

Improving Vegetation Establishment and Erosion Control with Compost- Based Specifications

TxDOT Experiences Using Compost
on Roadside Applications

September 26 & 28, 2006

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Water Quality Concerns in the Bosque River Watershed

- Located in north central Texas
- Approximately 41,000 dairy cows
- High levels of phosphorus

Responding to a TMDL

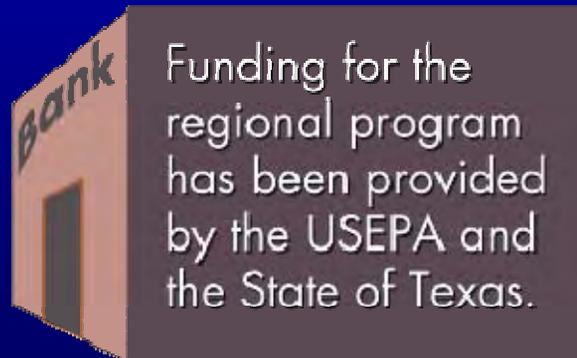
“Removing approximately half of the dairy generated manure from the North Bosque River watershed for use or disposal outside the watershed”

Why Composting?

- Value-added products increase mobility
- Texas Department of Transportation (TxDot) market
- A well-established technology representing low technical risk to investors

The Regional Manure Composting Program

- Funds provided by the U.S. Environmental Protection Agency and State of Texas
- Program began in November 2000 and is slated to continue until August 2004



The Regional Manure Composting Program

The program consists of two projects:

- Dairy Manure Export Support Project (DMES)
- Composted Manure Incentive Project (CMIP)

Composted Manure Incentive Project (CMIP)



State agencies that purchase compost under the CMIP project are reimbursed by TCEQ at \$5.00 per cubic yard.

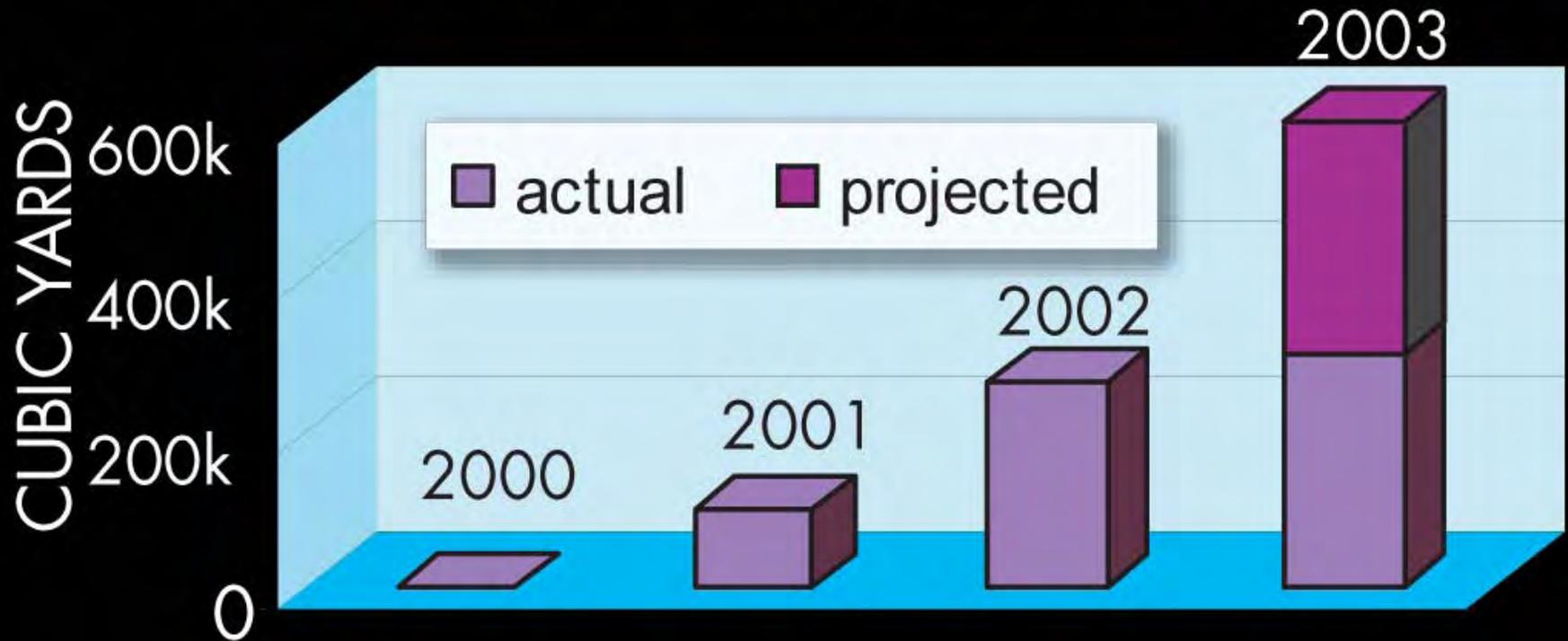


The TxDOT Story

- Agreed to purchase 200,000 cubic yards of manure-derived compost
- Used in new roadside construction and maintenance
- Mitigates soil erosion by accelerating plant growth

The TxDOT Story

COMPOST SPECIFIED BY TxDOT



Compost Specified by TxDOT: FY01-05

FY01 – 100,715 CY

FY02 – 266,151 CY

FY03 – 433,843 CY

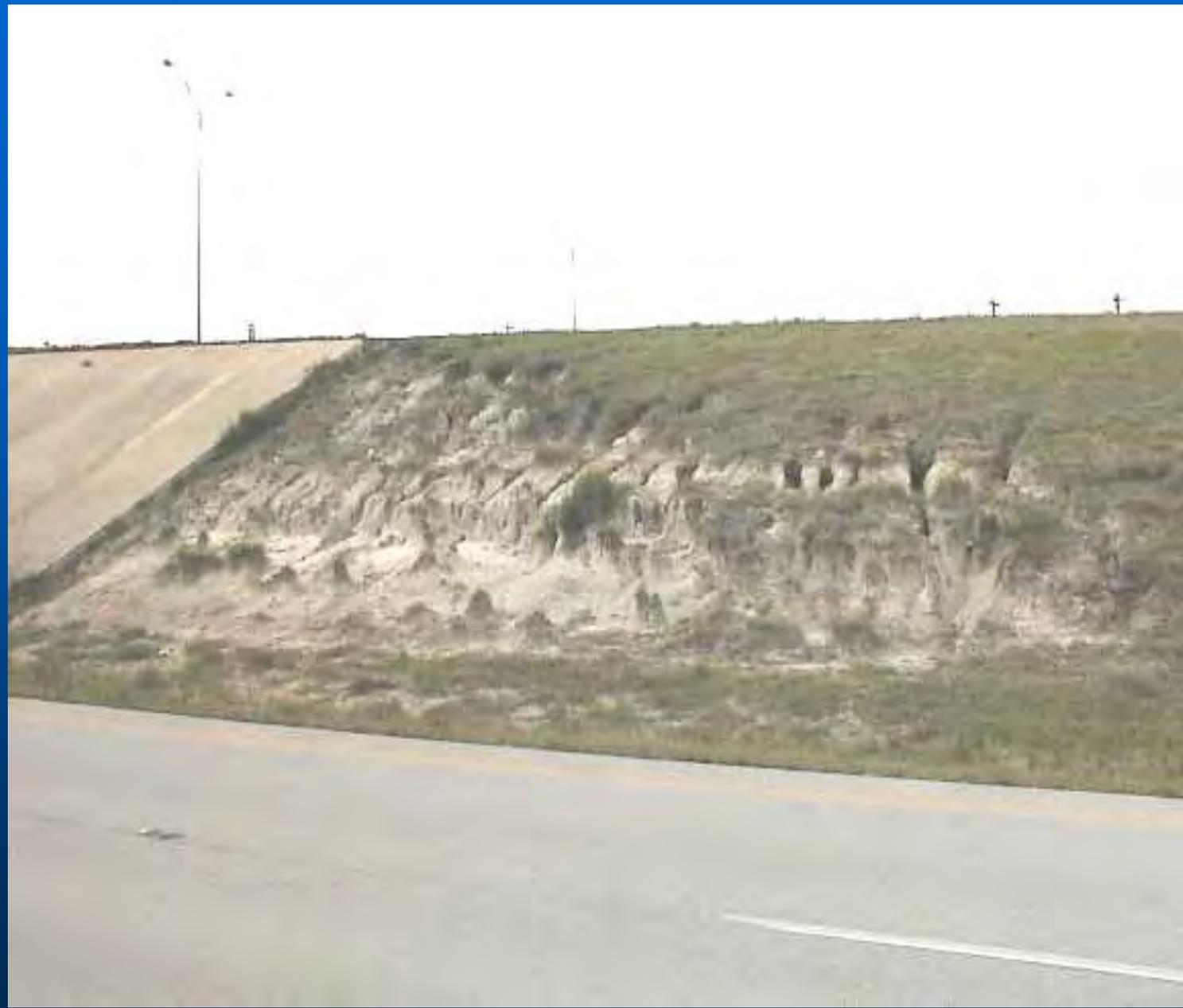
FY04 – 376,736 CY

FY05 – 507,137 CY















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Technical Advisory

Published as needed by the Construction and Bridge Divisions
December 1, 2002

Two Statewide Special Specifications Replaced

New Statewide Special Specifications

1058 - “Compost”

1059 - “Compost/Mulch Filter Berm”

Must be **Seal of Testing Assurance (STA)** certified.

Must present a **lab analysis** proving compost has met the physical requirements; must be performed by an STA-certified lab.

Item 161: Compost

- Compost Manufactured Topsoil
- Erosion Control Compost
- General Use Compost

Item 161: Compost Compost Manufactured Topsoil (CMT)

- Blended On-Site (BOS)
- Blended In-Place (BIP)
- Pre-blended (PB)

Compost Manufactured Topsoil

Blended On-site (BOS)

is achieved by incorporating 1" of compost into top 3" of existing soil

Item 161: Compost Compost Manufactured Topsoil (CMT)

Blended On-site (BOS)

“Topsoil may be salvaged from excavation and embankment areas. Apply CMT to the depth shown and incorporate into topsoil.”



SEP 26 2001

Item 161: Compost Compost Manufactured Topsoil (CMT)

Blended In-Place (BIP)

“Apply compost in a uniform layer and incorporate into the existing in place topsoil to the depth shown on the plans.”





Compost Manufactured Topsoil

Pre-blended (PB)

is 75% topsoil and 25% compost. Generally used for new flower bed planting areas.

Item 161: Compost Compost Manufactured Topsoil (CMT)

Pre-blended (PB)

"Apply CMT in a uniform layer to the depths shown on the plans."

Erosion Control Compost

Erosion Control Compost (ECC)

can be utilized on slopes of 3:1, generally
at a depth of 2"

Item 161 Compost Erosion Control Compost (ECC)

"After excavation and embankment work is complete, apply a 2" uniform layer."



General Use Compost

General Use Compost (GUC)

is used for top-dressing established turf. Basis for all compost specifications.

Item 161: Compost

General Use Compost (GUC)

“Apply in a uniform layer as a top dressing on established vegetation to the depth shown on the plans. If using GUC as a backfill ingredient in a planting soil mixture, apply as shown on the plans.”





CASE STUDY
IH-20 & US 87
Big Spring, TX

Big Spring

- Located in West Texas near Midland
- Average annual rainfall - 16-20"
- Sandy soil
- Highway intersection completed in 1968
- Five previous attempts to vegetate using conventional practices
- 3:1 slope with 6" rill erosion



Big Spring/IH 20 May 1999
compost/mulch+native seed mix applied
40MPH winds, 86° F avg temp



Big Spring/IH 20 Demo: May 1999



Big Spring/IH 20 Demo: May 1999



No compost area

Big Spring/IH 20

Results July 1999

Area had received 1" rain after application



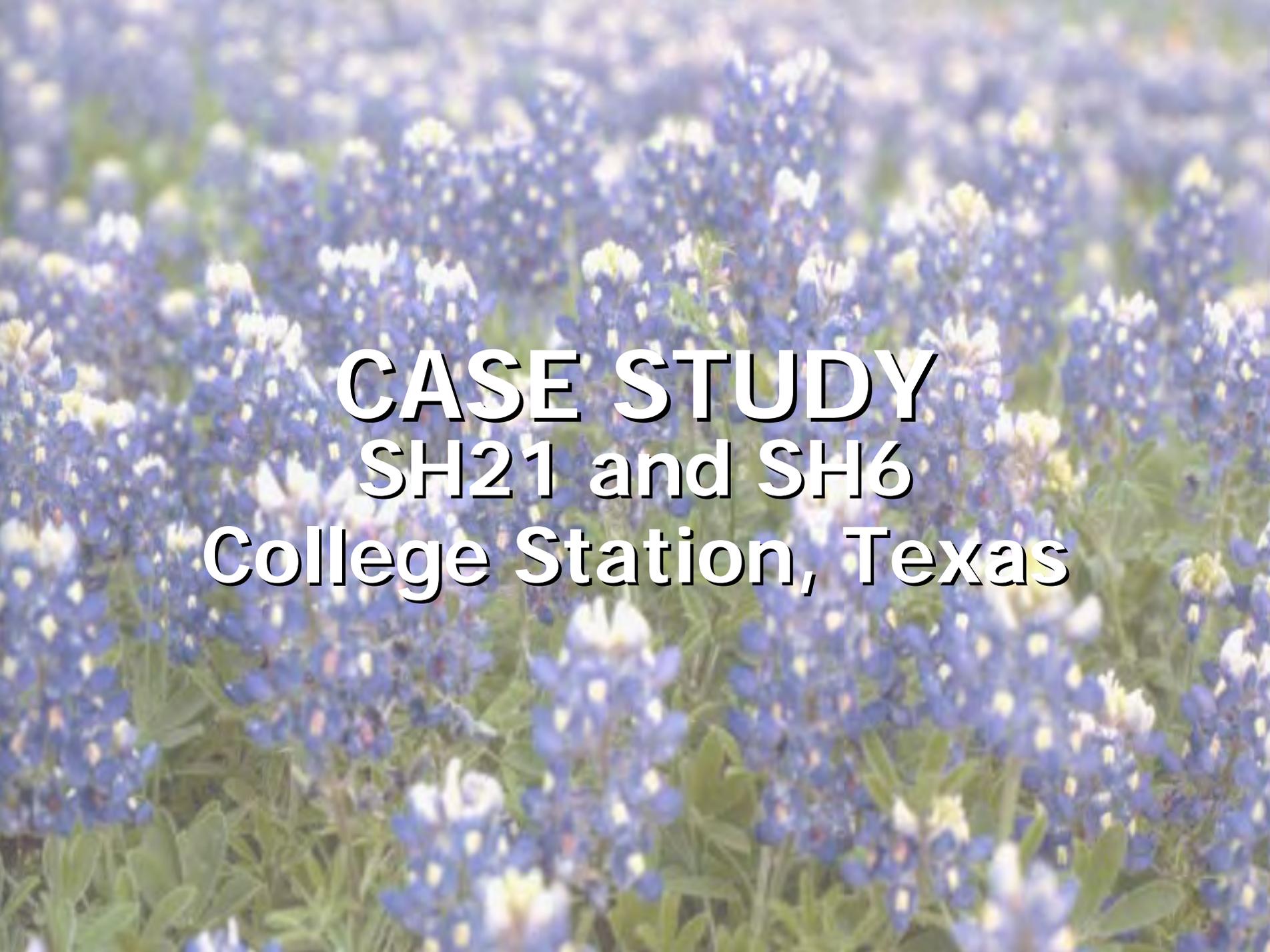
Big Spring/IH 20
Results July 1999



EXIT 176
176
Andrews
1/2 MILE

Big Spring/IH 20
Three years September 2002

12 2:48 PM



CASE STUDY
SH21 and SH6
College Station, Texas



College Station, Texas



Site prepared for compost/mulch/seed mix



How It Into Place!
713-895-9044



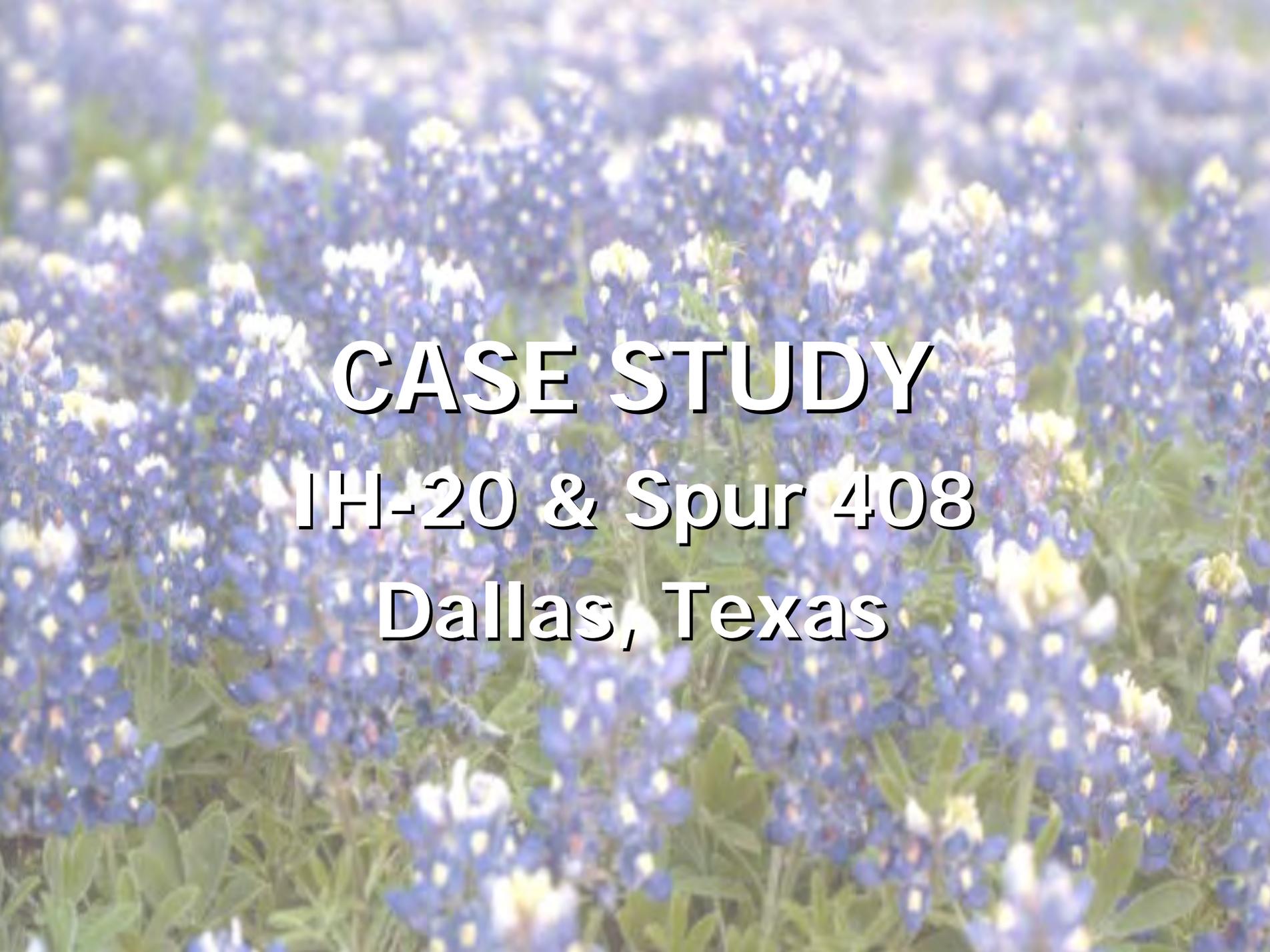
WATER - SEWER - GULF HEADS
AND TRENCHING - ERECTION



Two weeks Grass Coverage
College Station, Texas



Six Months
College Station, Texas



CASE STUDY
IH-20 & Spur 408
Dallas, Texas

Demonstration site – before
Dallas/Spur 408 August 1999

Rill erosion had started under erosion blanket



Demonstration site – application
Dallas/Spur 408 August 1999





Eight Months **April 2000**
Dallas/Spur 408

Two years

September 2001



5 11:42 AM



Three years

July 2002

3 3:53 PM

A close-up, slightly blurred photograph of a field of bluebonnets. The flowers are a vibrant blue, with some white and yellow flowers interspersed. The background is a soft, out-of-focus green and blue, suggesting a large field of similar flowers.

STRUCTURAL CONTROLS

Compost/Mulch Filter Berm



New construction, top 8 feet and new trees mulched;
After a 13 inch rain



The need for a better tool ...





State Specification 161: “Compost/Mulch Filter Berm”

- **Compost Filter Berm**
(50% compost & 50% wood chips)
- **Mulch Filter Berm**
(100% wood chips)



CASE STUDY
US Hwy 281
TxDOT Brownwood District
Lampasas, Texas



Compost Filter Berm Demonstration

US HWY281

1/11/01



Two weeks - Compost Filter Berm
US HWY281 - 1/30/01

Filter berm working after a 3 "rain event



Compost Filter Berm
US HWY281 1/30/01

Traditional Silt Fence Application

US HWY281 1/30/01



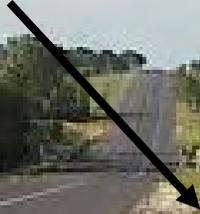


Seeded Erosion control compost

Compost Filter Berm
US HWY281 1/30/01

Grass established with Erosion Control Compost

Drill seeded, no compost



Compost Filter Berm & Blanket
US HWY281 2/28/01



Compost Filter Berm
US HWY281 2/28/01

Filter berm working during a rain event



Compost Filter Berm
US HWY281 2/14/01

Berm continues to work after being driven over



More Information is Available on the TxDOT Website:

www.dot.state.tx.us/compost

- Photos of demo projects
- Helpful inspection tips
- Compost material sources
- General note information

Don't be afraid to try something new.



SUCCESS STORIES



CASE STUDY
Barton Creek Development
Austin, TX

Barton Creek Development

- 100 acre-foot detention pond (32.7 million gallons)
- Exposed rock, caliche, commonly used in road construction
- Aesthetically unappealing



BARTON CREEK DEVELOPMENT
AUSTIN, TX

APR 30 2002



1:1 ROCK SLOPE

Barton Creek Development – Austin, TX

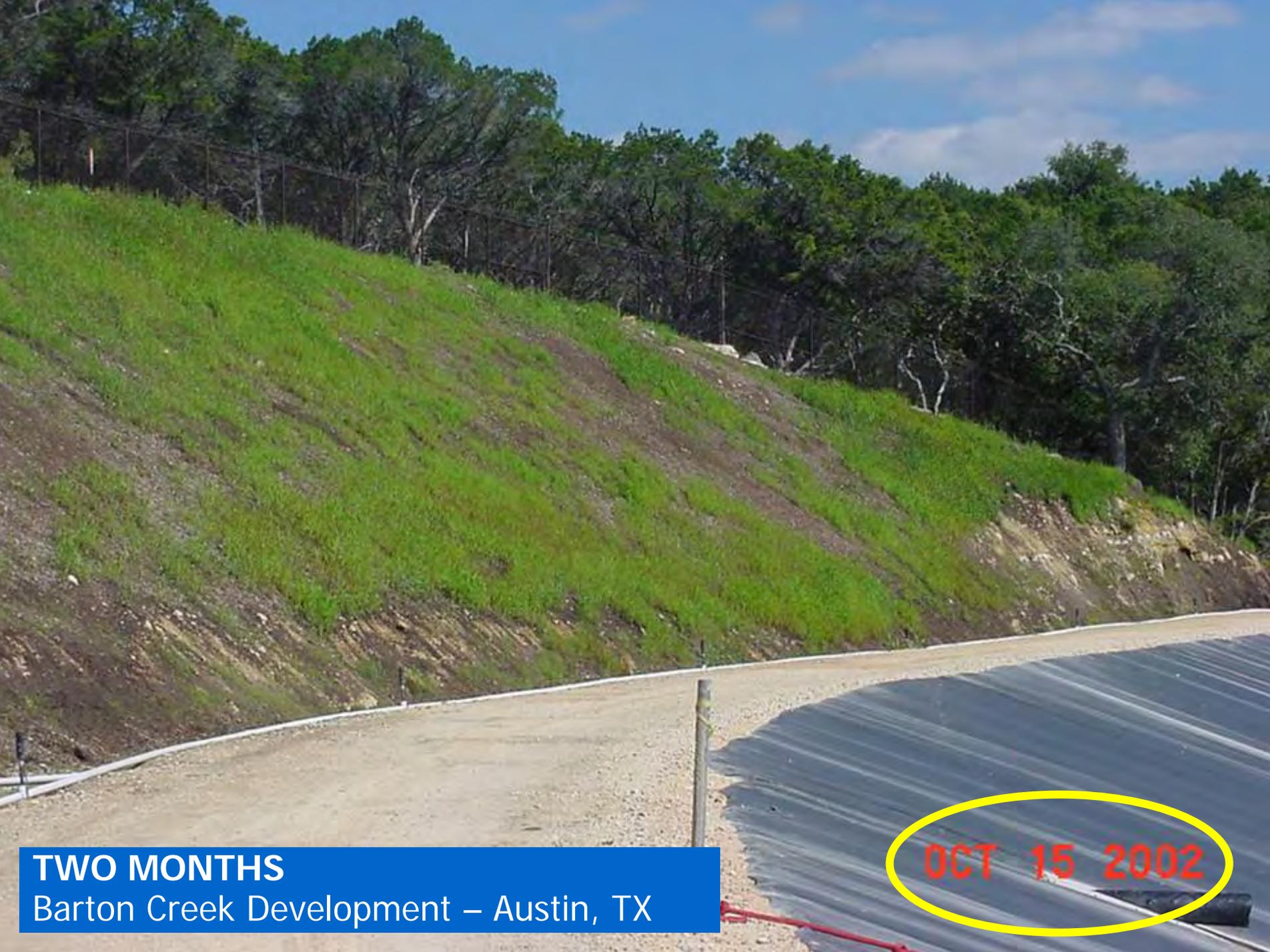
APR 30 2002



Application to 1:1 ROCK SLOPE
2" compost mulch w/native seed mix
Barton Creek Development – Austin, TX
AUGUST 17, 2002

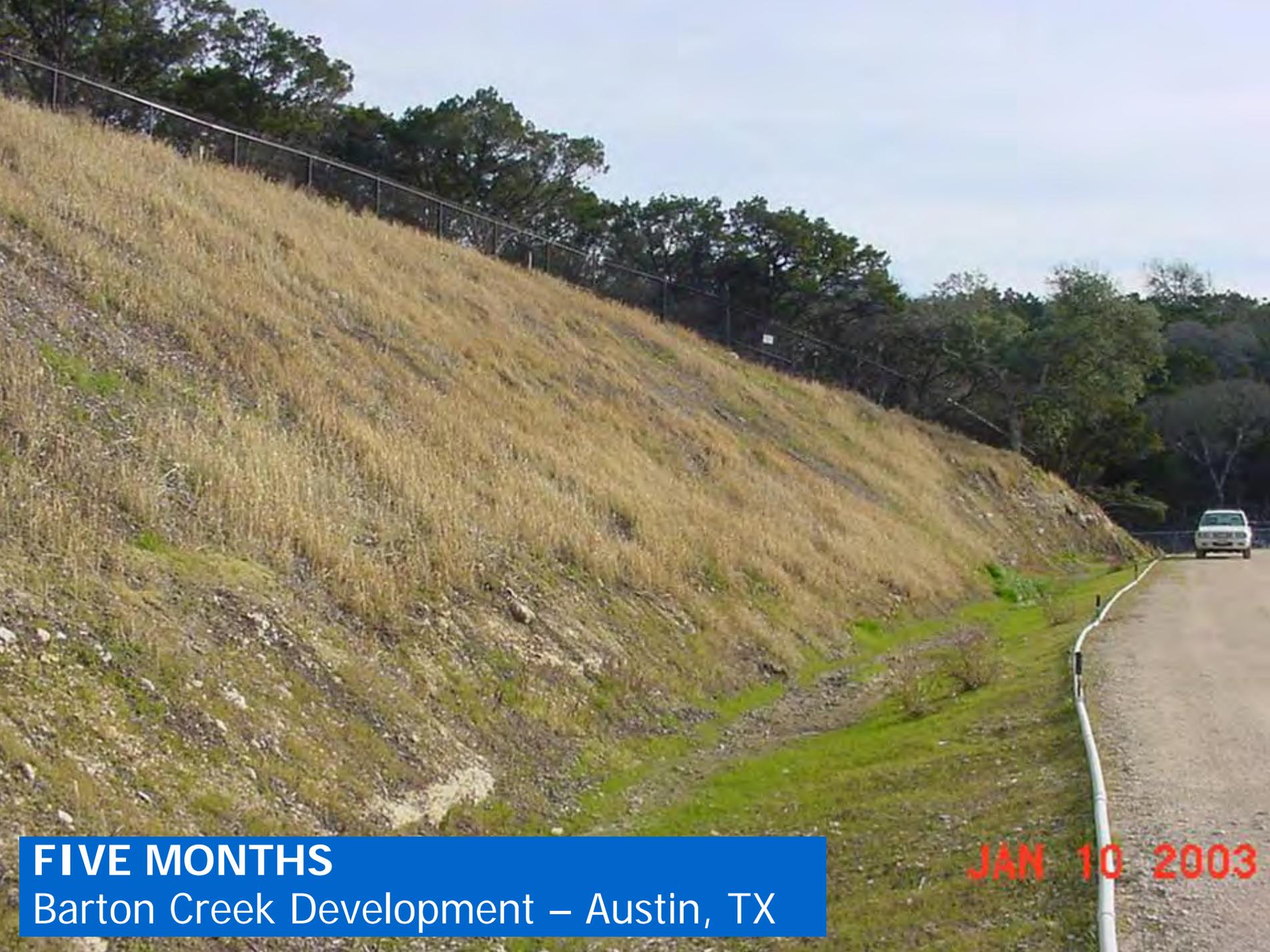
After Application

- Significant rain event, tropical storm
 - two rain events in three days, 5" and 7"
- No loss of application materials
- Slope stabilized and covered



TWO MONTHS
Barton Creek Development – Austin, TX

OCT 15 2002



FIVE MONTHS
Barton Creek Development – Austin, TX

JAN 10 2003

An aerial photograph showing a golf course green and fairway. The green is a light green color, and the fairway is a darker green. The surrounding area is covered in dense, dark green trees. The image is taken from an elevated position, looking down at the golf course.

8 MONTHS

Barton Creek Development – Austin, TX

APR 17 2003



VERTICAL SLOPE/ROCK FACE
Barton Creek Development – Austin, TX

APR 17 2003



8 MONTHS LATER
IRRIGATION INSTALLED, NEVER USED

APR 17 2003



ONE YEAR
Barton Creek Development - Austin, TX

SEP 4 2003



ONE YEAR

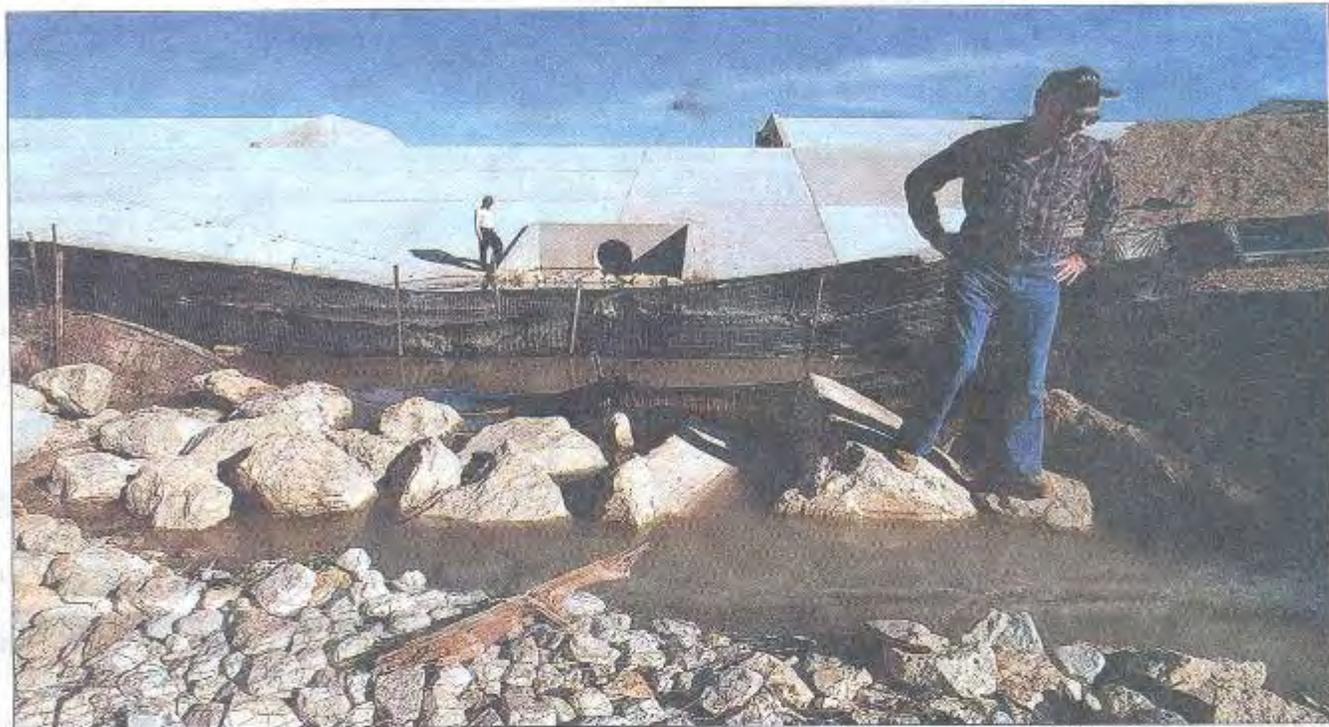
Barton Creek Development - Austin, TX

SEP 4 2003



CASE STUDY
WEST CYPRESS HILLS
DEVELOPMENT
Austin, TX

Development clouds Hill Country creek



Larry Kolvoord AMERICAN-STATESMAN

Richard Streety, right, and Jim Phillips survey the murky water flowing into Lick Creek in western Travis County near the dam built for the West Cypress Hills subdivision. The men, among

a group of residents who live downstream from the dam, say that the development is too dense for the hilly land and that its dam and detention pond are polluting the creek.

Neighbors fight pollution from dam

By Kevin Carmody
AMERICAN-STATESMAN STAFF

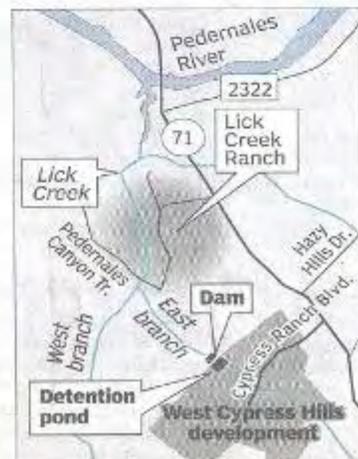
4/5/04

Early last August, Pepper Morris walked down the hillside from her home to a cypress-shaded swimming hole on Lick Creek, in western Travis County, to find the normally crystal-clear water a murky brown and dotted with white foam.

It took a few weeks for Morris and her creek-side neighbors to connect the sudden

stormwater detention pond by constructing a 25-foot-tall, 150-yard-long dam that sliced across the creek's small east branch. Creek water was clear when it flowed into the detention pond but was the color of chocolate milk as it discharged from the dam, across silt-inundated rocks and back into the creek, Morris recalled.

"I always thought the idea of detention ponds was to keep polluted runoff out of the creeks and rivers," Morris said. "Here we had a developer damming the creek to



New scrutiny of creekside developer

2 U.S. agencies looking into water, species issues in Hill Country

By Kevin Carmody 4/6/04
AMERICAN-STATESMAN STAFF

Two federal agencies confirmed Monday that they are investigating possible violations of the federal Clean Water and Endangered Species acts at a western Travis County residential development.

The U.S. Army Corps of Engineers issued the West Cypress Hills development a cease-and-desist order after determining that its developer violated the

Clean Water Act by filling the east branch tributary of Lick Creek without contacting the Corps or obtaining the required permit, the order states. A section of the tributary significant enough to fall under the Corps' jurisdiction was filled during construction of a large storm-water detention pond and dam, said Barry Osborn, a regulatory project manager for the Corps' office in Fort Worth.

Osborn said the investigation is not complete. His office must still determine what type of permit is required and what steps the developer might have to take, based in part on information he has asked the developer to provide.

Meanwhile, the U.S. Fish and Wildlife Service asked the developer in a March 26 letter for documentation about whether the property was a habitat for the endangered golden-cheeked warbler before land clearing started last year. If it was a warbler habitat — which exists in that area elsewhere — the developer would have been obligated to consult with the wildlife service about possible mitigation or pay a fee under the Balcones Canyonlands Conservation Plan.

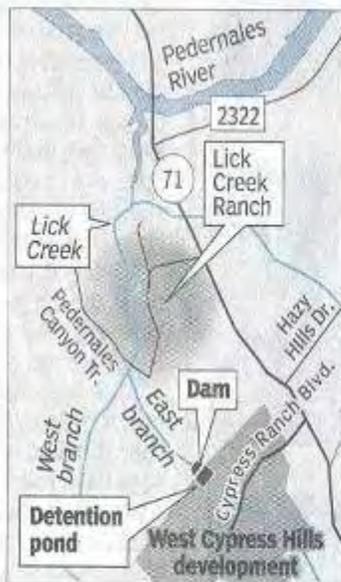
Both investigations were prompted by inquiries from downstream residents who, since last fall, have complained to various regulatory agencies

about sediment-laden water flowing from the development's dam and polluting Lick Creek. The spring-fed creek, which rivals Barton Creek in size and beauty, flows to the Pedernales River near Texas 71.

Russell Parker, developer of the planned 800-home subdivision, has said his consultants previously determined that the property was not a warbler habitat, so there was no need to consult with the wildlife service.

Even if the tract is now determined to be a warbler habitat, the wildlife service won't seek penalties unless the land

See **CREEK**, B5



AMERICAN-STATESMAN

Builder fined for pollution of creek

Citation by LCRA for debris latest
woc for western Travis subdivision

By Kevin Carmody 10/6/04
AMERICAN STATESMAN STAFF

The Lower Colorado River Authority has imposed a relatively rare \$5,000 fine and threatened identical daily fines on the developer of a Hill Country subdivision whose dam has been deemed responsible for polluting Lick Creek.

The penalty, for exceeding pollution limits at the West Cypress Hills development after a mid-September rainstorm, was levied this week. And after heavy rains on Saturday again overwhelmed the additional pollution control measures the developer had installed, LCRA officials said they will fine him the maximum \$5,000 a day unless he fixes the problem quickly.

"I haven't seen the lab results, but it's a no-brainer that they will have surpassed the (pollution) limits again" after Saturday's rains, said Vic Ramirez, the LCRA's associate general counsel.

However, the river authority probably will not automatically fine developer Rusty Parker for Saturday's violation or collect the daily fines for failing to stem pollution of the once-pristine creek in western Travis County unless Parker fails to meet new, more aggressive deadlines this month to fix the problems, Ramirez said.

During the Saturday morning storms, about 5 inches of rain washed soil and debris off newly



Unprotected Area Before Compost Application. October 05,

2004



West Cypress Hills on October 05, 2004. Before Compost Application



JAN 20 2005



Site on October 05, 2004 Before Any Compost Application



JAN 11 2005







Unprotected Slope; October 05,

2004



Grass Coverage in 6 Weeks and Over 24”
Rainfall

DEC 2 2004



12" Silt Tube After 12" of Rain Over 2 Weeks

NOV 1 2004



Silt Collected by 24" Filter
Tube After Record November

Rainfall

DEC 2 2004



Clean Water Below Dam Outfall.
Approx. 6 Weeks After Compost
Application and Over 24" of
November Rainfall

DEC 2 2004

Grass is greener in West Cypress Hills

If you've driven out Texas 71 West lately, you may have noticed a beautiful patch of green on the southwest side of the highway.

A subdivision called West Cypress Hills is the place. It's so green due to the efforts and talents of my friend Sally Brannon.

Rusty Parker, managing partner for Cypress Ranch Limited, brought Brannon aboard in October.

She has taken painstaking steps to heal the land and address soil erosion issues in a novel, environmentally friendly way. Being the earth mother that she is, her solutions had to be organic and safe for the environment. She has overseen the maintenance of miles of silt fencing to protect the creek, and directed the installation of thousands of feet of mulch logs to slow the velocity of the water and remove silt before water reaches the creek.

Don Legacy of JV Dirt & Loam was an integral part of her team. He invented the mulch rolls and an



Chella Judd

**LAKE AREA
PEOPLE**

organic, erosion-control compost with very low soluble nitrogen that works like a sponge during rain events - instead of running offsite like topsoil. It also serves as a bunny buffet!

The re-vegetation of 70-plus acres has taken many weeks - and the cooperation and team efforts of the contractors, engineers, Texas Commission on Environmental Quality, Lower Colorado River Authority and Travis County officials - and financial support from the owners.

These efforts haven't gone unnoticed. One inspector told Brannon recently, "I never expected to turn a corner in the Hill Country and find myself in Ireland!" During the recent cold, wet weather, Brannon called me to meet at Thai Spice for

a bowl of hot-and-sour soup so we could catch up with each other. She had been walking the property in the mud and rain, checking all the silt fences and making sure the creek was running clear. Every fence was in place and the rain was draining off the way it should.

Brannon has also worked to require low-water grasses in the homeowners' lawns and the subdivision's medians. She is now changing the rules so all yards will be fertilized with stabilized, organic nitrogen sources. Brannon is also working to ensure erosion control specifications in future sections follow the lay of the land.

Brannon was asked to take on this project because of her experience as project coordinator for the Flintrock Falls Golf Course during an El Niño weather pattern.

I've been friends with her since 1992, and have never known Brannon to do anything halfway. If she's cooking, you'll be well fed. If she's singing, you'll be entertained. If the earth needs mothering, she's already there.



The developers of West Cypress Hills on Texas 71 West drafted Sally Brannon to spruce up landscaping in the area. Among other things, she oversaw the installation of thousands of mulch logs, left, to slow the flow of water runoff.

CELLEA JUDD PHOTOS |
LAKE TRAVIS VIEW

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