



Soils, Vegetation, Erosion, Stormwater Runoff, & Compost

Greg Balzer
Office of Roadside Management
& Landscape Architecture Standards



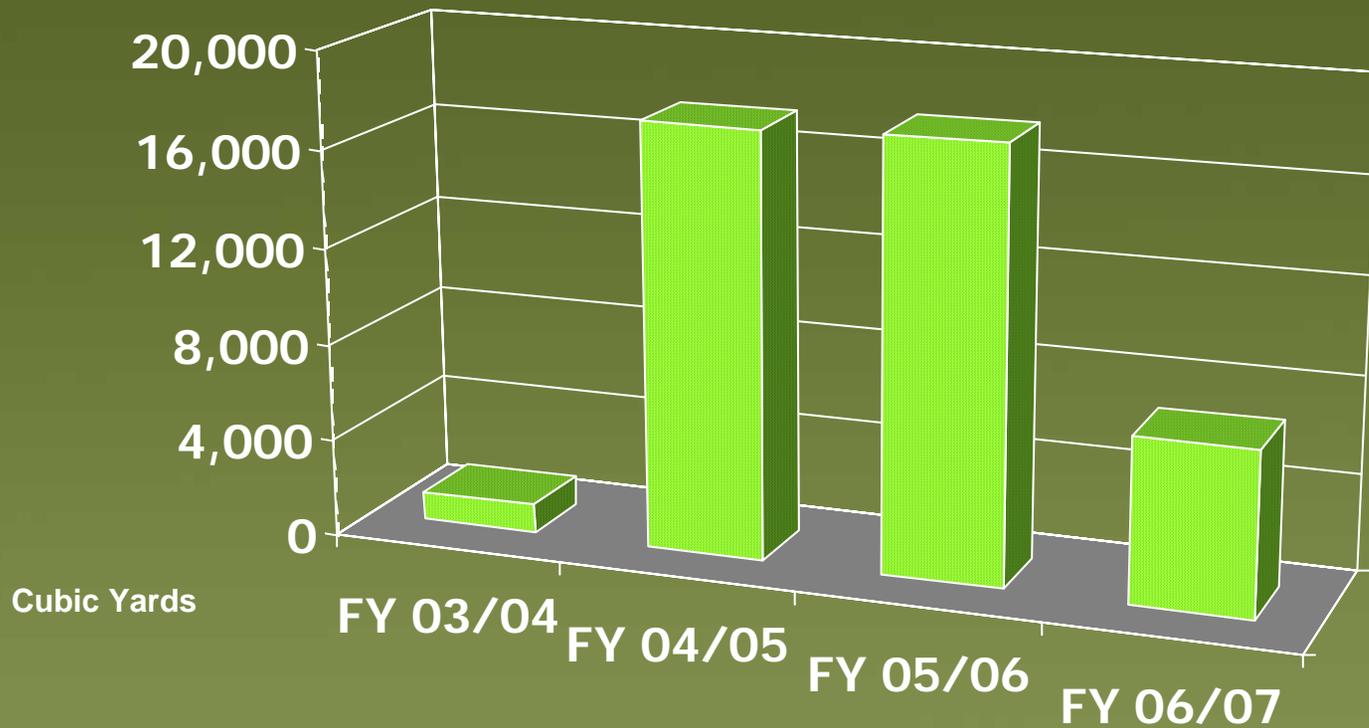
Compost Benefits

- Healthy Soils
- Healthy Vegetation
- Erosion Control
- Sediment Control

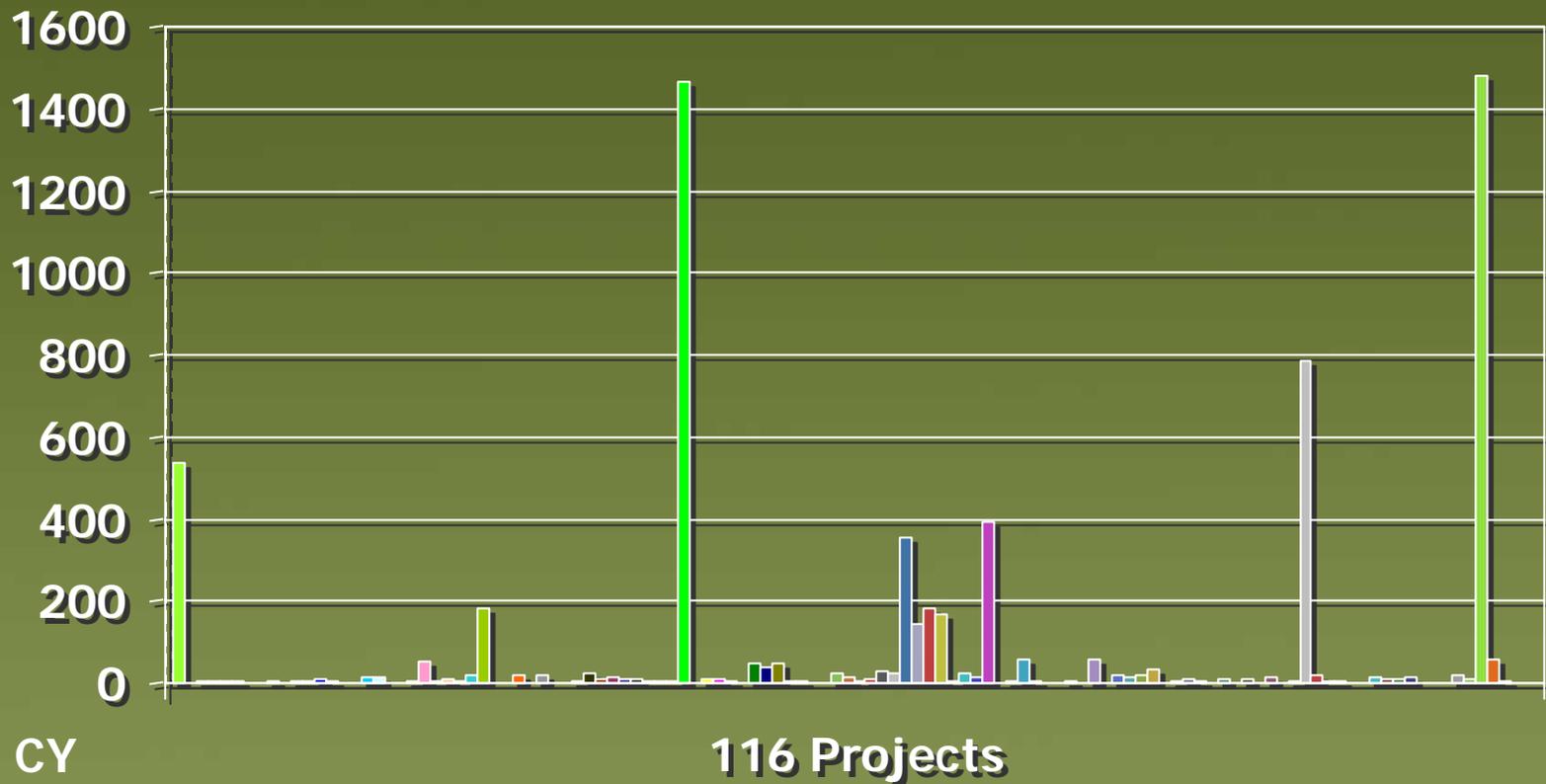


RECAP

Historic Compost Use



FY 06-07 Compost Use



Keys to Increased Use

- Cost
- Specs
- Training



Key: Reduce Cost

Cost



Key: Reduce Cost

Historic Weighted Average:

\$300/CY

Key: Reduce Cost

High Price Due To:

- Material Type
 - Bagged Compost (vs. Bulk)



Key: Reduce Cost

High Price Due To:

- Application Method
 - Hydroseed (vs. Blower Truck)



Key: Reduce Cost

- Specs Revised to Allow Bulk (As Well as Bagged) Materials

2. Compost may be dry applied at the total of the rates specified in the preceding table and the following table instead of including it as part of the hydro-seeding operations. In areas where the compost is dry applied, all compost for that area must be applied before the next operation.

Key: Reduce Cost

- New Specifications:
 - Erosion Control (Compost Blanket)
 - Compost (Incorporate)



Cost Recap



New Specs
(Bulk Material) =
Lower Costs

Key: Specifications

Specs



Standard Language

Compost Shall Comply
With the Following...

Producer Requirements

Compost Producer Shall be Fully Permitted Per:

- California Integrated Waste Management Board
- Local Enforcement Agencies
- Any Other State and Local Agencies That Regulate Solid Waste Facilities

Feedstocks

- Green Material
 - Chipped, Shredded, or Ground Vegetation
 - Clean, Processed, Recycled Wood Products
- Biosolids
- Manure
- Mixed Food Waste

Materials

- Shall be Composted to Reduce Weed Seed and Pathogens in Conformance with CA. Title 14, CCR, Div. 7, Ch. 3.1, Art. 7, Sec. 17868.3
 - Similar To US EPA Regulation 40 CFR, Part 503b

Standard Test Methods

USCC Seal of Testing Assurance (STA) Program:

- Regular Testing of Compost
- Standard Testing Methodologies
- Certified Labs

Quality Control

Old Spec Tests For:

- Maturity

Quality Control

New Spec Tests For:

- Maturity
- pH
- Soluble Salts
- Stability
- Pathogens
- Stability
- Phytotoxicity
- Particle Size
- Physical Contaminants
- Heavy Metals

Streamlined Submittals

Project Specifications

Physical/Chemical Requirements		
Property	Test Method	Requirement
pH	*TMECC 04.11-A, <u>Elastometric</u> pH 1:5 Slurry Method, pH Units	6.0-8.0
Soluble Salts	TMECC 04.10-A, Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A, Total Solids & Moisture at 70+/- 5 deg C, % Wet Weight Basis	N/A
Organic Matter Content	TMECC 05.07-A, Loss-On-Ignition Organic Matter Method (LOI), % Dry Weight Basis	30-65
Maturity	TMECC 05.05-A, Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B, Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	95% Passing 5/8 inch 70% Passing 3/8 inch
Pathogen	TMECC 07.01-B, Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B, Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Plastic, Glass and Metal, % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles), % > 4mm fraction	None Detected

*TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Data Sheet From Contractor

 US COMPOSTING COUNCIL <i>Seal of Testing Assurance</i>			
		Product Identification: Date Sampled/Received:	
COMPOST TECHNICAL DATA SHEET for Caltrans			
LABORATORY:			
Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test Method
pH		Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)		dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Moisture content		% dryweight basis	03.09-A - Total Solids and Moisture
Organic Matter Content		% dryweight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
Maturity Indicator (biassay) Percent Emergence Relative Seedling Vigor		average % of control average % of control	05.05-A Germination and vigor
Stability Indicator		mg CO ₂ -C/g OM/day	05.08-B Carbon Dioxide Evolution Rate
Particle Size		% dry weight passing through 9.5 mm	02.02-B Sample Sieving for Aggregate Size Classification
Pathogens		PASS/FAIL: Per US EPA Class A standard 40 CFR 503.32(a)	07.01-B Fecal coliforms
Pathogens		PASS/FAIL: Per US EPA Class A standard 40 CFR 503.32(a)	07.02 Salmonella
Physical Contaminants		% dryweight basis	02.02-C - Man-Made Inerts Total content
Physical Contaminants		% dryweight basis	02.02-C - Man-Made Inerts Sharps content

Key: Specifications

■ Planting Specifications

- Mulch
- Soil Amendment

■ Erosion Control Specifications

- Erosion Control (Type C & Type D)
- Erosion Control (Drill Seed)
- Erosion Control (Compost Blanket)
- Compost (Incorporate)



Planting Specifications

- Mulch
- Soil Amendment



Erosion Control (Type C/D)

- Erosion Control (Type C)
- Erosion Control (Type D)



Erosion Control (Type C/D)

- Erosion Control (Type C)
 - Seed, Fiber, Tack, Crimped Straw, Compost
- Erosion Control (Type D)
 - Seed, Fiber, Tack, Compost

Erosion Control (Type C/D)

Physical/Chemical Requirements		
Property	Test Method	Requirement
pH	*TMECC 04.11-A, Elastometric pH 1:5 Slurry Method, pH Units	6.0-8.0
Soluble Salts	TMECC 04.10-A, Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A, Total Solids & Moisture at 70+/- 5 deg C, % Wet Weight Basis	N/A
Organic Matter Content	TMECC 05.07-A, Loss-On-Ignition Organic Matter Method (LOI), % Dry Weight Basis	30-65
Maternity	TMECC 05.05-A, Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B, Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	95% Passing 5/8 inch 70% Passing 3/8 inch
Pathogen	TMECC 07.01-B, Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B, Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Plastic, Glass and Metal, % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles), % > 4mm fraction	None Detected

Erosion Control (Type C/D)



Erosion Control (Drill Seed)

- Erosion Control (Drill Seed)



$\leq 5:1$

Erosion Control (Drill Seed)

- 1" Compost Blanket
- Apply Seed via Drill Seeder
- Apply Tack via Hydroseed Rig

EC (Compost Blanket)

NEW! Erosion Control (Compost Blanket)

$\leq 3:1$?



EC (Compost Blanket)

- 1-2" Compost Blanket
- Seed Application Options:
 - a) Blower Truck (With Compost)
 - b) "Belly Grinder"
 - c) Separate Type D Application

EC (Compost Blanket)

Property	Test Method	Requirement
pH	*TMECC 04.11-A Elastometric pH 1:5 Slurry Method pH Units	6.0-8.0
Soluble Salts	TMECC 04.10-A Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A Total Solids & Moisture at 70+/- 5 deg C % Wet Weight Basis	30-60
Organic Matter Content	TMECC 05.07-A Loss-On-Ignition Organic Matter Method (LOI) % Dry Weight Basis	30-65
Maternity	TMECC 05.05-A Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	100% Passing, 3 inch 90-100% Passing, 1 inch 65-100% Passing, 3/4 inch 0 - 75% Passing, 1/4 inch Maximum length 6 inches
Pathogen	TMECC 07.01-B Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B Salmonella < 3 MPN/4 grams dry wt.	Pass

Compost (Incorporate)

NEW! Compost (Incorporate)

$\leq 3:1$



Compost (Incorporate)

- Apply 4" Compost
- Incorporate 12-18" in Depth
- Follow with Erosion Control (Type D) Application
 - Seed, Fiber, Tack

Compost (Incorporate)

Physical/Chemical Requirements		
Property	Test Method	Requirement
pH	*TMECC 04.11-A Elastometric pH 1:5 Slurry Method pH Units	6.0-8.0
Soluble Salts	TMECC 04.10-A Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A Total Solids & Moisture at 70+/- 5 deg C % Wet Weight Basis	30-60
Organic Matter Content	TMECC 05.07-A Loss-On-Ignition Organic Matter Method (LOI) % Dry Weight Basis	30-65
Maturity	TMECC 05.05-A Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	Inches % Passing 3 99% 3/8 < 25% Max. Length 4 inches
Pathogen	TMECC 07.01-B Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B Salmonella < 3 MPN/4 grams dry wt.	Pass

Key: Specifications

- Under Development
 - Erosion Control “(Type H)”
 - Compost Filter Strip
 - Compost Filter Berm

EC (Type H) Under Development

Compost Amendment, Incorporate, Jute,
Compost Mulch, Hydroseed



EC (Type H) Under Development

- Apply 1-4" Compost
- Incorporate (Trackwalk?)
- Add 2" Compost Blanket as Mulch
- Apply Jute Netting
- Hydroseed - Fiber, Seed and Tack

EC (Type H) Under Development

MAY Need to Use TWO Compost Mixes

	% Wet Weight Basis	
Organic Matter Content	TMECC 05.07-A Loss-On-Ignition Organic Matter Method (LOI) % Dry Weight Basis	30-65
Maturity	TMECC 05.05-A Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	Inches % Passing 3 99% 3/8 < 25% Max. Length 4 inches
Pathogen	TMECC 07.01-B Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B Salmonella < 3 MPN/4 grams dry wt.	Pass

Specs Recap



RECAP

- More Complete Testing
- Standard Test Methods
- Streamlined Submittals
- Improved Quality Control

Key: Training

Training



Recap

RECAP

- Cost
- Specs
- Training



Case Studies

Case
Studies

Cal Poly



Cal Poly



Cal Poly



Myers - Hwy 50



If a Little Compost is Good...



**Hwy 50 at Meyers
South Lake Tahoe**

3" Duff & Compost
Non-Incorporated



During Construction

If a Little Compost is Good...



Spring 2004

Hwy 50 at Meyers
South Lake Tahoe

3" Duff & Compost
Non-Incorporated



Spring 2006

Brockway Summit - Pla 267



More Compost is Better



2004 – Incorporate Compost

4" Duff & Compost
Incorporated 15-18 Inches

**Pla 267 at Brockway Summit
Lake Tahoe**



2004 – Finished Slope

More Compost is Better



**SR 267 at Brockway Summit
Lake Tahoe**

4" Duff & Compost
Incorporated 15-18 Inches



More Compost is Better

SR 267 at Brockway Summit
Lake Tahoe

Compost W/
Incorporation

Compost W/O
Incorporation



Caution:

- Test Soils
- Compost Blanket w/Biosolids - 1" Max
- 4:1 (H:V) Max - Incorporate Compost
- Coordinate w/Geotech



Benefits Recap



RECAP

- Healthy Soils
- Healthy Vegetation
- Erosion Control
- Stormwater Runoff

Get the Specs:

- http://www.dot.ca.gov/hq/LandArch/policy/compost_specs.htm
- Google "Compost Specs Caltrans"
- Contact: gregory_balzer@dot.ca.gov

The screenshot shows the Caltrans website page for "Compost Specifications". The page header includes the Caltrans logo, the text "CALIFORNIA DEPARTMENT OF TRANSPORTATION", and a search bar. The main navigation menu includes links for Home, Travel, Business, Engineering, News, Maps, Jobs, About Caltrans, and Contact Us. The breadcrumb trail reads: Caltrans > Landscape Architecture > Standards, Policy and Procedures > Compost Specifications. The page title is "Caltrans Compost Specifications". The main content area contains the following text: "According to California Integrated Waste Management Board (CIWMB), over 12,000,000 tons of compostable materials were landfilled in California in 2003. Not only does this practice consume valuable landfill space, this disposal of compostable organics misses out on the contribution compost brings to improving soil structure and fertility, improving infiltration, reducing runoff, promoting healthy vegetation, reducing erosion, and improving water quality." Below this, it states: "In 2005, the California Integrated Waste Management Board (CIWMB) partnered with Caltrans, the University of California Riverside (UCR) Extension, the Association of Compost Producers (ACP), the United States Compost Council (USCC), UC Cooperative Extension, Filtrex, and Soil Control Laboratories to identify and address the barriers preventing Caltrans from maximizing its use of compost. Working together, these various stakeholders developed a suite of compost specifications that resolved historic barriers to compost use including cost, availability and quality control. A series of six workshops were held statewide in 2006 to introduce these specifications to Caltrans designers and contractors, compost producers and other interested parties in city, county, or regional governmental agencies that might be interested." A section titled "2007 COMPOST WORKSHOPS" follows, with the text: "Caltrans and the California Integrated Waste Management Board (CIWMB) invite you to attend a series of workshops on managing storm water, controlling erosion, and improving roadside vegetation through compost-based BMPs. A series of workshops have been scheduled for the dates noted below. Click on the appropriate link below for a draft agenda." Below this text is a list of workshop dates and locations: "San Luis Obispo - August 21, 2007", "Chino - August 23, 2007", "Redding - September 25, 2007", and "Lake Tahoe - September 27, 2007". At the bottom of the page, it says: "To register for these workshops, please visit the following web page hosted by the Integrated Waste Management Board: <http://www.ciwmb.ca.gov/organics/Erosion/Workshops/2007/BMPCT/Default.htm>". The left sidebar contains a "TOPICS" section with links to: Highway Planting, Roadside Toolbox, Standards, Policy and Procedures, Scenic Highways, Roadside Rest Area System, Context Sensitive Solutions, Barrier Aesthetics, and Gateway Monuments.

Questions?



