Mixing Loading Pads

"Design and Management for Productivity"

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UW EXTENSION

Design Principles

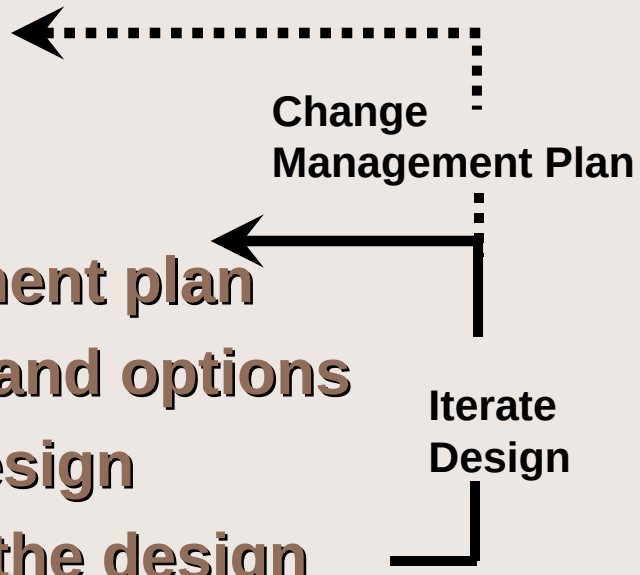
- Implement the desired management plan
- Planned Space
  - ✓ Product Storage
  - ✓ Equipment
  - ✓ Workers

Design Principles

- Storage security and secondary containment
  - ✓ Pesticides
  - ✓ Fertilizer
- Safety
  - ✓ Environment
  - ✓ Workers
  - ✓ Product
- Labor efficient

The Design Process

- ✓ Develop a “Rinsate” management plan
- ✓ Investigate and develop alternative designs to implement plan
- ✓ Evaluate design alternatives and options
- ✓ Choose the “best” system design
- ✓ Implement and troubleshoot the design



“Rinsate”

The liquid or solid generated from the rinsing of any equipment or container that has come in direct contact with any fertilizer, or pesticide, including wash water, contaminated precipitation, recovered sedimentation, or other contaminated debris.

“Waste”

- Rinsate that can not be used as intended.
  - The label defines the intended use.
    - The label is not always specific to proper methods for disposing of waste.
    - If it can’t be used according to label directions refer to regulatory agency

Rinsate vs. Waste

- Rinsate can be (re)used as part of the original application according to label directions.
- The product label is the best guideline available in making that determination
- The ability to use rinsate according to its “Intended use” maintains its identity as a rinsate and not a waste

Rinsate Generation

- Wash water
  - Rinsing out sprayer
  - Washing off application equipment
  - Washing off mix/load pad
- Contaminated precipitation
  - Mix/load pad
  - Fertilizer dike water
  - Pesticide dike water
- Contaminated debris
  - Mixing/Loading pad sump sludge
  - Mixing/Loading pad sweepings

Rinsate Management Plan

- Eliminate
  - Direct injection
  - Dedicated application equipment
  - Mixing/loading application equipment in field
  - Washing application equipment in field
- Minimize
- Segregate
- Apply

Rinsate Application

"In the real world"

- Even with good management there is always some rinsate to apply.
- Rinsate is likely contaminated with off label products.
- Intended use is to apply to crop.
- Need guidance from:
  - EPA to define acceptable levels of contamination to meet the legal requirements of label.
  - Manufacturer to define phytotoxicity to non labeled crops to minimize risk to crop and environment.

Rinsate Management
"Off the record"

- Application to land:
  - CRP or set aside
  - Fallow fields, (wheat stubble)
  - Fence row
  - Fall field going into labeled crop

Site Contamination

- Possible reasons for product getting off site:
  - Facility Design.
    - No roofs
    - Ineffective containment
    - Cracks
  - Poor management decisions and housekeeping.
    - Pumping over the dike (“clean water?”)
    - Improper waste disposal (pesticide container piles)
  - Practical problems
    - Tracking product off pad, (poor house keeping)
    - Parking areas, (washes off dirty equipment)
    - Operator error, (cover up mistakes)
    - Poor equipment maintenance, (leaking nozzles)

Rinsate Management

"Don't Ask, Don't Tell"

- Application to crop land either owned, rented, or contracted to apply rinsate generated in a calendar year.
- Land with mixed crop of all labeled crops.
  - A not very good mixed stand of:
    - Corn
    - Soybean
    - alfalfa
  - Fate of the crop in food chain

Design Concept and Reality

“The Rinsate Management Plan drives the Mixing and Loading Pad facility design”

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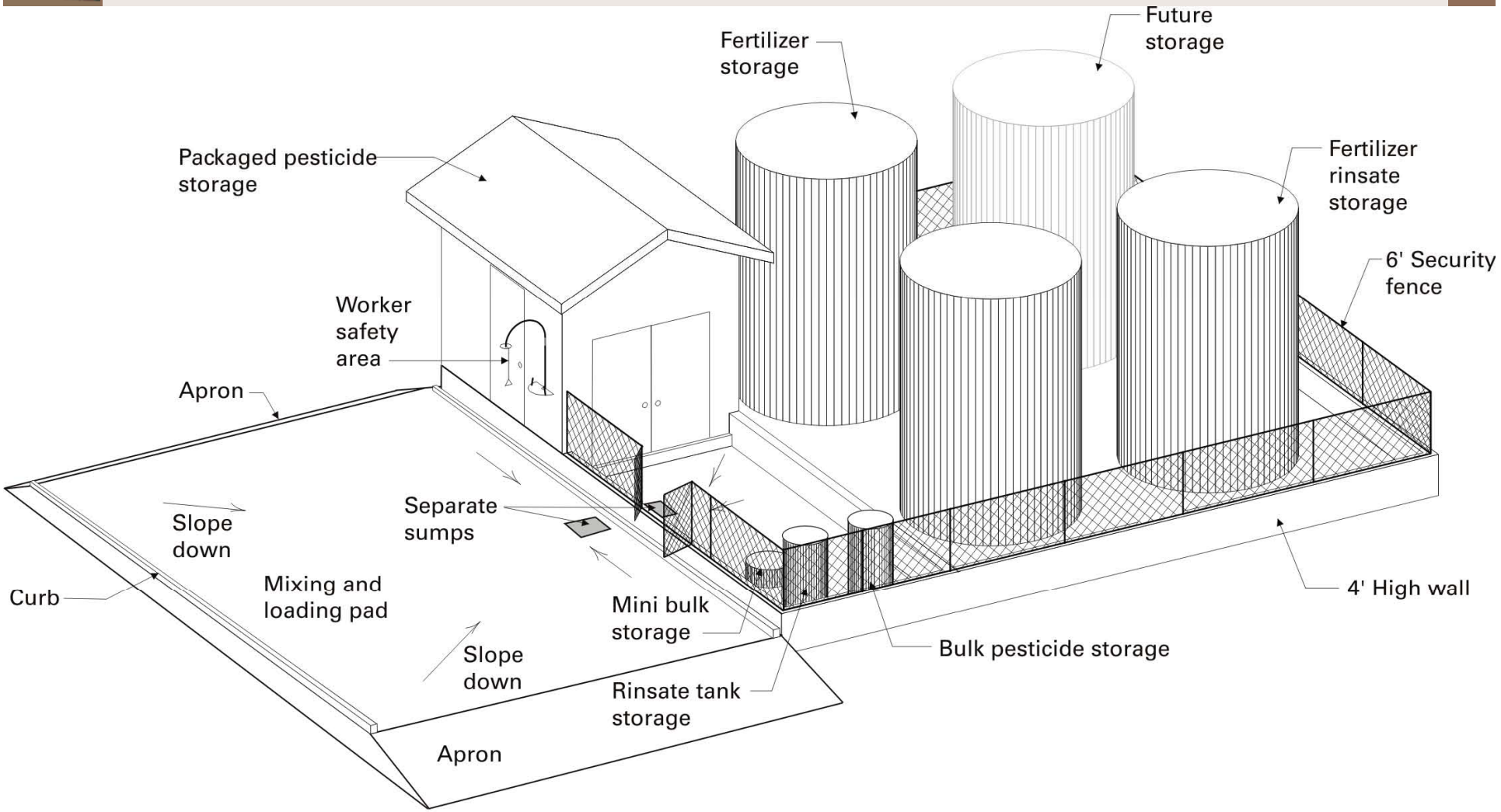
Mixing Loading Pad Facility Concept



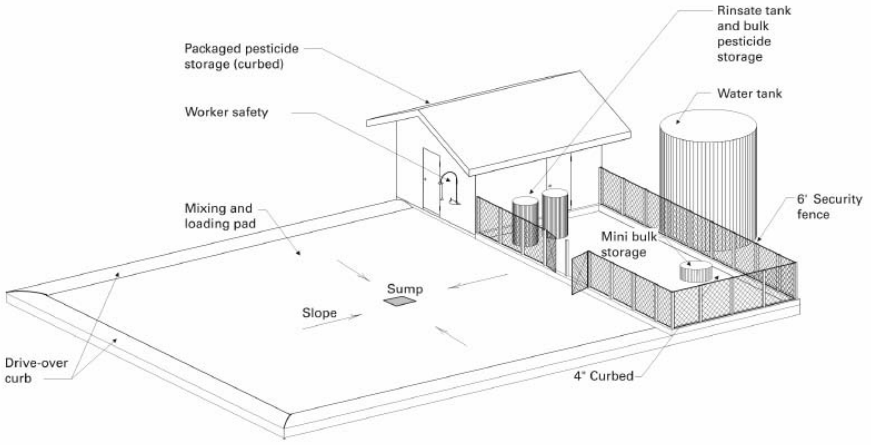


Figure 1.2. Small-scale facility, perspective view. Optional roof over entire facility.

Concept

Reality

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Mixing Loading Pad Facility Concept

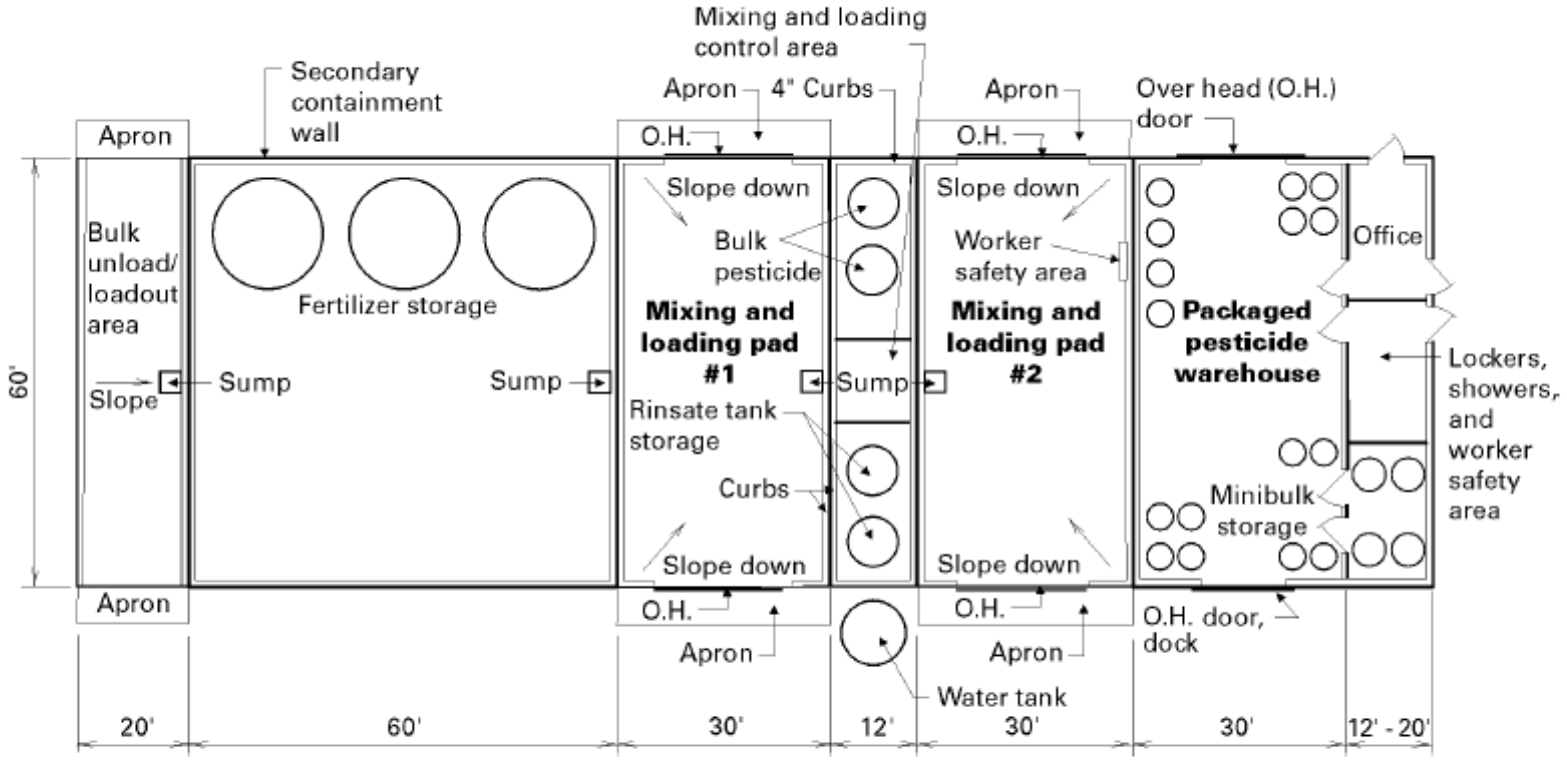
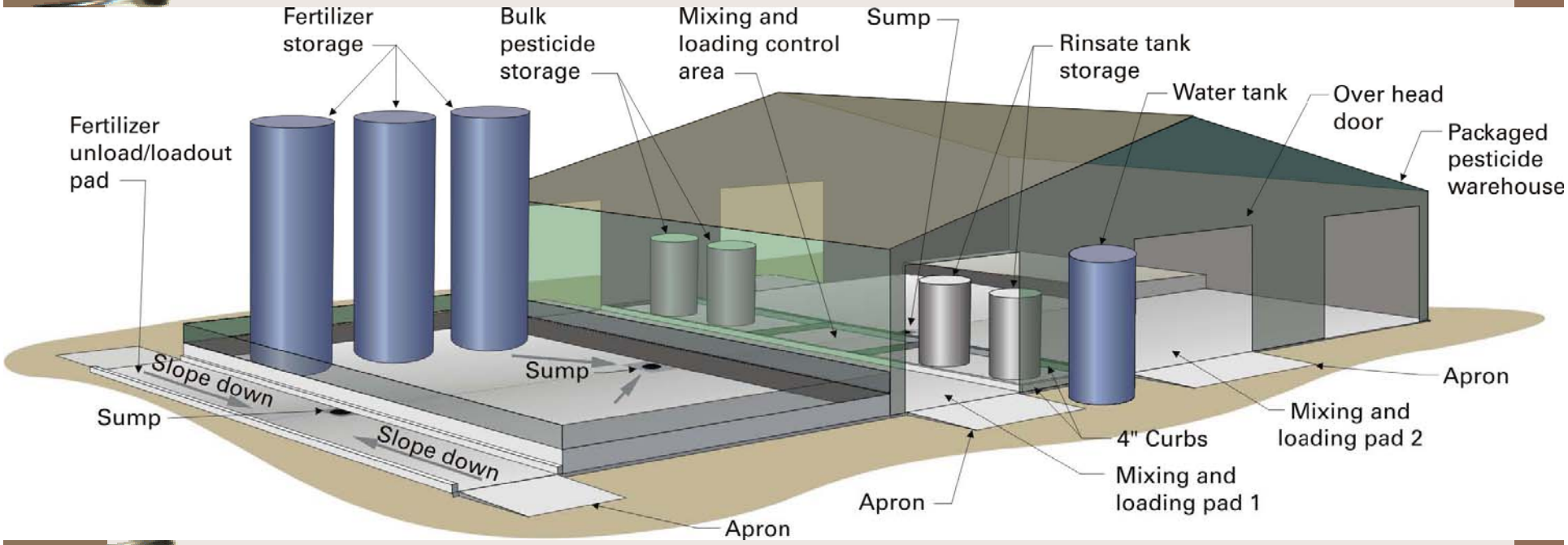


Figure 1.5. Large-scale facility, plan view. Optional roof over entire facility except fertilizer secondary containment and bulk unload pad.

Mixing Loading Pad Facility Reality

Small Scale Design

Large Scale Design



Roof or No Roof ??

"Plan the facility today for a roof in the future"

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Work Space Layout

Large Scale

Small Scale

Mixing Loading Pad Design

Single Use

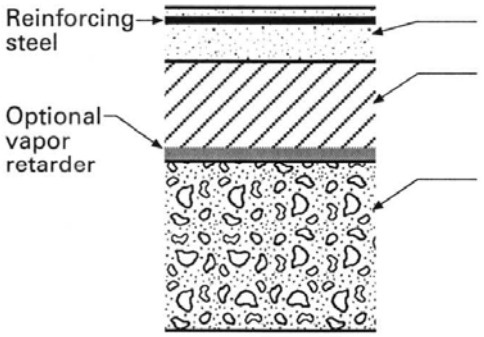
Multiple Use

Mixing Loading pad Material Selection

Concrete

Asphalt

Concrete Floor Design



1. Wearing surface: Portland cement concrete, typically a thickness of 6 in. or greater.
2. Subbase material (optional): Compactibles, drainable fill. Typical thickness is (6 in. - 12 in.) and a fine material may be spread over the surface to fill voids (choker material), which reduces friction with concrete topping.
3. Subgrade: The natural soil at the site. The top 6 in. - 20 in. is usually compacted prior to the placement of the other layers of the slab.

Mixing Loading Pad

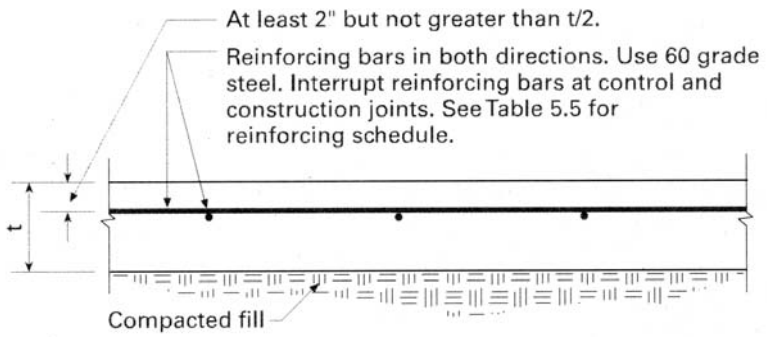


Figure 5.2. Concrete detail for mixing and loading pad floor with one layer of reinforcing. (See table 5.4 for concrete thickness, t).

Secondary Containment Floor

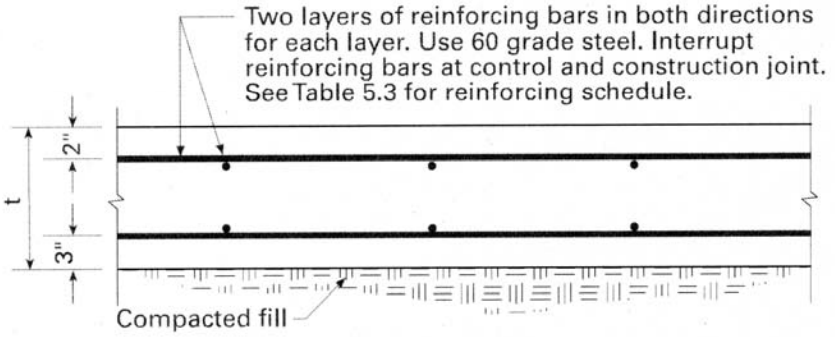


Figure 5.1. Concrete detail for secondary containment floor with two layers of reinforcing. (See table 5.2 for concrete thickness, t).

Flatwork
Joint Placement

- Minimize Joints exposed to standing water

Side Sump

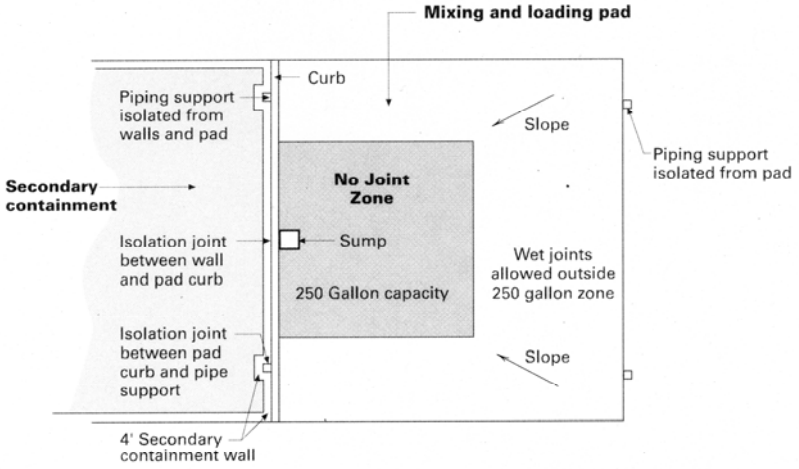


Figure 5.9. Common Joints in mixing and loading pad (side sump design). Note location of piping support outside mixing and loading pad.

Center Sump

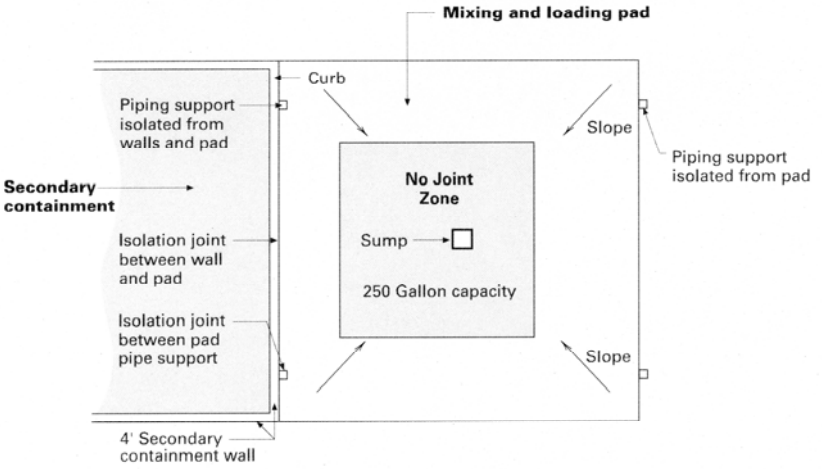


Figure 5.8. Common joints in mixing and loading pad (center sump design) Note location of piping supports.

Sump Design

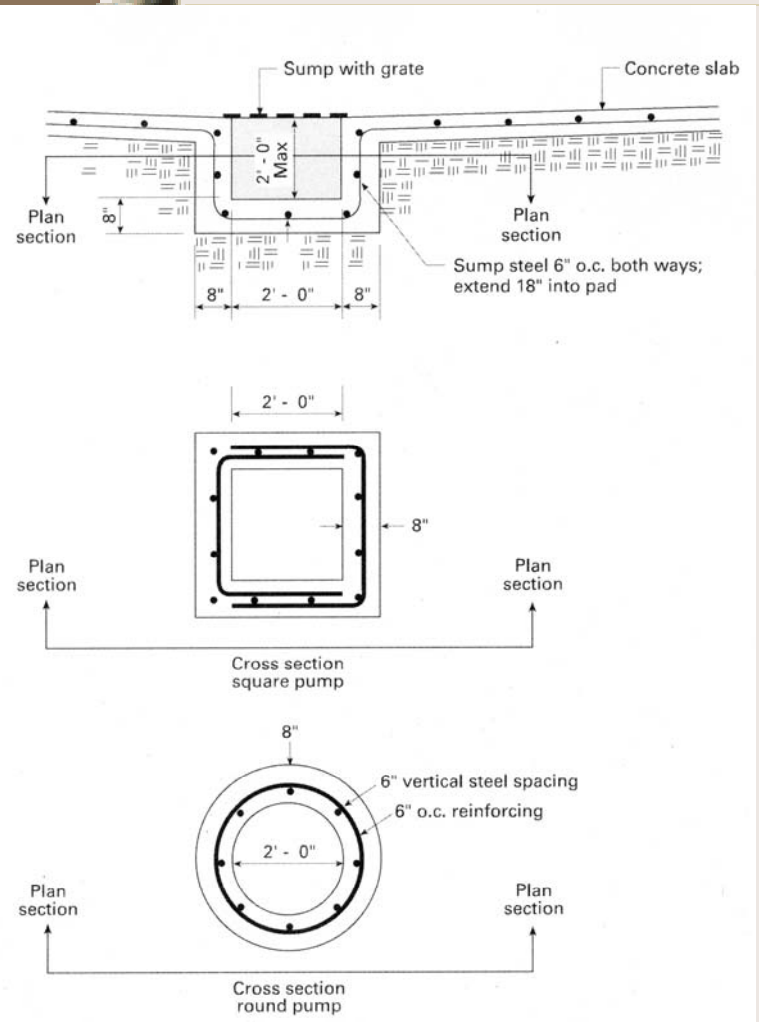


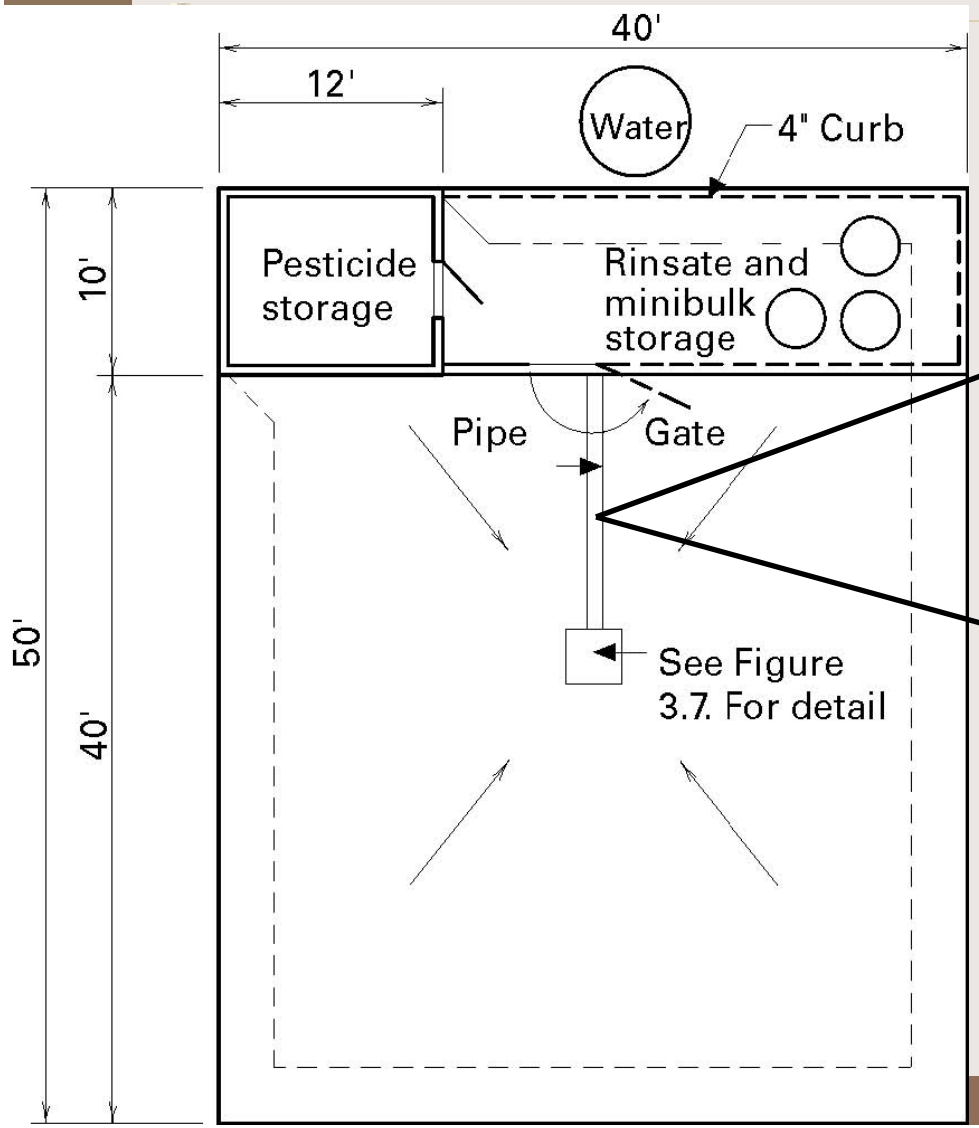
Figure 5.5. Sump or depression reinforcing schedule and design detail.

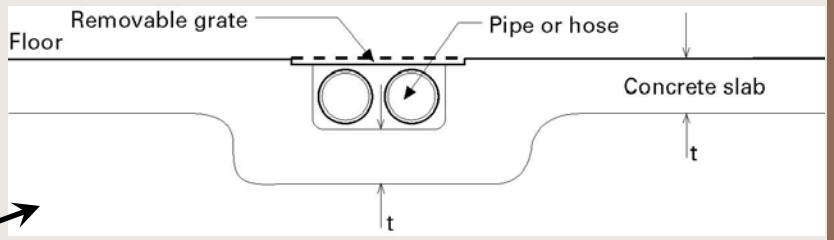
- Liquid Tight
- "The Smaller the Better"

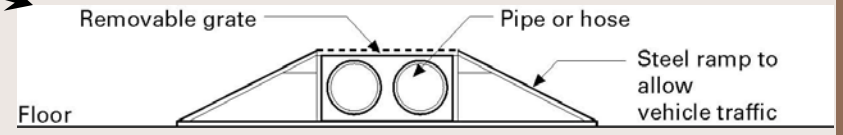
Sump Management

- Keep it Clean!
- Allows recovery of product

Pipe Chase Design







No Underground
"Inaccessible"
Plumbing

Secondary Containment Curb Details

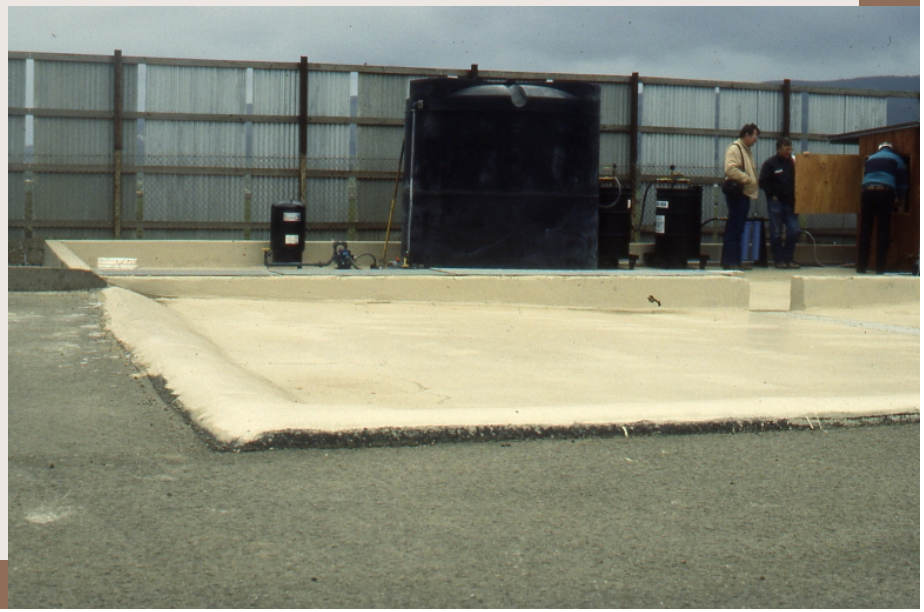
Mixing Loading Pad
Curb Details

Keep Rainfall Out

Keep Rainfall In

Coating Concrete

- Design impacted by:
  - Product
  - Vehicle Traffic
  - Foot Traffic
  - Weather
- Use other's experience in product selection



Resources

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- MWPS-C1. 1992.National Symposium on Pesticide and Fertilizer Containment: Design and Management, February 3-5, 1992.
- MWPS-C2. 1994. Pesticide and Fertilizer Containment Symposium, February 13-16, 1994.
- State Fertilizer and Pesticide Storage Rules
- Wisconsin Minimum Design and Construction Standards for Concrete Mixing and Loading Pads and Secondary Containment Structures, David W. Kammel, February 2005
- http://www.epa.gov/pesticides/regulating/containers.htm
- http://www.dep.state.fl.us/water/stormwater/npdes/guidance_links.htm