

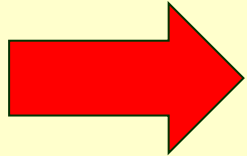
Environmentally Sensitive Maintenance for Dirt, Gravel, and Low-Volume Roads



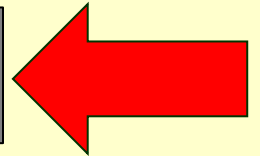
Off Right-of-Way



Off Right-of-Way Impacts



Introduction



**Traditional Road Maintenance
Practices**

**Environmentally Sensitive
Maintenance Practices**

OBJECTIVES:

ENABLE YOU TO RECOGNIZE:

- **The importance of working with landowners**
- **The importance of managing water before it reaches the road**
- **Problems with the traditional approach to handling off right-of-way impacts.**
- **ESM Practices for off right-of-way sources.**

What are “Off-ROW” impacts?

- Driveways
- Logging Access
- Farm field access
- Pipe-lines
- ATV trails
- Gas Pads/Roads
- Field Outlets
- Wet-weather channels
- Drain tile
- Other waterways (ag, natural, etc.)

**Anything that
brings water to
your road!**

Examples...

- **Brings EXCESS WATER to road area**
 - Saturates road base
 - Creates potholes
 - Increases erosion in road ditches
- **Brings excess SEDIMENT to road area**
- **Lack of smooth vehicle transitions cause damage to roadway**

Off Right-of-Way Impacts

Introduction



Traditional Road Maintenance
Practices



Environmentally Sensitive
Maintenance Practices

The “Traditional Practice” with off ROW concerns is to IGNORE it!

Why?

- Landowner Issues
 - Real issues
 - Perceived issues
- Legal issues
- Costs

What Happens?







Impact of ignoring off ROW impacts

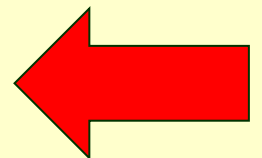
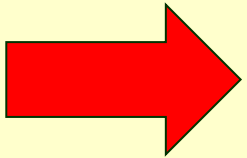
- Increased water on road and in ditches
- Increase maintenance cost
- Increased erosion
- More headaches

Off Right-of-Way Impacts

Introduction

Traditional Road Maintenance Practices

Environmentally Sensitive Maintenance Practices



1. Public Relations

2. Planning Ahead

3. Diversion Swale

4. Bank Benches

5. Through-Drains

6. Addressing Access Drainage

Prior to working off of the Right-of-Way:

Talk with landowner:

- Explain what you want to do and WHY.
- Explain the benefits to them.
- Listen to them!!!!
- Use volunteer groups.

Prior to working off of the Right-of-Way:

Announce intentions at a public meeting:

- Explain the benefits to
 - Association
 - Environment
 - Landowners
- Have your facts ready (when, how long, why)
- Respond to any concerns that are raised.
- Allow lead time to address landowner concerns

1. Public Relations
- 2. Planning Ahead**
3. Diversion Swale
4. Bank Benches
5. Through-Drains
6. Addressing Access Drainage

Discussion

- Do you have a driveway ordinance?
- Do you enforce it?
- Does the ordinance address run-on drainage?

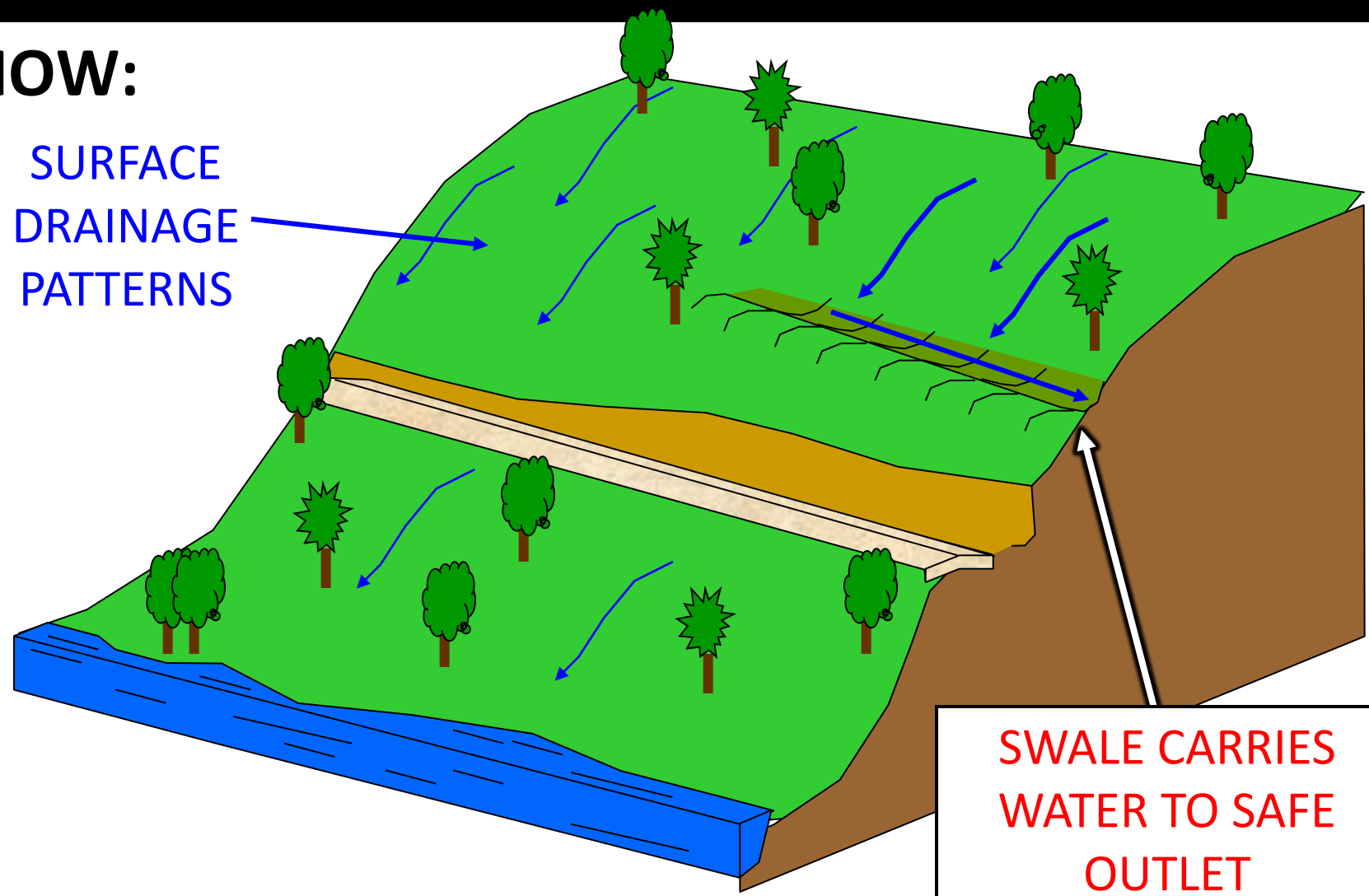


Uncontrolled water impacts the cart way!

1. Public Relations
2. Planning Ahead
- 3. Diversion Swale**
4. Bank Benches
5. Through-Drains
6. Addressing Access Drainage

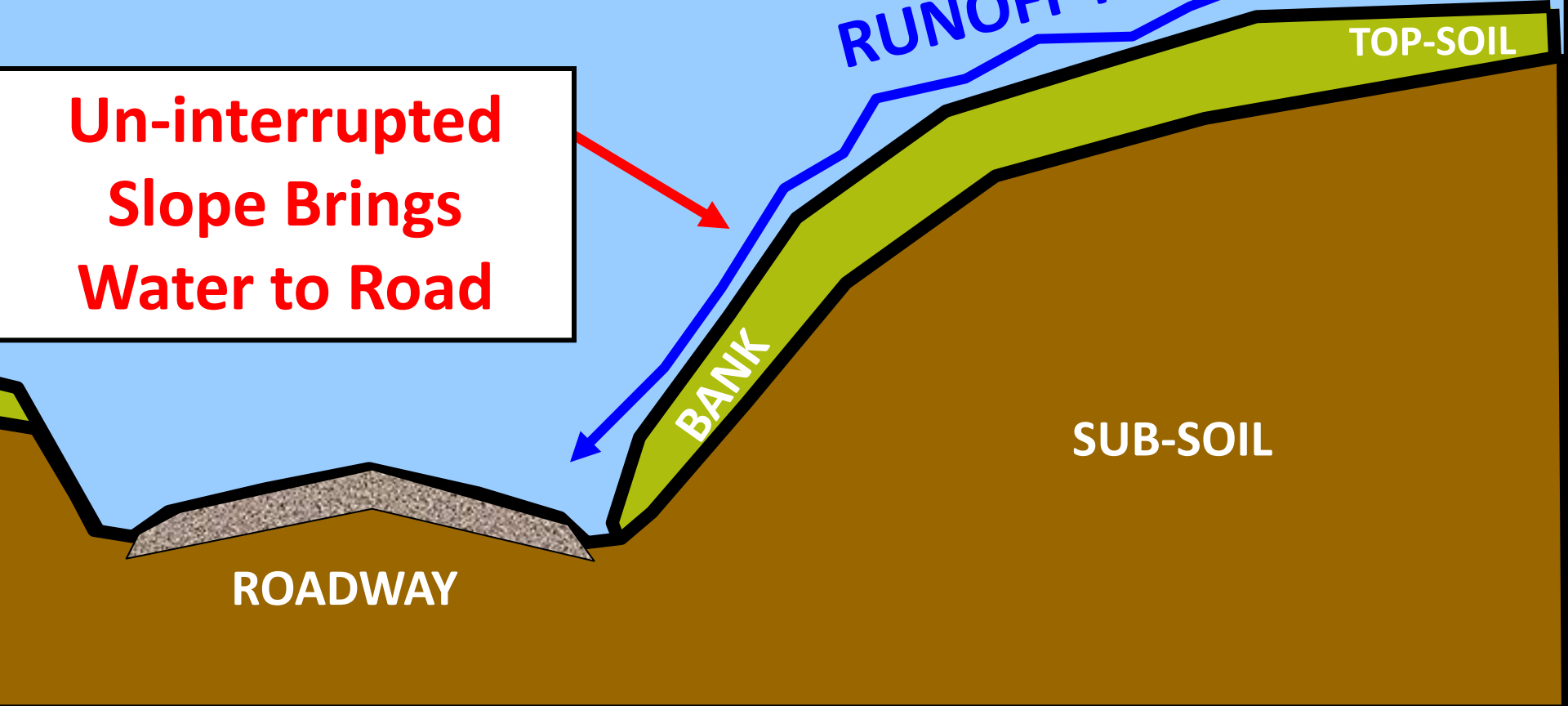
HOW:

SURFACE
DRAINAGE
PATTERNS



SWALE CARRIES
WATER TO SAFE
OUTLET

BEFORE



**Un-interrupted
Slope Brings
Water to Road**

RUNOFF FLOW

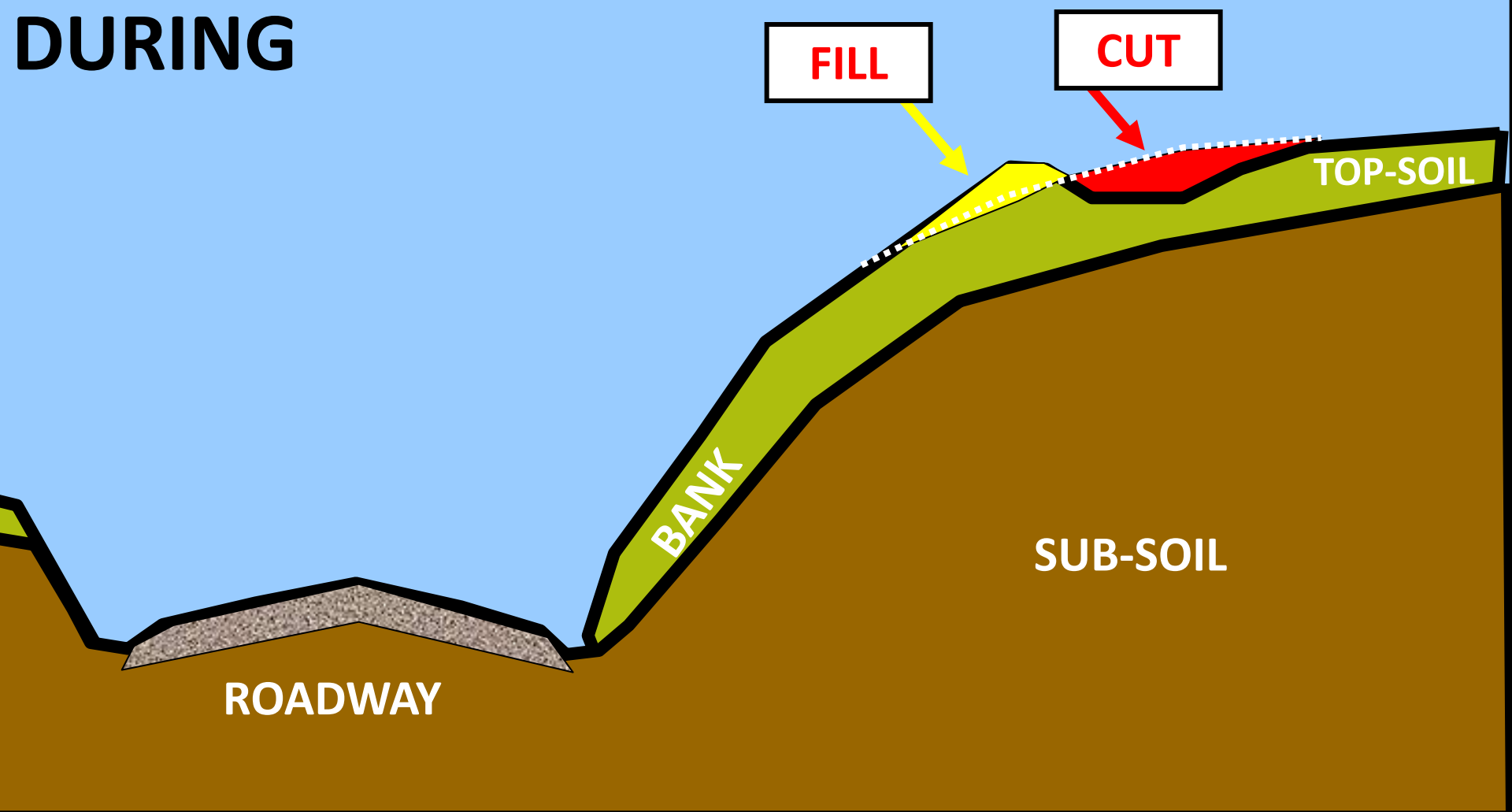
TOP-SOIL

BANK

SUB-SOIL

ROADWAY

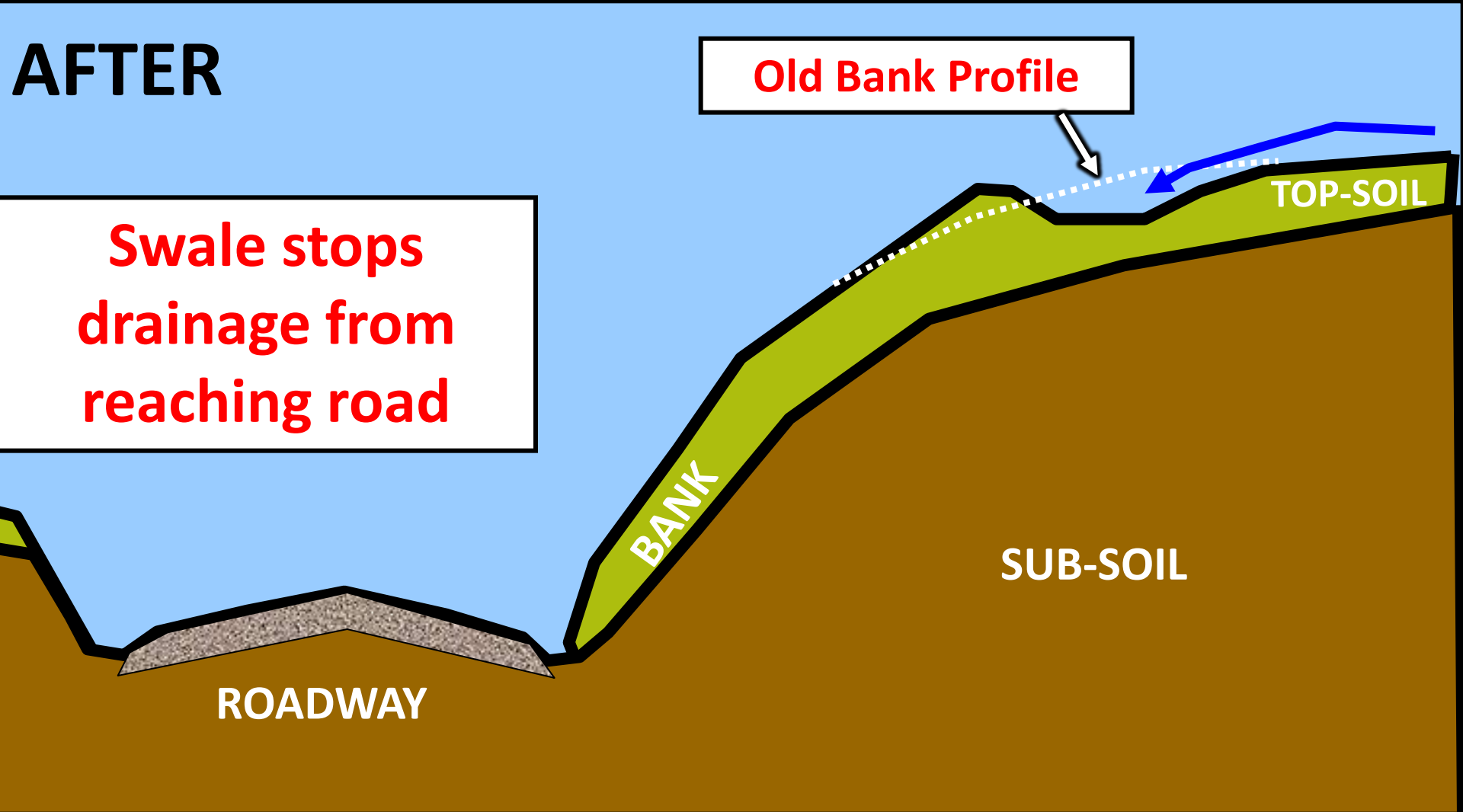
DURING



AFTER

Old Bank Profile

Swale stops drainage from reaching road



TOP-SOIL

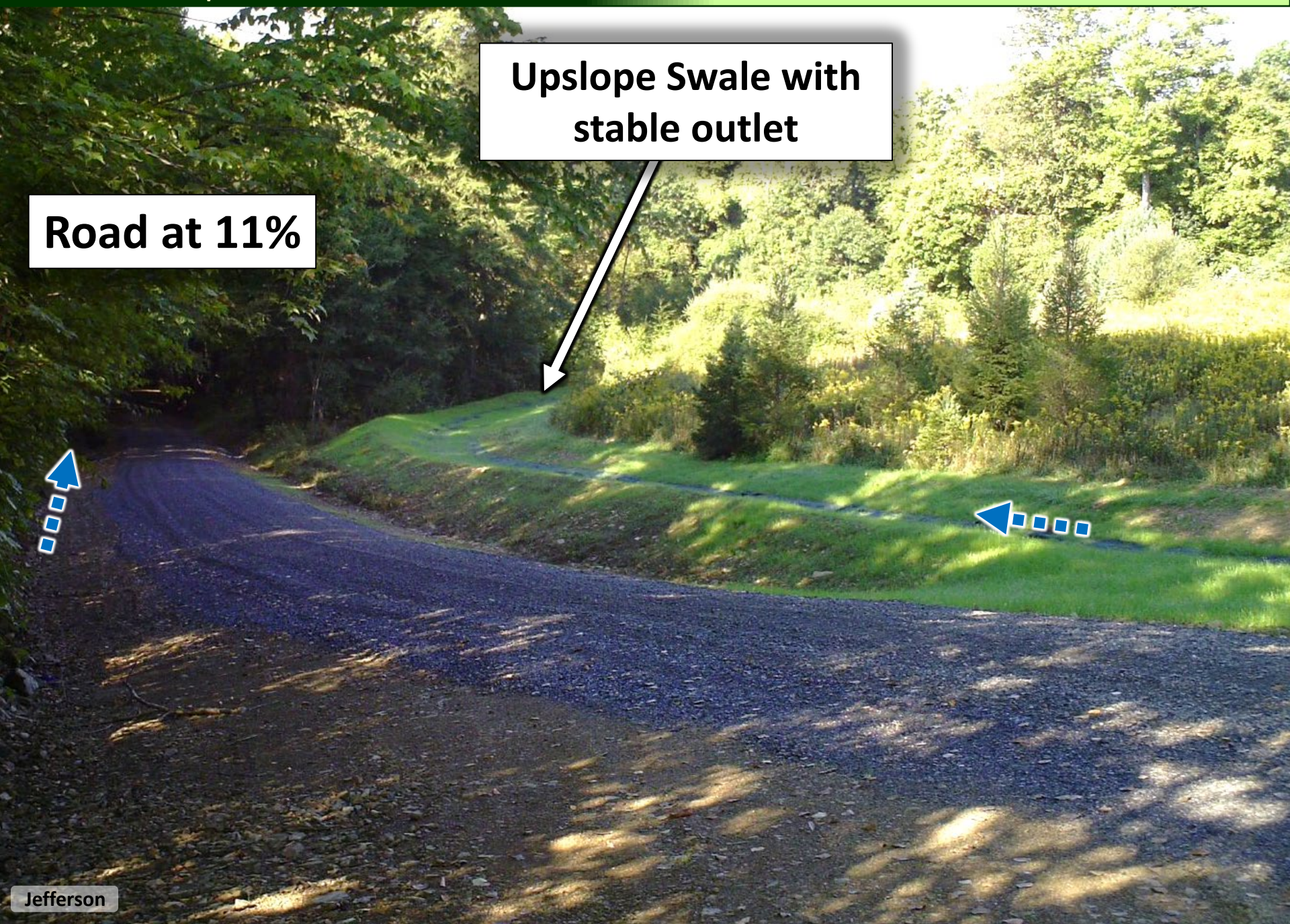
SUB-SOIL

ROADWAY

BANK

WHEN:

- Excessive overland flow is entering road area
- A safe and stable outlet is available for swale

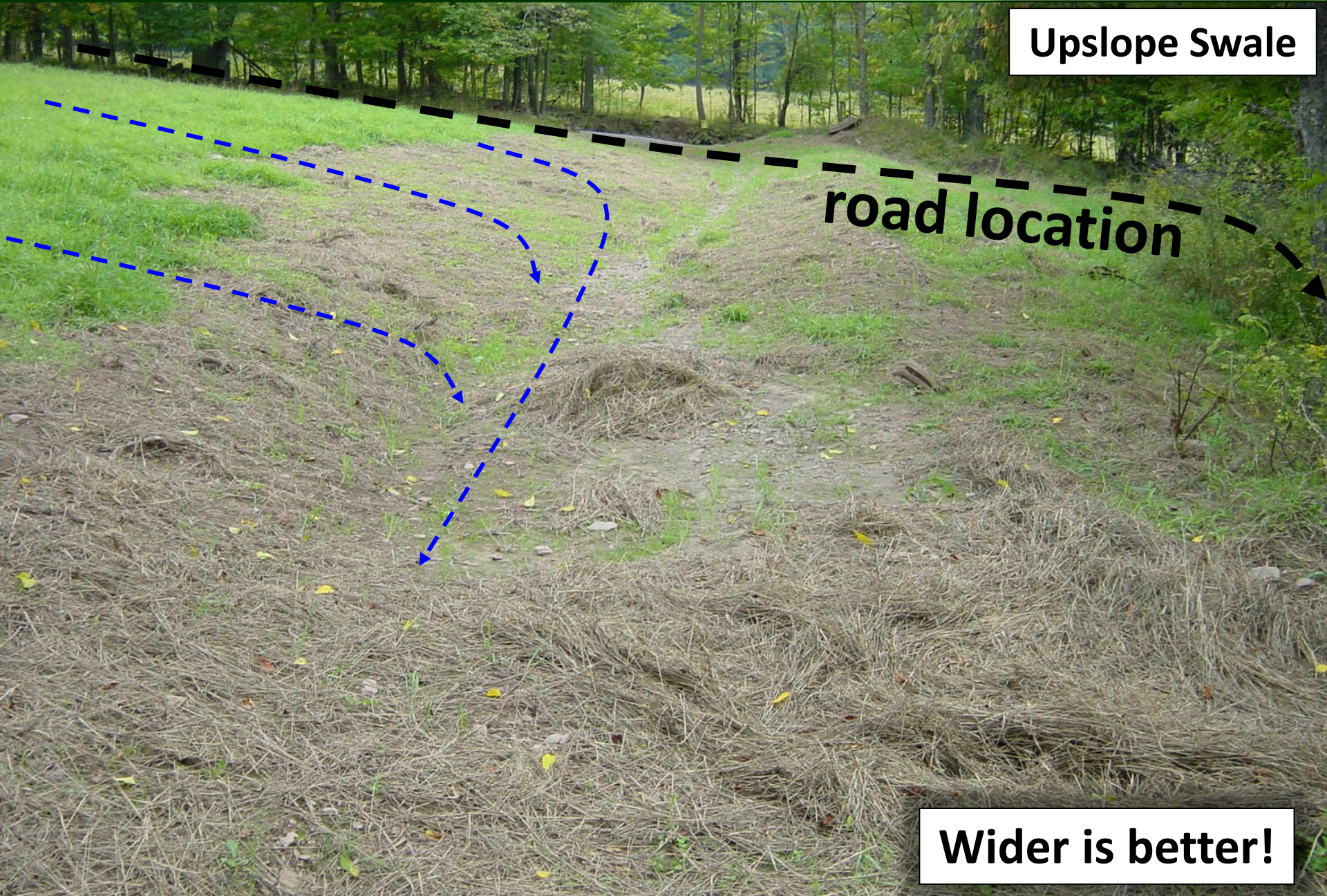


Road at 11%

Upslope Swale with stable outlet



Upslope Swale

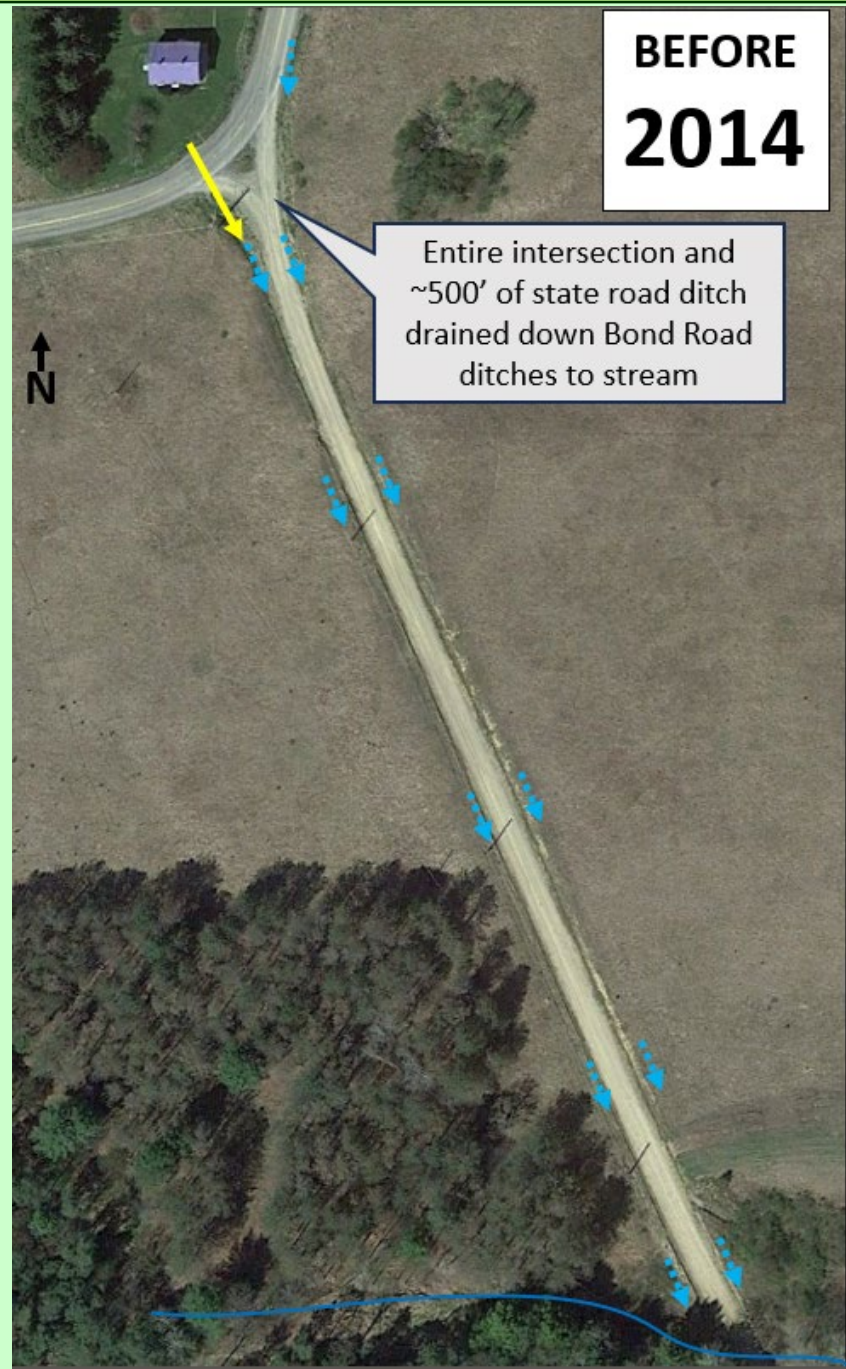


road location

Wider is better!

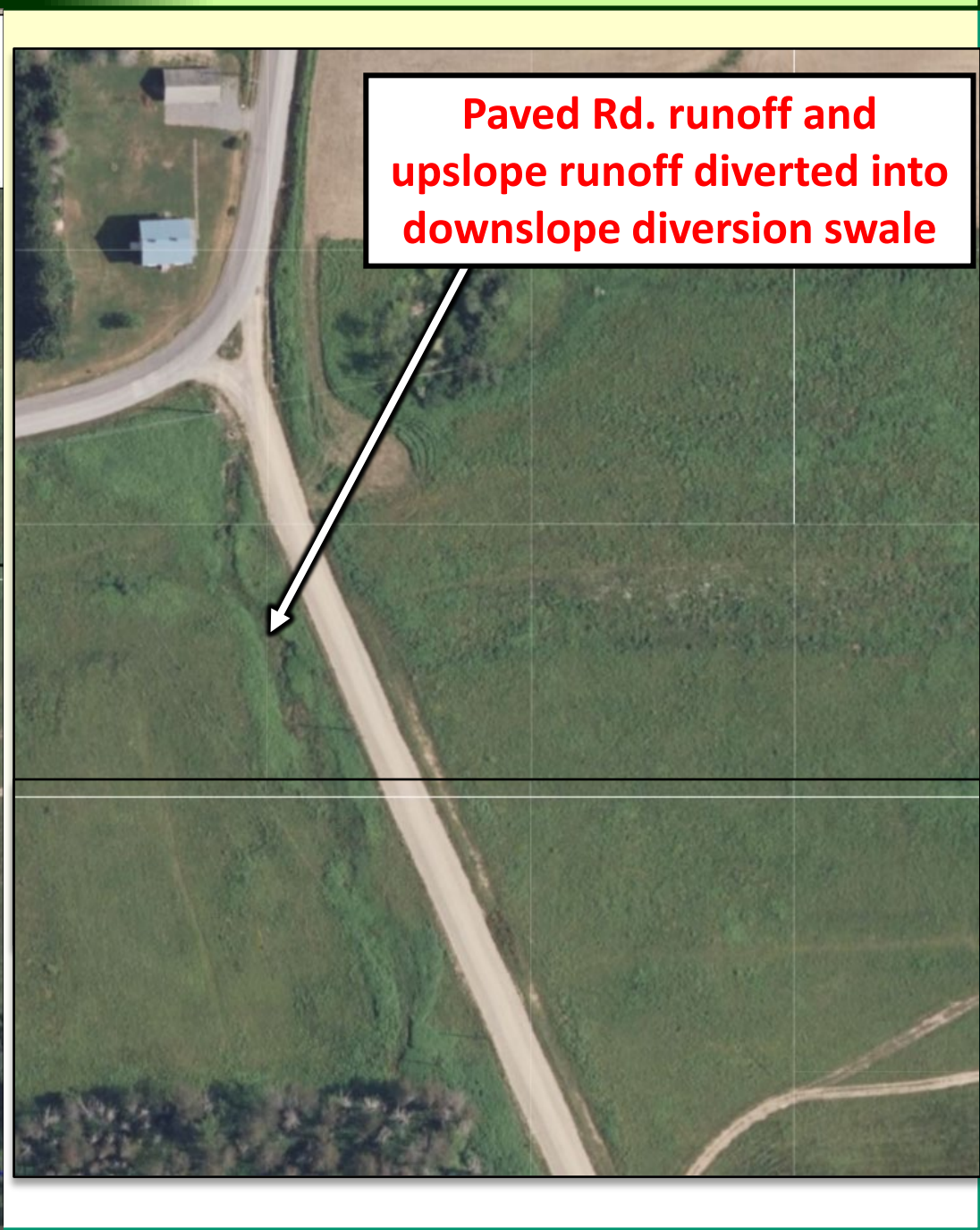
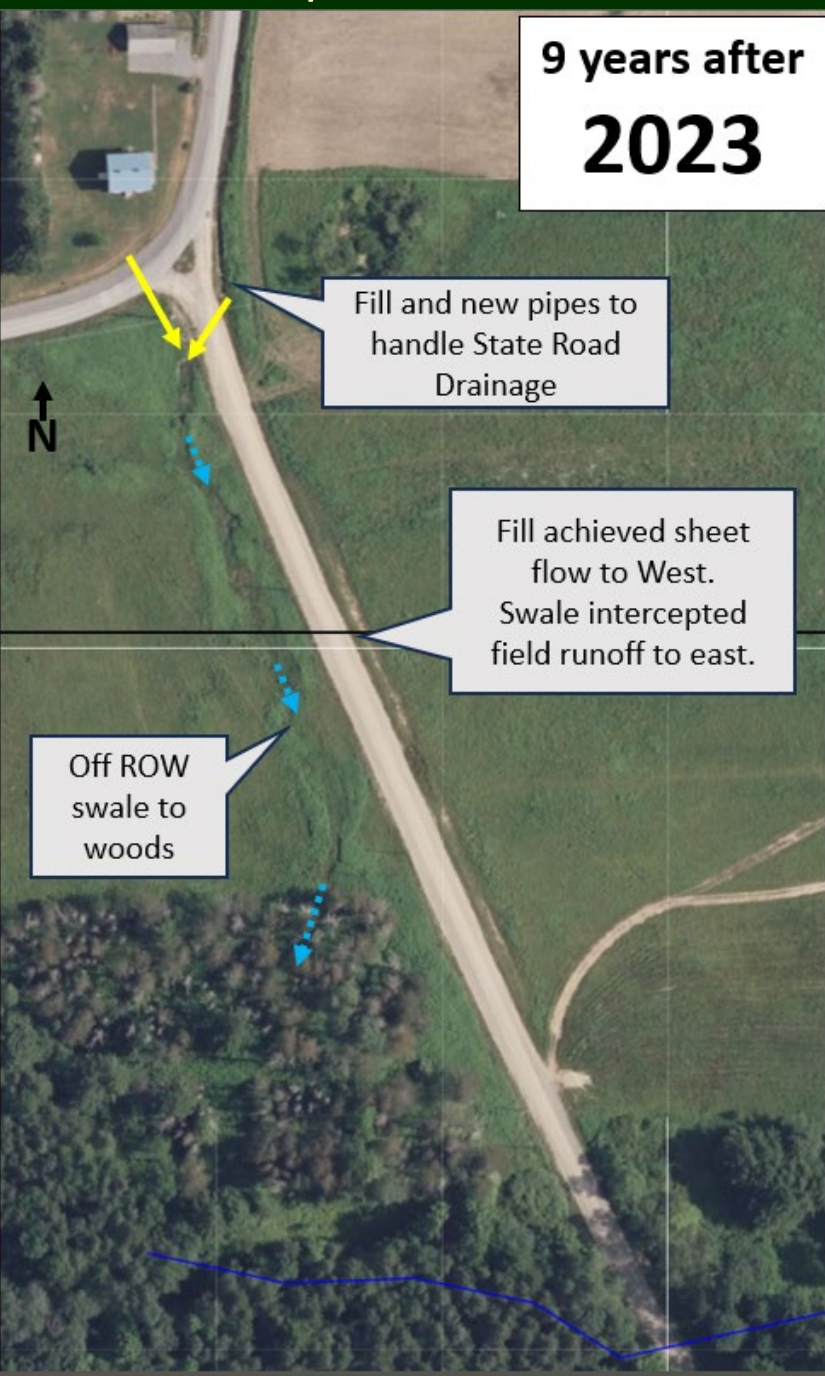
Bond Road, Polk Township

- Paved road ditch flow and upslope runoff flowed into Bond Road ditches, causing erosion.
- Ditches flowed into stream.
- Runoff diverted into downslope diversion swale.



Eroded ditches & saturated road base.







Benefits:

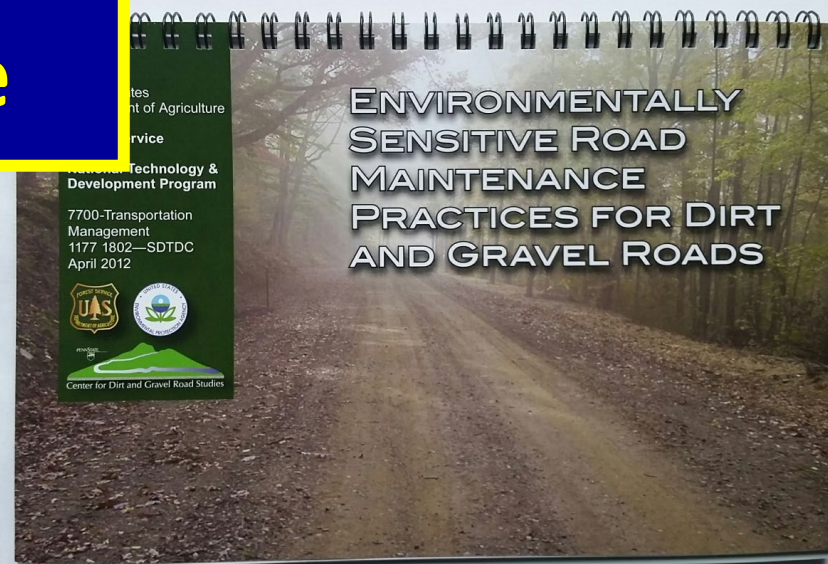
- Reduces amount of water flowing to road
- Prevents water from eroding road bank
- Should not interfere with property use

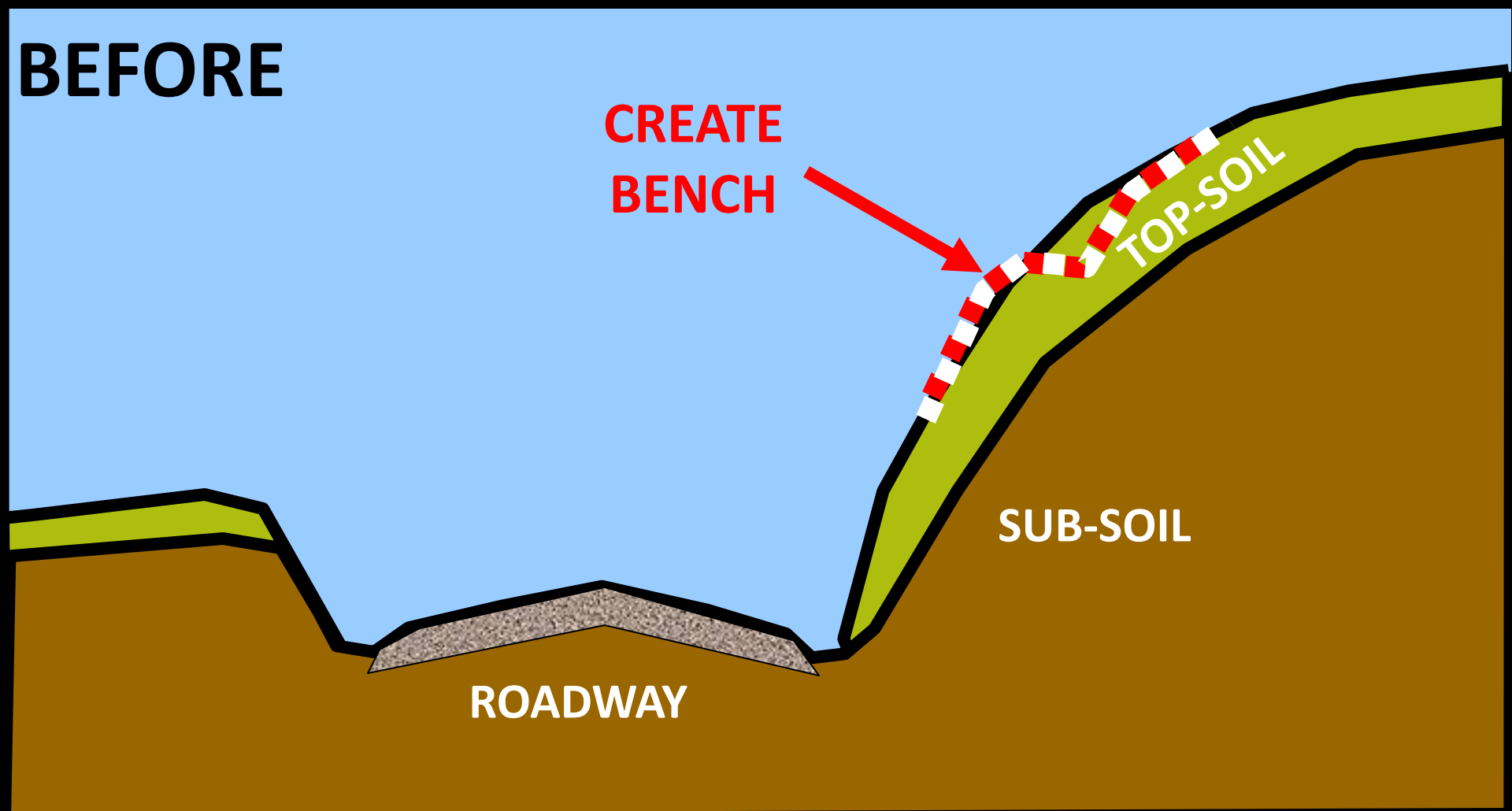
Considerations:

- Concentrates surface water (need stable outlet)
- Landowner concerns

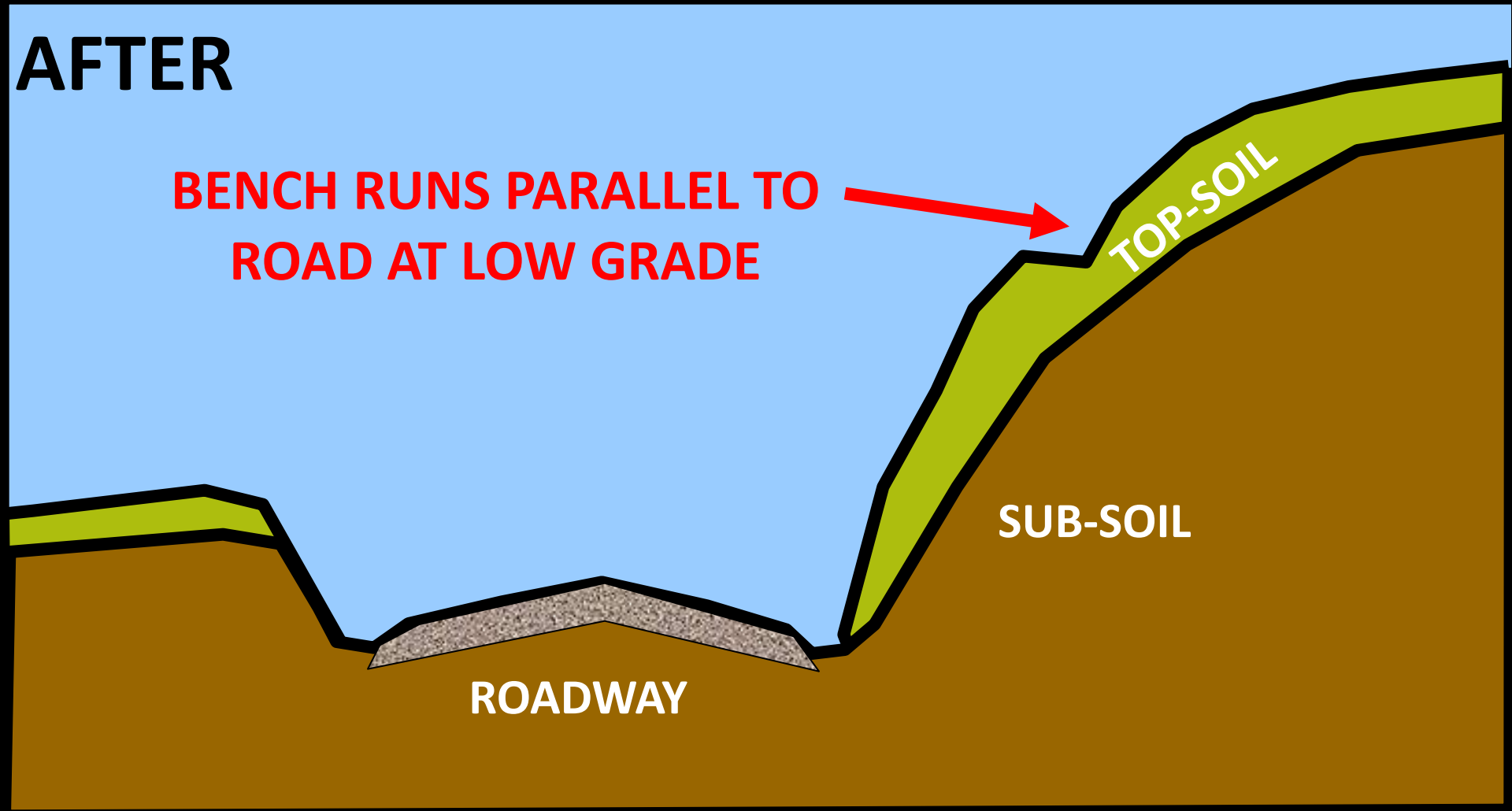
1. Public Relations
2. Planning Ahead
3. Diversion Swale
- 4. Bank Benches**

Page 99 in Field Guide





Page 99 in Field Guide



Page 99 in Field Guide



Huntingdon

1-year later



Huntingdon

Benefits:

- Reduces soil loss from water flowing over bank
- Reduces amount of water reaching roadway
- Easy to do
- Cheap

Considerations:

- Will concentrate surface water
- Need stable outlet

DIVERSION

SWALES

-VS-

BANK BENCHES

Channel shaped



Flat

Sloped for water flow

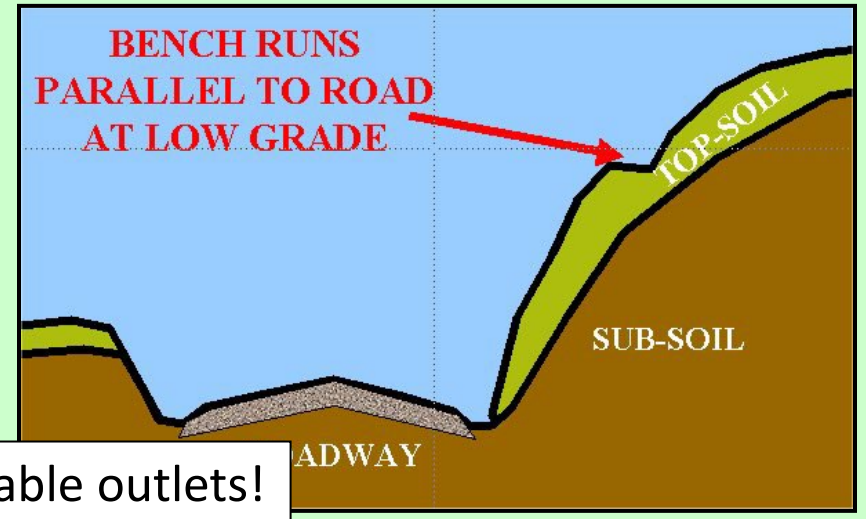
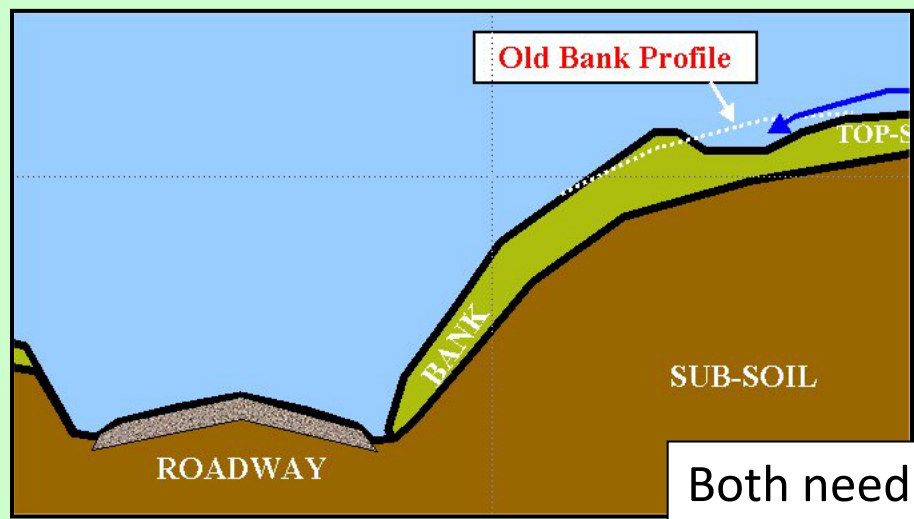


Very gentle slope

Designed to carry water



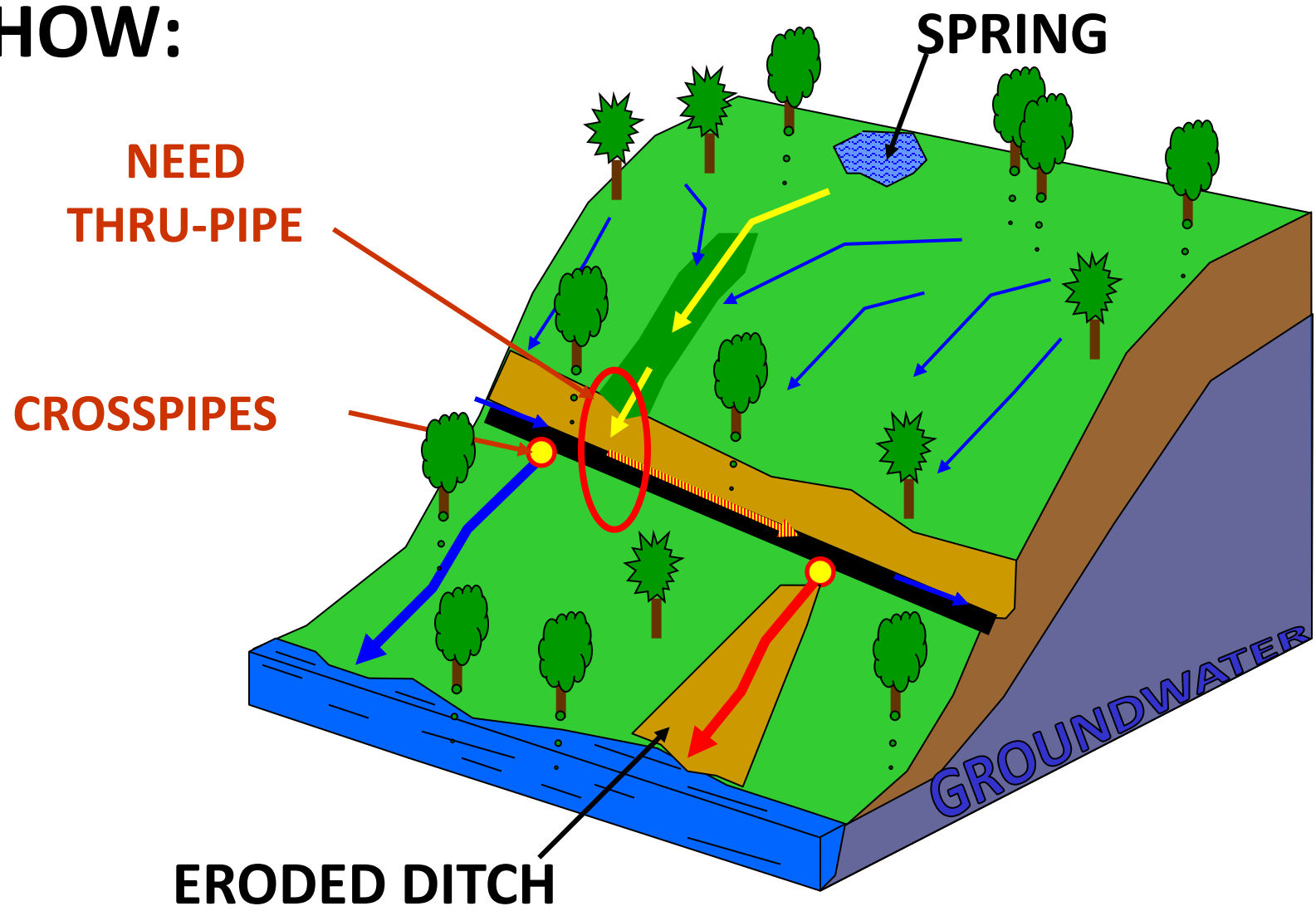
Designed to slow water



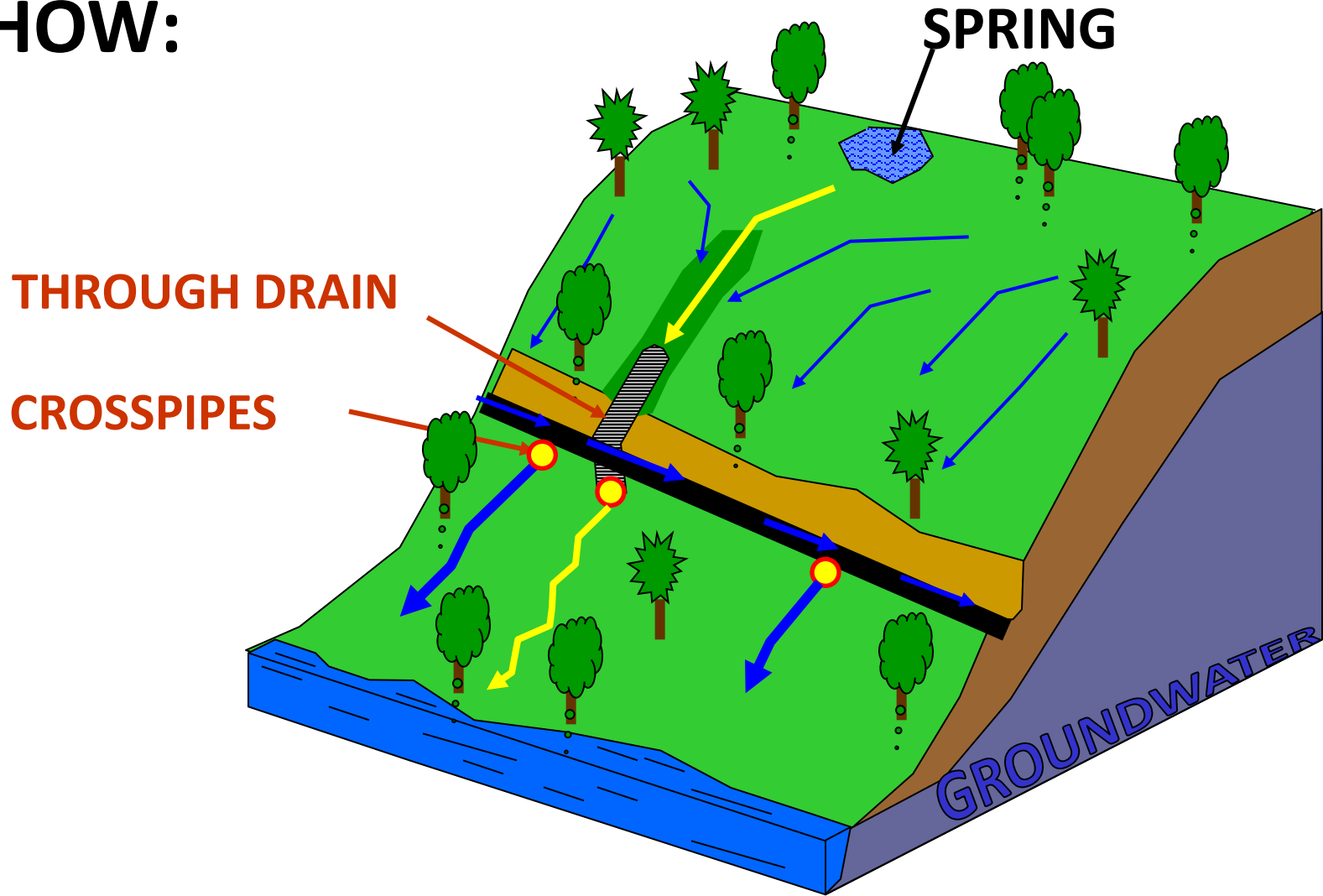
Both need stable outlets!

1. Public Relations
2. Planning Ahead
3. Diversion Swale
4. Bank Benches
- 5. Through-Drains**
6. Addressing Access Drainage

HOW:



HOW:



Inlet

View from road





Stable Outlet



Benefits:

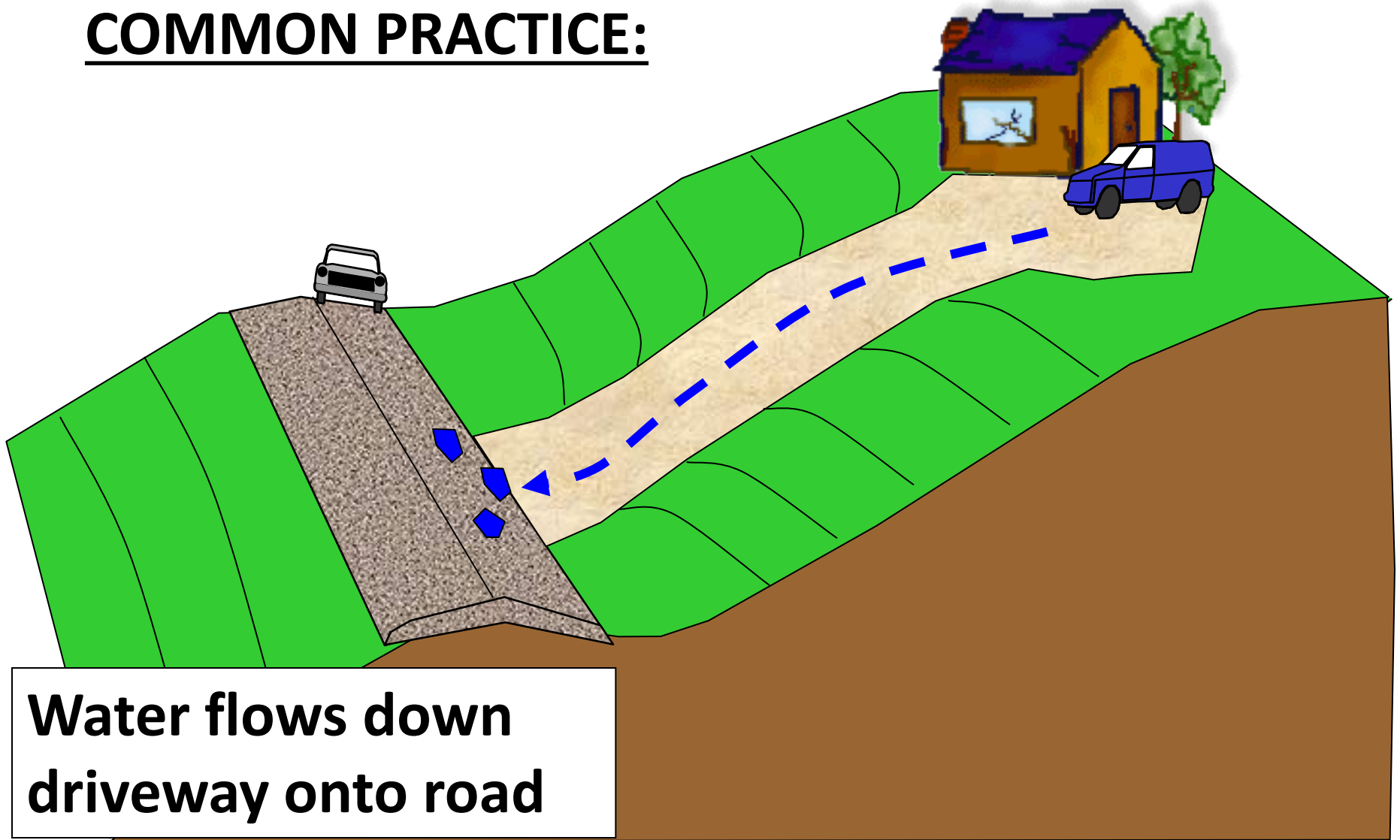
- Keeps clean water clean
- Reduces amount of water in road drainage system: more stable ditches and outlets

Considerations:

- May require outlet stabilization or re-establishment of channel downstream of road
- These practices may require permits or program waivers

1. Public Relations
2. Planning Ahead
3. Diversion Swale
4. Bank Benches
5. Through-Drains
- 6. Addressing Access Drainage**

Handling intersection drainage: COMMON PRACTICE:



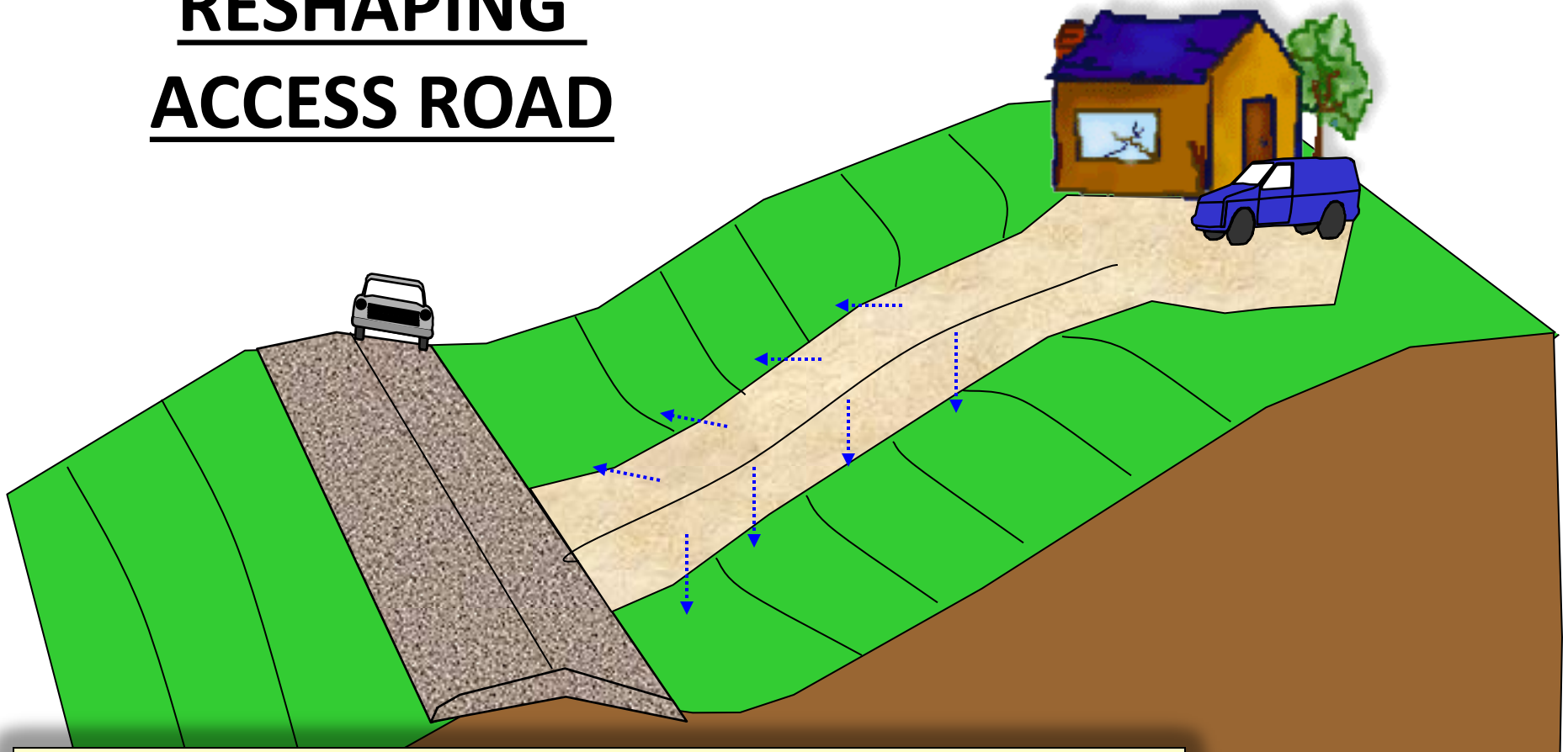
**Water flows down
driveway onto road**



**Uncontrolled water
impacts the cart way!**

1. Public Relations
2. Planning Ahead
3. Diversion Swale
4. Bank Benches
5. Through-Drains
- 6. Addressing Access Drainage**
 - **Shaping Access Roads**
 - Grade Breaks & Broad Based dips
 - Intersections

RESHAPING ACCESS ROAD



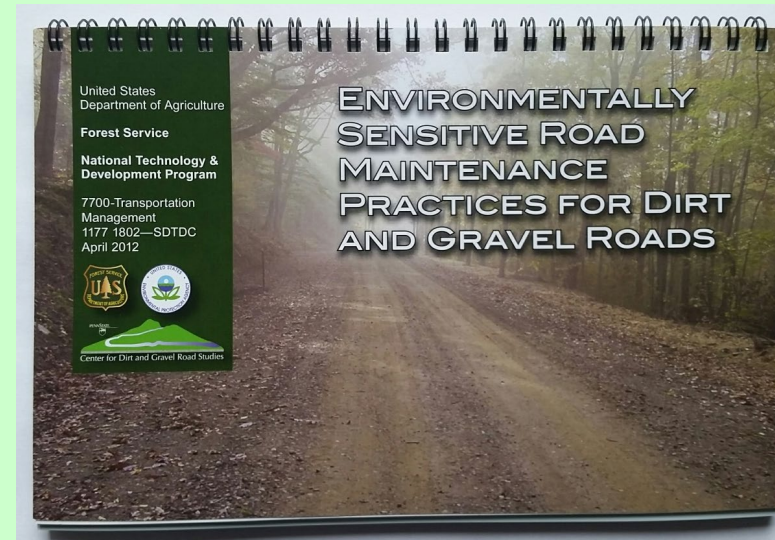
Crowned or side-sloped driveway prevents water from flowing to road

1. Public Relations
2. Planning Ahead
3. Diversion Swale
4. Bank Benches
5. Through-Drains
- 6. Addressing Access Drainage**
 - Shaping Access Roads
 - **Grade Breaks & Broad Based dips**
 - Intersections

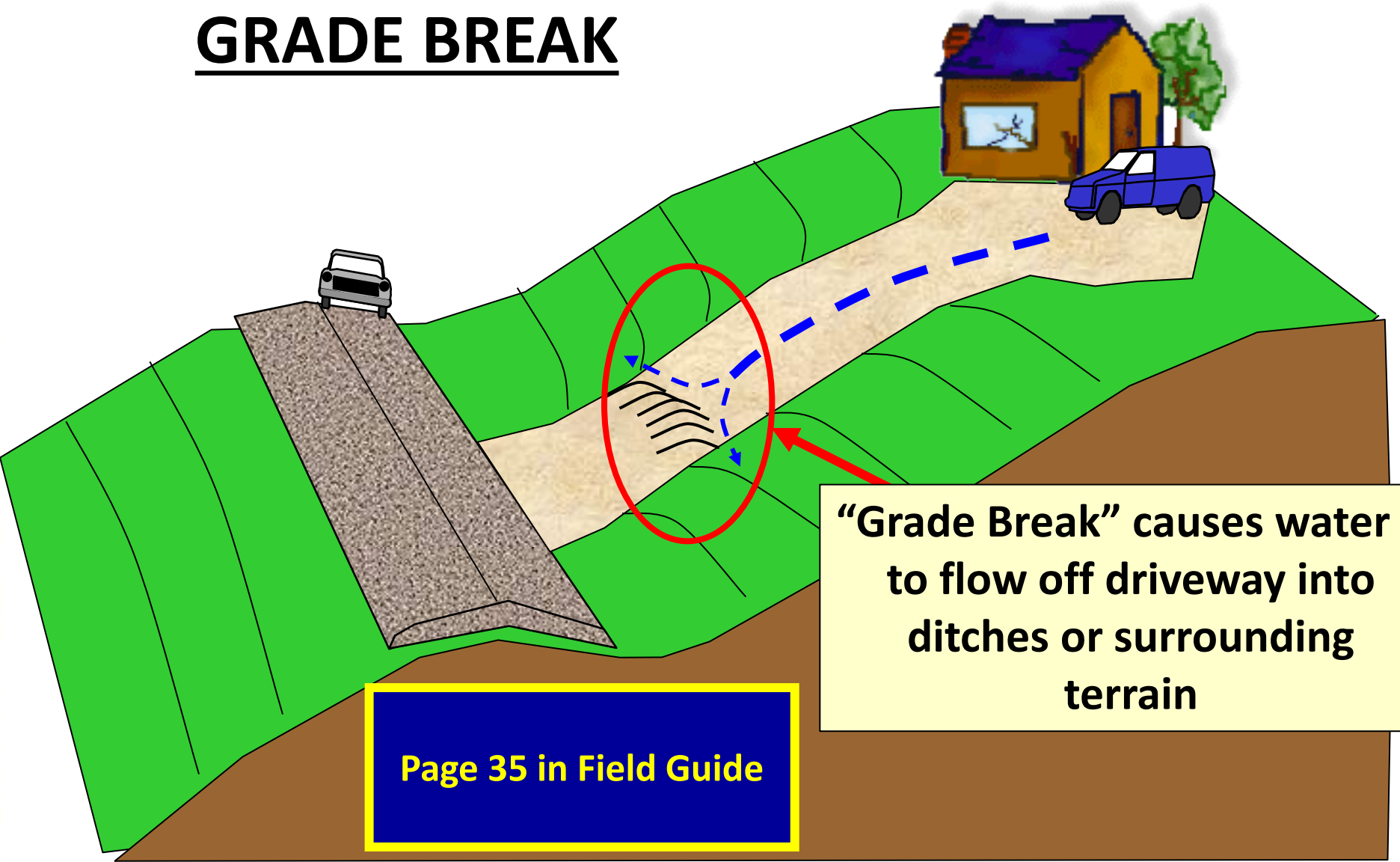
HOW: Grade Breaks

Surface drainage features that cause water to flow off to both sides of the road.

Page 35 in Field Guide



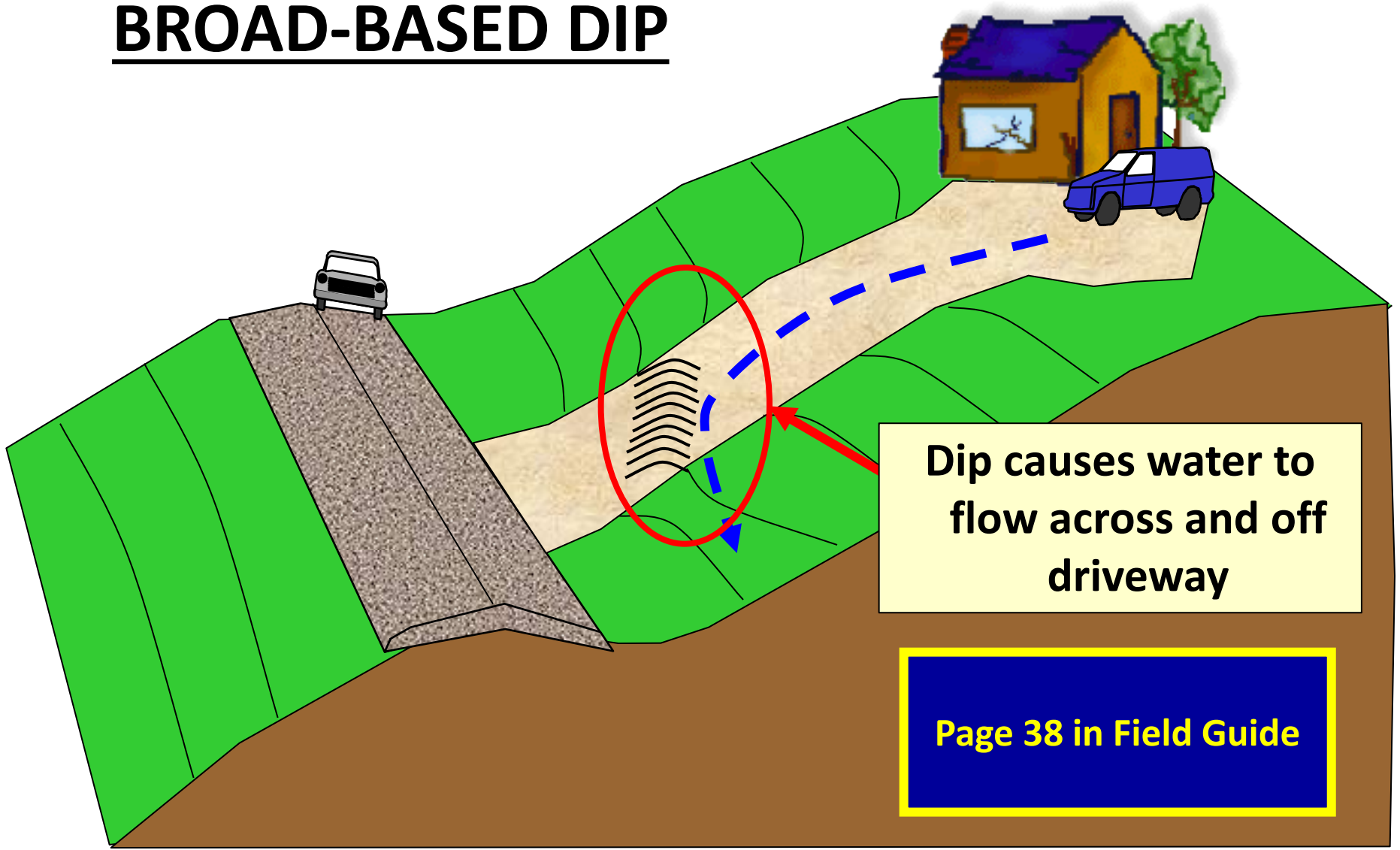
GRADE BREAK



“Grade Break” causes water to flow off driveway into ditches or surrounding terrain

Page 35 in Field Guide

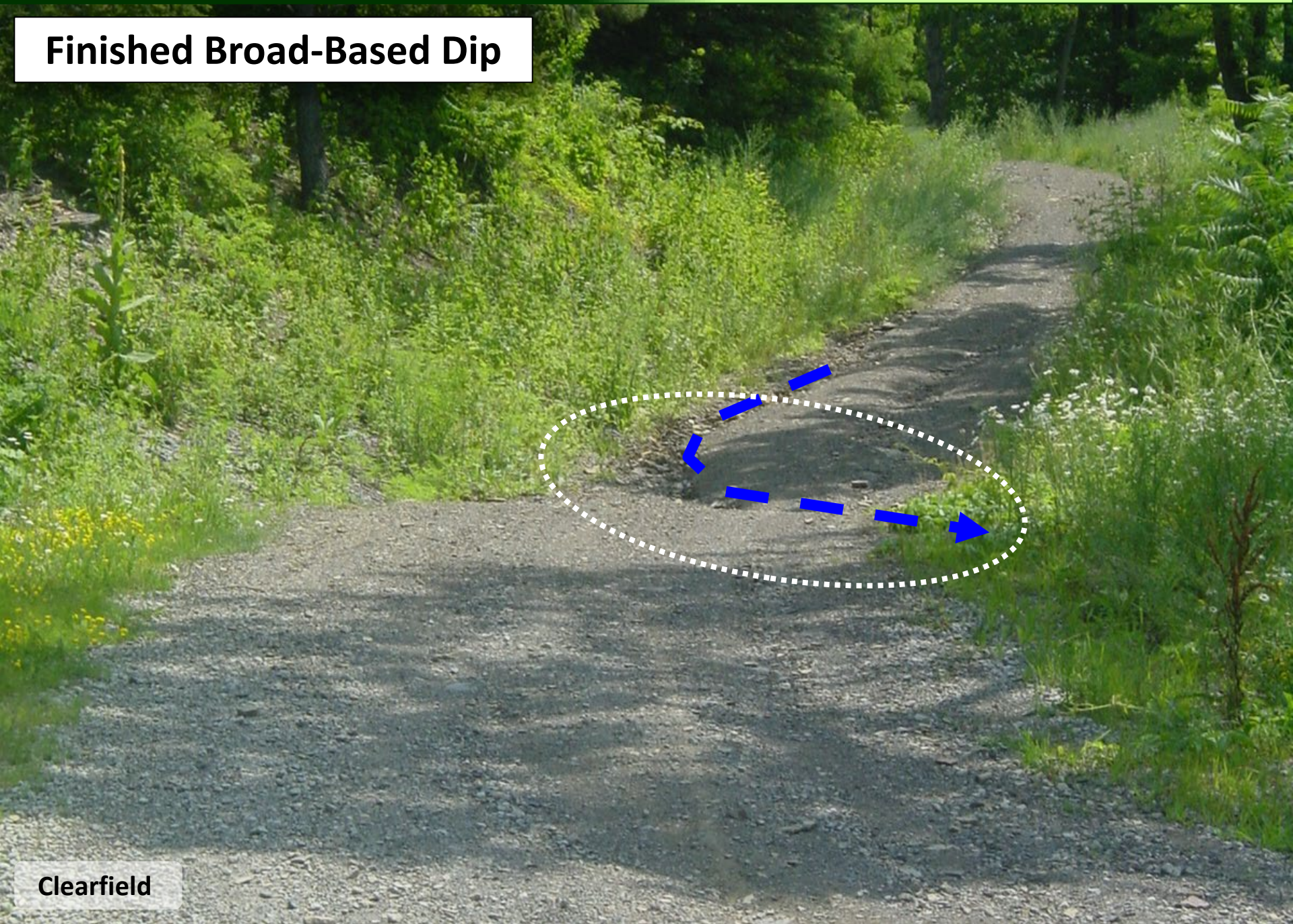
BROAD-BASED DIP



Dip causes water to flow across and off driveway

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Finished Broad-Based Dip



Clearfield

BEFORE

Driveway



Driveway brings water to road

Twp Road



BEFORE

Driveway brings water to road



Driveway





Twp Road

Installation of grade break and pipe

Driveway

DURING

Installation of grade break and pipe

Driveway

Twp Road

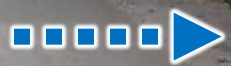
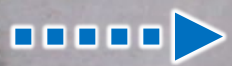
Snyder County – Mattern Road – pic 4/5



AFTER

Twp Road

Driveway



GRADE BREAK

-VS-

BROAD-BASED DIP

Straight across road

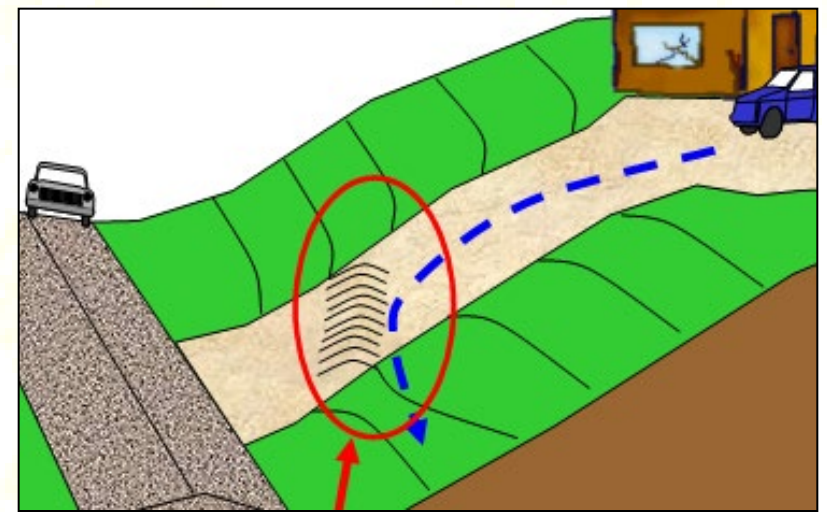
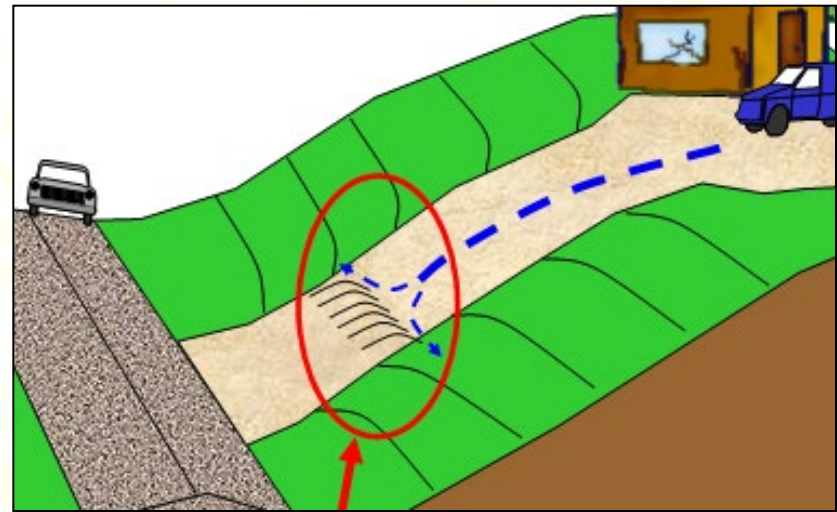
Across road at angle

Think of as “elongated speed bumps”

May need to be stabilized at base

Designed to get water off of road surface

Designed to carry water across road surface

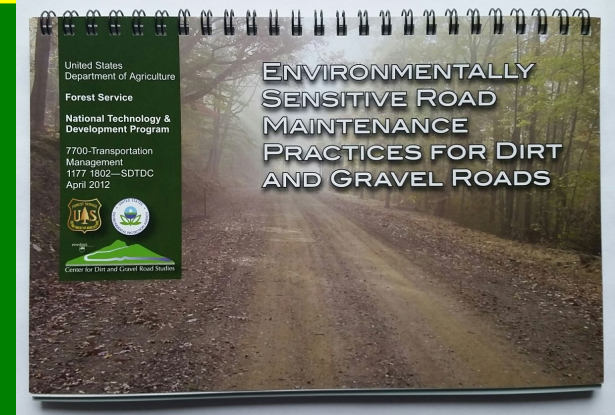


1. Public Relations
2. Planning Ahead
3. Diversion Swale
4. Bank Benches
5. Through-Drains

6. Addressing Access Drainage

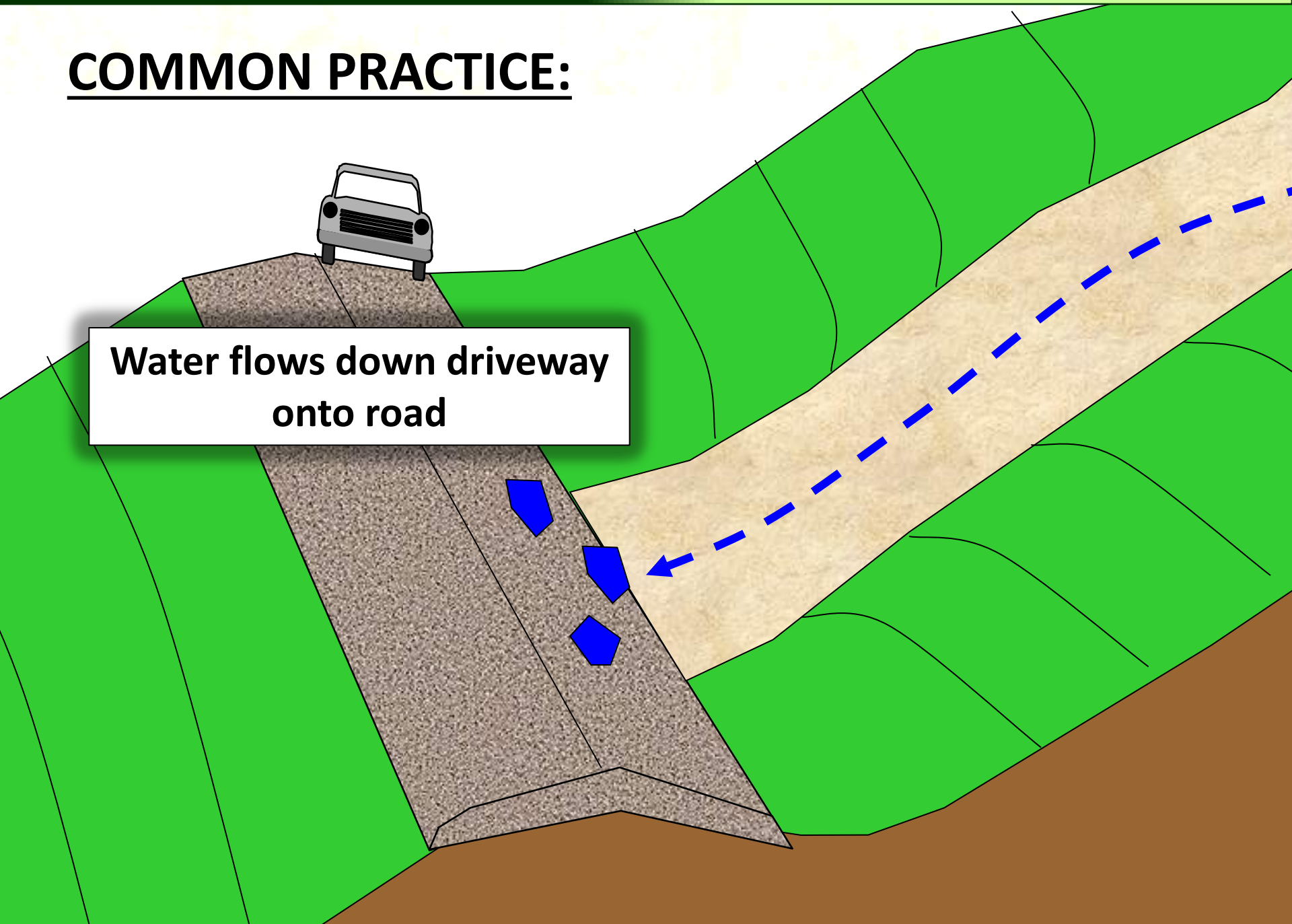
- Shaping Access Roads
- Grade Breaks & Broad Based dips
- Intersections

Page 41 in Field Guide



COMMON PRACTICE:

Water flows down driveway
onto road



COMMON PRACTICE:

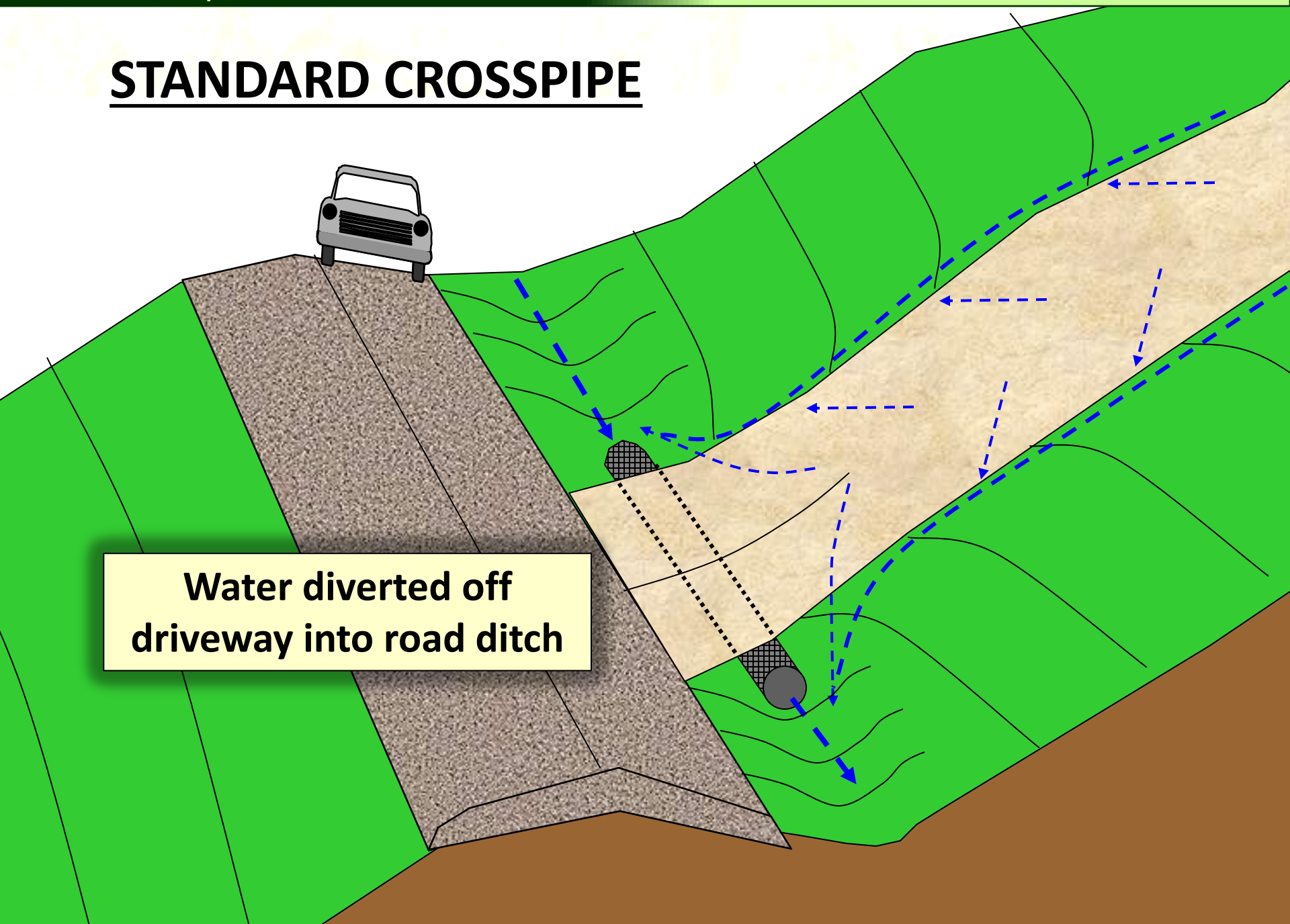


Handling Intersection Drainage

What can you do to handle this water?

- **Standard crosspipe**
- Open top crosspipe
- Shallow ditch

STANDARD CROSSPIPE



Water diverted off driveway into road ditch

Standard Driveway Pipe



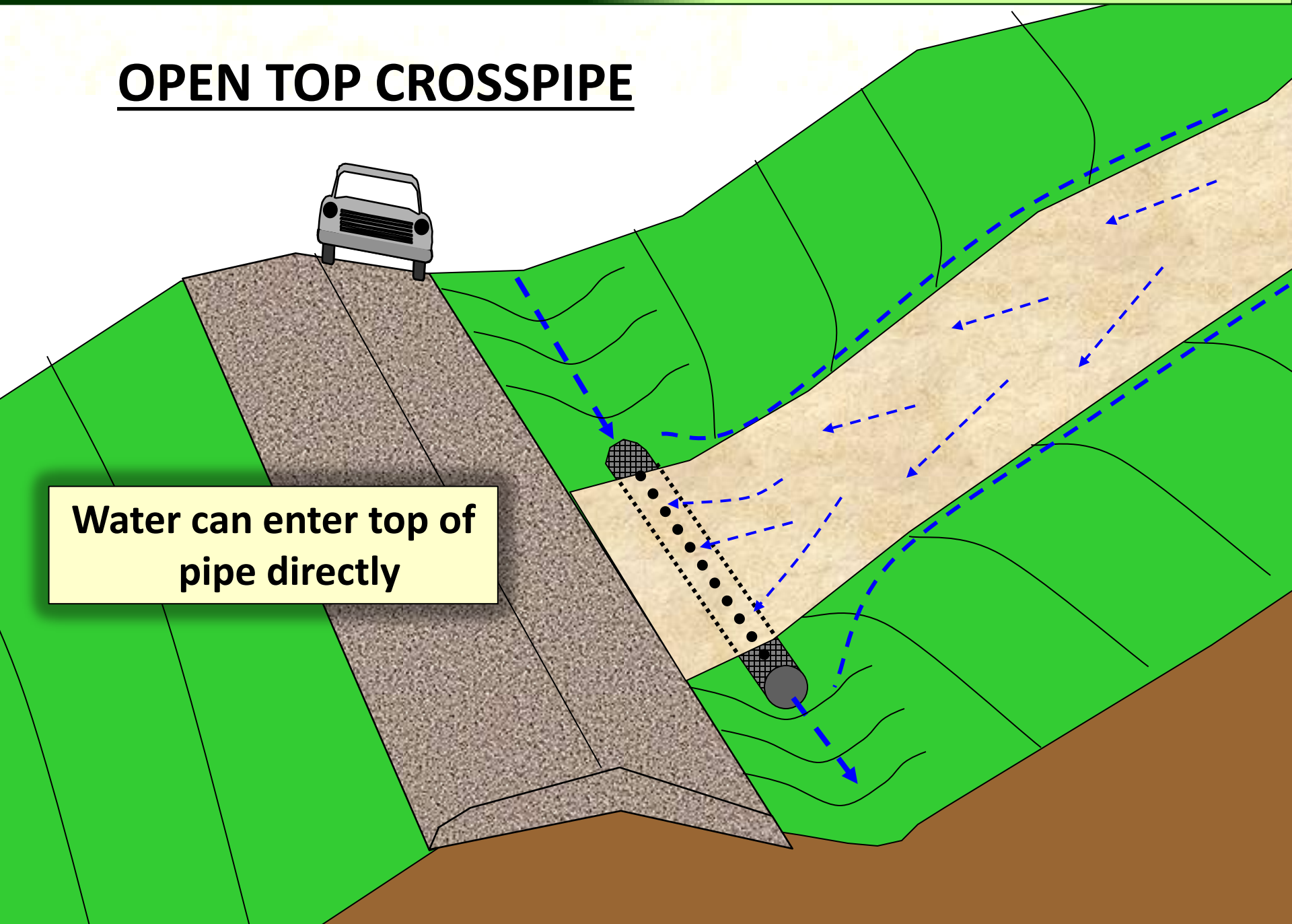
Water diverted off driveway
into road ditch

Handling Intersection Drainage

What can you do to handle this water?

- Standard crosspipe
- **Open top crosspipe**
- Shallow ditch

OPEN TOP CROSSPIPE



Water can enter top of pipe directly



OPEN TOP CROSSPIPE

Water can enter top of pipe directly

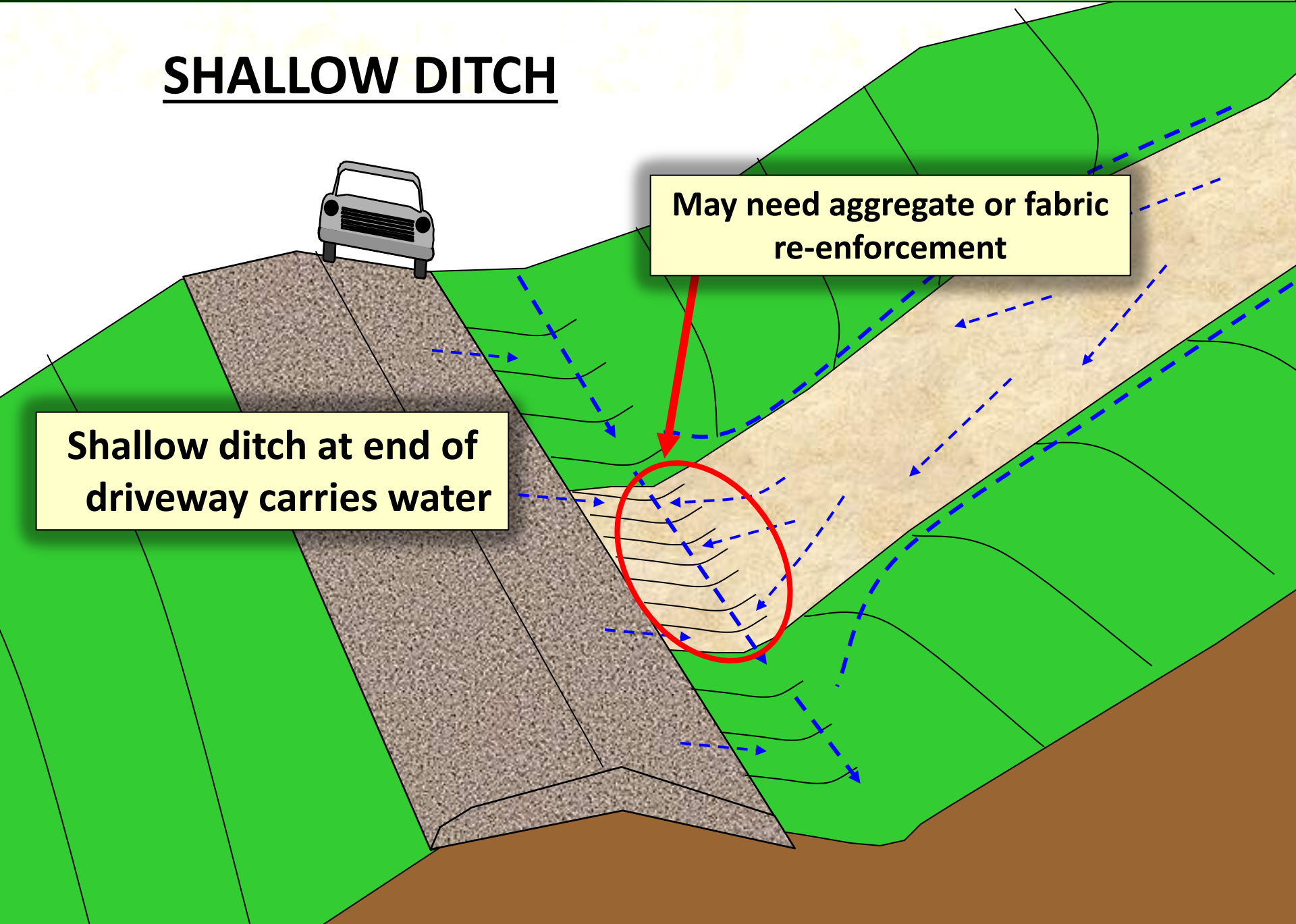
Best used on paved access roads Must be maintained!

SHALLOW DITCH



Shallow ditch at end of driveway carries water

May need aggregate or fabric re-enforcement



Handling Intersection Drainage

What can you do to handle this water?

- Standard crosspipe
- Open top crosspipe
- **Shallow ditch**

SHALLOW
DITCH



Off Right-of-Way

ADDITIONAL RESOURCES:

- Your Conservation District
- Your Municipal Engineer
- www.dirtandgravelroads.org

