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"Know the Flow"

Module 4

Maintenance of Stormwater Management Systems

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What is Maintenance?

- Maintaining the ability of the system to convey, store, and discharge storm water to provide treatment and flood protection.

Why do I need to do maintenance?

- Without maintenance storm water management systems will not provide the flood protection they were designed to and can eventually stop working altogether.
- The number one cause of flooding complaints is lack of maintenance

What are the typical maintenance activities?

- Remove sediment and debris that accumulates in the inlets and culverts annually.
- Restore eroded banks of ponds and around storm culverts and structures.
- Maintain swale grades, banks and berms.
- Maintain access to control structures in remote areas of the project.

When is the best time to do maintenance?

- South Florida gets 55 inches of rain per year, with most of that falling between May and October “The Rainy Season”
- The best time to do maintenance is when water levels are the lowest and Rain Fall is the least between November and April “The Dry Season”
- February – March are typically the best months to perform maintenance

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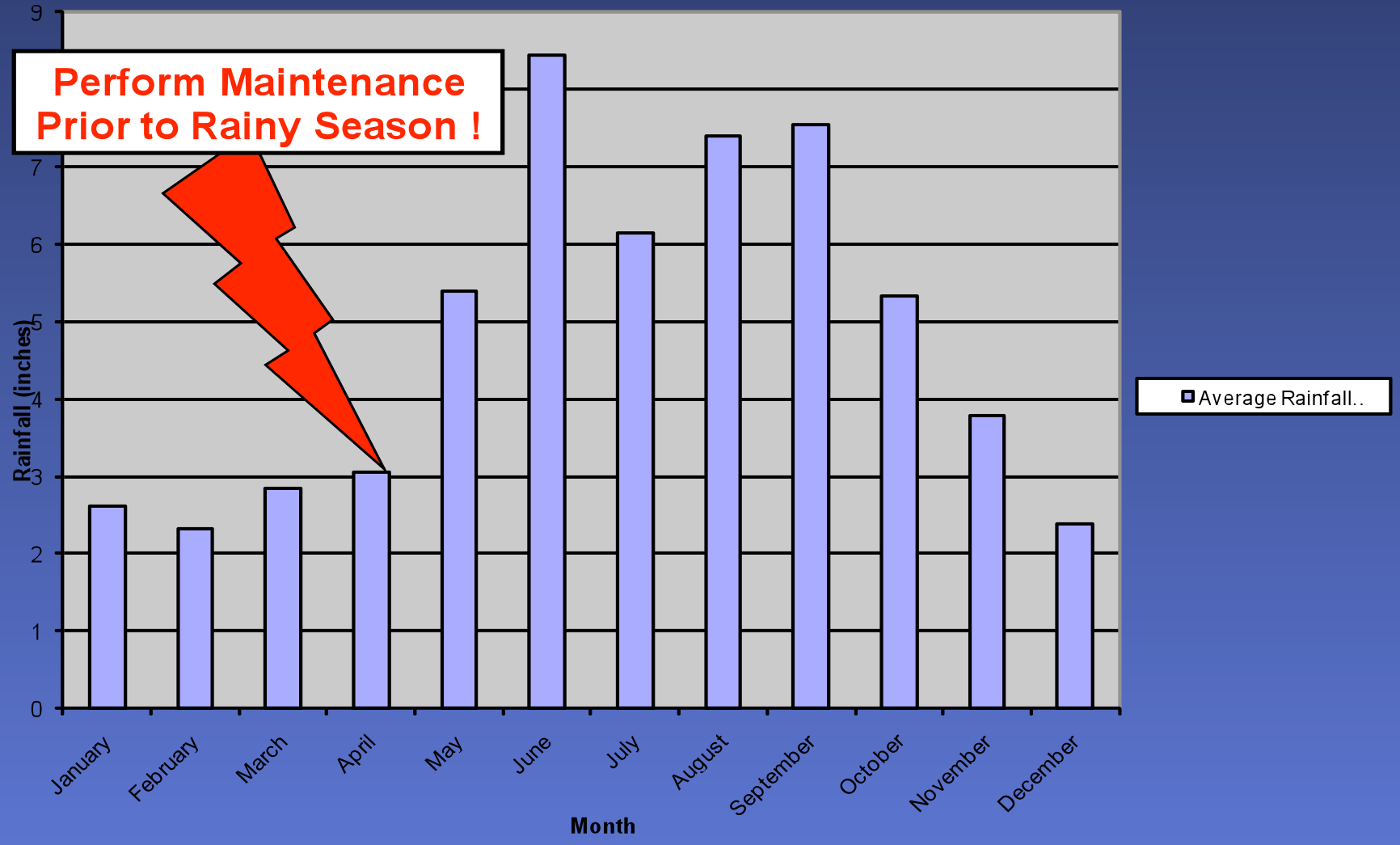
30 Year Average Rainfall (1971-2000)



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Maintenance of Specific types of Storm Water Management Facilities

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Grated Inlet

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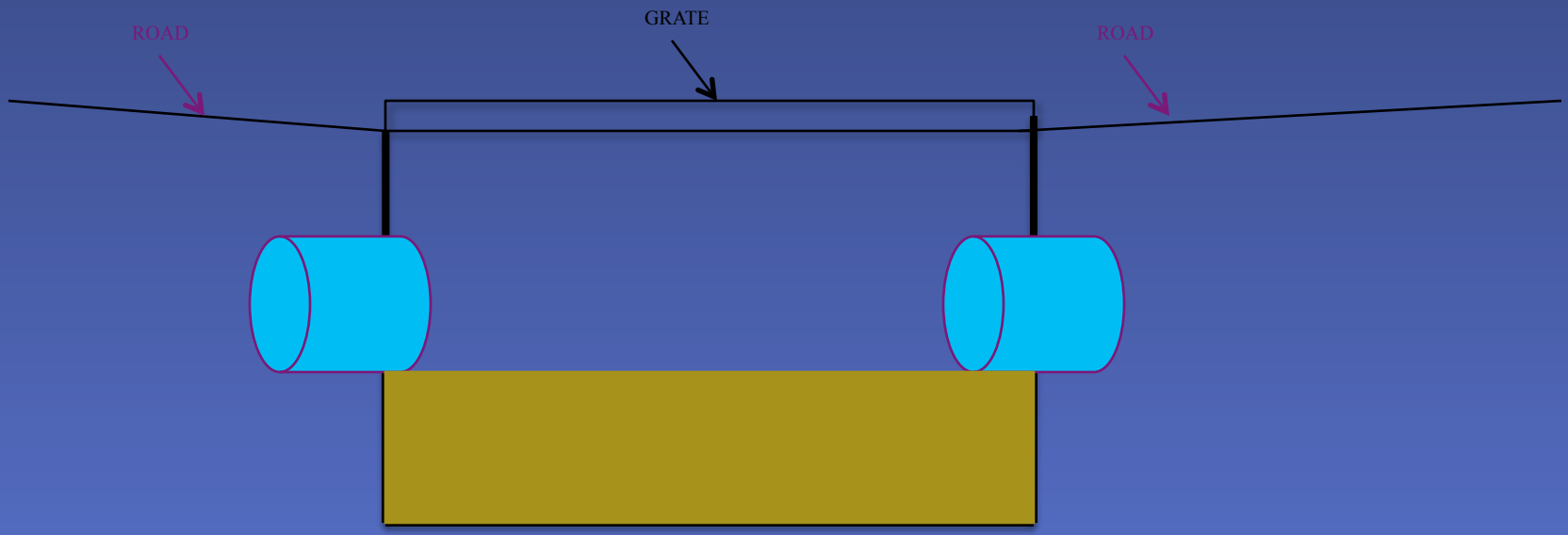
4a. Maintenance of Inlets

- Inlets should be accessible and clear of debris.
- Sediment build up in the bottom greater then 4-6 inches deep should be removed depending on the sump depth of the inlet.
- Large cracks or obvious damage should be repaired.
- Roots or vegetation intrusion should be removed.

Valley gutter inlet

Typical Inlet/Sump



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Grated Inlet in Landscaped Area

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Grated Inlet with Debris Clogging Inlet

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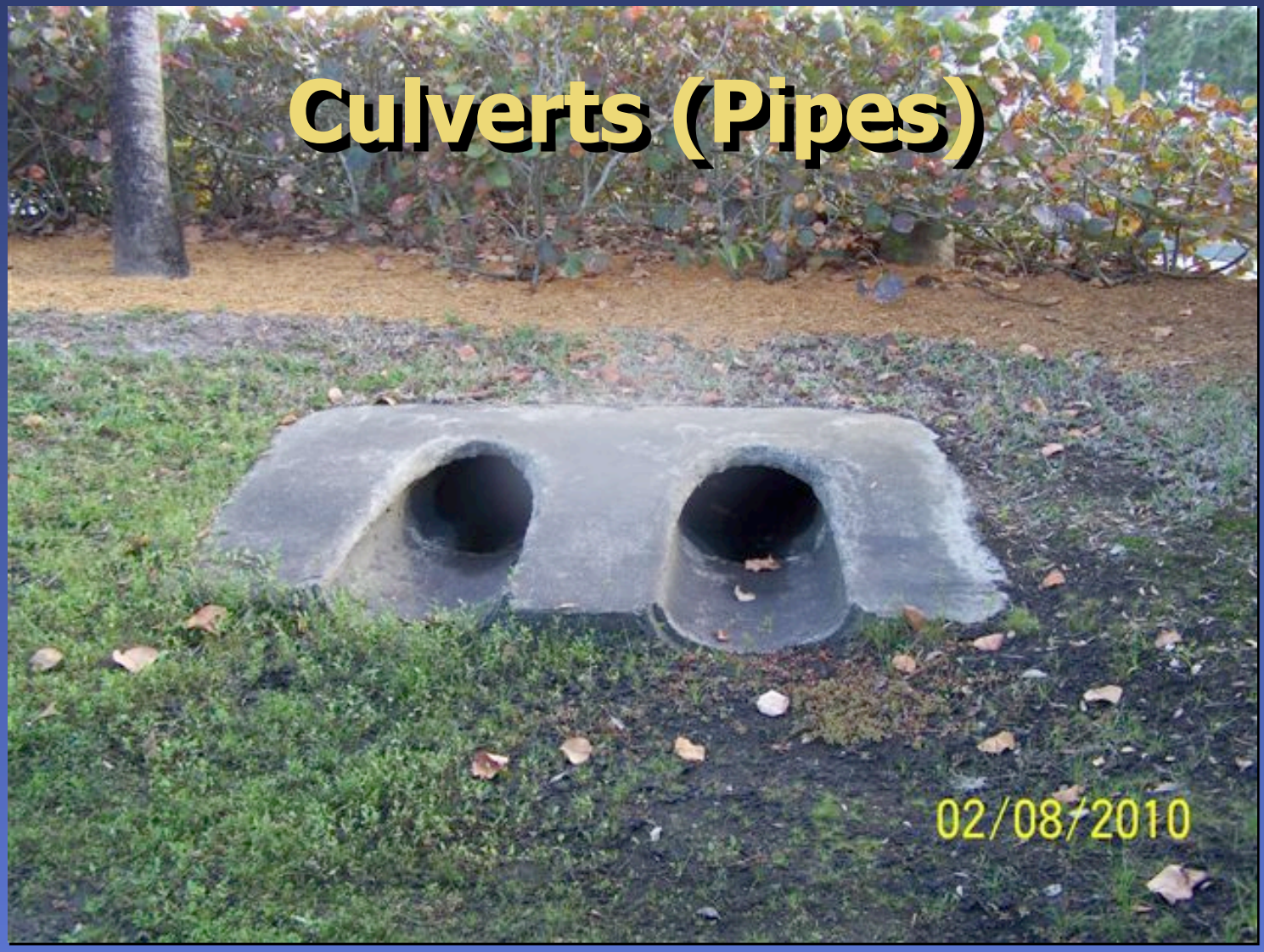
Culverts (Pipes)



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4b. Maintenance of Culverts

- Culverts ends should be open with no visible damage
- Culverts should be clear. Sediment build up greater then 2 - 4 inches should be removed.
- Culvert end walls or mitered end sections should be in good condition. Broken or loose concrete should be repaired.

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Culvert Maintenance

Metal Culvert with Headwall

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Elliptical Concrete Culvert with Headwall

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4c. Maintenance of Grassed Conveyance Swales

- Swales should be mowed regularly
- The swale invert should not have any unintended blockages
- The banks should be stabilized

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Grassed Conveyance Swales

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Dry Detention Areas

4d. Maintenance of Dry Detention Areas

- Dry detention pond bottom and banks should stable and mowed regularly.
- Connecting culverts should be clear.
- Sediment build up at flumes and culverts should be removed
- Control structures should be clear and accessible.

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4e. Bubble Up Structures

- Bubble up structures need regular maintenance to remove trapped debris and sediment
- Bubble up structures should have clear zone for accessibility

Bubble Up Structures

- Bubble up structures typically convey storm water "bubble up" into a dry pond and are located at the bottom of a dry pond.
- Similar type structures are used to connect wetlands to storm water management systems.
- Bubble up structures trap sediment and debris and require regular maintenance to function properly.

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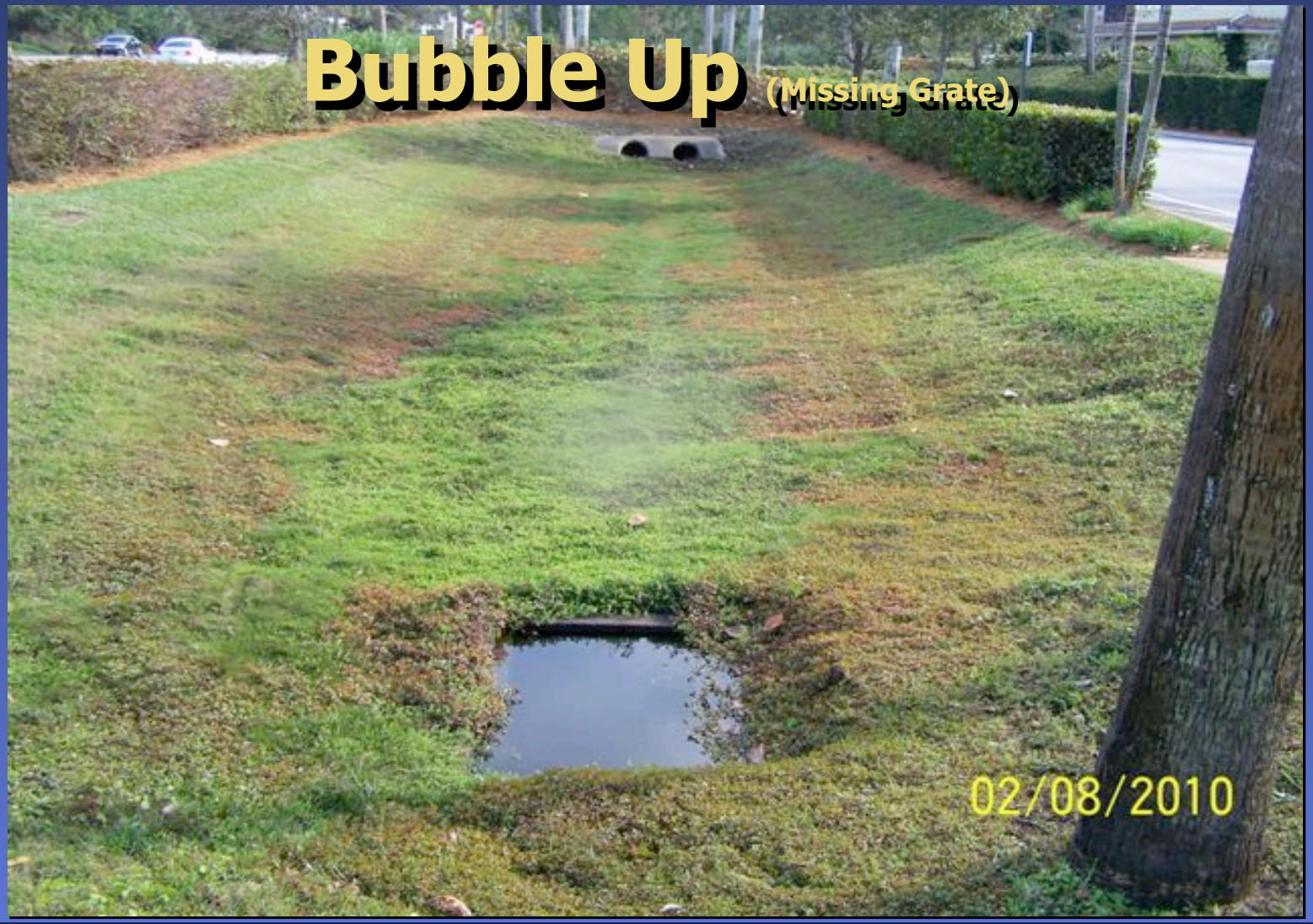
Bubble Up (Missing Grate)



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The grate of this bubble up structure was 50% over grown and one grate was removed during a storm to relieve flooding.

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Is this Bubble Up Structure Working?

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LAKES (WET DETENTION AREAS)

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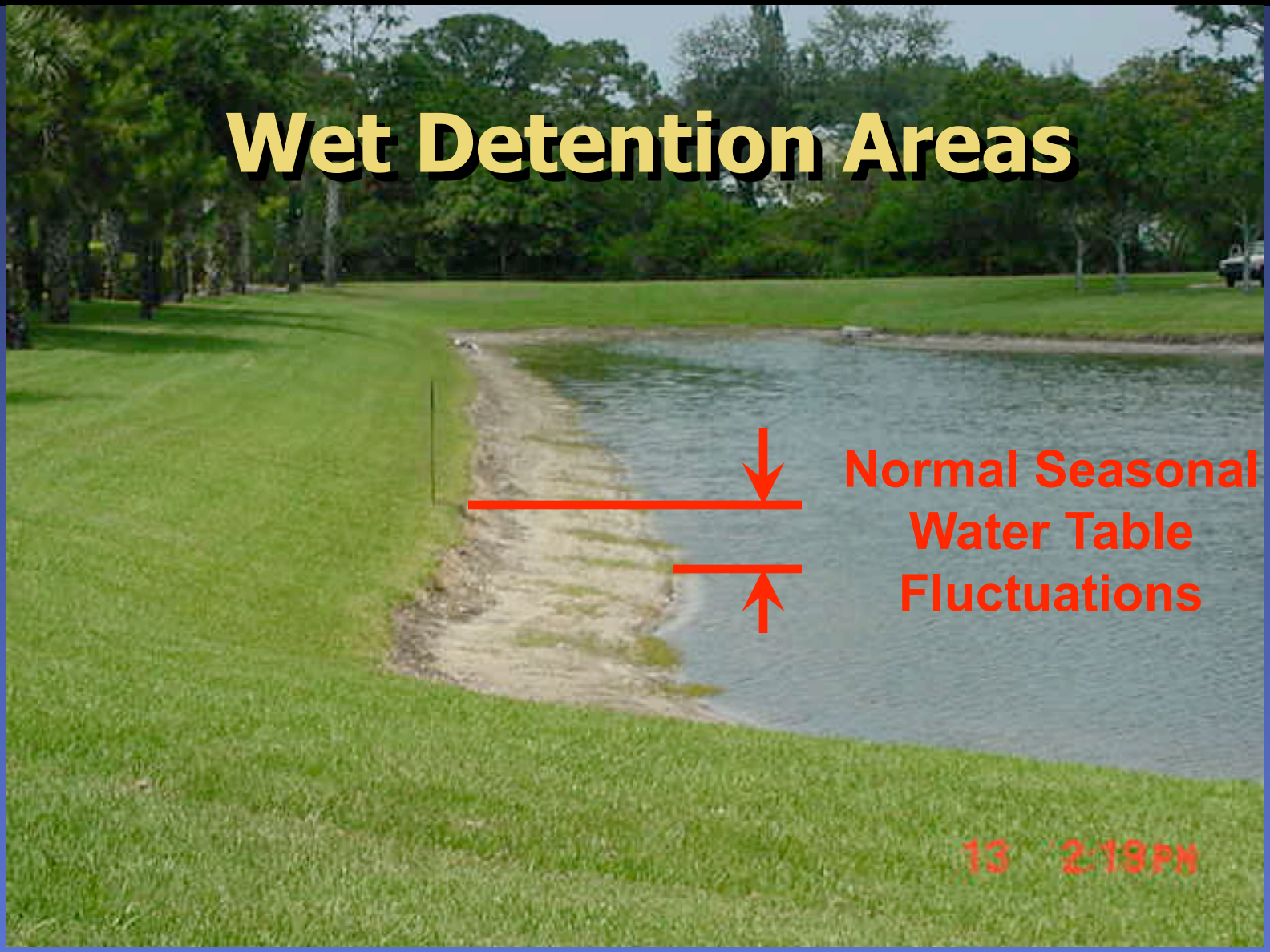
4f. Maintenance of Wet Detention Areas

- Wet detention ponds “Lakes” should have stabilized banks to prevent erosion.
- Control structures should be accessible and vegetation free clear zone around them.

Wet Detention Areas



Wet Detention Areas

Slope looks good but is not stabilized, it can still erode if not properly maintained

Not a 4:1 slope

Could be a safety issue

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Wet Detention Areas

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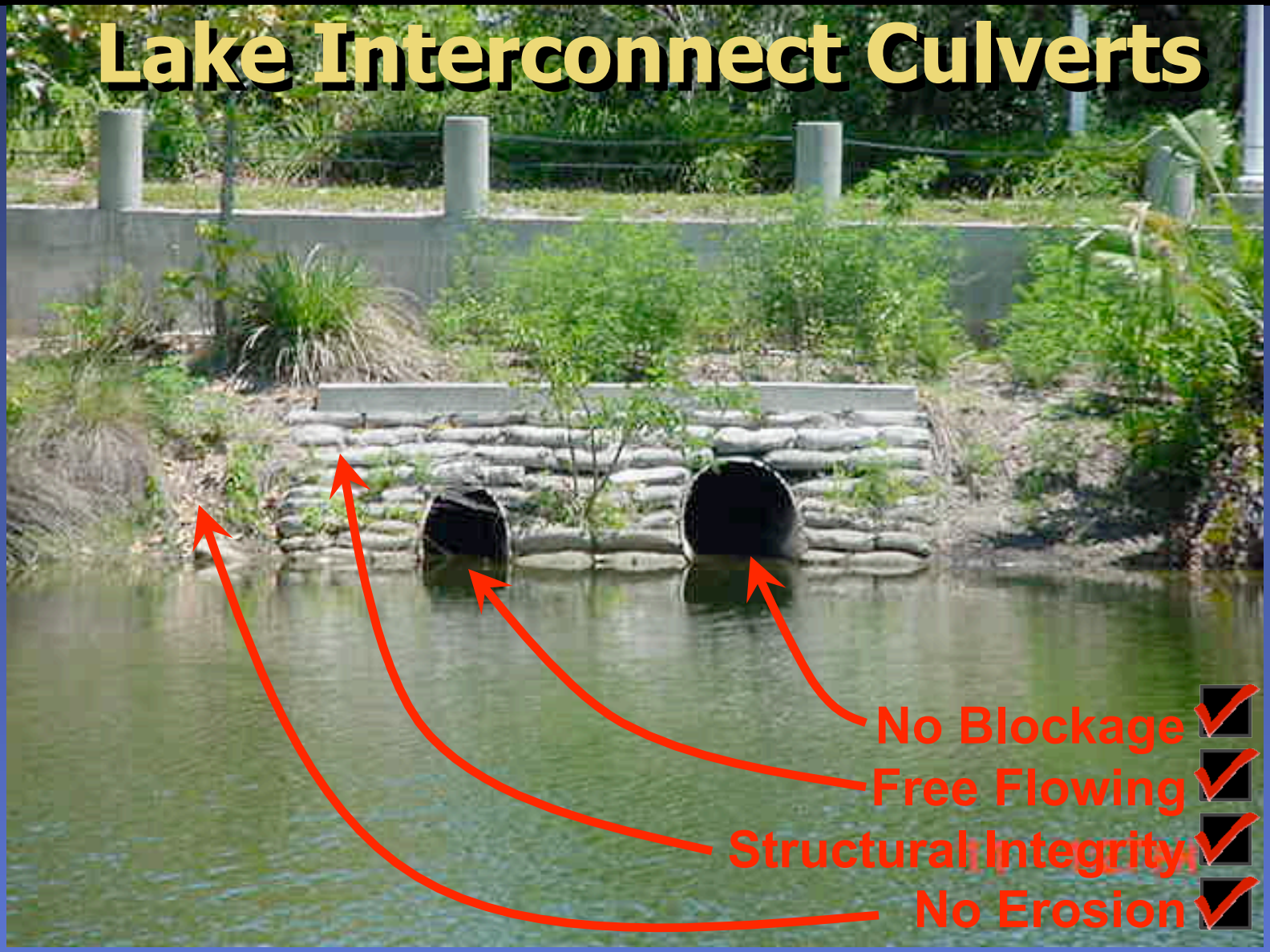
Lake Interconnect Culverts



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Wet Detention Areas

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CONTROL STRUCTURES (OUTFALLS)

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4g. Maintenance Of Control Structures

- Control structures should be accessible
- Lose soil near them should be stabilized and vegetation well trimmed
- Bleeders should be open and clear of any debris.
- We recommend external bleeders include a stabilized sump using concrete, sand cement or rip rap to prevent blockage by sod growth

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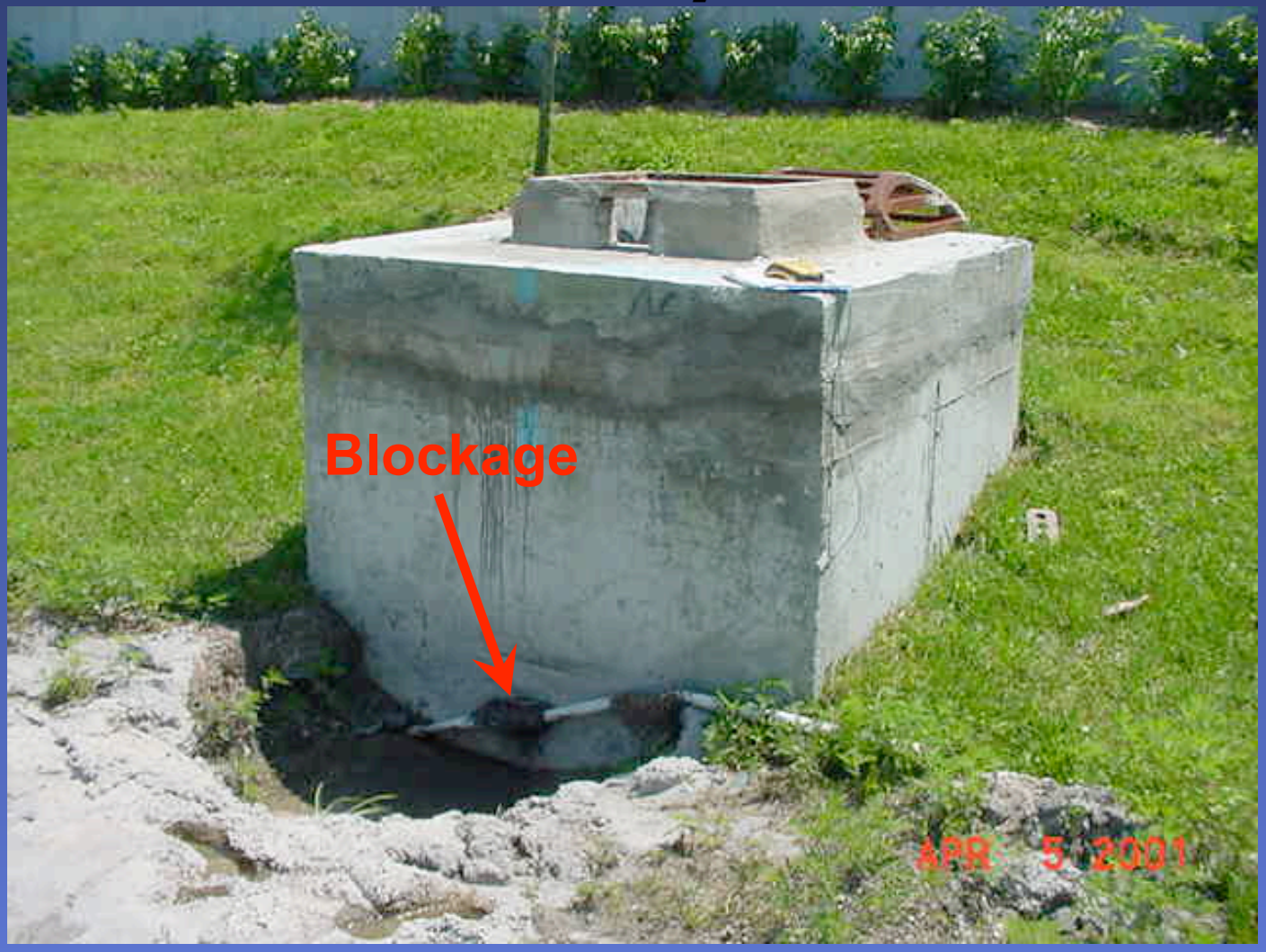
Control Structure /Blocked Bleeder



Debris Clogging Bleeder

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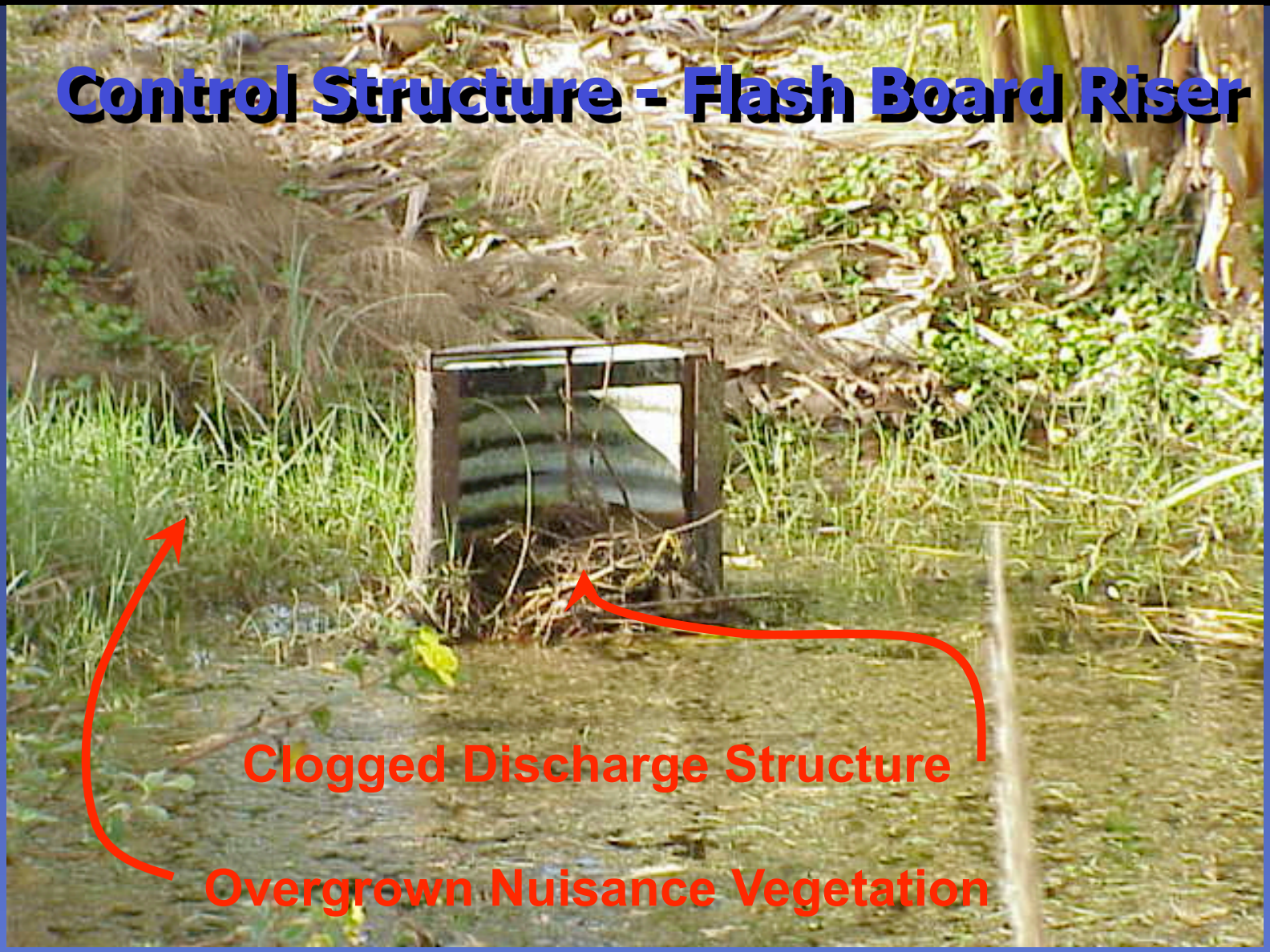
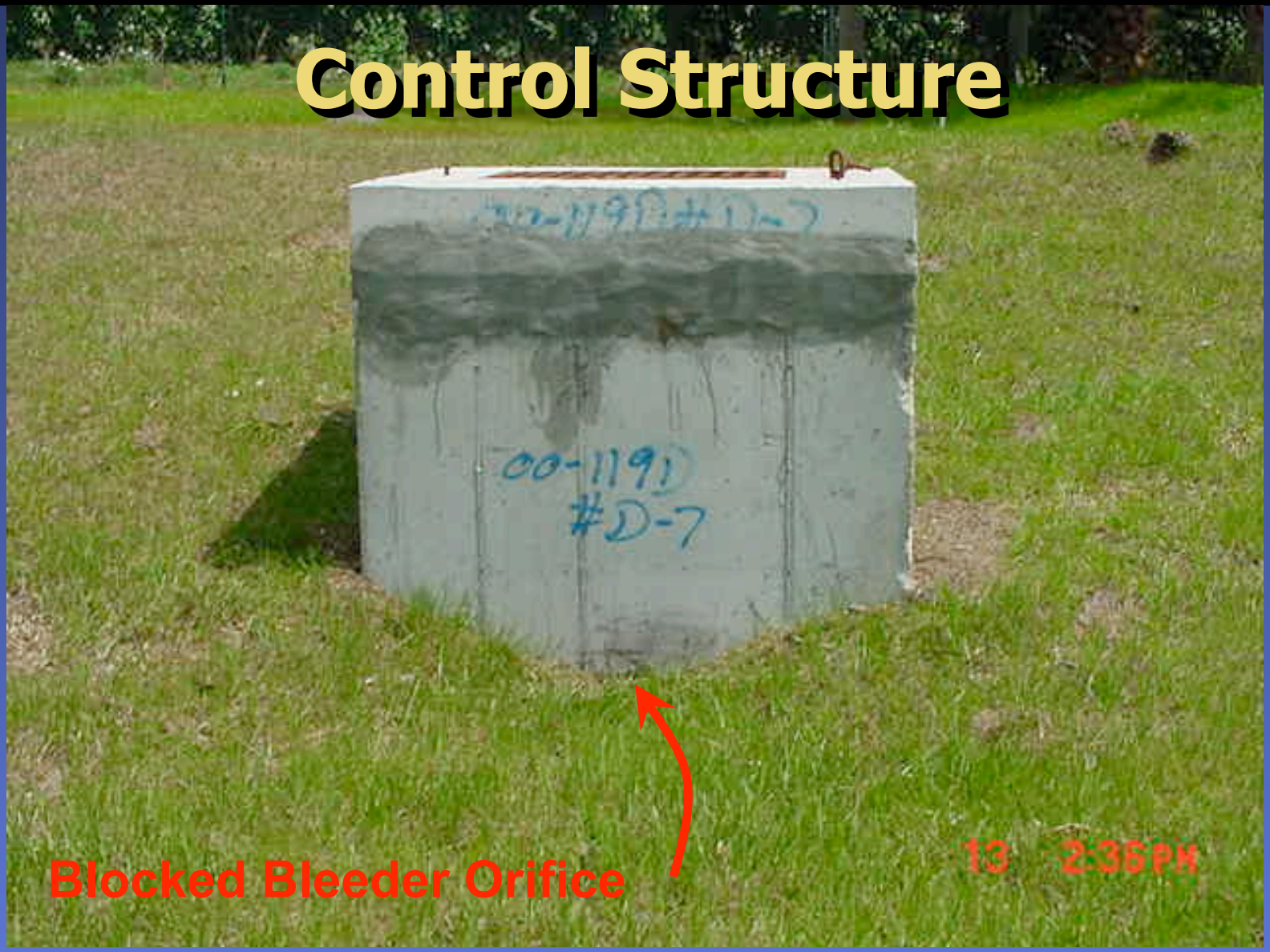
Control Structure - Flash Board Riser



Control Structure



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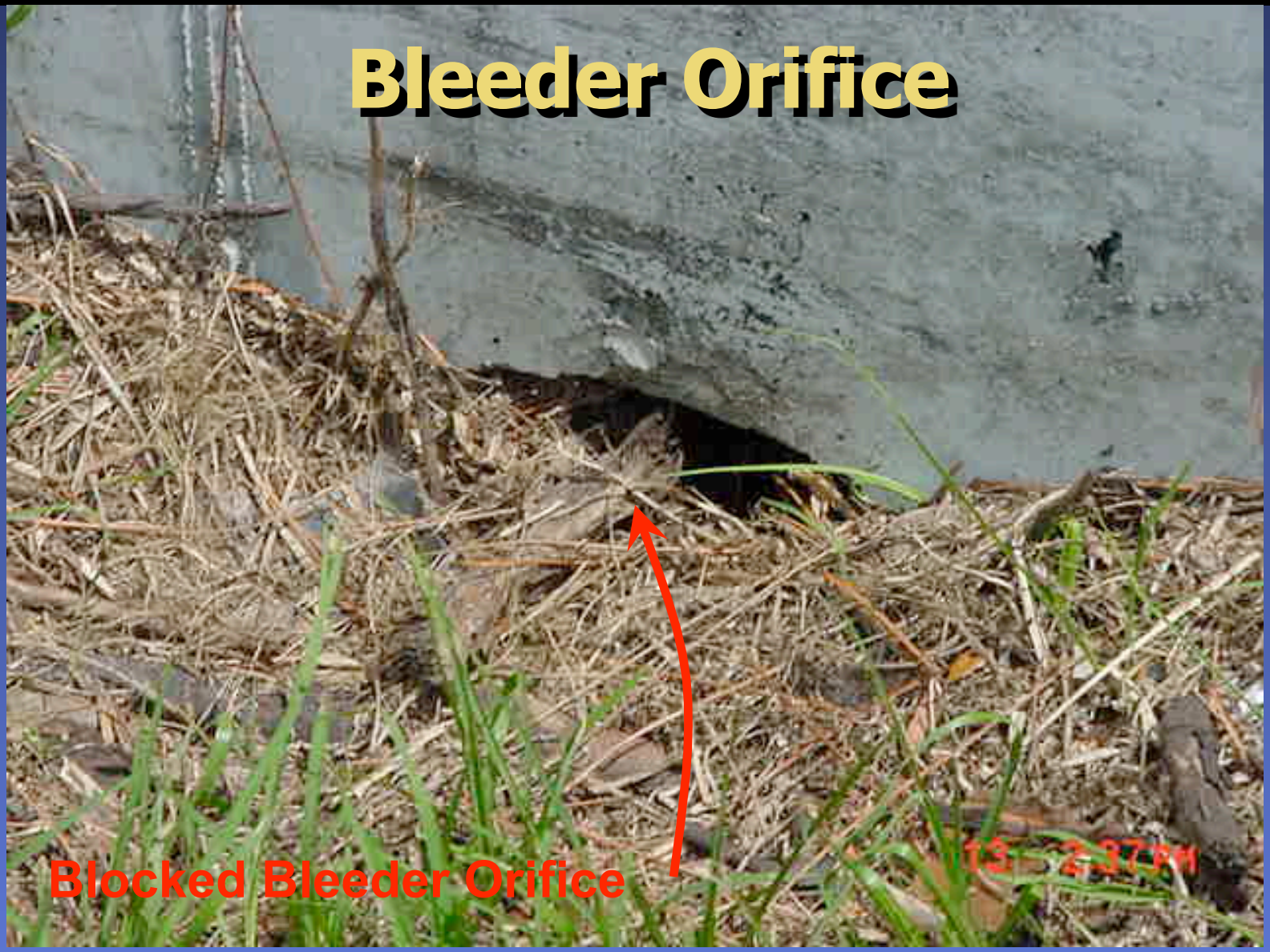
Bleeder Orifice



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Bleeder Orifice

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Control Structure

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Control Structure - CMP Riser with Aluminum Slide Gate

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4h. Maintenance of Berms

- Berms should be stabilized with sod or other vegetation to prevent erosion or a breach

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How can I prepare for the big storm?

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Pre-Storm

- Check discharge structures and conveyance swales are clear.
- Check any bubble up structures in dry ponds or wetlands for trapped debris.
- Secure or remove any debris such that it does not end up in the system (old news papers, yard trimmings, trash etc.)

Pre-storm debris

Pre-storm debris

Pre-storm debris

Post-Storm

- When it is safe to go out side after the storm perform the same checks for debris as you did Pre-Storm if possible.
- Look out for down power lines.
- Do not attempt to traverse flooded areas.
- Report significant debris blockages or damage to local authorities.

Who can do the maintenance and repair work?

- The are several companies and contractors that specialize in storm water system inspection, sediment and debris removal, and repair. Check your local listings.

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Develop a Maintenance Plan

A nickel of prevention is worth a dollar of cure!

- Become familiar with your system. If you need assistance the SFWMD staff can help.
  - Glen Gareau 772-223-2600 Ext. 3618
- Develop a plan and a budget depending on your project / property size.
- It does not need to be done all at once and can be phased as funding is available.

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Questions?

Maintenance of SWMS