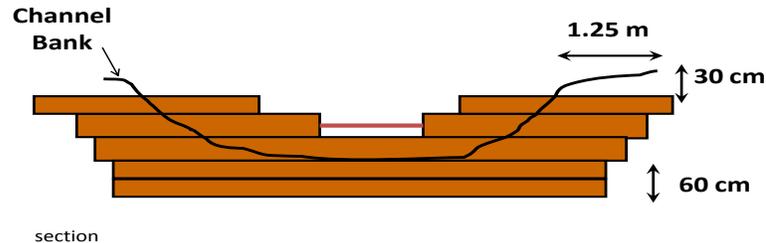
Check dams require the following construction components:

- A control section: an opening at top center of the dam to keep water in the channel
- An energy dissipation section to prevent scour on the downstream side of the dam
- Dams must be keyed into the bank to prevent erosion along the sides
- Dams must be keyed into the channel bank to prevent undermining
- Dams must be appropriately spaced

Key into channel bottom for a minimum of 60 cm

Key into channel bank for a minimum of 1.5 m

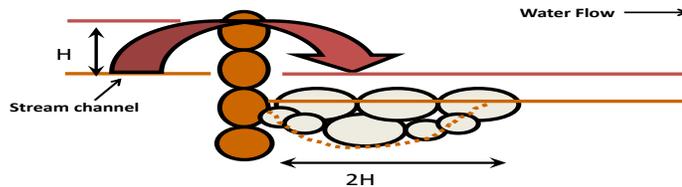
Top of check dam should be at least 30 cm below top of channel



Check dams will be constructed with an energy dissipation “floor” on the downstream side of the dam to prevent scouring and undermining. The length of the energy dissipation section shall be twice the height of the dam.

Energy dissipation section should be two times the structure height

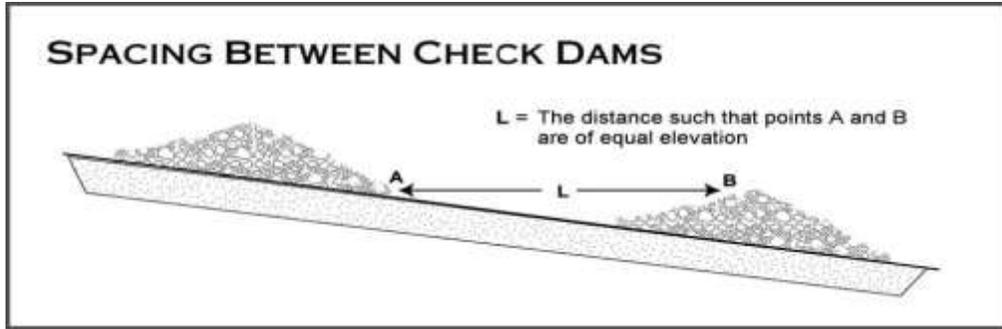
Maximum height should be less than 1.5 m



Alternatively, the upstream and downstream sides of the dam may be made to slope 45-degrees (1V:1H) or flatter. Such a design does not require the energy dissipation section.

The base layer of rock in the check dam (beneath the stream channel floor) and energy dissipation section shall be a minimum of 30 centimeters in the smallest dimension and stacked to create a solid structure. All rock above the base layer will be greater than 10 centimeters in the smallest dimension. The rock used must be large enough to stay in place given the expected design flow through the channel. Spacing of check dams is as follows.

The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam. Eventually, sediment and slough will fill in the channels, increasing vegetation recovery.



Channel Slope (%)	Rock Check Dam Spacing (m)			
	30 cm high dam	70 cm high dam	1 m high dam	
<2	30	60	90	
2-5	12	24	36	
5-10	6	12	18	
10-15	4	8	12	
15-20	3	6	9	
>20	Not recommended			

MEASUREMENT AND PAYMENT

Check dams are measured by the linear foot along the centerline of the check dams.

The contract price paid per linear foot for check dams includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the check dams, complete in place, including removal of materials, cleanup and disposal of waste construction debris, and backfilling and repairing holes, depressions and other ground disturbance, as specified in Section (III), General Provision, and as directed by the PPO/PRT Engineer.

OPERATION AND MAINTENANCE

An operation and Maintenance plan shall be prepared for use by the landowner or operator. The plan should include provisions to address the following, at a minimum:

- Dams should be inspected regularly and after each major storm. Check for signs of undercutting or erosion of the sides adjacent to the channel walls.
- If any erosion has taken place around or below the rock check dam or if rocks have been dislodged, repairs shall be made to prevent further damage.
- Remove all large accumulated debris from behind the dam.
- If sediment trapping is to be a continuing function of the rock check dam, the sediment shall be removed when it has accumulated to one-half the depth of the rock check dam.

REFERENCE:

Part 654 National Engineering Handbook Stream Restoration Design (210-VI-NEH), August, 2007, NRCS
<http://directives.sc.egov.usda.gov/viewerFS.aspx?id=3491>