

4.3-g SLOTTED CHANNEL DRAIN

Alternative Names: Trench Drain



Slotted channel drain with a sediment trap on a residential driveway.

DESCRIPTION

A slotted channel drain is a drain pipe placed below grade and constructed with a slot inlet along its entire length used to intercept sheet flow from paved driveways, roads, and parking lots and convey it downstream to a treatment and/or infiltration system. Contemporary slotted drains have removable grates and should be installed in conjunction with some type of sediment trap to accommodate easy maintenance.

A slotted channel drain has no water quality benefit alone; however, in a developed watershed it is often a required component of a drainage system that as a whole improves water quality.

APPLICABILITY

- Applicable for collecting stormwater runoff from all paved surfaces, particularly where there is no curb and gutter or the paved surface is too steep to convey with an A/C swale.
- Slotted channel drains are most commonly installed in driveways, intercepting stormwater before it enters the public right-of-way or storm drain system.

Advantages

- Assists in the control of stormwater runoff generated from impervious surfaces.

BMP DESIGN APPROACH

- Pollutant Source Control
- Hydrologic Source Control
- Stormwater Treatment

SCALE OF APPLICATION

- All SFR and MFR < 1 acre
- MFR 1-5 Acre and CICU < 5 acres
- MFR and CICU > 5 acres and all WQIPs

TYPE OF APPLICATION

- Temporary
- Permanent

- By capturing stormwater, generally increases the time of concentration of runoff and thereby reduce peak runoff rate.
- In most cases, this BMP can be installed on impervious surfaces that exceed a 5 percent slope.

Disadvantages

- Has the potential to concentrate stormwater runoff and deliver high volumes to one destination.
- Generally converts surface-generated sheet flow to channel flow, thereby increasing the potential for erosion.
- Requires periodic removal of sediment and debris.

DESIGN CONSIDERATIONS

- Seek the advice of a licensed professional civil engineer to determine the best placement and type of slotted channel drain.
- Use slotted channel drains with removable grates and sediment traps to make maintenance easier and prevent sediment and debris from clogging the system (Refer to Section 4.4-i, Sediment Trap).
- Include the following components into the design: channel, removable grates, grate locks, end plate, inlet/outlet plate, and a sediment catch basin.

INSTALLATION CONSIDERATIONS

- Construct slotted channel drains consistent with the manufacturer's design and installation specifications.
- Installing channel slopes greater or equal to 1 percent will help to ensure proper flow and prevent freezing and standing water. As velocities in the channel will be greater than velocities on pavement, the relative potential for freezing or silt buildup will be reduced.
- Select a slotted channel drain that is rated to accommodate the vehicle loads it will endure.

INSPECTION AND MAINTENANCE

Refer to the Slotted Channel Drain Inspection and Maintenance Table for guidelines.

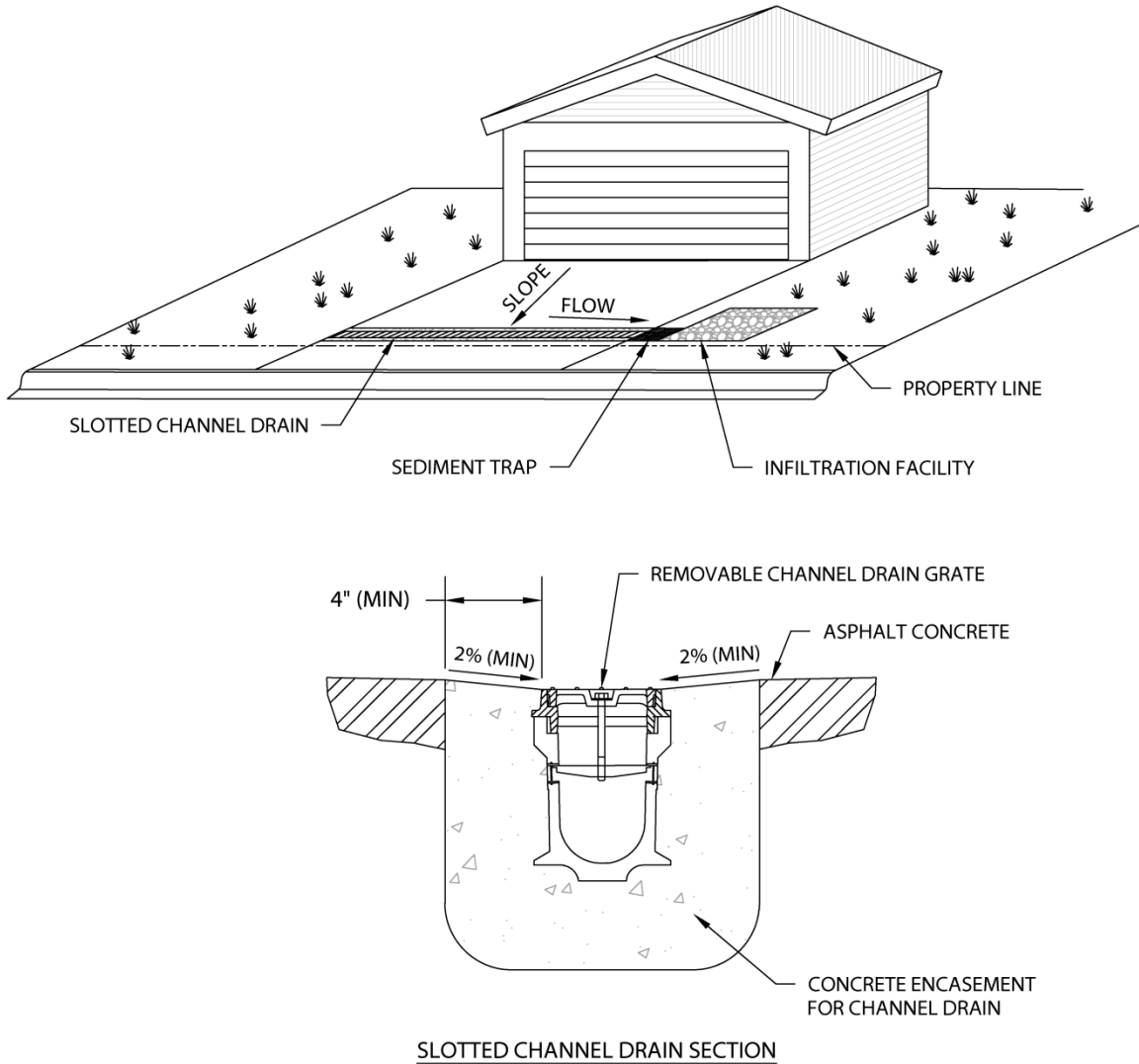
EFFECTIVENESS CONSIDERATIONS

Slotted drains are effective if designed and installed properly. Effectiveness is lost once the drain is clogged with sediment and debris. Regular street and parking lot sweeping reduces maintenance cost and frequency. Frequent inspections of the drain for debris and sediment are required.

Slotted Channel Drain Inspection and Maintenance Table

INSPECTION AND MAINTENANCE ACTIVITIES	SUGGESTED FREQUENCY	INSPECTION EQUIPMENT	MAINTENANCE EQUIPMENT
Inspect site for the presence of standing water 96 hours after precipitation events. <ul style="list-style-type: none"> ▪ Contact your local vector abatement office for specific instructions if standing water is present. 	96 hours after major storms		Tools suggested per qualified individual
Inspect that the slotted channel drain is properly capturing runoff from the impervious surface and conveying it to the infiltration/treatment system. The inspection crews should pour water using a hose or large water container on the surface to verify performance. Be sure to check the entire length of the drain. <ul style="list-style-type: none"> ▪ Repair any blocked or diverted conveyances and DO NOT store snow directly over the slotted channel drain. 	Annually in spring	Water Source	Tools as needed to repair
Inspect for accumulated sediment, debris, and litter. <ul style="list-style-type: none"> ▪ Remove accumulated material as described below. ▪ For drains with removable grates, <ul style="list-style-type: none"> ○ Remove grates and mark grates so they can be properly reinstalled. ○ Remove sediment and debris from channel drain by hand or using a vactor truck. ○ Dispose of sediment and debris in a TRPA approved stable on-site location or out of the Lake Tahoe Region. ▪ For drains with non-removable grates, <ul style="list-style-type: none"> ○ Obtain access to an end of the channel drain. ○ Wash sediment and debris out of channel drain end by using pressure washer or vacuum sediment and debris out of drain with a vactor truck. Use care not to wash sediment into a treatment or infiltration system. ○ Dispose of sediment and debris in a TRPA approved stable on-site location or out of the Lake Tahoe Region. 	Annually in spring and after major storms	Stadia Rod Or Ruler	Grate removal tools, Pressure washer or Vactor truck, Trash bag
Inspect for channel drain structural integrity. This is best performed after cleaning the drain of debris. For metal channel drains with non-removable grates, poke the drain bottom with a piece of rebar to determine corrosion extent. <ul style="list-style-type: none"> ▪ Repair or replace structurally suspect or deteriorated channel drains. 	Annually	3-foot long rebar	Tools as needed to repair or replace
Inspect the concrete or asphalt apron of the channel drain for chipping, cracking, or other damage. <ul style="list-style-type: none"> ▪ Repair or replace structurally suspect or deteriorated aprons. 	Annually		Tools as needed to repair or replace
Inspect for up slope contributing sediment sources to reduce the accumulation of sediment in the channel drain. <ul style="list-style-type: none"> ▪ Stabilize contributing eroding slopes and bare soil areas to prevent sediment entry into drain. ▪ Routinely sweep the street/driveway to remove sediment before it enters the channel drain. 	Annually in spring and before major storms		Soil Amendment, Seeds/Plants, Irrigation, Mulch, Erosion Control Blanket, Broom, Streetsweeper
Inspect site for unusual or unsafe conditions (snowplow damage, structural damage, dumping, etc.). <ul style="list-style-type: none"> ▪ Repair structural components as necessary. 	Annually in spring		Tools as needed
Monitor ongoing effectiveness and determine whether another BMP type or additional BMPs could improve long-term effectiveness and improve benefits to costs versus the existing channel drain. <ul style="list-style-type: none"> ▪ Analyze Inspection and Maintenance Log for trends or recurring issues. ▪ Prepare a plan that more effectively addresses conveyance needs, reduces long term maintenance costs and improves overall effectiveness and safety of the BMP. 	Every 5 years	Qualified Inspector or Consultant	Qualified Inspector or Consultant

Slotted Channel Drain Figure



NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION OF SLOTTED CHANNEL DRAIN.
2. CONNECT SLOTTED CHANNEL DRAIN TO SEDIMENT TRAP AND INFILTRATION FACILITY.
3. FOR EASE OF MAINTENANCE, CHOOSE A BRAND THAT HAS REMOVABLE GRATES. CORRUGATED METAL PIPE SLOTTED CHANNEL DRAINS OR OTHER TYPES OF CHANNEL DRAINS WITHOUT REMOVABLE GRATES ARE DIFFICULT TO INSPECT AND MAINTAIN.
4. INSTALL WITH SLOPE DIRECTED TOWARDS INFILTRATION SYSTEM. INSTALL SLOTTED CHANNEL DRAIN WITH A SLOPE GREATER THAN 1% TO ENSURE PROPER FLOW, AND PREVENT FREEZING AND STANDING WATER.
5. A REVERSE FLOW SYSTEM FOR A SLOTTED CHANNEL DRAIN MAY BE USED FOR DRIVEWAYS THAT SLOPE TOWARD AN AREA CONSIDERED UNSUITABLE FOR INFILTRATION (CONSTRAINED) AND WHEN A PRE-SLOPED CHANNEL WILL NOT PROVIDE ENOUGH SLOPE TO CONVEY RUNOFF TO THE DESIRED INFILTRATION SYSTEM LOCATION.

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