COLORADO
Department of Transportation

Sediment and Spill Control on Highways

TOPICS

- What is needed for sediment control?
  - General
  - In tight places
  - In MS4 vs. Mountains
- How to control spills?
- Lessons learned!

Keys to Sediment Control

- Divert stormwater runoff and slow it down.
- Let water sit, so sediment drops out. Meter water outflow to prevent mosquito problems.
- Maintenance MUST be safe, easy, and seldom!
- Design with maintenance in mind:
  - Good infiltration into soil
  - Good but metered drainage
  - Safe/easy access
  - Solid base for equipment
  - Size for equipment and maintenance schedule.

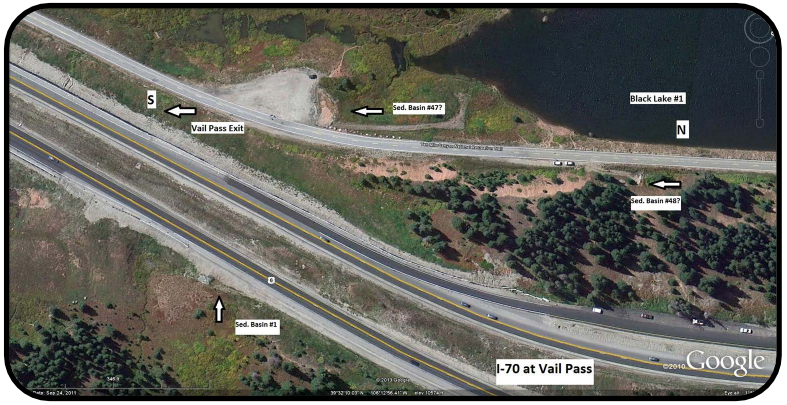
Formal vs. Informal Basins

Formal

- Concrete sides
- Engineered outlets
- Generally larger (except for vaults) and expensive

Informal

- Dirt or rock sides
- Riprap outlets (may have geotextile cores)
- Generally smaller and cheaper
- Do NOT meet MS4 standards



Size Matters!

Too Small: Vaults fit tight spaces, but hold 6 CY—need frequent and expensive maintenance.

Too Big: This holds ~120 CY, but half of it can't be reached. Bottom is too soft to drive on. So the effective size is ~60 CY

Just Right: Ponds should hold as much as possible, but be cleanable. This has sides, a hard end to push against, but gravel base for infiltration.

Drainage Matters!

Drainage should be slow, but consistent.

Options:

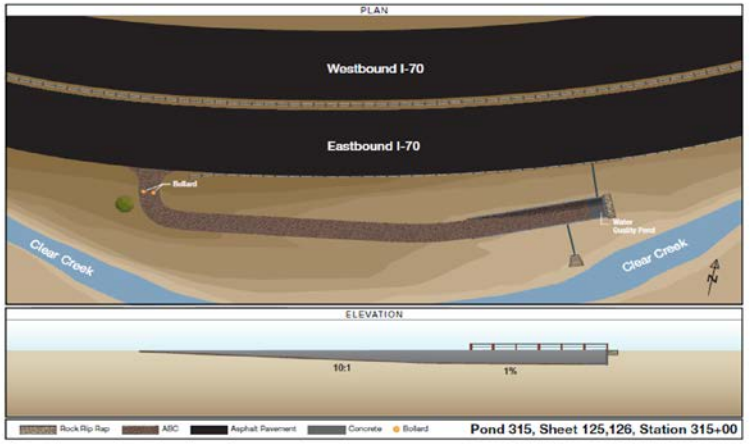
- Engineered outlet with holes drilled in metal plates
  - Good in urban or low-sediment areas. (MS4 areas)
  - Clog in high-sediment areas.
  - Add easy-to-clean screens in front to reduce clogging, but clean screens regularly.
- Riprap outlets with geotextile to filter finer sediments
  - Good in mountain areas with coarse sediments.
  - Clog less often, but still need maintenance.
  - Do not meet MS4 requirements, though.
- Combine drainage with infiltration if runoff is not polluted.

Access

Need access! This early pond cannot be maintained.

Recently built access:

- ✓ Packed gravel
- ✓ Gentle slope for heavily-loaded vehicles
- ✓ Good sight distance
- ✓ No guardrail to remove



Support for Equipment

Fraser Pond-completely redesigned to support heavy equipment.

- ✓ Very muddy bottom was covered with geotextile.
- ✓ Most covered with riprap-for support and to tell operators where to STOP digging.
- ✓ Concrete driveway for loaded equipment. Concrete is scored on steeper ramp for traction.

Thanks to Denver Water for cooperation on this project!

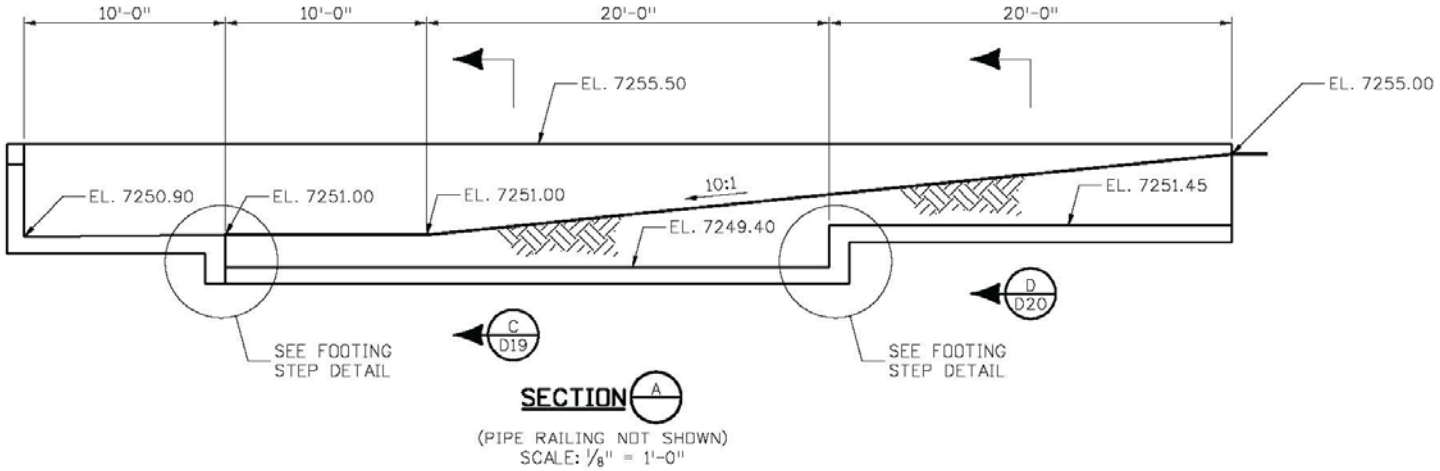
Work in Tight Spaces

When off-road is not an option:

- Sediment Inlets can help!
- Depth is greater than the drain outflow.
- Wide shoulder helps.
- Closed mesh grate keeps trash out.
- Safety:
  - Depth < 7 feet (confined space issue)
  - Access steps inside
  - Length < 20 feet
- Downside: 1 year maintenance schedule; requires vacuum truck.

Typical Pond Specs

- ✓ Width > 12 feet (at least 2 feet wider than loader blade)
- ✓ 4-foot concrete slab to push against
- ✓ 4-inch side-curb to guide loader blade
- ✓ 10 feet of concrete bottom to show when to stop digging
- ✓ Side walls to contain sediment
- ✓ Infiltration for water; outlet flush with walls (not shown)
- ✓ 5-year maintenance schedule
- ✓ Gentle access slope



Spill Control

Purpose: to contain spills until crews can clean them out

Different from Sediment Control because:

- DO NOT want infiltration or outflow
- Need concrete containment
- Size for typical spills, not for maintenance schedule.

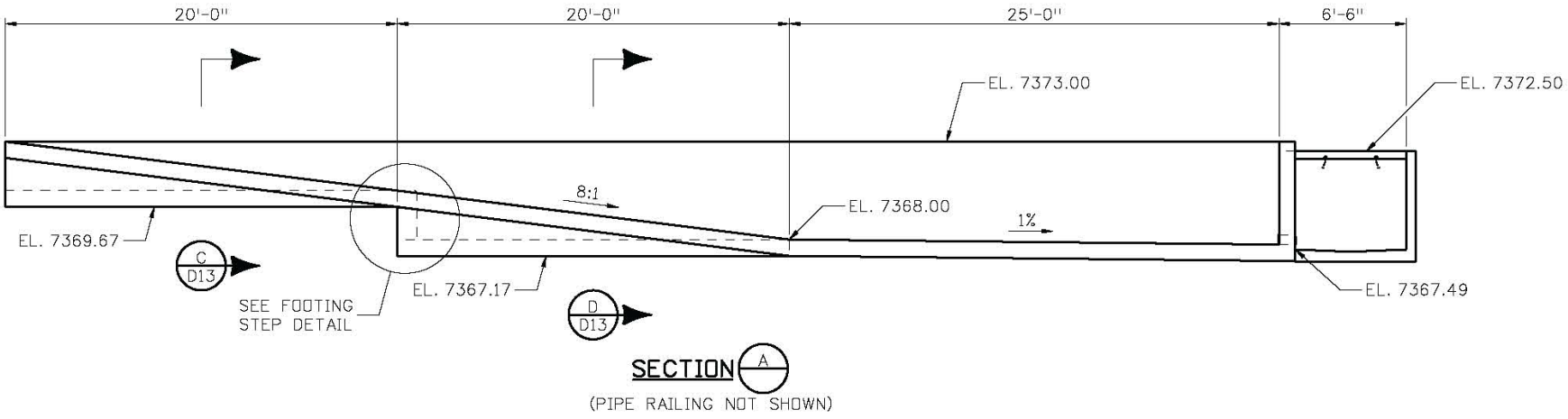
Options:

- Small concrete basins to capture small spills (< 25 gallons)
- Use modified drainage inlets with no outlet. (Requires access to absorbent pads for quick cleanout.)
- Keep a sediment basin CLOSED except for when draining.

Spill Containment/Sediment Control

Large basin east of I-70 Twin Tunnels is designed to capture sediment, spills, and fire-fighting chemicals.

- ✓ Holds 26,0000 gallons
- ✓ Has a valve that remains closed most of the time, in case of spills
- ✓ Valve can be opened to let water drain through engineered outlet
- ✓ Safe access (gentle slope, scored concrete, railing)
- ✓ Plenty of room for equipment to work to remove sediments or spills.



Lessons Learned

What is the purpose of the pond?

- Sediment control (Infiltration is GOOD)
- Stormwater runoff control (engineered outlet)
- Spills (Concrete; closeable outlet, kept closed)

What equipment will be used to maintain it?

- Vacuum Truck (expensive and labor intensive)
- Loader (wiggle room, back stop, gentle grades)
- Back Hoe (can it reach all areas?)

Lessons Learned-Continued (Sediment Control)

Is access safe and easy?

- NO guardrail to remove!
- Grade gentler than 7:1
- Saw-cut treads (scoring) in concrete ramps
- Off shoulders, long sight distance

How often does it need to be maintained?

- Every storm? NO WAY!!!
- Every 5 years is ideal—aim for that.

ASK MAINTENANCE WHAT THEY WANT BEFORE DESIGNING IT!

Why we all work so hard: