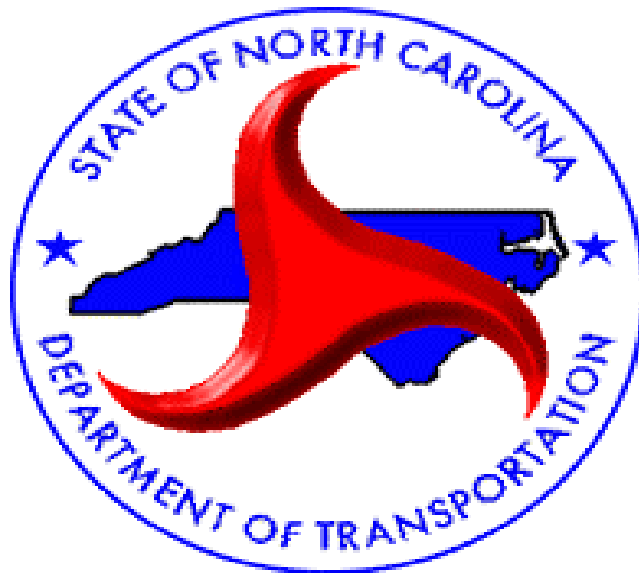


**CHAPTER 8 – Department of Transportation
NCDOT REDUCE/REUSE/RECYCLE Report**



**NCDOT
REDUCE/REUSE/RECYCLE
REPORT**

FISCAL YEAR 2007-2008



John L. Sharp
Environmental Specialist
General Service Division



NCDOT SECRETARY LYNDO TIPPETT,

"The environment is our most precious resource, and we must make every effort to protect it for future generations. As a public agency that touches the lives of both citizens and visitors throughout North Carolina, we play a large role in encouraging environmentally responsible practices such as waste reduction and recycling that will sustain the ecological health of our state."





STATE HIGHWAY ADMINISTRATOR W.F. "BILL" ROSSER, P.E.

As our Department redefines its mission statement –
"Connecting people and places in North Carolina safely and
efficiently with accountability and environmental sensitivity"
– we can reinforce our 3R Program (Reduce/Reuse/Recycle)
to help us uphold our commitment to our state.



N.C. DMV COMMISSIONER WILLIAM C. GORE JR.

One of DMV's key functions is working with the N.C. Division
of Air Quality and the U.S. Environmental Protection Agency to
reduce the pollutants coming from the vehicles we drive. We
take great pride in doing all we can to preserve the quality of
life for future North Carolinians.

NCDOT 3R Program Tree

Source Reduction
New Technology

Source Reduction
New Design

Source Reduction
Procurement

Reuse
Materials

Source Reduction
Planning

Reuse
Composting

Reuse
Items

Reuse
Waste Exchange

Reuse
Swap Shop Surplus

Recycle
Paper/Aluminum
Plastic/Cardboard

Recycle Purchasing
Buy Recycled Items

Benefits: • More Efficient Operation • Cost Savings • Environmental Sustainability • Compliance

Education on Waste Reduction and Recycling

Effective education is key to a successful waste reduction program.

As of 2007, NCDOT has the following measures in place:

- Top-down support for a recycling program;
- A lead coordinator for waste reduction and recycling efforts;
- WastEnders program;
- Waste reduction and recycling opportunities for visitors at its public facilities such as highway rest stops; and
- Ongoing educational and promotional programs for waste reduction and recycling.

A majority of the information was communicated and distributed electronically through e-mail and online.



Source Reduction of Waste/ Waste Prevention and Reuse



**NCDOT places source reduction of waste/
waste prevention and reuse at the top of
the hierarchy of preferred methods for
managing solid waste. Executive Order
156 requires state agencies to practice
waste reduction.**

The following are actions taken by NCDOT in 2007 to practice waste reduction:

- Most employees practiced at least one technique for reducing waste.
- 70 percent of NCDOT facilities took action to reduce office paper such as copy paper, letterhead, envelopes and packaging.

This was done through:

- Eliminating unnecessary reports and reducing report size;
- Eliminating unnecessary forms or converting to electronic format;
- Making fewer copies;
- Printing or copying documents on both sides of paper;
- Using electronic mail and voice mail; and
- Posting announcements on bulletin boards and in break areas.



Reuse - NCDOT Swap Shop/ Property Request



This is an expansion program of the NCDOT 3R Program that provides a formalized process, to all NCDOT employees, to review and exchange surplus items and materials within NCDOT state-wide before disposing of it through State Surplus Properties. This also provides a formalized process for any Department within NCDOT state-wide to communicate to all other Departments a need of an item (s) or material (s). To view item (s) that are in the process of being surplus or item (s) that are needed by other Departments go to our NCDOT web site using Internet Explorer <https://intranet.dot.state.nc.us/portal>.

Recycled Products & Solid Waste Utilization
in Construction & Maintenance Projects



Reused Materials 2007-2008	Quantity	Unit of Measure
Aggregate Base Course	2569.7	Tons
Concrete Pipe	1164	Linear Feet
Guardrail	15135	Linear Feet
Portable Concrete Barrier	770	Linear Feet
Sign Posts	1276	each
Signal Heads	80	each
Signs	1289	each
Steel Beams	93500	Pounds



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

**Recycling and Solid Waste Management Report
For Highway Construction and Maintenance Projects
Fiscal Year 2008**

This report is a summary of the recycling and solid waste management efforts on highway construction and maintenance projects within the North Carolina Department of Transportation for fiscal year 2008 (July 1, 2007 - June 30, 2008) as required by G.S. 136-28.8(g). This statute mandates the Department prepare an annual report on the amounts and types of recycled materials specified or used in construction and maintenance operations during the previous fiscal year. The types of recycled materials incorporated into the projects noted would normally contribute to the consumer and industrial waste streams, compounding the problem of declining space in landfills.

Efforts to utilize recycled and solid waste materials are in response to the requirements of G.S. 136-28.8(b) which mandates the Department to use recycled materials in highway construction projects, specifically:

- (1) Rubber from tires for pavements, subbase materials, and other appropriate applications.
- (2) Recycled materials for guardrail posts, right of way fence posts, and sign supports.
- (3) Recycling technology including but not limited to hot in-place recycling, in road and highway maintenance.

All applications of recycled materials are to be consistent with economic feasibility and applicable engineering and environmental quality standards.

Highway Construction and Maintenance Projects

Specifications now require that many products used on highway construction projects, such as guardrail offset blocks and flexible delineator posts, are manufactured using recycled materials. Glass beads used for retroreflective pavement markings are manufactured from 100% recycled glass. Reclaimed asphalt pavement (RAP) may constitute up to 50 percent of the total material used in most recycled mixtures and RAP mixtures are used on the majority of projects. Fly ash is used as a concrete component for up to 20% by weight of the required cement content. Some of the notable recycled or solid waste materials utilized this fiscal year are listed below.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
ALTERNATIVE DELIVERY UNIT
1595 MAIL SERVICE CENTER
RALEIGH NC 27699-1595

TELEPHONE: 919-250-4234
FAX: 919-212-5711

WEBSITE:
WWW.NCDOT.ORG/~ADU

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-1
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Recycling and Solid Waste Management Report
For Highway Construction and Maintenance Projects
Fiscal Year 2008

1. Over 860,000 tons of Reclaimed Asphalt Pavement (RAP) was used as an asphalt mix additive.
2. Clearing and grubbing debris was mulched and 67,500 cubic yards were used for erosion control and roadside environmental applications.
3. Twelve thousand tons of coal combustion fly ash was used in concrete mixes.
4. Approximately 7,500 tons of recycled glass beads were used in pavement markings.
5. One project started this fiscal year is contracted to utilize 500,000 waste scrap tires as embankment fill material.
6. Maintenance personnel across the state continue to reuse products including:
 - Aggregate Base Course
 - Concrete pipe
 - Guardrail
 - Signs and posts
 - Steel Beams

See Attachment 1 for quantities of recycled and solid waste materials used during the 2008 Fiscal Year. Attachment 2 summarizes total quantities from 1989 through June 30, 2008. This year for the first time the report includes current year quantities as well as a rolling average since 1989.

This next fiscal year we have received approval to incorporate the Department's annual commitment of one (1) million waste scrap tires in a project scheduled to be let in December 2008. This next year will also include investigating the feasibility of developing a new web-based application for entering and reporting recycled and solid waste materials used on projects. The goal will be to ease the burden of tracking materials in the field by offering user-friendly data entry options and provide multiple reporting capabilities.

Web site

For up-to-date information on NCDOT's use of recycled materials, visit <http://www.ncdot.org/~adu>

North Carolina Department of Transportation
Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects
 Summary, January 1989 through June 2008

Product Category and Description	Usage	Quantity	Unit of Measure
8-Roadside Environmental:			
Advanced Alkaline Sludge	Soil Amendment	495	Tons
Aged Leaf Mold & Yard Debris	Soil Amendment	2,370	Tons
Ammonium Sulfate Liquid	Fertilizer/Soil Amendment	420,948	Gallons
Bark Mulch	Soil Amendment	10,434	Tons
Bioremediated Petroleum Affected Soils	Soil Amendment	920	Cubic Yards
Cotton Gin Waste	Soil Amendment	7,130	Cubic Yards
Hog Waste Compost	Fertilizer/Soil Amendment	25	Cubic Yards
Hurricane Fran Mulch	Soil Amendment	200,000	Cubic Yards
Hydromulch	Mulch	82,160	Pounds
Lime-Stabilized Municipal Sludge	Soil Amendment	704	Tons
Municipal Sludge	Soil Amendment	8,610	Tons
Poultry Litter	Fertilizer/Soil Amendment	425	Tons
Soil Derived from Demolition Debris	Soil Amendment	1,742	Tons
9-Other:			
Steel Slag	Base Aggregate	224	Tons
Processed Silica	Embankment Fill	46,072	Cubic Yards
Recycled Polyester Resin	Weedmat	1,152	Square Yards
10-Reused Materials:			
Aggregate Base Course	Aggregate Base Course	20,799	Tons
Concrete Pipe	Concrete Pipe	5,830	Linear Feet
Guardrail	Guardrail	21,090	Linear Feet
Refurbished Traffic Signal Heads	Traffic Signal Heads	11	Each
Sign Posts	Sign Posts	1,276	Each
Signal Heads	Signal Heads	80	Each
Signs	Signs	1,289	Each
Silt Fence and Posts	Silt Fence and Posts	2,550	Linear Feet
Steel Beams	Steel Beams	173,500	Pounds
Double Faced Concrete Barrier	Concrete Barrier	8,041	Linear Feet
Wooden Breakaway Posts	Guardrail Offset Blocks	11,409	Each

North Carolina Department of Transportation
Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects
 Summary, January 1989 through June 2008

Product Category and Description	Usage	Quantity	Unit of Measure
1-Asphalt:			
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	3,530,724	Tons
Reclaimed Asphalt Pavement (RAP)	Aggregate Base Course (ABC)	23,508	Tons
Reclaimed Asphalt Pavement (RAP)	Shoulder Reconstruction	586	Cubic Yards
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	43,886	Tons
Hot-In-Place Asphalt Recycling	Pavement	1,714,394	Square Yards
Full-Depth Reclamation	Pavement	132,451	Cubic Yards
2-Clearing and Grubbing Debris:			
Mulch	Mulch	358	Acres
Mulch	Mulch - Roadside Environmental	30,360	Cubic Yards
Mulch	Erosion Control	37,502	Cubic Yards
3-Coal Combustion Products:			
Fly Ash	Concrete Mix Additive	61,959	Tons
Fly Ash	Embankment Fill	865,186	Cubic Yards
Fly Ash	Flowable Fill	630	Cubic Yards
Fly Ash	Asphalt Mix Additive	40,800	Tons
Bottom Ash	Embankment Fill	2,707	Cubic Yards
4-Concrete:			
Recycled Concrete	Aggregate Base Course (ABC)	4,229	Tons
Recycled Concrete	Fill Material	52,910	Tons
Crack and Seat	Base Material	260,778	Tons
Rubblized Concrete	Base Material	310,917	Tons
5-Glass:			
Recycled Glass Beads	Pavement Markings	63,773	Tons
Crushed Glass	Subdrain Backfill	130	Tons
Crushed Glass	Pipe Foundation	333	Tons
Crushed Glass	Aggregate Base	203	Tons
6-Plastic:			
Recycled Plastic Offset Blocks	Guardrail Offset Blocks	301,265	Each
Recycled Plastic Fence Posts (All Sizes)	Fence Posts	8,100	Each
Recycled Plastic Pipe (All Types and Sizes)	Pipe	56,718	Linear Feet
Recycled Plastic Flexible Delineators	Flexible Delineator Posts	4,663	Each
Recycled Plastic Barricades	Type III Barricades	2,091	Feet
Recycled Plastic Traffic Separators	Railroad Safety Device	2,922	Linear Feet
7-Scrap Tires:			
Chipped Tires	Embankment Fill	11,687,965	Tires
Chipped Tires	Lightweight Aggregate	50,739	Tires
Chipped Tires	Sound Wall Panels	8,000	Tires
Crumb Rubber	Crack Sealant	25	Tires
Crumb Rubber	Soil Amendment	2,000	Tires
Crumb Rubber	Asphalt Mix Additive	124,512	Tires
Rubber Mulch	Mulch	1,225	Tires
Tire Sidewalls	Traffic Drum Ballast	58,484	Tires
Whole Tires	Retaining Wall	2,500	Tires
Total Waste Scrap Tires		11,935,450	Tires

North Carolina Department of Transportation
Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects
 Fiscal Year July 1, 2007 - June 30, 2008

Product Category and Description	Usage	2007-2008 Quantity	1989-2008 Rolling Avg (Yr)	Unit of Measure
1-Asphalt:				
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	860,699	181,063	Tons
Reclaimed Asphalt Pavement (RAP)	Shoulder Reconstruction	586	30	Cubic Yards
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	9,024	2,251	Tons
Hot-In-Place Asphalt Recycling	Pavement	254,525	87,918	Square Yards
Full-Depth Reclamation	Pavement	132,451	6,792	Cubic Yards
2-Clearing and Grubbing Debris:				
Mulch	Mulch	331	18	Acres
Mulch	Mulch - Roadside Environmental	30,033	1,557	Cubic Yards
Mulch	Erosion Control	37,502	1,923	Cubic Yards
3-Coal Combustion Products:				
Fly Ash	Concrete Mix Additive	12,142	3,177	Tons
Fly Ash	Flowable Fill	504	32	Cubic Yards
4-Concrete:				
Recycled Concrete	Aggregate Base Course (ABC)	829	217	Tons
Recycled Concrete	Fill Material	461	2,713	Tons
5-Glass:				
Recycled Glass Beads	Pavement Markings	7,500	3,270	Tons
6-Plastic:				
Recycled Plastic Offset Blocks	Guardrail Offset Blocks	18,641	15,449	Each
Recycled Plastic Fence Posts (All Sizes)	Fence Posts	500	415	Each
Recycled Plastic Pipe (All Types and Sizes)	Pipe	7,655	2,909	Linear Feet
Recycled Plastic Flexible Delineators	Flexible Delineators	302	239	Each
7-Scrap Tires:				
Chipped Tires	Embankment Fill	500,310	599,383	Tires
Chipped Tires	Lightweight Aggregate	3,528	2,602	Tires
Rubber Mulch	Mulch	425	63	Tires
Tire Sidewalls	Traffic Drum Ballast	1,737	2,999	Tires
Total Waste Scrap Tires		505,999	612,074	Tires
8-Roadside Environmental:				
Hydromulch (from recycled newspaper)	Mulch	6,160	4,213	Pounds
9-Other:				

The NCDOT Division of Highways has embraced recycling throughout North Carolina.



The growth of recycling programs throughout NCDOT reflects employees' commitment to conserving resources, saving on operating costs and transforming waste materials into useable resources.

Recycling provides NCDOT and North Carolina with several major benefits:

- Conserves natural resources and landfill space;
- Conserves energy and water;
- Reduces pollution; and
- Creates jobs and reduces costs in manufacturing sectors that are an important part of the economy.

In 2007-2008, NCDOT recycled 1,045 tons of paper such as office papers, telephone books and cardboard.

NCDOT has embraced recycling throughout North Carolina.

The growth in recycling programs throughout NCDOT reflects the common-sense instinct of its employees to conserve resources and save on operating costs in their own backyard. Transforming waste materials into useable resources provides NCDOT and the state with several major benefits:

- Conserves energy and water;
- Conserves natural resources and landfill space;
- Programs can be cost-competitive with solid waste land fill disposal and incineration;
- Reduces pollution; and
- Creates jobs and reduces costs in manufacturing sectors that are an important part of the economy.



NCDOT 2007–2008 Paper Recycling Program Environmental Impact

- 7,315,000 gallons of water saved
- 4,180,000 kilowatt hours of energy saved
- 397,100 gallons of oil saved
- 3,135 cubic yards of landfill space saved
- 17,765 trees saved

In 2007-2008, NCDOT recycled 15.1 tons of plastic such as jugs, buckets and bottles.



NCDOT Rest Areas make recycling opportunities easy for the general public.



In 2007-2008, NCDOT recycled 1,201,230 tons of oil, tires and asphalt.



In 2007-2008, NCDOT recycled 17,164 tons of organic material such as yard waste and wood mulch.



In 2007-2008, NCDOT recycled 123.8 tons of electronics such as computers, monitors and printers.



NCDOT also recycled 3229 tons of metal such as highway signs and scrap metal that same year.



NCDOT Rail, Ferry and Aviation Divisions



The NCDOT Rail Division leads the way among alternative modes in reuse and recycling of materials. Rail Division reuse programs provided thousands of dollars in cost savings.



Reuse and Recycle programs in the Ferry and Aviation divisions keep their waste stream to a minimum.

NCDOT Solid Waste Disposal and Cost Information July 1, 2007 - June 30, 2008

SOLID WASTE DISPOSAL AND COST INFORMATION

1. Total tons of solid waste disposed of in land fills or by incineration
41,729
2. Total costs for solid waste collection and disposal
\$ 1,502,238
3. Total tons recycled or composted
1,222,707
4. Total solid waste collection and disposal costs avoided through recycling and composting
\$ 24,454,140
5. Total revenues from sale of recycled materials and compost products
\$ 107,615

NCDOT's focus on waste management over the past year has moved towards implementing and educating employees on source reduction, reuse, and recycle practices. These practices have resulted in a significant reduction in our waste stream and a large increase in recycling numbers reported.

- **Completing the 2008 NCDOT Business Plan. This plan incorporated two major goals:**
 - Reducing waste stream by 5 percent; and
 - Increasing recycling by 10 percent.
- **Increasing specifications to allow more reuse of asphalt, hot in-place recycling and Highway Construction and Materials System (HiCAMS) reporting.**
- **Eliminating mass printing of several manuals, documents and forms by placing them online for customers and employees.**