Fluid Fertilizer Foundation

Storage Tanks and Containment

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Agenda

- Background
- Safety
- Facility design
- Large tanks
- Containment “do’s and don’ts”

Experience

- Bachelors degree in Construction Management
  - Colorado State University
- Large projects
  - Children's Hospital (Denver)
  - Sun Microsystems (Broomfield)
  - Denver Botanical Gardens
- Hands on retail experience
- Design of modern retail facilities

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Tanks, Containment and Plumbing.

Safety
It is the top priority!

- Send all your employees home safe
  - Fall protection
    - OSHA defines hazards over 6’ (CFR 1926.501)
    - Engineer out fall hazards
      - Catwalks and stairs
    - PPE requires specific training
      - Do not tie them off and call it good
  - Don’t rely on the safety guy
    - Train your eye

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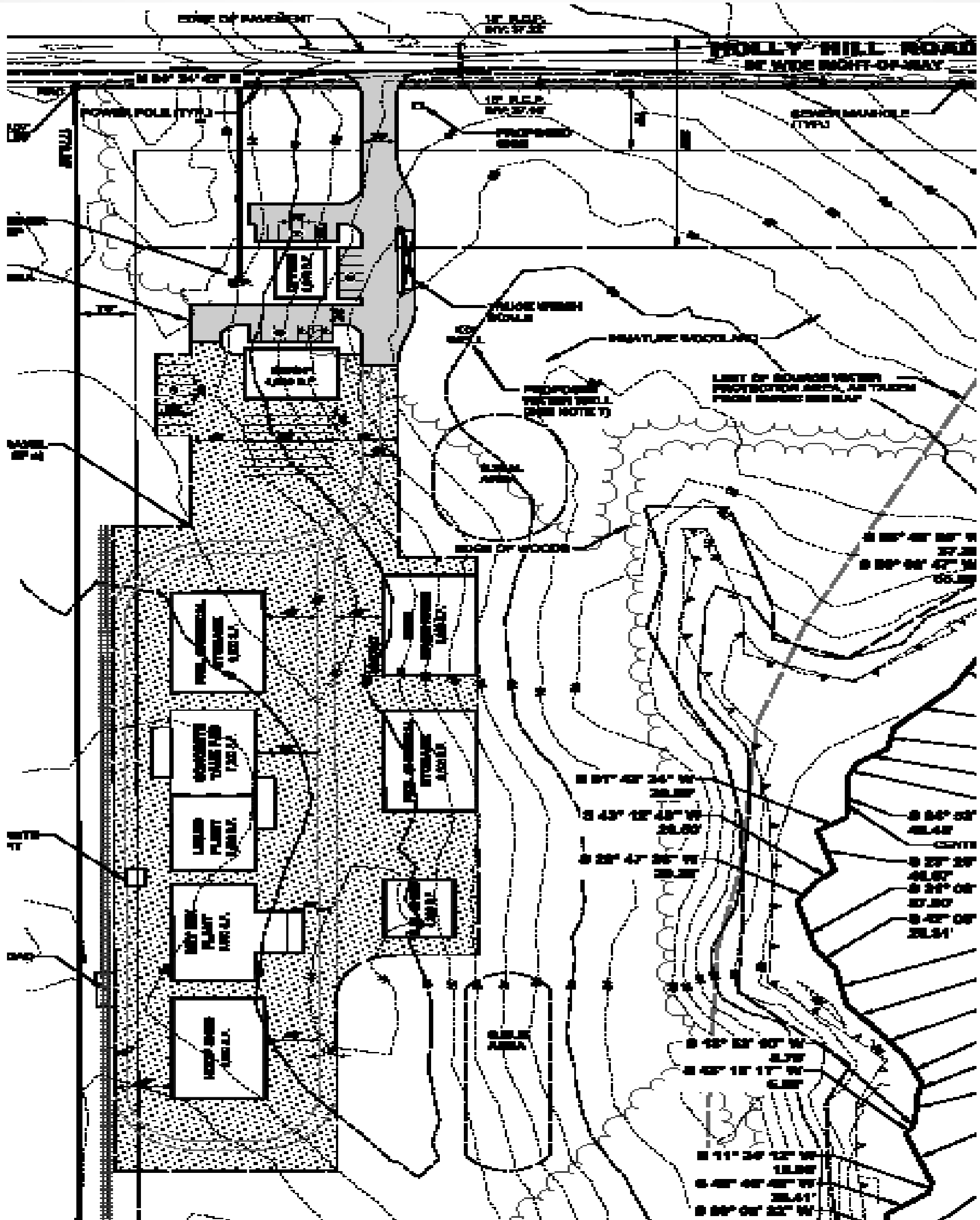
Regulations are tightening
Do not get caught off guard!

- Changes after West Texas
  - Local code review on new and existing facilities
- WOTUS (Waters of the United States)
  - New facility design
  - Existing facility improvements
  - Storm water run off control (BMP's)
  - Construction SWMPP (Usually over 1 acre disturbed)


HOLLY HILL ROAD
EDGE OF PAVEMENT
POWER POLE (TYP.)
SEWER MANHOLE (TYP.)
PROPOSED
IMMATURE WOODLAND
LIMIT OF SOURCE WATER PROTECTION AREA, AS TAKEN FROM
PROPOSED WATER WELL (SEE NOTE 7)
EDGE OF WOODS

Large Tanks

- Usually considered 100,000 gallons or more
- Construction – API 650 (American Petroleum Institute)
- Inspection – API 653 "Inspection, repair, alteration and reconstruction of steel aboveground storage tanks used in the chemical and petroleum industries"
  - Ensure inspector is API 653 Certified
    - Establish baseline tank condition and corrosion rates

Large Tanks

- Lined tanks vs. secondary containment structures
  - **Lined tanks (bladders)**
    - Ensure there is a leak detection system installed
    - Review state and local regulations (more states requiring liners under tanks)
    - Is it true secondary containment? (valve boxes)
    - Recommend filling with partially with water before fertilizer. Liners can leak!

Large Tanks

- Lined tanks vs. secondary containment structures
  - **Secondary containment (no bladder)**
    - When planning ensure adequate size
    - Plan for future growth
    - Consider access into containment after it is built
    - Large concrete structures can be a challenge to maintain
    - Double check calculations!

Containment
Steel or Concrete?

- Concrete
  - Traditionally used
  - Structurally sound
  - Contractor limitations
  - Weather limitations
  - Design thickness, reinforcement and placement are critical
    - Subbase preparation/compaction
  - Control joints, control joints, control joints!!
    - Floors, walls and load pads
  - Housekeeping

Containment
Steel or Concrete?

- Steel
  - Can be built in sections
  - Can be built in a controlled environment
  - Not as weather dependent
  - Does not crack like concrete
  - Good for leased facilities (movable)
  - Easier to modify/add on to
  - Still need good housekeeping!

Warehouse and Indoor Containment

- Indoor Tanks
  - Recommend indoor tank separation
  - Regularly inspect pluming and valves
  - Ensure material compatibility
  - Consider automation for efficiency

- Warehouse
  - Authority Having Jurisdiction
  - Inspections


CHOICE
Liberate
Granum


GRAIN
GRAIN SO
HYBRID
GRAIN SO
HYBRID
GRAIN SO
HYBRID
GRAIN SO
DELTAPINE

Questions/Discussion

Thank You!

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