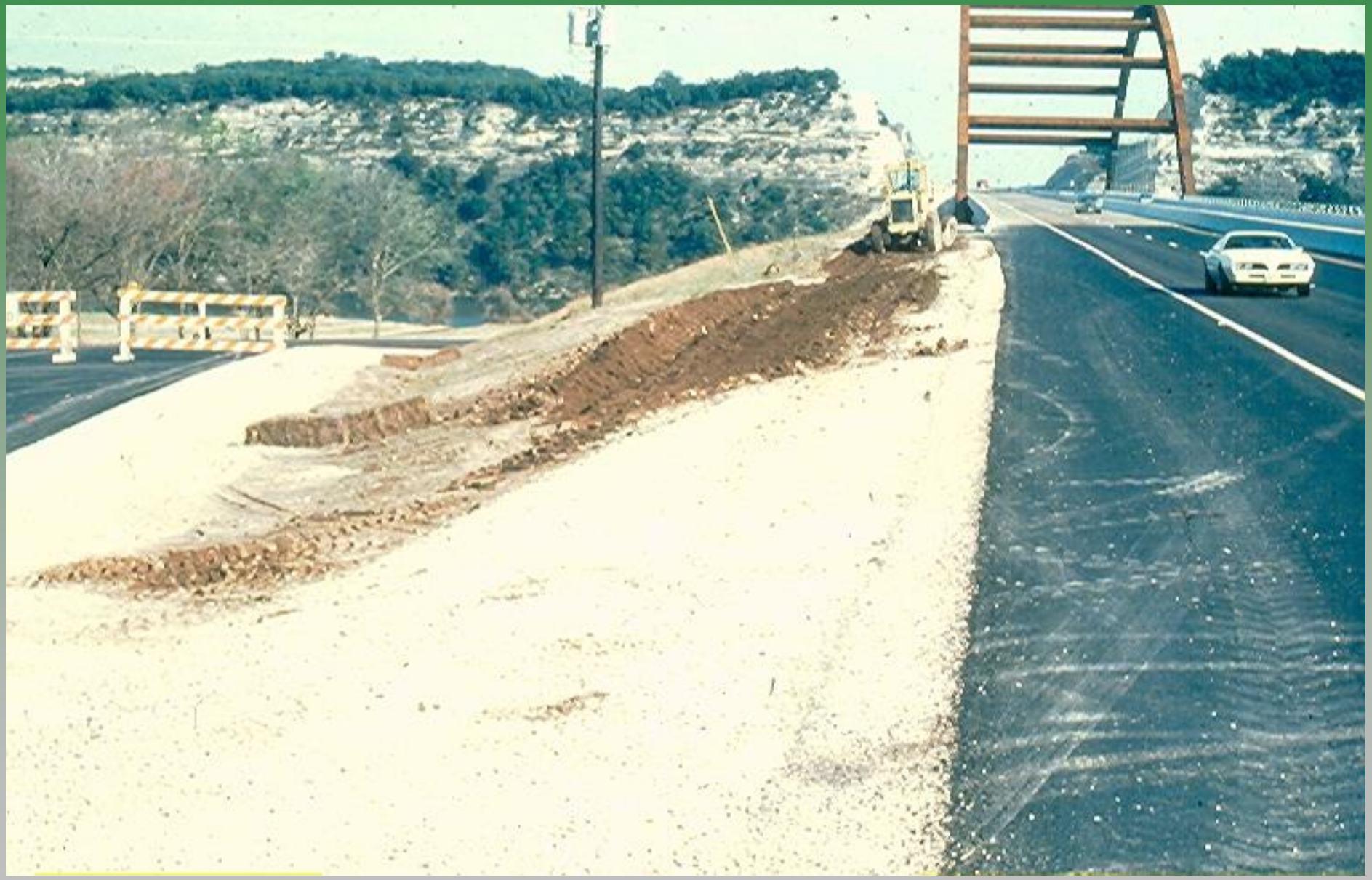
TxDOT & TCEQ Partnership:
Development of the Nation's Largest Compost Market

Barrie Cogburn
Landscape Architect
Retired TxDOT




FORD

WHY NOT COMPOST?

Texas Commission on Environmental Quality

"Compostable materials are taking up valuable landfill space … this is a waste of organic matter!"

Texas Department of Transportation

"Poor quality topsoil can't sustain vegetation & this leads to erosion … we need organic matter!"

Could we convince the engineers?

Cost savings?

Good or Bad PR for TxDOT?

Road-building industry support?

Would compost perform?

Quality Control?

IS COMPOST THE ANSWER?

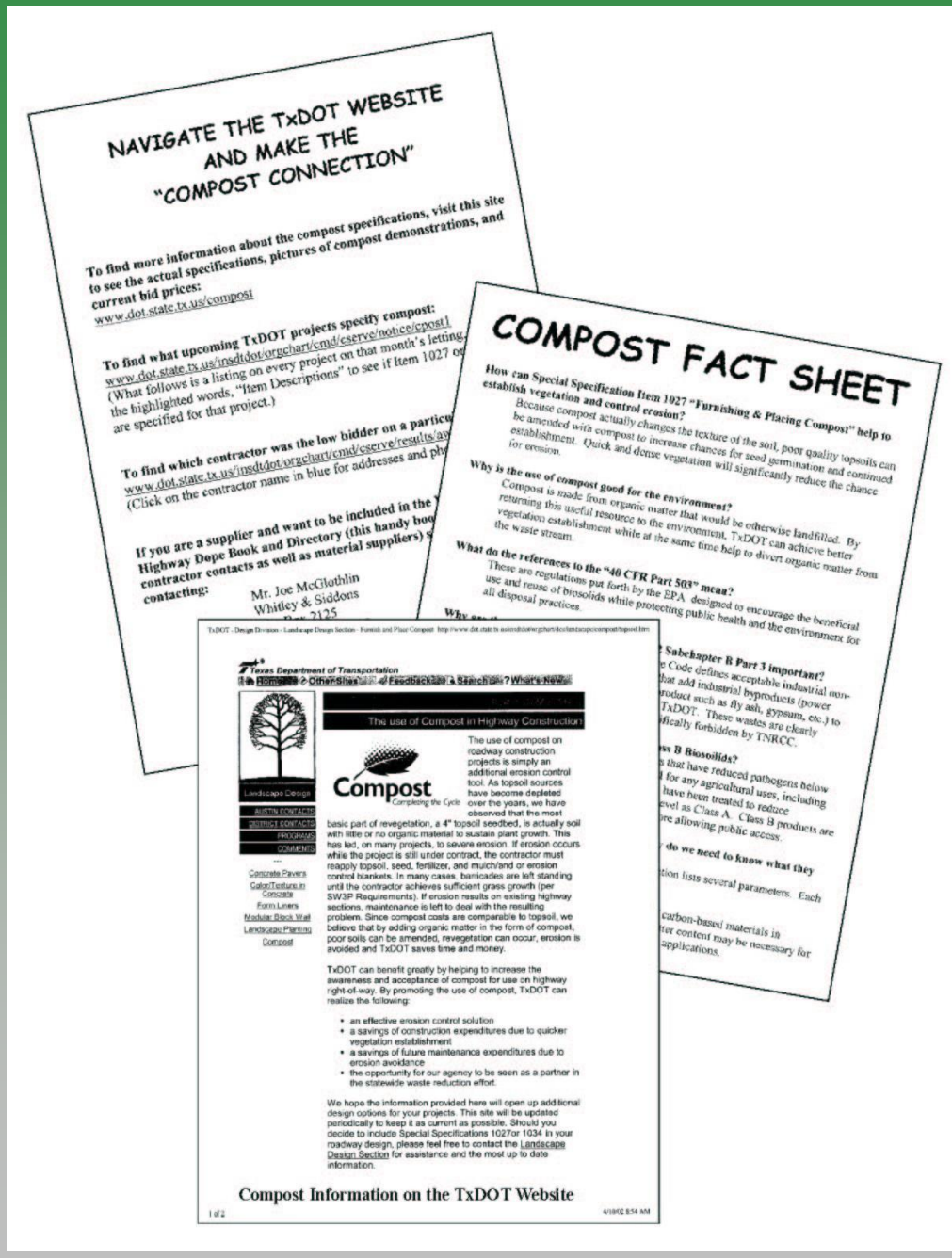
How we got the word out …

Workshop Presentations

Promotional logo to “brand” our message …

Booths at Trade Fairs

TxDOT Commissioner Robert Nichols



NAVIGATE THE TxDOT WEBSITE AND MAKE THE "COMPOST CONNECTION"

To find more information about the compost specifications, visit this site to see the actual specifications, pictures of compost demonstrations, and current bid prices:
www.dot.state.tx.us/compost

To find what upcoming TxDOT projects specify compost:
www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/notice/cpost1
(What follows is a listing on every project on that month's letting
the highlighted words, "Item Descriptions" to see if Item 1027 o
are specified for that project.)

To find which contractor was the low bidder on a particu
www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/results/av
(Click on the contractor name in blue for addresses and ph

If you are a supplier and want to be included in the
Highway Dope Book and Directory (this handy boo
contractor contacts as well as material suppliers)
contacting:
Mr. Joe McGlothlin
Whitley & Siddons

COMPOST FACT SHEET

How can Special Specification Item 1027 "Furnishing & Placing Compost" help to establish vegetation and control erosion?
Because compost actually changes the texture of the soil, poor quality topsoils can be amended with compost to increase chances for seed germination and continued establishment. Quick and dense vegetation will significantly reduce the chance for erosion.

Why is the use of compost good for the environment?
Compost is made from organic matter that would be otherwise landfilled. By returning this useful resource to the environment, TxDOT can achieve better vegetation establishment while at the same time help to divert organic matter from the waste stream.

What do the references to the "40 CFR Part 503" mean?
These are regulations put forth by the EPA designed to encourage the beneficial use and reuse of biosolids while protecting public health and the environment for all disposal practices.

Why [illegible]

Subchapter B Part 3 important?
e Code defines acceptable industrial non-
hat add industrial byproducts (power
roduct such as fly ash, gypsum, etc.) to
TxDOT. These wastes are clearly
ifically forbidden by TNRCC.

ss B Biosolids?
s that have reduced pathogens below
l for any agricultural uses, including
have been treated to reduce
evel as Class A. Class B products are
re allowing public access.

do we need to know what they
tion lists several parameters. Each

carbon-based materials in
ter content may be necessary for
applications.

TxDOT - Design Division - Landscape Design Section - Furnish and Place Compost http://www.dot.state.tx.us/insdtdot/orgchart/cmd/landscape/compost/topsoil.htm

Texas Department of Transportation
Home | Other Sites | Feedback | Search | ? | What's New

Landscape Design
AUSTIN CONTACTS
DISTRICT CONTACTS
PROGRAMS
COMMENTS

Concrete Pavers
Color/Texture in Concrete
Form Liners
Modular Block Wall
Landscape Planting
Compost

The use of Compost in Highway Construction

Compost
Completing the Cycle

The use of compost on roadway construction projects is simply an additional erosion control tool. As topsoil sources have become depleted over the years, we have observed that the most basic part of revegetation, a 4" topsoil seedbed, is actually soil with little or no organic material to sustain plant growth. This has led, on many projects, to severe erosion. If erosion occurs while the project is still under contract, the contractor must reapply topsoil, seed, fertilizer, and mulch/and or erosion control blankets. In many cases, barricades are left standing until the contractor achieves sufficient grass growth (per SW3P Requirements). If erosion results on existing highway sections, maintenance is left to deal with the resulting problem. Since compost costs are comparable to topsoil, we believe that by adding organic matter in the form of compost, poor soils can be amended, revegetation can occur, erosion is avoided and TxDOT saves time and money.

TxDOT can benefit greatly by helping to increase the awareness and acceptance of compost for use on highway right-of-way. By promoting the use of compost, TxDOT can realize the following:

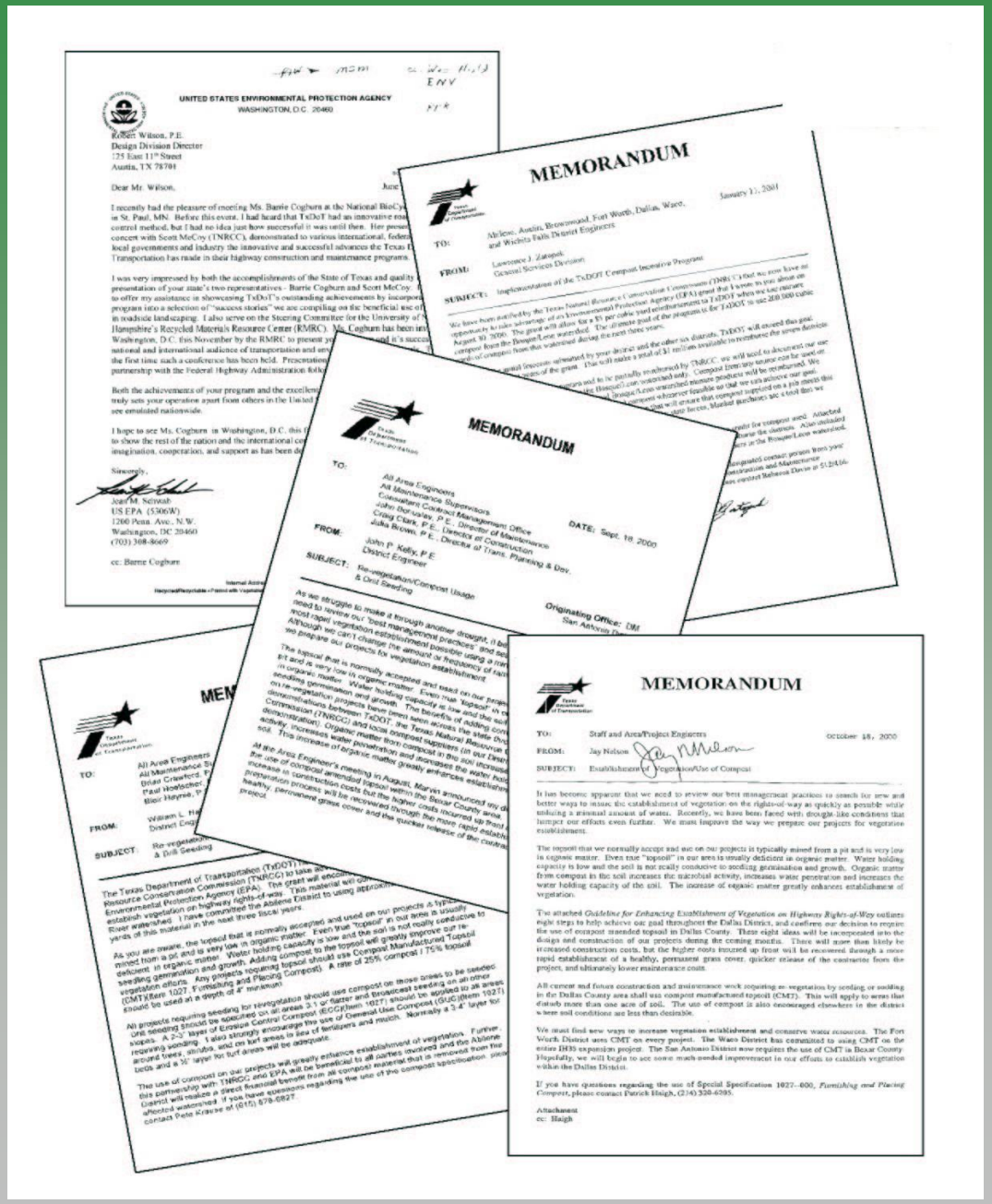
- an effective erosion control solution
- a savings of construction expenditures due to quicker vegetation establishment
- a savings of future maintenance expenditures due to erosion avoidance
- the opportunity for our agency to be seen as a partner in the statewide waste reduction effort.

We hope the information provided here will open up additional design options for your projects. This site will be updated periodically to keep it as current as possible. Should you decide to include Special Specifications 1027or 1034 in your roadway design, please feel free to contact the Landscape Design Section for assistance and the most up to date information.

Compost Information on the TxDOT Website

1 of 2 4/18/02 8:54 AM

Repeated contact with contractors and compost producers …



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Robert Wilson, P.E.
Design Division Director
125 East 11th Street
Austin, TX 78701

Dear Mr. Wilson,

Sincerely,
Joan M. Schwab
US EPA (5306W)
1200 Penn. Ave., N.W.
Washington, DC 20460
(703) 308-8669

cc: Barrie Coghurn

MEMORANDUM

TO: All Area Engineers
All Maintenance Supervisors
Consultant Contract Management Office
John Barnhart, P.E., Director of Maintenance
Craig Clark, P.E., Director of Construction
Julka Brown, P.E., Director of Trans. Planning & Dev.

FROM: John P. Kelly, P.E.
District Engineer

DATE: Sept. 18, 2000

SUBJECT: Re-vegetation/Compost Usage & Drill Seeding

Originating Office: DM

MEMORANDUM

TO: Staff and Area/Project Engineers

FROM: Jay Nelson

SUBJECT: Establishment of Vegetation/Use of Compost

October 18, 2000

It has become apparent that we need to review our best management practices to search for new and better ways to insure the establishment of vegetation on the rights-of-way as quickly as possible while utilizing a minimal amount of water. Recently, we have been faced with drought-like conditions that hamper our efforts even further. We must improve the way we prepare our projects for vegetation establishment.

The topsoil that we normally accept and use on our projects is typically mined from a pit and is very low in organic matter. Even true "topsoil" in our area is usually deficient in organic matter. Water holding capacity is low and the soil is not really conducive to seeding germination and growth. Organic matter from compost in the soil increases the microbial activity, increases water penetration and increases the water holding capacity of the soil. The increase of organic matter greatly enhances establishment of vegetation.

The attached *Guideline for Enhancing Establishment of Vegetation on Highway Rights-of-Way* outlines eight steps to help achieve our goal throughout the Dallas District, and confirms our decision to require the use of compost amended topsoil in Dallas County. These eight ideas will be incorporated into the design and construction of our projects during the coming months. There will more than likely be increased construction costs, but the higher costs incurred up front will be recovered through a more rapid establishment of a healthy, permanent grass cover, quicker release of the contractor from the project, and ultimately lower maintenance costs.

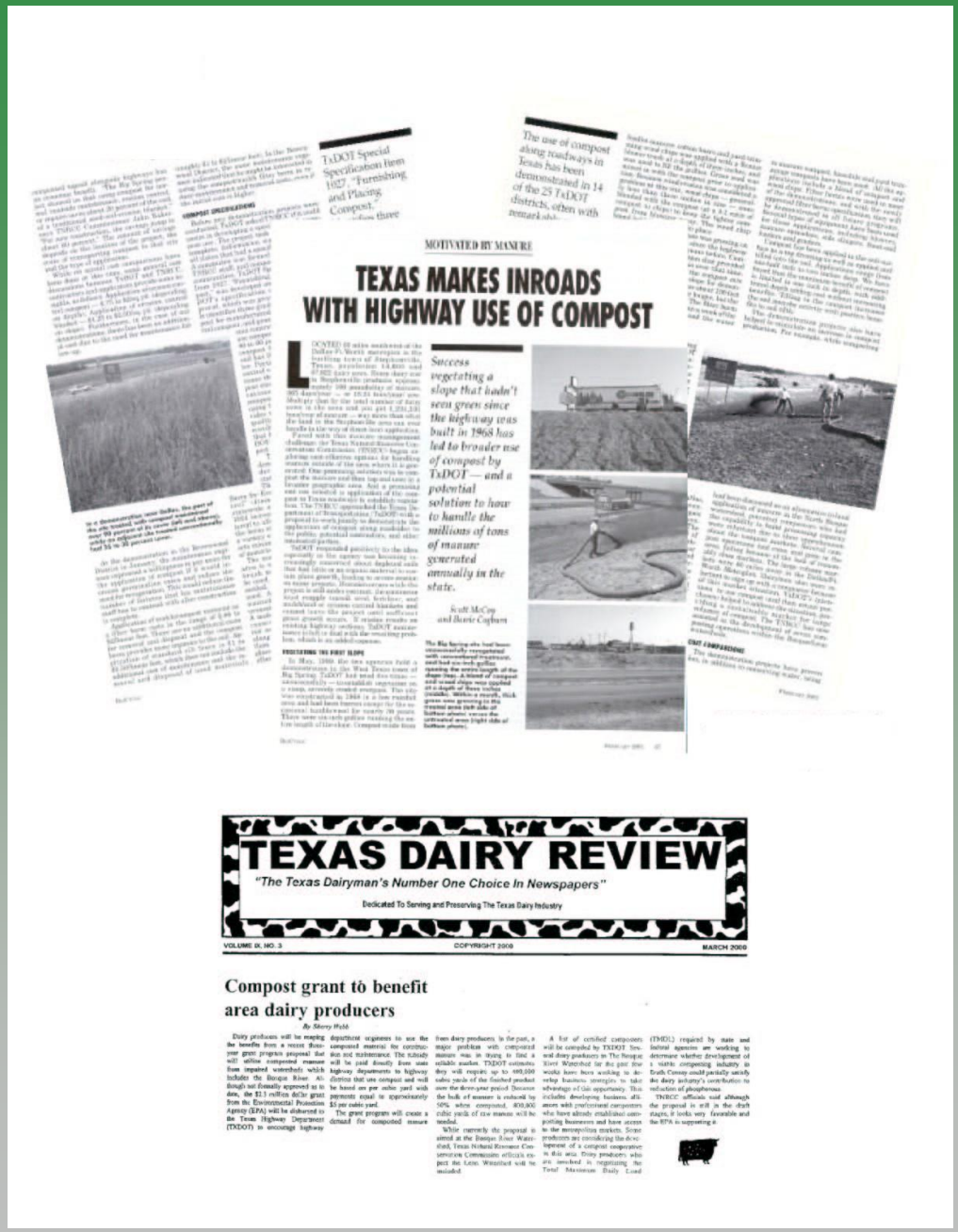
All current and future construction and maintenance work requiring re-vegetation by seeding or sodding in the Dallas County area shall use compost manufactured topsoil (CMT). This will apply to areas that disturb more than one acre of soil. The use of compost is also encouraged elsewhere in the district where soil conditions are less than desirable.

We must find new ways to increase vegetation establishment and conserve water resources. The Fort Worth District uses CMT on every project. The Waco District has committed to using CMT on the entire IH35 expansion project. The San Antonio District now requires the use of CMT in Bexar County. Hopefully, we will begin to see some much needed improvement in our efforts to establish vegetation within the Dallas District.

If you have questions regarding the use of Special Specification 1027-000, *Furnishing and Placing Compost*, please contact Patrick Haigh, (214) 320-6095.

Attachment
cc: Haigh

Support letters from EPA and TxDOT District Engineers …



TxDOT Special Specification Item 1027 "Furnishing and Placing Compost."

The use of compost along roadways in Texas has been demonstrated in 14 of the 25 TxDOT districts, often with remark-

MOTIVATED BY MANURE

TEXAS MAKES INROADS WITH HIGHWAY USE OF COMPOST

Success vegetating a slope that hadn't seen green since the highway was built in 1968 has led to broader use of compost by TxDOT — and a potential solution to how to handle the millions of tons of manure generated annually in the state.

Scott McCoy and Barrie Cupkan

TEXAS DAIRY REVIEW

"The Texas Dairyman's Number One Choice In Newspapers"

Dedicated To Serving and Preserving The Texas Dairy Industry

VOLUME IX, NO. 3 COPYRIGHT 2000 MARCH 2000

Compost grant to benefit area dairy producers

By Sherry Webb

Dairy producers will be reaping the benefits from a recent three-year grant program proposal that will utilize composted manure from impaired watersheds which includes the Bosque River. Although not formally approved as to date, the $2.5 million dollar grant from the Environmental Protection Agency (EPA) will be disbursed to the Texas Highway Department (TXDOT) to encourage highway department engineers to use the composted material for construction and maintenance. The subsidy will be paid directly from state highway departments to highway districts that use compost and will be based on per cubic yard with payments equal to approximately $5 per cubic yard.

The grant program will create a demand for composted manure from dairy producers. In the past, a major problem with composted manure was in trying to find a reliable market. TXDOT estimates they will require up to 600,000 cubic yards of the finished product over the three-year period. Because the bulk of manure is reduced by 50% when composted, 400,000 cubic yards of raw manure will be needed.

While currently the proposal is aimed at the Bosque River Watershed, Texas Natural Resource Conservation Commission officials expect the Lake Waxahachie will be included.

A list of certified composters will be compiled by TXDOT Several dairy producers in The Bosque River Watershed for the past few weeks have been working to develop business strategies to take advantage of this opportunity. This includes developing business affiliations with professional composters who have already established composting businesses and have access to the metropolitan markets. Some producers are considering the development of a compost cooperative in this area. Dairy producers who are involved in negotiating the Total Maximum Daily Load (TMDL) required by state and federal agencies are working to determine whether development of a viable composting industry in Erath County could partially satisfy the dairy industry's contribution to reduction of phosphorous.

TNRCC officials said although the proposal is still in the draft stages, it looks very favorable and the EPA is supporting it.

Trade Publication Articles

Why TxDOT Uses Compost

- Improves poor quality topsoil
- Establishes vegetation
- Avoids erosion

Compost Helps to Re-establish Vegetation

- Returns organic matter to the soil
- Adds moisture to the seedbed
- Changes the structure of the soil

Acceptable Feedstocks for TxDOT Compost

- leaves and yard trimmings
- food scraps
- food processing residues
- manure
- Class A biosolids


POWERSCREEN

Compost **IS NOT:**
raw sewage sludge or manure

Compost **IS:**
a pasteurized, pathogen free, organic soil amendment

US COMPOSTING COUNCIL

Seal of Testing Assurance

TCEQ

Texas Department of Transportation

Types of Composts Utilized by TxDOT

ITEM 161
COMPOST

161.1 Description. Furnish and place compost as shown on the plans.

161.2 Materials. Furnish compost that has been produced by aerobic (biological) decomposition of organic matter and meets the requirements of Table 1. Compost feedstock may include, but is not limited to, leaves and yard trimmings, biosolids, food scraps, food-processing residuals, manure or other agricultural residuals, forest residues, bark, and paper. Ensure compost and wood chips do not contain any visible refuse, other physical contaminants, or any substance considered harmful to plant growth. Do not use materials that have been treated with chemical preservatives as a compost feedstock or as wood chips. Do not use mixed municipal solid waste compost. Provide compost meeting all applicable 40 CFR 503 standards for Class A biosolids and TCEQ health and safety regulations as defined in the TAC, Chapter 332, including the time and temperature standards in Subchapter B, Part 23. Meet the requirements of the United States Composting Council (USCC) Seal of Testing Assurance (STA) program.

Before delivery of the compost, provide quality control (QC) documentation that includes the following:

- the feedstock by percentage in the final compost product,
- a statement that the compost meets federal and state health and safety regulations,
- a statement that the composting process has met time and temperature requirements,
- a copy of the producer's STA certification, and
- a copy of the lab analysis, performed by an STA-certified lab, verifying that the compost meets the requirements of Table 1.

Table 1
Physical Requirements for Compost

Property	Test Method	Requirement
Particle Size	TMECC[1] 02.02-B, "Sample Sieving for Aggregate Size Classification"	95% passing 5/8 in. 70% passing 3/8 in.
Heavy Metals Content	TMECC 04.06, **"**Heavy Metals and Hazardous Elements": 04.06-As, Arsenic 04.06-Cd, Cadmium 04.06-Cu, Copper 04.06-Pb, Lead 04.06-Hg, Mercury 04.06-Mo, Molybdenum 04.06-Ni, Nickel 04.06-Se, Selenium 04.06-Zn, Zinc	Pass
Soluble Salts	TMECC 04.10-A, "1:5 Slurry Method, Mass Basis"	5.0 dS/m maximum[2]
pH	TMECC 04.11-A, "1:5 Slurry pH"	5.5–8.5
Maturity	TMECC 05.05-A, "Germination and Root Elongation"	> 80%
Organic Matter Content	TMECC 05.07-A, "Loss-On-Ignition Organic Matter Method"	25–65% (dry mass)
Stability	TMECC 05.08-B, "Carbon Dioxide Evolution Rate"	8 or below
Fecal Coliform	TMECC 07.01-B, "Fecal Coliforms"	Pass

1. "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the USCC.
2. A soluble salt content up to 10.0 dS/m for compost used in compost manufactured topsoil will be acceptable.

Provide a designated project stockpile of unblended compost for sampling and testing at the producer's site. The Department will take samples from each stockpile for quality assurance (QA). Make payment to the STA-certified lab chosen by the Department for the required QA testing. Submit lab invoices for passing QA tests to the Department for reimbursement.

Maintain compost in designated stockpiles at the producer's site until accepted by the Engineer. The Engineer reserves the right to sample compost at the jobsite.

US COMPOSTING COUNCIL

Seal of Testing Assurance

Composter
Sample Report
Address
Texarkana
TX 75504-2008

Product Identification: Compost

Date Sampled/Received: 04 Nov. 02 / 05 Nov. 02

Distribution Pile D-22

COMPOST TECHNICAL DATA SHEET for Texas DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 *tel:* 831.724.5422 *fax:* 831.724.3188

Compost Parameters	*Test Results*	*Reported as (units of measure)*	*TMECC Test Method*
Organic Matter Content	45.8	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
pH	6.28	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	2.98	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Particle Size	97.0 94.9	%, dry weight passing through 5/8th inch screen and 3/8th inch screen	02.02-B Sample Sieving for Aggregate Size Classification
Stability Indicator (respirometry) CO_2 Evolution	0.43	mg CO_2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate
Maturity Indicator (bioassay) Percent Emergence	100	average % of control	05.05-A Germination and vigor Evolution rate
Relative Seedling Vigor	100	average % of control	05.05-A Germination and vigor
Select Pathogens (Fecal Cliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements

Laboratory Batch Number: Nov.-3-02 Laboratory Number: 167917112934

Analyst: Frank Shields

3 Ways to Specify Compost

1. Compost Manufactured Topsoil (CMT)
2. Erosion Control Compost (ECC)
3. General Use Compost (GUC)


CMT Blended In-Place
(1” compost over 3” existing soil)


CMT Blended In-Place
1” compost over 3” existing soil)

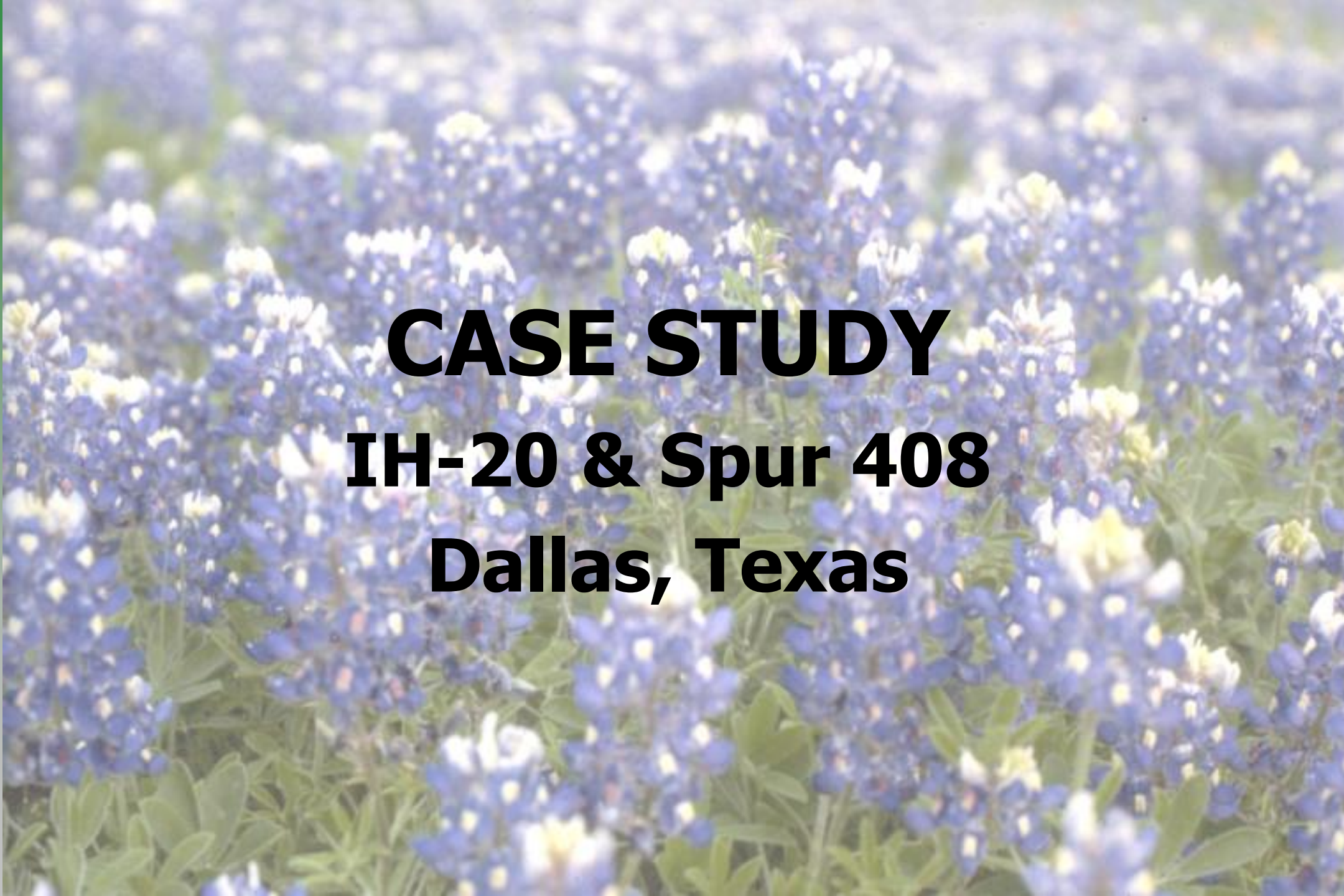
Erosion Control Compost

(½ compost, ½ wood chips)


Erosion Control Compost
(½ compost, ½ wood chips)
26 2001

General Use Compost

(100% compost)



CASE STUDY

IH-20 & Spur 408

Dallas, Texas

Dallas/Spur 408 Demonstration August 1999

Dallas/Spur 408 Demonstration August 1999

Dallas/Spur 408 Demonstration May 2000

CASE STUDY
Big Spring, Texas

Big Spring/IH 20 Demonstration May 1999

Big Spring/IH 20 Demonstration May 1999

Big Spring/IH 20 Demonstration May 1999

Big Spring/IH 20 Demonstration May 1999

Big Spring/IH 20 Demonstration July 1999

Big Spring/IH 20 Demonstration July 1999

CASE STUDY
Floyd County, Texas

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Floyd County FM 689

Biodegradable Erosion Control Logs

Traditional Silt Fence

Installation Issues ????

Compost Filter Berm Demonstration

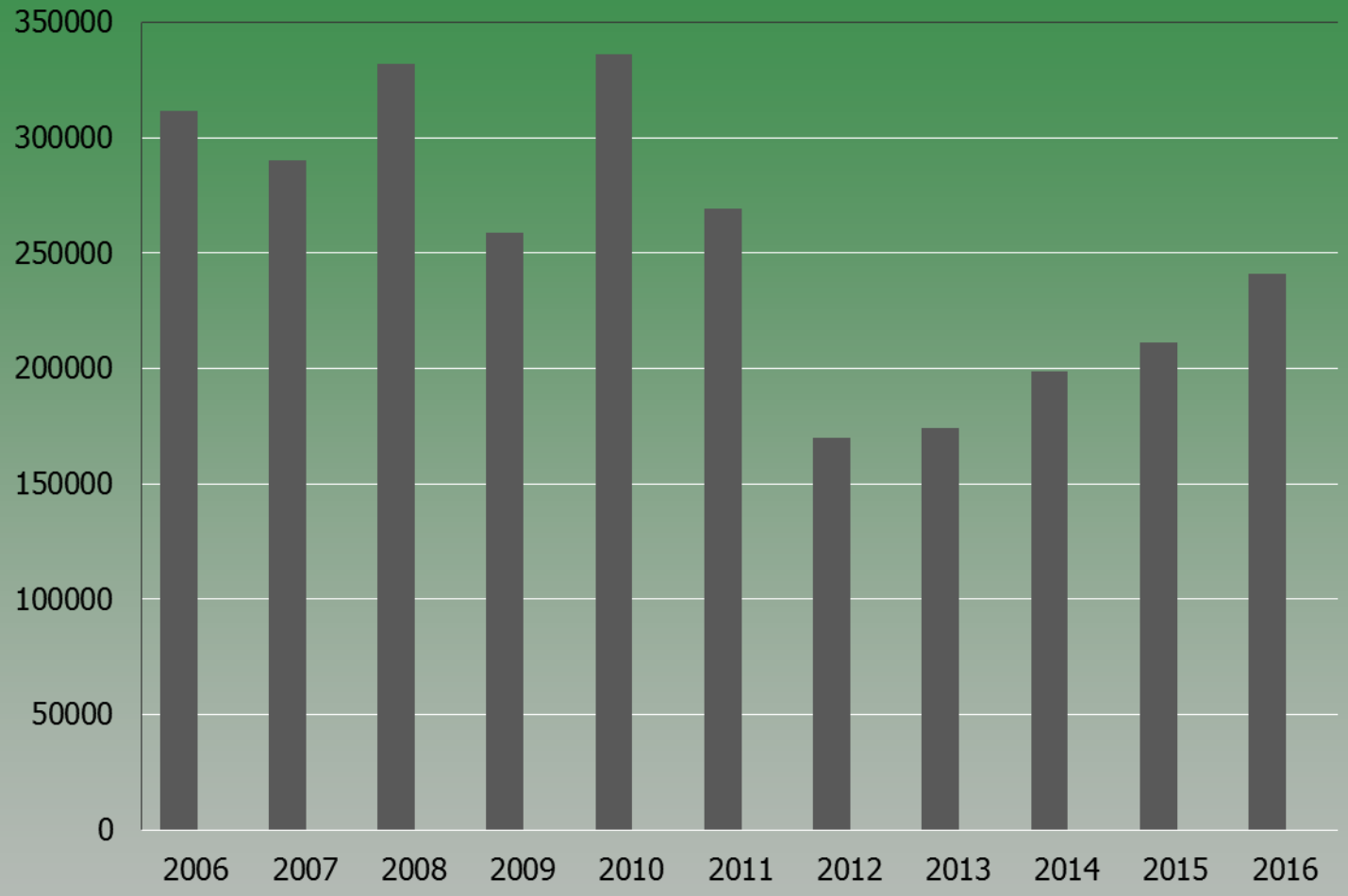
US HWY 281 Jan. 11th

Filter berm working during a rain event

Compost Filter Berm US HWY 281 Feb. 14th


OCT 30 2003


4:31PM



Cubic Yards of Compost Specified by TxDOT

TxDOT Compost Research

- ***The Use of Compost and Shredded Brush on Rights of Way for Erosion Control***
  1352 Texas Transportation Institute, January 1995

- ***A Review and Evaluation of Literature Pertaining to Compost Characteristics and to the Application of Compost Alone and Mixed with Different Soils***
  4403-1 Center For Transportation Research, July 2002

- ***Characteristics of Compost: Moisture Holding and Water Quality Improvement***
  4403-2 Center For Transportation Research, August 2003

- ***Water Quality Characteristics and Performance of Compost Filter Berms***
  4572 Texas Transportation Institute, April 2006

- ***The Effects of Using Compost as a Preventative Measure to Mitigate Shoulder Cracking: Laboratory Studies***
  4573 University of Texas at Arlington, October 2006

- ***Roadside Sediment Control Device Evaluation Program***
  5948 Texas Transportation Institute, ongoing

EPA United States Environmental Protection Agency

Stormwater Best Management Practice

Compost Blankets

Minimum Measure

Construction Site Stormwater Runoff Control

Subcategory

Erosion Control

Purpose and Description

A compost blanket is a layer of loosely applied composted material placed on the soil in disturbed areas to reduce stormwater runoff and erosion. This material fills in small rills and voids to limit channelized flow, provides a more permeable surface to facilitate stormwater infiltration, and promotes revegetation. Seeds can be mixed into the compost before it is applied. Composts are made from a variety of feedstocks, including yard trimmings, food residuals, separated municipal solid waste, and municipal sewage sludge (biosolids). Controlling erosion protects water quality in surface waters,

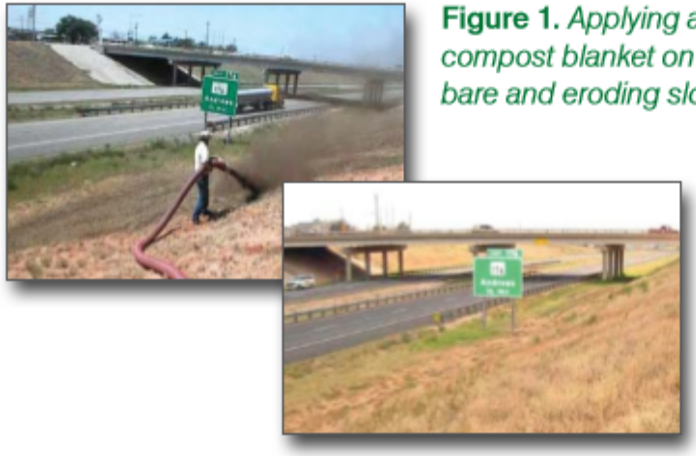
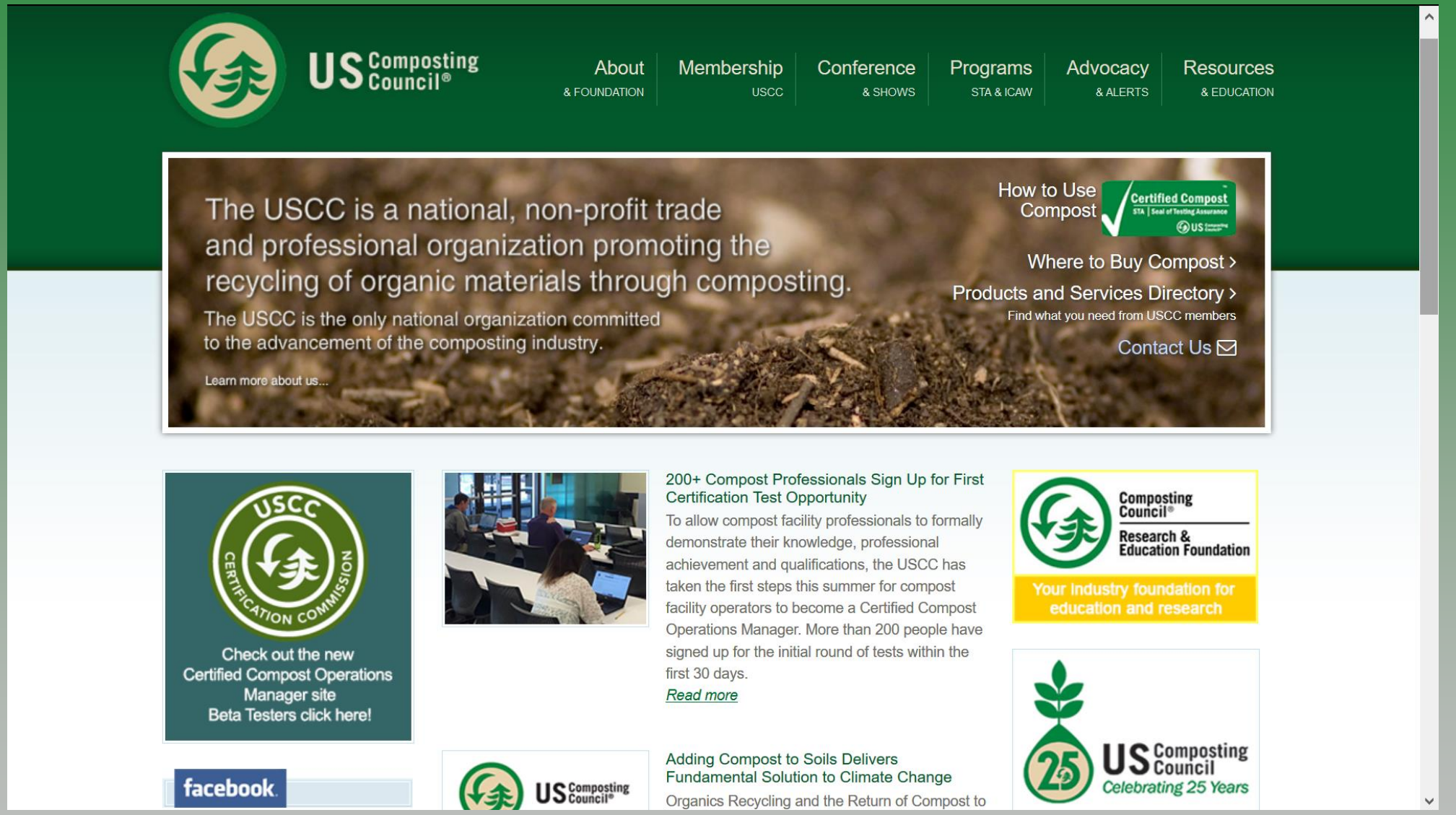


Figure 1. *Applying a compost blanket on a bare and eroding slope*

Figure 2. *Same slope after revegetation*

banks; where stormwater runoff can occur as sheet flow. On the steeper slopes (1:1) the compost blanket should be used in conjunction with netting or other confinement systems to further stabilize the compost and slope, or the compost particle size and depth should be specially designed for this application. Compost blankets should not be placed in locations that receive concentrated or channeled flows either as runoff or a point source discharge. If compost blankets are placed adjacent to highways and receive concentrated runoff from the traffic lanes,



USCC – Seal of Testing Assurance Program

Summary

- ✓ **Solves high-priority environmental challenges**
- ✓ **Provides self-sustaining market solutions**
- ✓ **Builds public/private and interagency partnerships**

Barrie Cogburn, RLA
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barriecogburn@gmail.com