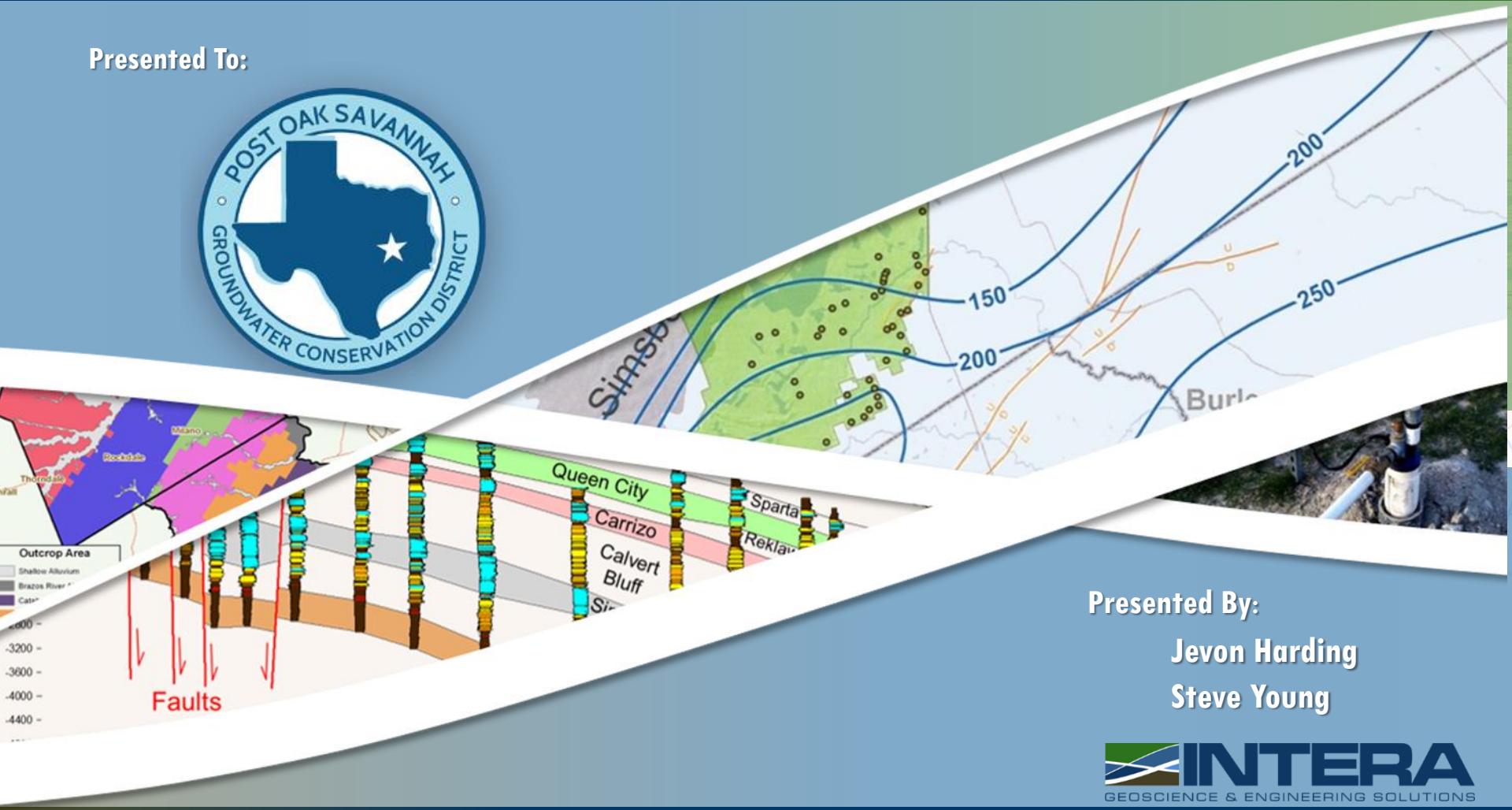
Proposed Bio-solids Land Application Site in Milam County

Presented To:

POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT



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GEOSCIENCE & ENGINEERING SOLUTIONS

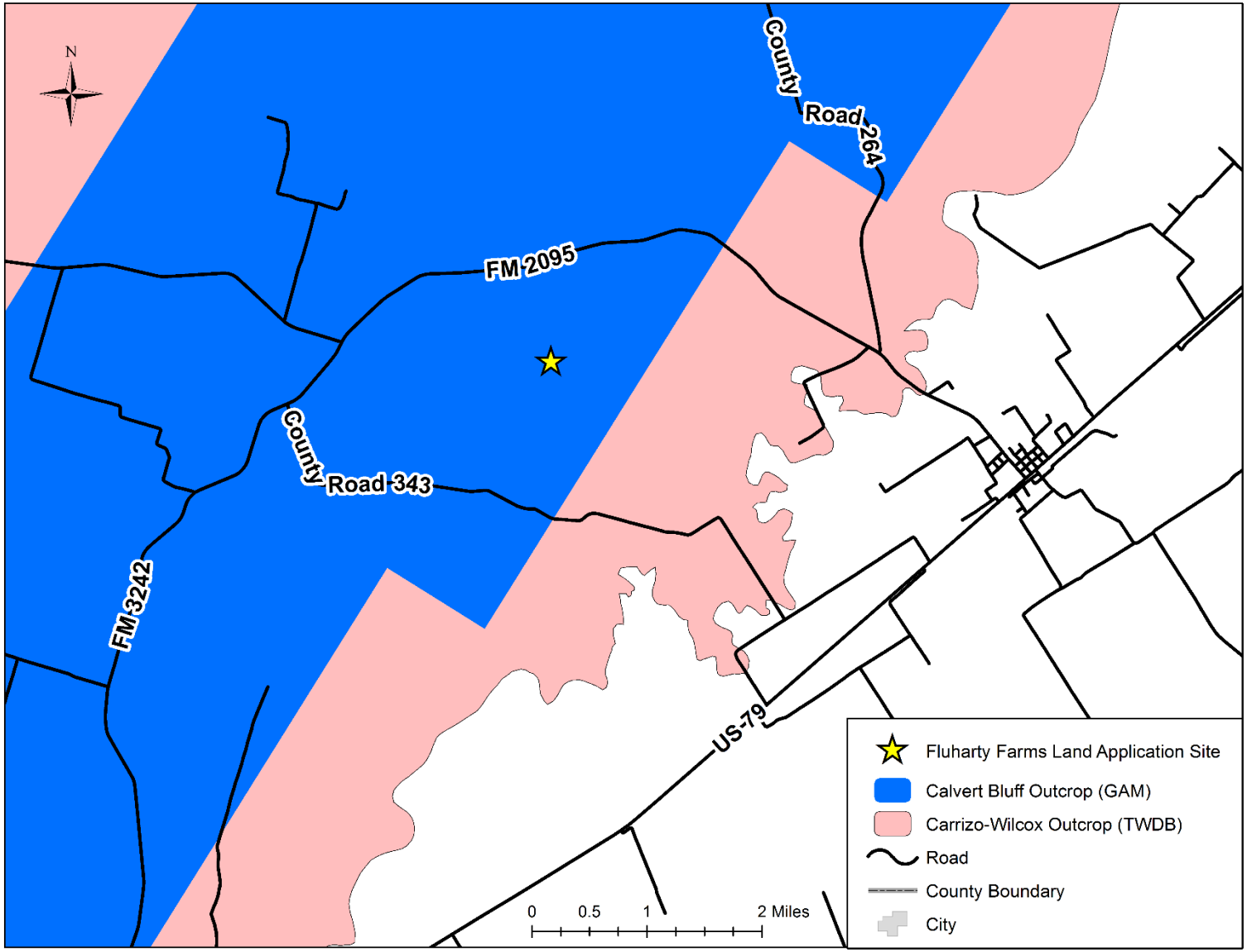
March 8, 2016

Outline

- Background
- What are “Class B Bio-solids”?
- TCEQ Land Application Permit Requirements
- Concerns for Groundwater
- Possible Role of GCD

Background on the proposed Milam County Site

TCEQ permit application WQ0005191000



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TCEQ permit application WQ0005191000

- **Applicant:**
  Denali Water Solutions
- **Type of waste:**
  Wastewater Treatment Plant Bio-solids
  Water Treatment Plant Bio-solids
- **Amount of waste:**
  Undetermined (Denali estimates 6-7 tons per year)
- **Type of Permit:**
  Class “B” Bio-solids Land Application
- **Location of permit site:**
  Fluharty Farms (near Gause, TX)
- **Size of permit site:**
  1022 acres

TCEQ permit application WQ0005191000

- 1st Notice : NORI (Notice of Receipt of Application and Intent to Obtain Permit) - *completed*

  comment period: open essentially until 2nd notice goes out – *open*

- TCEQ replies to comments on the 1st notice:

  comment period: 30 days

- 2nd Notice: NOAPD or NAPD (Notice of Application and Preliminary Decision)

  comment period: 30 days

- TCEQ will hold a public meeting if more than 10 complaints from citizens or an official request is made by a public official

- If there is a dispute the process will eventually go to a contested case hearing.

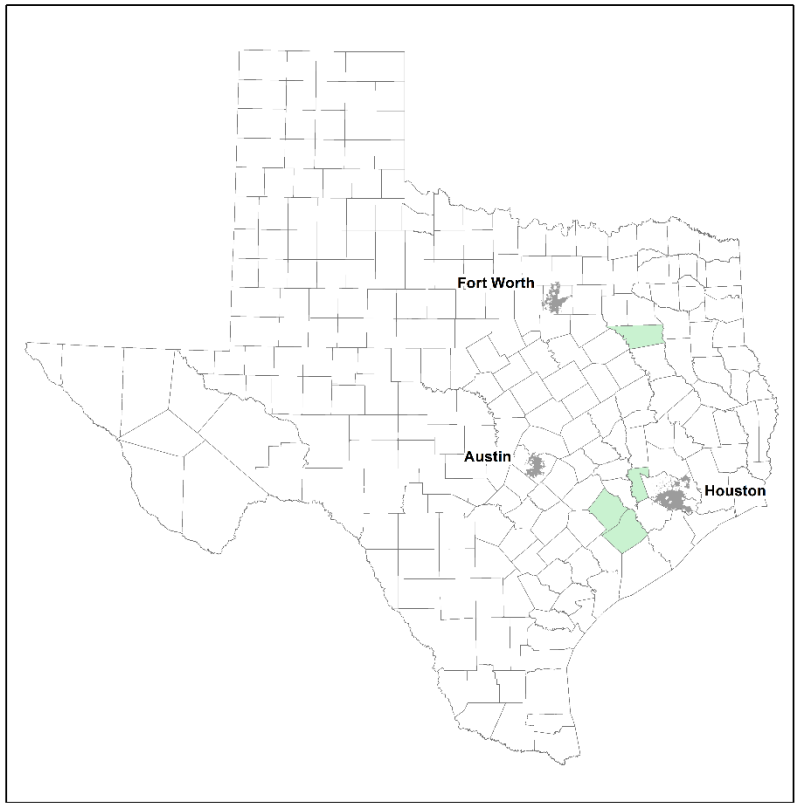
Background on Sludge/Bio-solids Land Application

Bio-solids Land Application – United States

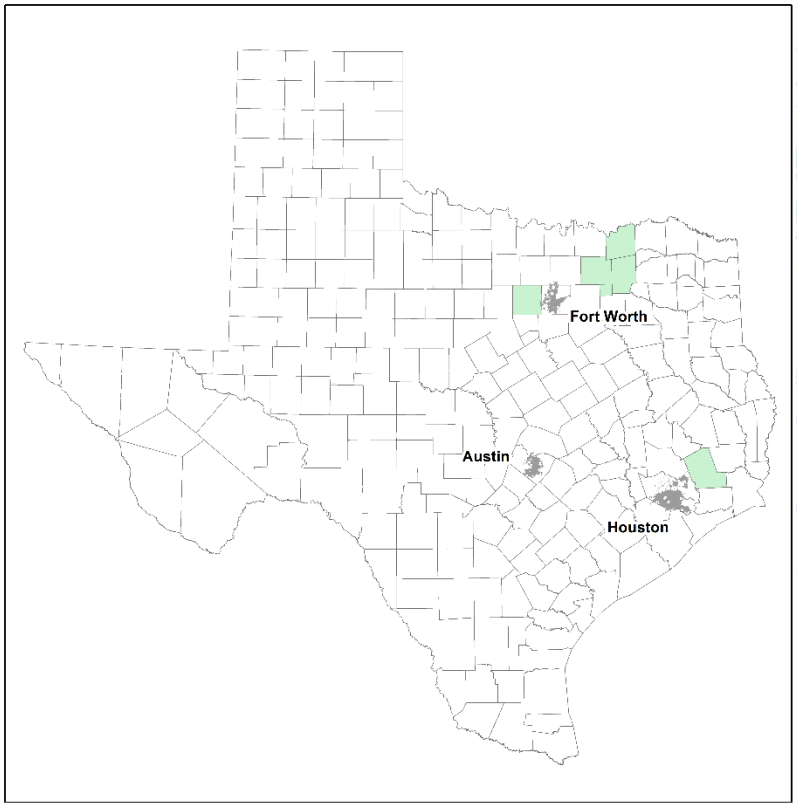
- Sewage Sludge is produced by wastewater treatment plants
- As of the 1980s, it could no longer be dumped in rivers or ocean.
- 3 options for municipal WWTPs:
  1) Incinerate
  2) Landfill
  3) Land Application of Bio-solids
- Today, land application used for about ½ of US sewage sludge
- TCEQ has regulated the land application of bio-solids in TX since 1995.

Bio-solids Land Application - TX

- **Fort Worth, Austin and Houston are the biggest TX cities that use bio-solids land application for Waste Water Treatment Plant disposal.**



Synagro (Austin's current disposer)
active land application sites



Denali (Milam County permit)
active land application sites

Determining what's "Safe" for Land Application

- Based on EPA standards with additions by TCEQ

- Bio-solids Composition Limits (**What's in it?**)
  - Pathogens
  - Leaching
  - Heavy Metals & Toxic Pollutants

- Land application site Requirements (**Where can it go?**)
  - Buffer zones (including water table considerations)
  - Harvesting and Grazing restrictions
  - Application rate restrictions
  - Required annual monitoring

Bio-solids Composition

(What's in it?)

Bio-solids: Pathogen Limits

- "Class B" has to meet following criteria (defined by TAC):
  - Density of fecal coliform must be less than 2,000,000 per gram of total solids OR
  - the waste has undergone adequate Processes to Significantly Reduce Pathogens (PSRP)

Bio-solids: Leaching Limits

- Toxicity Characteristic Leaching Procedure (TCLP)
  - designed to determine the mobility of substances through landfills and potentially into groundwater
  - The TCEQ mandates TCLP analysis limits for
    - 8 heavy metals
    - 13 semi-volatiles (ex. household or industrial by-products, like cresol)
    - 11 volatiles (ex. petrochemical by-products, like benzene)
    - 6 pesticides
    - 2 herbicides

Bio-solids: Heavy Metals & Toxic Pollutants Limits

- Bio-solids cannot be applied to land if any of the following pollutant concentrations are exceeded:
  - Arsenic (As) - 75 mg/kg
  - Cadmium (Cd) - 85 mg/kg
  - Chromium (Cr) - 3,000 mg/kg
  - Copper (Cu) - 4,300 mg/kg
  - Lead (Pb) - 840 mg/kg
  - Mercury (Hg) - 57 mg/kg
  - Molybdenum (Mo) - 75 mg/kg
  - Nickel (Ni) - 420 mg/kg
  - Selenium (Se) - 100 mg/kg
  - Zinc (Zn) - 7,500 mg/kg
  - PCBs - 2 ppm

TCEQ Land Application Permit Requirements

(Where can it go?)

Bio-solids: Site Limitations

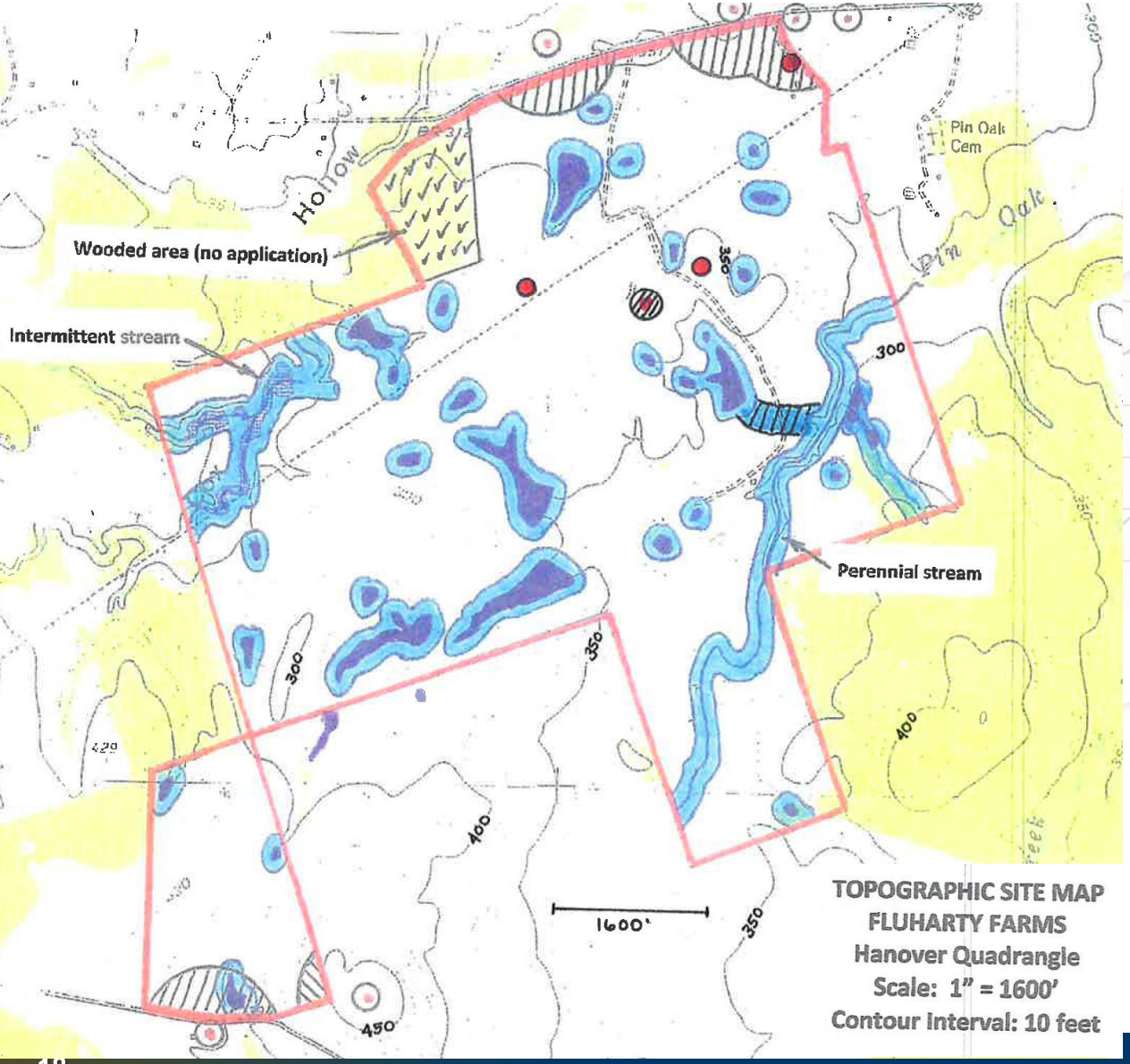
- Defined in 30 Texas Adminstrative Code, Subsection 312.44 (c) and (d)
- Cannot be in a county that borders the Gulf of Mexico
- Buffer zones around Surface water bodies:
  - 200 ft vegetative buffer zone if sludge not mixed in soil
  - 33 ft vegetative buffer zone if sludge is mixed in soil
  - 10 ft from irrigation conveyance canal

Bio-solids: Site Limitations

- Buffer zones around Groundwater sources/conduits:
  - 150 ft from private water supply well
  - 500 ft from public water supply well, intake, spring or similar source, treatment plant, or storage tank
  - 200 ft from solution channel, sinkhole, or other conduit to groundwater

- Other Buffer zones
  - 750 ft from school, institution, business, or occupied residential structure (unless agreement reached with owners)
  - 50 ft from public right-of-way and property boundaries (unless agreement reached with owners)

Fluharty Farms Site Plan



TOPOGRAPHIC SITE MAP
FLUHARTY FARMS
MAP LEGEND

- Property line/application area (50' buffer)
- Residences (750' buffer)
- Streams (200' buffer)
- Ponds (200' buffer)
- Water wells (150' buffer)
- Ranch Manager Residence (150' buffer)
- Drainage buffer per site inspection (200')

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Groundwater Level Limitations

- Seasonal groundwater or groundwater table shall be below the treatment zone at least:
  - 3 feet for soil with permeability of < 2 in/hr (4 ft/day)
  - 4 feet for soil with permeability of 2-6 in/hr (4-12 ft/day)
  - For soil permeabilities of >6 in/hr (> 12 ft/day), the TCEQ will review each case individually.

Bio-solids: Application Rates

- Cannot exceed 12 tons/acre/year
- Calculate max rate based on nutrient loads in sludge & the nutrient uptake of the crops/grass (nutrients decrease over time)
- Calculate max rate based on metal loads in sludge & the cumulative metal limit (metals accumulate over time)
- Use LOWEST application rate of these two calculations

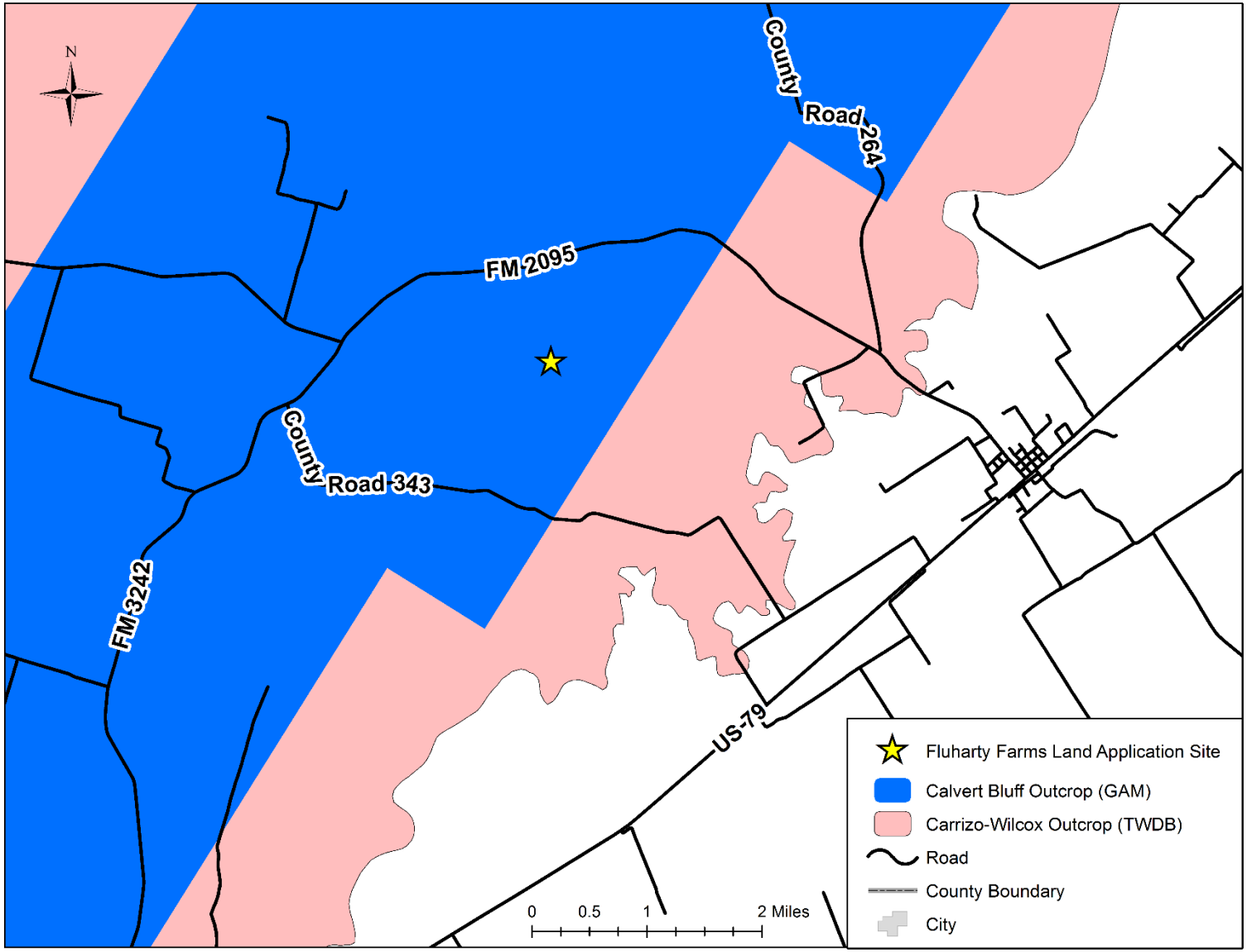
Bio-solids: Monitoring Requirements

- Soil monitoring of nutrients & heavy metals
  - Samples needed prior to application of other fertilizer
  - Annual samples to be taken within the same 45 day time-frame each year (or other approved sampling plan)

- New application rate of bio-solids re-calculated after sampling.

Concerns for Groundwater

Concerns for Groundwater



Other unregulated contaminants

- 2009 EPA study of 74 Wastewater treatment plants across US
- Included 1 large municipal system (> 100 MGD), 1 medium (10-100 MGD) and 5 small (<10 MGD) from TX
- 3 pharmaceuticals (cyprofloxacin, diphenhydramine, and triclocarban) were found in every sample
- 3 steroids (campesterol, cholestanol, and coprostanol) were found in every sample
- 10 flame retardants were found in every sample

Other unregulated contaminants

- New constituents can be added to regulations as new information about toxicity to humans or ecological effects are discovered
- Every 2 years, EPA supposed to check most current literature to determine whether additional pollutants should be considered for review
- As of 2011 (the latest review), 10 new constituents (including antibiotics/pesticides) are under further review for possible future inclusion in regulations.
- Basis for picking additional constituents depends on
  - the availability of research quantifying human and/or ecological risk AND
  - sufficient evidence that this constituent occurs in sewage sludge.

Review of GCGCD experience with TCEQ and landfill application

Guadalupe County GCD vs. TCEQ

- GCGCD has 2001 rule prohibiting disposal of solid waste on aquifer outcrop and requires at least 10-day notification of such a permit request
- Post Oak Clean Green Inc. filed landfill permit application w/ TCEQ in December 2011 but did not notify GCGCD for another month
- GCGCD insisted Post Oak pay late notification penalty and sued when they didn't pay.
- TCEQ entered suit on behalf of Post Oak saying that GCGCD was overstepping its authority.
- State District Judge upheld authority of the GCGCD in 2015 ruling.
- Contested case was just heard in Austin in Jan 2016, with final ruling to come later this year.

Lessons from Guadalupe County GCD vs. TCEQ

- GCGCD had strong case & still may not win:
  - Rule in effect for 10 years before application
  - Landfill site would have intersected water table
  - Lots of abandoned wells to provide direct conduits to water table
- Landfills are very different beasts than “safe” land application sites
- Lawsuits cost a LOT of time + $$

Possible Role of GCD: District Rules

- **From Post Oak-Savannah GCD Rules (as amended through June 2014): http://www.posgcd.org/district-information/district-rules/**

SECTION 2. BOARD.

RULE 2.1. PURPOSE OF THE BOARD. The Board was created to determine policy and regulate the withdrawal of groundwater, protect and recharge groundwater, prevent pollution or waste of groundwater, control subsidence caused by the withdrawal of groundwater within the boundaries of the District, and to regulate the transport of groundwater out of the District, for conserving, preserving, protecting and recharging the groundwater within the District, and to exercise the rights, powers, and duties of the District in a way that will effectively and expeditiously accomplish the purposes of the District Act. The Board's responsibilities include, but are not limited to, the adoption and enforcement of reasonable rules and other orders.

RULE 12.2. LOCATION OF WELLS.

4. No well may be located within five hundred (500) feet of a cemetery, sewage treatment plant, solid waste disposal site, or land irrigated by sewage plant effluent, or within three hundred (300) feet of a sewage wet well, sewage pumping station, or a drainage ditch that contains industrial waste discharges or wastes from sewage treatment systems; provided the general manager may grant a variance for wells that have obtained a variance pursuant to *Texas Administrative Code, Title 16, Part 4, Chapter 76*, as amended. [Amended June 12, 2012]

Possible Role of GCD – TWC Chapter 36

- **From Texas Water Code Chapter 36: http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.36.htm**

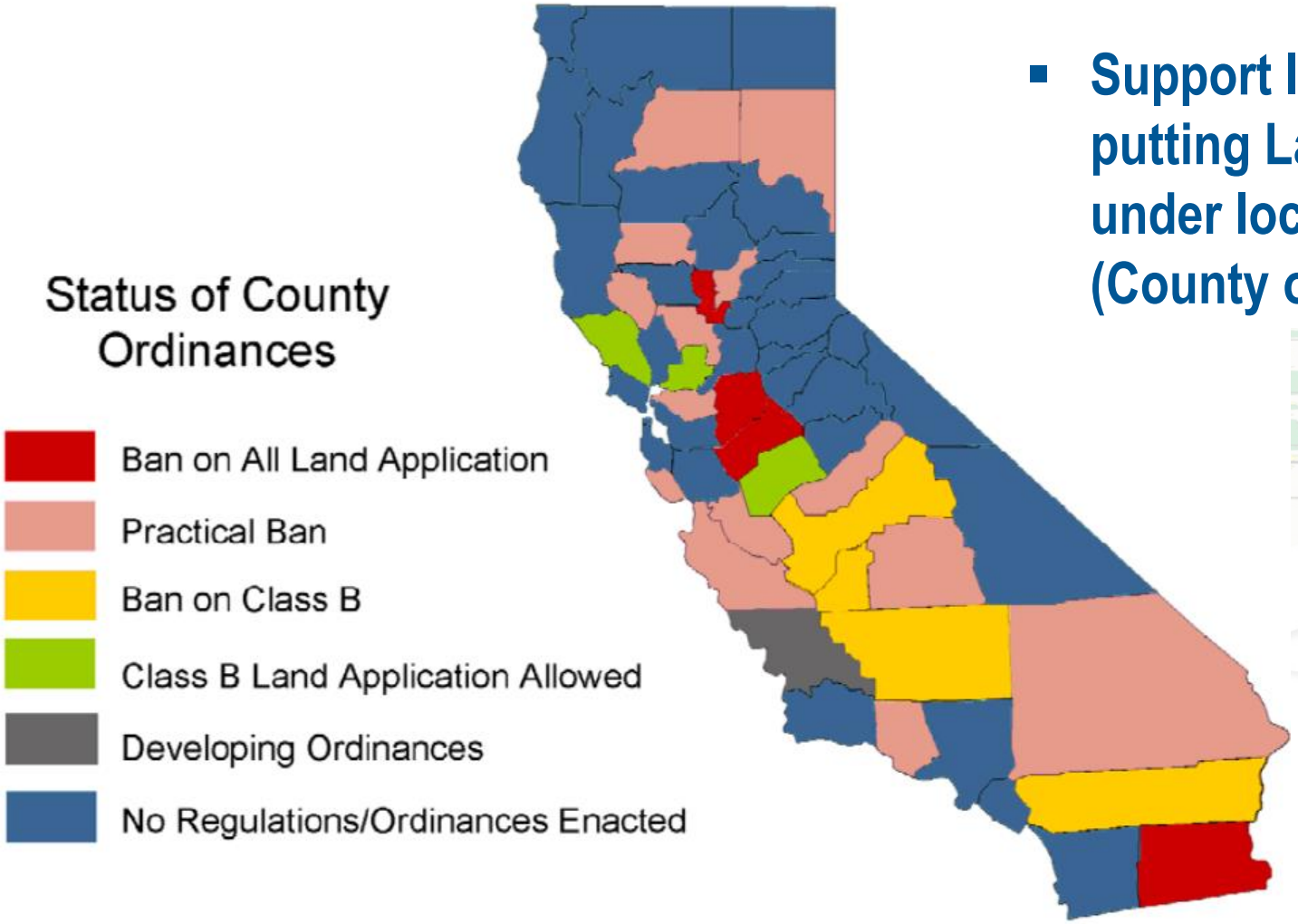
Sec. 36.101. RULEMAKING POWER. (a) A district may make and enforce rules, including rules limiting groundwater production based on tract size or the spacing of wells, to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater and to carry out the powers and duties provided by this chapter.

Sec. 36.116. REGULATION OF SPACING AND PRODUCTION. (a) In order to minimize as far as practicable the drawdown of the water table or the reduction of artesian pressure, to control subsidence, to prevent interference between wells, to prevent degradation of water quality, or to prevent waste, a district by rule may regulate:

Potential Role of GCD – future?

- Establish a system of coordination/required notification with TCEQ so that GCD is kept up-to-date on certain permit requests.
- Potential Groundwater Rule Modifications
  - Expanded Monitoring Requirements
  - Notification of certain land use
  - Well spacing requirements for bio-solids
- Disseminate information about relevant TCEQ and TRRC permit requests to the public through POSGCD Web Site.
- Facilitate Board discussions/Public meetings
- Support legislation putting Bio-solids Land Application under local jurisdiction (County or GCD-level)?

Role of GCD – future?



- **Support legislation putting Land Application under local jurisdiction (County or GCD-level)?**

http://www.bcwaternews.com/bcwn/SpecialEdition/WEFTEC2011/charting_the_future_of_biosolids_management.pdf

Role of GCD - current

- **From Texas Water Code Chapter 36: http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.36.htm**

(8) "Waste" means any one or more of the following:

(A) withdrawal of groundwater from a groundwater reservoir at a rate and in an amount that causes or threatens to cause intrusion into the reservoir of water unsuitable for agricultural, gardening, domestic, or stock raising purposes;

(B) the flowing or producing of wells from a groundwater reservoir if the water produced is not used for a beneficial purpose;

(C) escape of groundwater from a groundwater reservoir to any other reservoir or geologic strata that does not contain groundwater;

(D) pollution or harmful alteration of groundwater in a groundwater reservoir by saltwater or by other deleterious matter admitted from another stratum or from the surface of the ground;

SUBCHAPTER D. POWERS AND DUTIES

Sec. 36.101. RULEMAKING POWER. (a) A district may make and enforce rules, including rules limiting groundwater production based on tract size or the spacing of wells, to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater and to carry out the powers and duties provided by this chapter. In adopting a rule under this chapter, a district shall: