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Executive Summary

In response to the Waste Tire Management and Recycling Act of 2003, the Geotechnical Engineering Bureau (GEB) of the NYSDOT implemented and executed an initiative to beneficially use tires in civil engineering applications, namely, as a replacement for embankment fill. To do this, the GEB developed specifications for tire shred delivery and placement, material specifications and requirements, new material QA procedures, new test methods, design details, and guidance for project selection. GEB personnel selected candidate projects, developed a training and certification course for inspectors, conducted training, installed water monitoring wells, took samples for water quality testing, performed numerous QA tests and site inspections both at the tire shredding contract sites and at the DOT project sites, and provided on site technical support. Between 2004 and 2008, the Department achieved the following:

- Number of inspectors trained and certified: 81
- Number of projects that beneficially used tire shreds: 6 (Regions 1, 7, 8 jointly with the Thruway, 9, and two projects in Region 5)
- Number of tires beneficially used as fill material: 5.6 million
- Number of tire shred inspection forms reviewed for QA on the inspectors: well over 1,000
- Numbers of participating Regions: 5

Background and Purpose of the Tire Shred Initiative

The Tire Shred Initiative is a New York State Department of Transportation (NYSDOT) effort to help the New York State Department of Environmental Conservation (DEC) clean up waste tire piles across the state by providing a beneficial end use of the tire waste as a replacement for embankment fill.

In New York State, there is an ever increasing demand to recycle or reuse more and more consumer waste products. State agencies such as the Department of Environmental Conservation and the Empire State Development Corporation (ESD) are responsible for meeting this demand as expeditiously as possible while striking a balance between communal good and economic reality.

Discarded tires are, perhaps, one of the more obvious and onerous consumer waste products. Prior to 2003, there was an estimated 40 million stockpiled tires in New York State. Each year, another 18 million tires (or, one discarded tire for every New Yorker) was added to these discard piles.

The GEB recognized this problem early. On August 14, 1997, GEB and other Department personnel attended a day-long seminar on the use of shredded tires as fill material, presented by Dr. Dana Humphrey of the University of Maine, Orono. The Geotechnical Engineering Bureau then began the process of selecting a pilot project to try tire shreds. On March 1, 1998, the GEB issued “Guidelines For The Use Of Tire Shreds In Embankment Construction”. This document was based on the findings of the FHWA
and Dr. Humphrey (and has since been superseded by GEB manuals GEM-20 – Guidelines For Project Selection, Design and Construction of Tire Shreds in Embankments, and GCP-19 - Sampling and Testing Tire Shreds). Its purpose was to provide construction guidance so as to avoid internal heating problems experienced on earlier tire shred projects in other parts of the country.

In 1999, DOT's Region 9 Office began construction of an embankment that included a prototype section of shredded waste tires. The goal of this strategy was to reuse old tires to benefit the environment as well as the economy, to develop new construction technologies and to experiment with new construction materials.

The 200-meter (650 feet) long prototype embankment section, which was designed by the GEB, is part of a larger embankment for a new exit ramp on a $30,000,000 project to reconstruct six miles of Route 17 between Five Mile Point and Oceanum in Broome County.

In cross-section, DOT's contractor placed a layer of Geotextile - Slope Protection on natural ground. Tire shreds were provided, placed and compacted according to specification, up to a maximum height of 3 meters (10 feet).

The contractor then wrapped the tire shreds in geotextile material; completely covered the wrapped tire shred with 1.5 meters (5 feet) of embankment fill; and surcharged with an additional 1.25 to 2.5 meters (4 to 8 feet) of embankment fill. DOT required the contractor to keep the surcharge in place for a specified waiting period to allow the settlement (due to compression) of the tire shreds. When the tire shred had settled, the surcharge was removed to the subgrade surface elevation and exit ramp was then paved. In all, 2,500 metric tons (2,700 tons) of tire shreds, representing more than 265,000 scrap tires were used. DOT obtained all of the tires used in this prototype embankment section from New York State sources, shredded at the Cycletex facility.

This pilot project was an excellent example of how the New York State Department of Transportation partnered with Empire State Development and the Department of Environmental Conservation to investigate beneficial uses for scrap tires. For it, the three agencies developed a program of monetary incentives for DOT's contractor to eliminate selected tire stockpiles in New York State. DOT designed the embankment section and
had it built. DEC identified waste stockpile sites; verified their remediation; and released funds to DOT’s contractor after verifying the remediation. ESD provided up to $500,000 for the incentive payments to entice the contractor to remediate the waste tire sites identified by DEC.

On July 1, 2000, having proven that we could successfully design and construct a tire shred embankment, Technical Services Division Director Paul Mack established a goal to use up to 1 million waste tires per year in embankment construction. He felt strongly that DOT, as a responsible State agency, had a responsibility to help solve the waste tire stockpile problem.

To minimize the additional financial burden to the Department, the GEB restricted the use of tire shreds to only those applications that took advantage of the engineering properties of shreds (light weight, high permeability), which minimized the cost differential with traditional materials. We met with DEC to discuss the goal. DEC was positive about this initiative, but was unable to supply the tire shreds in accordance with our requirements, because:

- They had no money to fund a tire shredding contractor in the first instance. DOT would have had to transfer funds, or another funding source would need to be found.
- DEC expected to not be able to provide project inspection and management staff for the shredding contract.
- DEC also did not have the money for their engineering costs associated with administering the contract.

As a result of these limitations, DEC approached DOT about DOT cleaning up waste tire sites with their own contractors. DOT declined due to the legal and environmental entanglements sure to occur, and for which DOT is poorly prepared. That function clearly belonged to DEC. Because of these issues, DEC did not follow through, and the goal of using 1 million tires per year was never implemented.


In 2003, the “Waste Tire Management and Recycling Act” was enacted to ensure the proper management of waste tires in New York State. The Act added Title 19 to Article 27 of the Environmental Conservation Law. Title 19 includes provisions that require the following:

1. Establishment of waste tire management priorities for New York State:
   a. First, to reduce the number of waste tires generated;
   b. Second, to remediate waste tire stockpiles in noncompliance;
   c. Third, to recycle waste tires into value-added products;
   d. Fourth, to beneficially use waste tires in an environmentally acceptable manner, including the beneficial use in civil engineering applications, and;
e. Fifth, to recover, in an environmentally acceptable manner consistent with the purpose of this chapter, energy from waste tires that cannot be economically recycled or otherwise beneficially used.

2. Establishment of the Waste Tire Management and Recycling Fund and enactment of a waste tire management and recycling fee of $2.50 per new tire sold, including tires on new motor vehicles. Tire services must collect the waste tire management and recycling fee from the purchaser at the time of the sale and remit such fee to the Department of Tax and Finance. The tire service shall be entitled to retain an allowance of 25 cents per tire from fees collected. The fee is mandated from the effective date until December 31, 2010.

3. Mandatory acceptance of used tires from customers by tire service centers until December 31, 2010. Customers may return tires in approximately the same size and in a quantity equal to the number of new tires purchased or installed. Sign posting requirements are also included for tire service centers.

4. Preparation, by the DEC, of a comprehensive plan designed to abate all noncompliant waste tire stockpiles by December 31, 2010. This plan is required to establish a priority list and schedule for abatement of each noncompliant waste tire stockpile based on potential adverse impacts on public health, safety or welfare, the environment, or natural resources. The plan must also include a census of compliant and noncompliant waste tire stockpiles in New York State and the number of waste tires believed to be stored at each site. The plan is to be submitted to the Governor and the Legislature by September 12, 2004. The Act provides the DEC with authority to enter all noncompliant waste tire stockpiles for the purpose of investigation and abatement.

5. Publication, by the DEC, or requests for proposals by September 12, 2005 seeking contractors to prepare waste tires at noncompliant waste tire stockpiles in accordance with fire safety requirements and for removal for appropriate processing, recycling or beneficial use or disposal as a last option.

6. The Department of Economic Development, by September 12, 2004, and annually thereafter to:

a. Assist private market development with new technologies for waste tire reuse and recycling with an emphasis on higher-value end uses in order to further create and enhance sustainable markets;
b. Provide industrial and consumer education on other benefits of recycled waste tire products through the preparation of fact sheets and public workshops; and

c. Prepare an annual summary report and analysis of markets and disposition of both New York State stockpiled tires and New York State annually generated waste tires. This report shall be submitted to the DEC and legislature by the last day of March of each year.

7. Owners or operators of noncompliant waste tire stockpiles to submit to and/or cooperate with any and all remedial measures necessary for the abatement of noncompliant waste tire stockpiles.

8. Establishment of a prohibition of land burial of waste tires and prescribes that no moneys from the waste tire management and recycling fund can be used to dispose of waste tires in a landfill unless the DEC has determined that it is not feasible to convert the waste tires to a beneficial use.

9. Funds from the waste tire management and recycling fund will be used for the following purposes:

a. DEC:
   1. Enumeration and assessment of noncompliant waste tire stockpiles, including aerial reconnaissance to locate, survey and characterize sites environmentally, for remote sensing, special analysis and scanning;
   2. Abatement of noncompliant waste tire stockpiles; and
   3. Administrative costs.

b. Department of Economic Development:
   1. Conducting an updated market analysis of outlets for waste tire utilization including recycling and energy recovery opportunities;
   2. Establishment of a program to provide funds to businesses to develop technology that leads to increased markets for waste tires;
   3. Funding of demonstration projects; and
   4. Administrative costs.

c. Department of Transportation and the NYS Thruway Authority:
   1. Demonstration and other projects for road base;
   2. Paving and other civil engineering uses; and
   3. Administrative costs.

d. New York State Energy Research and Development Authority (NYSERDA):
1. research projects which will enhance sustainable waste 
tire recycling activities; and
2. Administrative costs.

e. Department of Health (DOH):
   1. Recommendations to protect public health; and
   2. Administrative costs.

DOT Agreement With DEC

In order to establish the process by which DEC and DOT would implement the goals of 
the new law, both parties entered into an agreement that was formalized with a Memoran
andum of Understanding (MOU). The MOU defines the roles between our two
agencies, and stipulates that DOT gets satisfactory shred material for free, as well as 
reimbursement for delivery. Some features of the MOU are:

- DOT has engineering control on the use of shreds, as well as the projects on which the shreds are to be used.
- Shreds have to comply with the requirements of GEB manual GCP-19.
- DOT (GEB) keeps DEC informed as to the schedule of the applicable projects.
- DOT provides training for shred inspectors.
- DOT picks up shred from the site.
- DEC loads the shred, and provides supplemental trucking if required.
- The agreement provides for reimbursement to DOT for additional costs due to the use of shreds, including payment for delivery and instrumentation.
- Material is free to DOT.

This MOU is included in the Appendix.

DOT and DEC both realized that trying to coordinate the DOT’s Capital program needs with the availability of tire shreds would prove to be impractical. Therefore, the decision was made early on that DOT projects would incorporate shreds with no regard to the location of shreds, and DEC would provide reimbursement for shipping costs.

It was also realized that although DEC preferred DOT to take advantage of the beneficial engineering characteristics of tire shreds (i.e. light weight, high permeability), the relative scarcity of opportunities for such specialized use prompted DOT to simply substitute tire shreds for common embankment fill material.

DEC Enumeration and Assessment Efforts

DEC inspected 163 known or suspected sites. They found that there were approximately 31.6 million tires in 95 waste tire sites statewide. The size of the sites ranged from
approximately 10 million tires (at Fortino) to 1,500 tires. Of the 95 sites, there were four sites that contained over 1 million tires each, which comprised 85% of the total waste tires stockpiled. These sites are as follows:

Fortino (West Monroe) – 10 million tires
Mohawk Tire Recycling (Waterford) – 8 million tires
Hornburg Tire (Sinclairville) – 7 million tires
New York Tire/Izzo Property (Smithtown) – 2 million tires

DEC prioritized the sites based on factors that accounted for a wide array of adverse impacts. They then identified several sites for which they would require their contractors to produce DOT-acceptable tire shreds, also known as “GCP-19 material”. These sites were:

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Number of Tires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortino</td>
<td>West Monroe, Oswego Co.</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Mohawk Tire Recycling</td>
<td>Waterford, Saratoga Co.</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Hornburg Tire</td>
<td>Sinclairville, Chautauqua Co.</td>
<td>7,000,000</td>
</tr>
<tr>
<td>Hutchings Automotive</td>
<td>Smyrna, Chenango Co.</td>
<td>800,000</td>
</tr>
<tr>
<td>Clarence Auto Parts</td>
<td>Clarence, Erie Co.</td>
<td>650,000</td>
</tr>
<tr>
<td>Cycletech</td>
<td>Columbia Co.</td>
<td>425,000</td>
</tr>
<tr>
<td>Southern Tier Tire</td>
<td>Cattaraugus Co.</td>
<td>350,000</td>
</tr>
<tr>
<td>Tire Recycling</td>
<td>Saugerties, Ulster Co.</td>
<td>300,000</td>
</tr>
</tbody>
</table>

All remaining sites were abated by DEC without DOT’s involvement, and tires were processed without regard to the requirements of GCP-19.

Tire Shred Program Description

The Players – Roles and Agreements

DEC: Ultimately responsible for mitigating waste tire sites. Receives the bulk of the proceeds from the waste tire fund ($2.25 per new tire sold in NYS, equating to approximately $25 M per year).

- Inventory and assess waste tire piles statewide.
- Work with OGS to let shredding contracts.
- Provide funds to OGS for their contracts, including a component for trucking.
- Provide funding to reimburse DOT for delivery costs.
- Work with DOT to provide tire shreds suitable for embankment use.

OGS: Let and manage contracts for DEC to shred tires from existing waste piles.

- Provide tire shred delivery to DOT if requested.
- Provide inspectors for QA of shredding process.
DOT: As the end user, DOT identifies projects (i.e. end use) that can beneficially use tire shreds. Provide training to other state agencies, their consultants, and their contractors on shred inspection and testing. Maintain a QA oversight on the OGS shredding contracts.

**Material Quality Assurance**

Quality Assurance (QA) is an essential part of material acceptance. New QA procedures had to be developed for tire shreds because:
- The Department needed a reliable and repeatable process to assure quality of tire shreds for multiple projects.
- There was no existing QA process that could be applied to tire shreds.

QA procedures were developed. These procedures were documented in GCP-19, which included the following features:

- It allowed for inspection and sampling of existing tire stockpiles. Early in the process, the DEC took possession of waste tire sites which already had piles of shredded tires on them. The procedures had to account for the evaluation of those existing piles.
- It implemented procedures for QA sampling and testing performed by a non-DOT state agency as a proxy, which is a highly unusual feature. Personnel from OGS were responsible for evaluating and approving shred material on behalf of DOT. Therefore, those people had to be trained and certified by DOT. Each inspector participated in a one day training and certification course. At the end of the day, each student was evaluated by a written exam, and a practical exam where they had to demonstrate proficiency in taking a sample, performing the test, performing calculations and correctly reporting results. Candidates were required to successfully pass both the written and practical portions of the course. Certifications were valid for 2 years. DOT trained and certified 81 inspectors between 2003 and 2007.
- It provided a means by which a stockpile with a known quantity could be pre-approved for DOT applications.
- It established material requirements for tire shreds to be used as DOT fill applications.

All tire shred test forms were reviewed by our General Soils Lab personnel. Through this review, many arithmetic errors were caught and corrected.

GEB personnel would also periodically conduct their own QA sampling and testing to verify that the certified inspector’s methods were correct and accurate. During all tire shredding operations, the GEB maintained an active presence at the shredding sites.
Excellent quality shred produced at the Clarence site.

GEM-20: Guidelines for Selection, Design and Construction of Tire Shred

Design and construction guidance was developed and published by GEB in the manual GEM-20. The manual was developed in order to provide designers with criteria with which to select appropriate projects and sites for tire shred construction, provide important information involving construction sequencing, provide design guidance, call out instrumentation and monitoring requirements, and to provide the appropriate pay items and specifications for the work.

Using these criteria, Area Engineers from the GEB’s Highway Design and Construction Section (HD&C) reviewed upcoming projects in each Region with Regional Geotechnical and Design personnel and selected candidate projects. Final project selection was made by Regional Design.

For the pilot project and several earlier projects (including Route 240X and the I87 Bridge Elimination project), tire shred layer thickness was limited to 3 m (10 feet). Additional layers could be stacked provided that each layer was separated with at least 0.6 m (2 feet) of compacted embankment material. This layer thickness was based on designs developed by Dana Humphrey.

We found that although the size requirements for shreds closely matched the requirements developed by Dana, the method we used to measure the size distribution (a “sizing board” vs. sieves as used by Dana) resulted in tire shreds that were smaller than expected. This is because the sizing board measures the longer dimension (length) of the shred, while sieves measure the smaller dimension (width) of the shred. The smaller average size of the shreds introduced a minor concern for internal heating of the shred mass. Although we had experienced no heating concerns on previous applications, we decided to be conservative and limit the layer thickness to 1 m (3 feet) for all subsequent projects. These requirements are included in GEM-20.
Groundwater Quality Monitoring

All projects had groundwater wells installed, with the intention of measuring quality of the groundwater before and after the tire shreds were installed. Due to the volatility of the capital program, it was not always possible to install wells sufficiently in advance of the tire shred placement to get a reliable background reading. Nevertheless, the data that was gathered confirmed research from Dr. Dana Humphrey and others documenting that tire shreds only affect the drinking water standards (taste and color).

Construction Specifications
Specifications for the work were broken up as follows:
- Tire shred delivery
- Tire shred placement
- Providing scales to weigh tire shreds

There was no need for a material specification as the tire shred material was produced under separate contracts let and inspected by OGS. These specifications are included in the Appendix.

NYSDOT’s special specifications were initially developed for the pilot project in cooperation with Dr. Dana Humphrey of the University of Maine in 1998. Since then, the material requirements were updated based on our own experiences on the pilot project, as well as on others’ experiences in other states, and with consideration to processing and placement issues. The current material requirements ensure safety for construction workers, provide ease of placement and handling, provide predictable and consistent performance in the field, and minimize the susceptibility to spontaneous combustion. At the same time, the requirements feature wide ranges for each of the values, making it relatively easy for the shredding contractor to make acceptable shred.

It was agreed upon early in the tire shred initiative to develop one specification for all shredding contracts, for the sake of consistency and uniformity, both from the shredding contractors bidding purposes, and also to ensure uniform performance across the state, wherever shreds are used. It is common for a single DOT project to use shreds from different sources, and so uniform, predictable and safe performance is essential. Although we recognize that there are likely many shred material configurations that would not spontaneously combust, our current specification was developed to work with our handling and placement procedures in order to perform satisfactorily in the short and long terms. The current specification is the one for which we feel certain that it will perform successfully, both short and long term.
Tire Shreds in DOT Projects

As of December 2005, over 1.4 M tires have been used in two DOT projects: I87 Railroad Crossing Elimination in Region 7, and the Route 240X over Cattaraugus Creek Bridge Replacement project in Region 5.

In the fall of 2006, another 1.3 M +/- were placed in embankments via Force Account for a temporary lane shift for the I87 Bridge Replacement project north of Exit 15. The embankment will be used for temporary traffic, but will remain in place.

Starting in May 2007, tire shred placement began for the Route 219 project in Springville. About 13,000 metric tons were placed south of the Route 39 interchange. About 6.7 million tire equivalents of shred were planned to be placed on this project. However, a very large landslide forced a redesign of the portion of the project originally designed to use the majority of the tire shreds. Because of this, an effort was made to find other locations on the project where tire shreds could be used. One such location was at the Peters Road approaches, where about 10,000 metric tons (about 900 K tires) were placed. Another location, Zoar Valley Road, used an additional 960 metric tons. Although this project became a waste job (where the quantity of soil excavated exceeds the amount of fill needed) and there was plenty of natural fill available for the construction of new embankments, we used tire shreds as opportunity allowed.

By the end of the summer of 2008, all shreds processed by the large mitigation sites mentioned previously had been beneficially used, save the shreds being processed at the Mohawk site. As the contractor for the Mohawk shredding operations did not intend to make GCP-19 material after 2008, and all remaining sites were being processed for other uses, DOT’s involvement came to a close.

Summary

By partnering with other state agencies, and through cooperation with Regional geotechnical, design, and construction personnel, the GEB was able to meet the obligation imposed on DOT by the Waste Management and Recycling Act. The GEB developed new and unique material specifications, as well as procedures for assuring material quality, training inspectors, selecting projects, detailing design, and performing construction. As a result of this effort, over 5.6 million tires have been put to beneficial use as a replacement for earth fill material.
<table>
<thead>
<tr>
<th>Project</th>
<th>PIN</th>
<th>Contract</th>
<th>Total Quantity Placed MT</th>
<th>Shred Sources)</th>
<th>Quantity (MT) By Source</th>
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<tbody>
<tr>
<td>Route 17: Five Mile Point to Occorum (Pilot Project)</td>
<td>9066.41</td>
<td>D267903</td>
<td>2,500.00</td>
<td>Cyclotech</td>
<td>2,500.00</td>
</tr>
<tr>
<td>Removal of I-87 Bridges over Abandoned Railroad</td>
<td>7720.55</td>
<td>D259677</td>
<td>10,860.91</td>
<td>Cyclotech</td>
<td>10,860.91</td>
</tr>
<tr>
<td>Route 240X Over Cattaraugus Creek</td>
<td>5268.28</td>
<td>D259720</td>
<td>2,668.13</td>
<td>Southern Tier</td>
<td>1,794.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clarence</td>
<td>873.62</td>
</tr>
<tr>
<td>I-87 over D&amp;H Railroad (by OOC)</td>
<td>1721.56</td>
<td>D260240</td>
<td>9,015.85</td>
<td>Fortino</td>
<td>9,015.85</td>
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<tr>
<td>I-84-I-87 Interchange</td>
<td>6720.33</td>
<td>TANY 06-51</td>
<td>3,624.55</td>
<td>Saugertiet</td>
<td>1,079.09</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Hutchings</td>
<td>1,363.64</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Fortino</td>
<td>1,181.62</td>
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<tr>
<td>Rt 219 Stage V</td>
<td>5101.53</td>
<td>D260140</td>
<td>23,298.46</td>
<td>Fortino *</td>
<td>15,509.98</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Clarence **</td>
<td>4,330.43</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hornburg **</td>
<td>3,467.05</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>51,967.90</td>
<td></td>
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Route 219:

* Fortino: South of Rt 39: 13,070.88 MT
  Zoar Valley Rd: 962.32 MT
  Peters Rd: 1,467.98 MT

** All shreds from Hornburg and Clarence were placed at Peters Road
<table>
<thead>
<tr>
<th>Waste Tire Stockpile</th>
<th>Location</th>
<th>Contract Amount</th>
<th>Date Issued/ Completed/Terminated</th>
<th>Contractor Name</th>
<th>Tire Quantity Estimates (not including burned or contaminated tires)</th>
<th>Total Expenditures</th>
<th>Tire Shred Production and Removal (as reported by OGS)</th>
<th>Whole Tires Removed</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>dollars</td>
<td>tons</td>
<td>tires</td>
<td>dollars</td>
<td>tons</td>
<td>tires</td>
<td>dollars</td>
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<td>Sites with Abatement Contract for production of GCP-19 Material for Use on Highway Project by DOT/NYSTA:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cycletech</td>
<td>Greencourt (Columbia Co.)</td>
<td>$3,148,511</td>
<td>08/31/04 11/15/05</td>
<td>Ridenburg</td>
<td>12,000</td>
<td>2,297,000</td>
<td>1,200,000</td>
<td>$3,066,218</td>
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<td>Southern Tier Tire</td>
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<td>$2,736,559</td>
<td>02/03/05 02/07/05</td>
<td>Pike</td>
<td>3,850</td>
<td>219,500</td>
<td>350,000</td>
<td>$1,869,158</td>
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Project Notes for GCP-19 Material:
- Cycletech material (11,250 tons) used in DOT’s I-87 Project (PIN 7720-55.112) in Clinton County in 2004 & 2005.
- Southern Tier material (1,977 tons) used in DOT’s I-240X Project (PIN 5268.28) in Cattaraugus County in 2005.
- Tire Recycling material (1,186 tons) used in NYSTA’s I-4857 Interchange Project (PIN 8720.33) in Orange County in 2007.
- Hutchings Automotive material (1,663 tons) used in NYSTA’s I-4857 Interchange Project (PIN 8720.33) in Orange County in 2007.
- Clarence Auto Parts material (964 tons) used in DOT’s I-240X Project (PIN 5268.28) in Cattaraugus County in 2005.
- Hudson material (1,331 tons) used in DOT’s US Route 219 Project (PIN 5101.53) in Erie & Cattaraugus Counties in 2007.
- Fortino material (21.530 tons) shipped to High Acres Landfill in 2007.
- Fortino material (2,985 tons) shipped to Cheyenne County Landfill in 2007.
- Fortino material (6,362.36 tons) shipped to Madison County Landfill in 2007.
- Fortino material (6,849.81 tons) shipped to Bakers Landfill in 2007.
PIN 9066.41, D257903 Rt. 17: Five Mile Point to Oceanum
PIN 9066.41, D257903 Rt. 17: Five Mile Point to Oceanum
PIN 7720.55, D259677 187 Bridge Elimination
PIN 7720.55, D259677 187 Bridge Elimination
PIN 7720.55, D259677 187 Bridge Elimination

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PIN 7720.55, D259677 187 Bridge Elimination
PIN 7720.55, D259677 187 Bridge Elimination
PIN 7720.55, D259677 187 Bridge Elimination
PIN 7720.55, D259677 187 Bridge Elimination

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**Diagram Description**

- Diagram showing bridge elimination with specific measurements and details.
- Indicates elimination of 187 as per the documentation.
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**Estimated Quantities**

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**Notes:**

- PIN 5268.28, D259720 Rt. 240X/Catt Creek
PIN 5268.28, D259720 Rt. 240X/Catt Creek
PIN 5268.28, D259720 Rt. 240X/Catt Creek
PIN 8720.33, TANY 06-51, I84-I87 Interchange
PIN 8720.33, TANY 06-51, I84-I87 Interchange
PIN 8720.33, TANY 06-51, I84-I87 Interchange
PIN 8720.33, TANY 06-51, I84-I87 Interchange
PIN 1721.56, D260240, I87 over D&H Railroad
PIN 1721.56, D260240, I87 over D&H Railroad
PIN 1721.56, D260240, 187 over D&H Railroad
PIN 1721.56, D260240, 187 over D&H Railroad
PIN 1721.56, D260240, I87 over D&H Railroad
PIN 1721.56, D260240, 187 over D&H Railroad
PIN 5101.53, D260140, Rt 219 Springville to Salamanca, Stage V

Plans not available at this time
APPENDIX D

Specifications for tire shred placement, delivery and loading

ITEM 203.0394NN01 - FURNISH EQUIPMENT FOR LOADING TIRE SHREDS
ITEM 203.0395 01 - OPERATE EQUIPMENT FOR LOADING TIRE SHREDS

DESCRIPTION
This work shall consist of furnishing and operating equipment for each tire shred site in accordance with the contract documents and as directed by the Engineer. Each location that contains tire shred stockpile(s) shall be considered to be a site.

MATERIALS
Provide equipment, materials and personnel to load tire shreds from the shred stockpile(s) into trucks. Select and operate equipment so that the loading process does not contaminate the tire shreds with any non-shred material.

CONSTRUCTION DETAILS
None.

METHOD OF MEASUREMENT
Furnishing equipment will be measured on a lump sum basis. Operating equipment will be measured on an hourly basis.

BASIS OF PAYMENT
The price bid for each site shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily perform and complete the work at each tire shred site.

Note: The serialized portion (NN) of this specification is input as follows:

NN = 01 Mohawk Tire, Schoolhouse Lane, Waterford NY 12188
     = 02 Tire Recycling, Quarry Road, Saugerties NY 12477
     = 03 Hutchings Automotive, County Route 21, Pike Hill Rd, Plymouth NY 13832
     = 04 Fortino, Pinnacle Road, West Monroe NY 13167
     = 05 Clarence, 11167 Main St, Clarence NY 14031
     = 06 Homberg Tire, 6134 Route 60, Sinclairville NY 14782
     = 07 Other
ITEM 07203.XXXxm M - TIRE SHRED TRANSPORTATION AND DELIVERY

DESCRIPTION:

Transport and deliver tire shreds from identified NYSDOT-approved stockpiles to the project site as shown on the plans or as directed by the Engineer. All deliveries must be accompanied with actual weight tickets for each shipment indicating metric tons of tire shred and the stockpile number identifying the source of the tire shreds being transported and delivered to the project. Certified scales as well as any equipment necessary to load the tire shreds into the transport and delivery vehicles will be provided by the supplier(s). All transport and delivery vehicles must be free of contaminants and/or deleterious material and be covered at all times while in transit.

Transport and deliver the tire shreds to the areas shown on the plans or to temporary stock piles. All temporary tire shred stockpiles that will be constructed by the Contractor must be at the approval of the Engineer and as described in the latest “GUIDELINES FOR PROJECT SELECTION, DESIGN AND CONSTRUCTION USING TIRE SHREDS IN EMBANKMENTS”. All equipment and materials necessary to build temporary tire shred stockpiles will be furnished by the Contractor and will be paid for under separate items.

METHOD OF MEASUREMENT:

Measure the quantity to be paid as the number of metric tons of tire shred transported from each zone to the project site. The location and zone associated with each NYSDOT-approved stockpile is shown in the contract documents. Zones are shown in the contract documents and the table below:

| Zone A: 0 to 50 miles from the project site | Zone B: 51 to 100 miles from the project site |
| Zone C: 101 to 150 miles from the project site | Zone D: 151 to 200 miles from the project site |
| Zone E: 201 to 250 miles from the project site | Zone F: 251 to 300 miles from the project site |
| Zone G: 301 to 350 miles from the project site |

BASIS OF PAYMENT:

The unit price bid includes the round trip cost of all labor and equipment necessary to satisfactorily transport and deliver the tire shreds as shown in the plans or as directed by the Engineer. Do not include the cost to build temporary stockpiles. This work is to be paid under separate items as shown in the plans.

Payment will be made under:

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<td>07203.XXXxm M</td>
<td>Tire Shred Transportation and Delivery – Zone G</td>
<td>Metric Ton</td>
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ITEM 203.0397 XX M - TIRE SHREDS - PLACEMENT

DESCRIPTION:
Place and compact tire shreds to the lines and grades shown on the plans or as directed by the Engineer.

MATERIALS:
Construct the tire shred embankment using tire shreds obtained from NYSDOT-approved stockpiles. Shred stockpile locations and quantities are indicated in the contract documents.

CONSTRUCTION DETAILS:
Place tire shreds such that:

a. The maximum loose-lift thickness does not exceed 300 mm.

b. The tire shred lifts are spread in uniform thickness over the full width of the section.

c. A uniform gradation of tire shreds is maintained throughout the embankment.

d. The tire shreds do not become contaminated during the work by oil, gasoline, diesel fuel, grease, hydraulic fluid, soil, wood or other fibrous organic matter, or ice and snow.

e. The tire shreds are completely encapsulated by geotextile as shown in the contract documents.

Compact each tire shred lift with a minimum of eight passes of a vibratory or non-vibratory smooth, steel-wheel roller with a minimum nominal gross weight of nine metric tons. Operate the roller at a maximum speed of 2 m/s (4.5 mph) during compaction.

Place the surcharge and observe the waiting period as required in the contract documents.

METHOD OF MEASUREMENT:
Measurement for payment is the number of metric tons of tire shreds, as determined from weight tickets from certified truck scales, delivered, and incorporated into the work conforming to the requirements of this specification and in accordance with the lines, grades, and typical section(s) shown on the plans or as directed by the Engineer. Truck scales are provided by the NYSDEC and located at the shredding sites or near the approved stockpiles.

BASIS OF PAYMENT:
The unit price bid includes the cost all of labor, materials, and equipment necessary to properly complete the work. Include the costs of equipment and labor necessary to construct tire shred stockpiles, if the Contractor decides to construct such stockpiles. Do not include the material or delivery cost of tire shreds. The tire shreds are provided by NYSDEC and the delivery costs will be paid for under a separate item. Payment for the pad material beneath stockpiles will be made under a separate item.
ITEM 203.0393 01- FURNISH, MAINTAIN AND OPERATE CERTIFIED TRUCK SCALE(S)

DESCRIPTION
This work shall consist of furnishing, maintaining and operating Certified Track Scale(s) in accordance with the contract documents and as directed by the Engineer.

MATERIALS
Provide certified scale(s) capable of weighing fully loaded trucks of the type used to transport tire shreds. Certified Public Scale(s) or scale(s) furnished to the project may be utilized. All scale(s) shall be certified and bear the unexpired seal of the appropriate Sealer of Weight and Measures. Storage, placement and handling of the scales is the Contractor's responsibility.

CONSTRUCTION DETAILS

1. Certified Public Scales
   Designate location of scale(s) to the Engineer. Do not utilize scale(s) until authorized to do so, in writing, by the Engineer. Weigh each truck used and provide the tare weight to the Engineer or his designated representative. Weigh each truck fully loaded, and provide a ticket for each truck load which indicates, as a minimum, scale identification, date and time, and loaded truck weight.

2. Scales Furnished to Project
   Weigh each truck to be used to determine tare weight in the presence of the Engineer or his representative. Weigh each fully loaded truck in the presence of the Engineer or his representative to determine the weight of the tire shreds. Remove scales from the project site which are damaged or non-working.

METHOD OF MEASUREMENT
This work will be measured on a lump sum basis.

BASIS OF PAYMENT
The lump sum price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.
APPENDIX E

Tire Shred Trivia

100 - 110 tires per Metric Ton (compacted), OR 90 – 100 tires per Ton (compacted)

65 - 75 tires per cubic meter (compacted) so, 1m\(^3\) = 0.7 MT (compacted)
49 – 56 tires per cubic yard (compacted) so, 1 yd\(^3\) = 0.55 Tons (compacted)

$80 - $95 per cubic meter (assume $1.25 per tire)

Compacted Density: 0.6 to 0.9 Mg/m\(^3\) -- On the I87 Bridge Elimination project in Region 7 we got values of 0.82 metric tons per cubic meter for Cell 1, and 0.88 metric tons per cubic meter for Cell 2, for an average of 0.85 MT/cubic meter. (53 lbs/cubic foot).

The I87 project in Region 1 got 0.71 MT/cubic meter (44 lbs/cubic foot) after compaction.

“DEC” pile: 20 feet High x 50 feet Wide x 200 feet Long - ~5,500 m\(^3\), ~385,000 tires
Volume of a pile of these dimensions is 120,000 ft\(^3\) = 4,444 yd\(^3\)
= 3,400 m\(^3\)

Each DEC pile of shred stores slightly different quantities of shred depending on the gradation. At Fortino, each pad holds about 1,600 tons. The other sites hold somewhat less, from 1,300 to 1,500 tons.
APPENDIX F

Tire Shred FAQ’s

Questions on the Waste Tire Initiative

What is the objective of the Waste Tire Initiative?
The New York State Department of Transportation (DOT), along with the Department of Environmental Conservation (DEC), the Governor’s Office, and other agencies, has committed to using waste tires in a beneficial manner (i.e. as embankment fill) in support of a statewide mitigation plan as called for by the Waste Tire Management and Recycling Act of 2003.

Who are the state agencies involved, and what are their roles?
The roles and responsibilities of the various state agencies are as follows:

DEC – Responsible for performing an inventory of waste tire stockpiles and for mitigating the waste tire stockpiles by December 31, 2010.

OGS (Office of General Services) – Produces DOT-acceptable shred by contracts on behalf of DEC.

DOT – Uses approved shred as embankment material. Also performs quality assurance (QA) during tire shred production by training OGS inspectors, and performs its own QA testing during construction.

Why does it seem to be difficult to use tire shreds on those projects that could use them?
The main issue is the difficulty of coordinating the tire shred supply with the demand. The supply is provided through OGS contracts that produce shreds in a mostly steady, but slow, rate. Demand, on the other hand, occurs in short time-periods of high demand. In order to feed a large-demand project, such as Route 219, it would be necessary for OGS to have a large enough lead time so that large quantities of shred are stockpiled in “inventory”. While the placement rate (i.e. demand) is much greater than the production rate (supply), the inventory provides sufficient quantity for placement to continue uninterrupted.

DOT has two large projects scheduled to be awarded in the next two years that could accept 36 million tires between them. The problem is that sufficient quantity to feed either of the projects will not exist, based on current production rates and project schedules. For example, although the Route 219 project could accept 15 million tires, less than 6 million tires will be available in time for construction.

The other problem is that shredding operations are expected to continue until late 2009, and the fund sunsets on December 31, 2010. This fund provides, among other things, funding to DOT for reimbursement of trucking costs. Because most shreds will not be available until late in the funding period, it is expected that a large quantity of shreds will
be left over in stockpiles after the 2010 sunset date. For DOT to use these shreds, it would be desirable to find a way to set aside funding for trucking costs incurred after the 2010 sunset date.

In order for DOT to use as many tire shreds as possible, it would be preferable to focus on many small projects, and use shreds as they become available.

**What do the contract plans need to include?**
The contract plans need to include:
- Special specification for tire shred delivery (costs are reimbursed by DEC)
- Special specification for tire shred placement
- Tire shred typical cross-section and details (provided by the Geotechnical Engineering Bureau - GEB)
- Tire shred embankment quantities, profile and plan (prepared by Regional Design, with assistance from GEB)
- Special specification for settlement platforms or gauges (usually 2)

What are the anticipated extra cost items required as a result of using tire shreds?
- Geotextile (used to wrap each 1 m thick layer of shreds). For example, if a 1 m thick shred layer is constructed as part of a 3 m high embankment, the cost of the geotextile could be expected to be $300 per linear meter of embankment.
- Settlement platforms – anticipate $13,000 per project (assumes two platforms)
- Waiting period of 60 days which may be reduced based on settlement platform readings (indirect cost)
- Placement of shreds takes slightly longer than placement of ordinary embankment material (indirect cost)
- Tire shred material cost – provided to DOT free of charge. No cost to DOT.
- Tire shred delivery – costs are borne by DEC. No cost to DOT.

What is the potential effect on project schedule?
**Design**
Inclusion of shreds requires a minor amount of design time. Standard details are available from GEB for the shred layers.

**Construction**
Anticipate a 60 day waiting period, plus slightly slower placement rate.
Note that the contractor needs to anticipate delivery time and its effect on placement. Delivery time is directly affected by the distance to the shred sites, and the number of trucks employed.
What if we are designing a job that requires a certain quantity of shreds that haven’t been produced yet? What assurance do we have that OGS will produce the required number in time for the contractor to use them?

We should only design for the quantity of shreds that are already produced, plus a reasonable yet conservative estimate of shreds that will become available in the time between PS&E and the anticipated placement date. In the unlikely event that production is disrupted, the DOT will issue an OOC to change back to ordinary fill to compensate for the lack of the anticipated shreds.

Will these catch fire?

The controls on the material as well as the established construction procedures have been carefully developed to minimize the risk of combustion. These methods have been used since the early 1990’s and have proven to be effective, not only by NYSDOT, but by many other state DOT’s as well as the FHWA.

What is the background of the tire shred initiative?

There are approximately 35 million tires in both legal and illegal waste sites throughout New York State. As a responsible state agency, NYSDOT is taking steps to assist DEC with the cleanup of waste tires by providing a market for their use. This market consists primarily of using these tires, in shredded form, as a replacement for conventional embankment fill. DOT’s first step was to demonstrate that it could safely construct such an embankment. In 1999, DOT progressed a pilot project in Broome County that used 267,000 tires in the construction of an off ramp from Route 17. To date, the ramp is performing very well.

In 2003, the DOT embarked on an ambitious program that identified projects where tire shreds could be beneficially used. A new process was developed that addressed material quality issues. Through the development of strong ties with other state agencies including DEC, OGS and ESD (Empire State Development Corporation), the DOT is now in position to beneficially use tire shreds on a production basis. NYSDOT’s efforts under the tire shred initiative include training and certifying tire shred inspectors, performing quality assurance sampling and testing, providing construction specifications, and performing design functions. Guidance for sampling and testing, as well as for selecting appropriate projects, is shown in GCP-19 Procedure for the Sampling and Testing of Tire Shreds, and GEM-20 Guidelines for Project Selection, Design and Construction of Tire Shreds in Embankments.

As of December 2005, over 1.4 M tires have been used in two DOT projects: I87 Railroad Crossing Elimination in Region 7, and the Route 240X over Cattaraugus Creek Bridge Replacement project in Region 5. In the fall of 2006, another 1.3 M +/- were placed in embankments for a temporary lane shift for the I87 Bridge Replacement project north of Exit 15. The embankment will be used for temporary traffic, but will remain in place.
Questions on Tire Shred Properties

How many tire equivalents are in a metric ton of shred, after compaction?
Typically, there are between 100 and 110 tires per Metric Ton of shred, after compaction.

How many tire equivalents are in a cubic meter of shred, after compaction?
Typically, there are between 65 and 75 tires per cubic meter of shred, after compaction.

What is the cost of tire shred fill?
Typically, the cost is $80 - $95 per cubic meter (assume $1.25 per tire), in place.

What is the compacted density of tire shred fill?
It is typically between 0.6 and 0.9 Mg/m$^3$ but that value depends on the size distribution of the shreds. On the I87 Bridge Elimination project in Region 7 we got values of 0.82 metric tons per cubic meter for Cell 1, and 0.88 metric tons per cubic meter for Cell 2, for an average of 0.85 MT/cubic meter, (53 lbs/cubic foot). The I87 project in Region 1 got 0.71 MT/cubic meter (44 lbs/cubic foot) after compaction.

Construction questions:

1) Who will control the surge piles (temporary stock piles) on site? Once on site, the contractor is responsible for them.
2) How should temporary shred stockpiles be constructed? On a 1’ thick pad of crushed stone or underdrain filter stone (quantity included in the contract). Stockpile dimensions are 50’ wide x 200’ long x 20’ high, max. Stockpiles can be built using typical construction equipment (i.e. loaders, dozers).
3) Should any erosion/pollution control measures be done around these piles (i.e.: construction platform, silt fence)? If so, how should this be paid for? None should be needed.
4) Will further sampling/monitoring be required after testing is done at tire shred supplier? Once the stockpile is approved, further testing is unnecessary.
5) How much compaction effort is actually necessary during the placement of the tire shreds if a surcharge and waiting period is implemented? Compaction aligns the shreds horizontally. The surcharge and waiting period allows the shreds to flatten and compress under load. The combination of compaction and the surcharge have been shown to give good, predictable results.
6) What is the recommended minimum thickness and cover of the tire shreds where they will be used in the M&PT crossovers? For temporary M&PT, 1 m of cover underlying the temporary pavement section is sufficient.
7) Are delivery vehicles allowed to drive on/across the geotextile fabric? If not what is recommended procedure for placing initial lift of tire shreds? Initial lift – place shreds using a front end loader, or dump them at the end of the fill and spread them with a dozer. The metal protruding from tire shreds will flatten tires on trucks, loaders or other construction equipment.
8) How many passes are recommended in the initial lift? It seems that the compaction equipment could damage the geotextile fabric; or should the first lift
be thicker avoiding this? Initial lift should conform to the same requirements as the other lifts, as stated in the specification. There is no evidence that the fabric will be significantly damaged.

9) Weather questions: Can tire shred embankment be constructed in heavy rain? Is excessive heat during the construction an issue? A lift of shred could be placed in heavy rain, but compaction should wait until drier weather. Compaction equipment would have a hard time operating properly on loose, wet shreds. Excessive heat during placement is not an issue.

10) When the Contractor goes to the site to pick up the shreds, who loads them, and how? The DEC’s contractor will load the shreds. Typically, they use a grapple.

11) If availability, delivery of tire shreds, etc. becomes an issue and the embankment is continued with typical 203.03, what is minimum lift thickness of the subsequent tire shreds before resuming with 203.03? Successive tire shred layers can be built on top of one another provided the maximum thickness of each is 3 feet (1 m), each is wrapped with a geotextile, and there is at least 2 feet (0.6 m) of Embankment-In-Place between shred layers.

12) What if DEC fails to have the personnel or equipment to load the shreds onto the Contractor’s trucks at the shredding site? Have DEC provide sufficient loading personnel and equipment at the shredding sites. Where shreds are to be obtained from inactive sites (shredding operation is complete), the contract should include pay items for loading and weighing.

13) Why can’t “dirty” shreds be used? Excessive dirt is one of the factors that can lead to exothermic reactions. The others are crumb rubber, free steel, excessive layer thickness and free access to air and water.

14) What is the maximum allowable embankment height over a tire shred layer? There is no maximum.

15) What is the minimum thickness of a tire shred layer? The minimum allowable thickness would be one lift, or 1 foot (300 mm).
APPENDIX G

MOU

MEMORANDUM OF UNDERSTANDING
TIRE SHRED FILL PROGRAM

This Memorandum of Understanding, made this _ Day of __________ 2004, by and between the New York State Department of Environmental Conservation (hereinafter referred to as DEC), acting by and through Erin M. Creppy, Commissioner, whose principal office is located at 625 Broadway, Albany, New York 12233, and the New York State Department of Transportation (hereinafter referred to as DOT), acting by and through Joseph H. Boardman, Commissioner, whose office is 50 Wolf Road, Albany, New York 12232.

WITNESSETH:

WHEREAS, DEC regulates Solid Waste Management in accordance with Article 27 of the Environmental Conservation Law (ECL) and 6 NYCRR Part 360, which includes regulation of waste tires (6 NYCRR Subpart 360-13); and

WHEREAS, DOT is authorized to consult with and cooperate with other state agencies having duties or responsibilities related to transportation, pursuant to Section 14, Paragraph 5 of the Transportation Law; and

WHEREAS, the DEC is mandated by the Waste Tire Management and Recycling Act of 2003, pursuant to ECL Article 27, Title 19, to assure all noncompliant waste tire stockpiles in New YorkState by December 31, 2010 and is identified as eligible to use funds from the Waste Tire Management Recycling Fund for that purpose; and

WHEREAS, the DOT is mandated, pursuant to its Environmental Initiative, to coordinate with other state agencies to identify opportunities to advance state environmental policies, programs and objectives and to proactively plan, design, construct and maintain transportation projects in an environmentally sound manner; and

WHEREAS, the Waste Tire Management and Recycling Act of 2003 identifies the DOT as eligible to use funds from the Waste Tire Management and Recycling Fund for demonstration and other projects for road base, as well as paving and other civil engineering uses; and

WHEREAS, the Waste Tire Management and Recycling Act of 2003 establishes the following waste tire management priorities for New York State:

- first, to reduce the number of waste tires generated;
- second, to remediate waste tire stockpiles in noncompliance;
- third, to recycle waste tires into value-added products;
- fourth, to beneficially use waste tires in an environmentally acceptable manner, including the beneficial use in civil engineering applications; and
- fifth, to recover, in an environmentally acceptable manner consistent with the purpose of the Waste Tire Management and Recycling Act, energy from waste tires that cannot be economically recycled or otherwise beneficially used; and
WHEREAS, it is in the best interest of the State to reduce or eliminate the number of noncompliant waste tire stockpiles across the State by developing an environmentally acceptable beneficial use of waste tires in civil engineering from waste tire stockpiles; and

WHEREAS, DOT has developed an environmentally acceptable beneficial use and economically sustainable market for waste tire shreds as fill or lightweight fill in embankments, and as a drainage media on its construction projects.

NOW THEREFORE, the parties agree as follows:

1. On appropriate projects throughout the State, the DOT will incorporate the use of tire shreds as fill or lightweight fill in embankments into its design and will include the applicable tire shred specification, as written by DOT’s Geotechnical Engineering Bureau, in its contract documents for those projects. DOT will have sole discretion to determine which of its projects is appropriate for said purposes. Attached hereto as Attachments A and B are the current DOT tire shred Specification, and Geotechnical Control Procedure (GCP) GCP-19 Sampling and Testing of Tire Shreds, respectively. Both the tire shred specification and GCP-19 are anticipated to be updated, as needed, to reflect additional data and information gained through experience using this material. GPC-19 can be found at http://www.dot.state.ny.us/tech-serv/geo-manuals.html.

2. DOT’s Director of the Geotechnical Engineering Bureau will advise DEC’s Director of the Bureau of Solid Waste, Reduction and Recycling at the beginning of each month of the schedule of applicable road and embankment construction projects.

3. Tire shredding operations shall be inspected; and shreds shall be tested for quality assurance by certified inspectors. DOT, through the Geotechnical Engineering Bureau’s General Soils Laboratory, will conduct training for inspectors from the DEC, the Office of General Services, or their consultants/contractors and issue a Certification of Completion to each inspector who successfully completes the training.

4. DEC, through its contractors, will be responsible for producing tire shred, meeting the specifications outlined in the most recent DOT tire shred Specification, and adhering to the sampling, testing and certification procedures outlined in GCP-19 at locations throughout the State, to be determined by the DEC at its sole discretion. DEC will endeavor to coordinate tire shred production to meet the identified DOT projects’ construction schedules.

5. DOT, through its contractors, will be responsible for providing pick up of tire shred from sites designated by DEC for DOT’s applicable road and embankment construction projects. The pick up locations will be determined at the sole discretion of DEC based on production and storage constraints at DEC designated processing locations. All tire shred will be weighed prior to leaving the DEC designated processing locations on certified scales provided by DEC, through its contractors, by subtracting the weight of the
transport vehicles prior to loading of the tire shred from the weight of the vehicle after
loading of the tire shred. Weight of each load will be documented by a weight ticket.

6. DOT's Director of the Geotechnical Engineering Bureau and DEC's Director of the
Bureau of Solid Waste, Reduction and Recycling shall discuss, prior to the issuance of
any DOT issued bidding documents for DOT selected projects, the appropriate bidding
and acceptable cost limits for transportation of the tire shred in an effort to maximize tire
shred usage while minimizing transportation costs.

7. DEC, through its contractors, will be responsible for loading of tire shred into DOT's
contractor's vehicles for delivery to the designated DOT road or embankment
construction project storage locations.

8. DEC, through its contractors, will provide supplemental delivery service of tire shred to
road or embankment construction project storage locations designated by DOT, at DOT's
sole discretion, should DOT request such service.

9. DOT will be solely responsible for placement of tire shred at the DOT designated road or
embankment construction project storage locations and eventual use in the road or
embankment construction projects. After placement of the tire shreds is completed by
DOT's contractor on a project, DOT will report the quantity in tons transported and used
for the project and the transportation cost associated with the transportation of the tire
shred.

10. DEC will ensure that funds from the Waste Tire Management and Recycling Fund will be
sub-allocated to the DOT as reimbursement for the costs incurred for the transportation of
the tire shred. DOT will provide a reporting of tonnage transported as well as
transportation cost for each separate project at the end of each state fiscal year that this
MOU is in effect.

11. No payment will be provided by DOT, to the DEC, for the value of the tire shred itself.

12. Any notice given pursuant to this MOU must be in writing, sent to the parties at the
addresses herein above set forth to the attention of the following:

For DOT - Director, Geotechnical Engineering Bureau
For DEC - Director, Bureau of Solid Waste, Reduction and Recycling

13. The term of this MOU shall commence on the date herein above set forth and shall
terminate on December 31, 2010. The term of this MOU may be amended upon mutual
written consent of the parties.

14. This MOU consists of this document, as well as Attachment A, the current DOT tire
shred Specification, and Attachment B "GCP-19 Sampling and Testing of Tire Shred,"
which are incorporated herein and made part of hereof.
IN WITNESS WHEREOF, the parties hereto have caused this MOU to be executed by the Commissioner of DEC or her duly authorized representative and by the Commissioner of DOT or his duly authorized representative as of the date herein above set forth.

NEW YORK STATE DEPARTMENT
OF TRANSPORTATION

[Signature]

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

[Signature]
APPENDIX H
Project Check List For Designers

PIN:

Project Name:

Total Shred Quantity Needed:

<table>
<thead>
<tr>
<th>Source</th>
<th>Quantity</th>
<th>Trucking Zone</th>
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Specs Needed:
- Thermistors (one per shred layer at min. two locations) 203.1401_17 M
- Surface Settlement Gauge (need 2 at each location for first shred layer, one per additional shred layer after that): 203.10 M
- Trucking Item 203.0396nn07 M. (nn = 01 for Zone A, 02 for Zone B, etc.)
- Placement Item 203.0397__07 M
- Geotextile Stabilization 207.14 M
- Loading (for Hutchings, Clarence, Hornburg)

Plan Details:
- Typical X-Section
- Elevation view
- Plan View
- Storage pad locations, quantities and design details

Special Notes:
- Tire shred stockpile locations and quantities
- Trucking/Delivery sequence
- Waiting period

Examples:

1. Construct embankment to desired subgrade surface elevation using embankment in place. The contractor is informed that as a result of placing embankment in place the tire shred embankment will compress approximately 10 percent of its total height. Additional embankment in place will be required to achieve the desired subgrade surface elevation. No separate payment will be made for this additional material or work.
2. Once the desired subgrade surface elevation has been reached, place minimum ______ m surcharge of embankment in place. Observe a ______ month waiting period. This waiting period may be reduced based on results from field instrumentation. Remove surcharge under unclassified excavation and disposal.

3. Field instrumentation will be paid for under its respective item numbers.

"4. Upon completion of the tire shred cells a minimum of 0.6 m of item 203.03 shall be placed on top for a minimum 30 day settlement period."

**Useful Conversions:**

1 MT = 1.1 ton (short)

100 tires per MT (110 tires per short ton)

Final in-place density of shred layer (after compaction and compression) = 0.85 MT/m$^3$ (53 pcf)
APPENDIX I

The Environmental Case for Tire Shreds

Tire Shreds: An Environmentally Friendly Solution to the Waste Tire Problem in New York State

Donald Dwyer, Geotechnical Engineering Bureau
Jeanne Hewitt, Environmental Analysis Bureau

Overview – The Waste Tire Problem

New York State is home to over 35 million scrap tires, located throughout the state in both permitted and illegal waste tire dumps. These waste tires pose environmental and health threats.

Environmental Dangers of Scrap Tire Stockpiles

Scrap tires can have harmful and even deadly impacts on human health and the environment. When collected into a pile and ignited by lightning or arsonists, tires burn at very high temperatures and emit noxious black smoke that contains carbon black, volatile and semi-volatile organic compounds, sulfur and nitrogen oxides, polycyclic aromatic hydrocarbons, oils and soot particles enriched in arsenic, cadmium, chromium, lead, zinc, iron and lead. In addition, as the tires melt and partially burn, they discharge an oily liquid that flows into nearby streams, ditches and waterways, and seeps into the ground water. Tire fires are very difficult to extinguish and firefighters near waste tires piles typically have emergency plans for dealing with the special problems fighting a tire fire.

Scrap Tire Stockpiles Spread Disease

Because of their shape, waste tires contain water and provide an excellent breeding ground for mosquitoes. Mosquitoes act as vectors to transmit serious diseases such as West Nile virus, Sepsik and dengue fever, and St. Louis and Japanese encephalitis. A 1992 study by consultants for the Illinois Dept. of Energy and Natural Resources found that 80% of children in Ohio communities who suffered mosquito-borne disease lived within 100 yards of a tire dump.

Solutions to the waste tire problem are limited. Markets are limited due to the poor economic leverage. In order to create a useful product, tires must be salvaged from a waste tire stockpile, which is physically difficult. Often there are other obstacles, such as the question of ownership, site access limited physically and legally, the presence of hidden “surprises” such as drums of liquid waste, just to name a few. All these difficulties add to the processing costs, making any product derived from waste tires prohibitively expensive. The most economical type of application is civil engineering, as the least processing is required. Even so, without an additional funding source, civil engineering products derived from waste tires cannot compete on an equal economic footing with conventional products and materials. The number of waste tires in the state was unknown, but was estimated to be between 70 and 40 million. The problem was obvious, and growing.

NYS DOT realized that as a responsible state agency, it was incumbent on it to at least help solve the waste tire problem. In 1997, NYS DOT took steps to prepare for possible future use of tire shreds as an engineering material. Dr. Dana Humphrey, the nation’s leader on civil engineering uses of tire shreds, was invited to come to Albany and speak on August 14, 1997. In addition to technical information, the environmental effects of tire shreds was a concern. Dr. Humphrey
explained that leachate from tire shreds had no effect on primary drinking water standards, and only had a minor effect on secondary drinking water standards (taste, color and odor). There was a slight increase in concentrations of iron and manganese, but these concentrations were still within limits.

NYSDOT initiated a pilot project to demonstrate that we could design and safely construct a tire shred embankment, and that embankment would perform adequately and pose no health or environmental risk. This pilot project, part of the Route 17: Five Mile Point to Oceanaum project in Broome County, was progressed with the full support and cooperation of the Department of Environmental Conservation (DEC). The DEC issued a case-specific Beneficial Use Determination (BUD) that classified shredded tires for use as embankment material as a product, and not as a solid waste. The project was progressed with no changes made to the Environmental Impact Statement.

The pilot project included water observation wells, used to sample groundwater for testing. Wells were installed both up-gradient and down-gradient in several locations around the tire shred fill. In addition, a port was installed in the tire shred fill itself so that samples could be taken of water that was in direct contact with the shreds. Test results from the pilot project showed elevated levels of manganese and iron, as was expected. However, further investigation showed that the elevated levels were due to the presence of these metals in the native soil, and not due to the presence of tire shreds. In fact, the levels of metals taken from samples in the shreds were actually lower than those levels in the soils in the nearby area. Our conclusion at this site was that tire shreds did not add to the concentrations of iron and manganese in the groundwater.

**New York State Takes Action**

More than twenty tire fires have occurred in New York since 1989 at both illegal tire stockpiles and at tire recyclers, creating ongoing environmental and safety threats from Chautauqua County where an estimated 1 million scrap tires are located in Hornburg to Island Wide Recycling in Suffolk County.

In 2003 New York acted to eliminate these ongoing threats by enacting the Waste Tire Management and Recycling Act that added Title 19 to Article 27 of the Environmental Conservation Law. That act imposed a $2.50 fee on all new tires sold, and used these funds to prepare a report on all the legal and noncompliant tire stockpiles in the State. (A copy of that report that is dated July 2004 can be read at [http://www.dec.state.ny.us/website/dsh/itrecy/tirerep.html](http://www.dec.state.ny.us/website/dsh/itrecy/tirerep.html).) Under this law, six State agencies are involved in various aspects of this work and carrying out pilot projects that are instrumental in creating markets for scrap tire use. (See [http://www.epa.gov/epaoswer02/waste/scrap_tires.htm](http://www.epa.gov/epaoswer02/waste/scrap_tires.htm) for more information about the tasks of these agencies.)

Both the Thruway and DOT were required by this legislated mandate to identify projects proposed to be built within the next five years where scrap tires could be beneficially reused in civil engineering applications. DOT's response was summarized in Operational Goal 02-1,

Early lists of Tire Shred Candidate Projects were developed and have been continuously revised since that time. The NYSDEC, working in conjunction with the State Health Dept., has issued a formal Beneficial Use Determination pursuant to 6 NYCRR 360-1.15 to DOT for these activities. (New York’s solid waste management regulations also provides a “generic” exemption for tire shreds used as embankment fill in 360-1.15(b)(6) and states: “the following items are no longer considered solid waste for the purposes of this Part when used as described in this subdivision...” for tire shreds that are beneficially reused by the NYS Dept. of Transportation).

DOT and DEC co-wrote and signed a Memorandum of Understanding (MOU) that established the working relationship between the two agencies, and the responsibilities of each. DEC was responsible for producing the final product for DOT use, and provides funds to reimburse DOT for trucking costs. In addition, the material is provided to DOT free of charge. DOT is responsible for identifying projects where the use of tire shreds would be appropriate, and performs all design and construction activities.

NYSDOT has completed tire shred embankments on two projects in 2005. The first project, the I-87 Railroad Grade Crossing Elimination Project in Clinton County, utilized approximately 1.1 million tires and was completed in the spring of 2005. The second, which was recently completed, was on the Route 240X over Cattaraugus Creek project in Cattaraugus County, which used approximately 300,000 tires. Test results from samples of groundwater from both projects confirms the expectations of very low levels of iron and manganese.

The DEC is extremely pleased with our use of shredded tires so far. However, the linchpin to success of the program is the Route 219 project, which is expected to use approximately 20 million tires. Designers in Region 5 actually requested the use of tire shreds for this project, as it will save them from needing to obtain 250,000 cubic meters of fill.

NYSDOT selects, designs and constructs projects that use tire shreds in accordance with the requirements of Geotechnical Engineering Manual GEM-20: Guidelines for Project Selection, Design and Construction of Tire Shreds in Embankments. The guidance establishes criteria for selecting projects appropriate for tire shred use. The environmental criteria are:

- Tire shreds must be above the water table
- Tire shred embankments must not be constructed near environmentally sensitive areas, such as near drinking water supplies, in wetlands or in the New York City watershed.
- All tire shred embankments are monitored for water quality, with monitoring wells up-gradient, and down-gradient. Water is tested for RCRA list of toxic metals.

Although all evidence and research points to the conclusion that there is not problem, GEM-20 takes a conservative approach and eliminates projects or locations within a project where any concern could possibly exist, however unlikely.
The Environmental Case for Tire Shreds

The use of tire shreds is nearly commonplace. Today, 39 states have approved the use of shredded tires for civil engineering applications including: subgrade fill and embankments, backfill and lightweight fill for wall and bridge abutments, subgrade insulation for roads, landfills (drainage and gas venting layers), and as septic system drain fields. (See: U.S. EPA website at http://www.epa.gov/epa ANSWER/ non-hw/munpl/tires/civil_eng.htm).

Reuse of Scrap Tires is Encouraged by Environmental Agencies

The U.S. Environmental Protection Agency encourages the reuse of scrap tires in applications such as the embankment fill that NYS DOT proposes for Route 219 in western New York. Their website states: “There is no current evidence that products containing recycled rubber from scrap tires substantially increases the threat to human health and the environment as compared to the threats from conventional products.”

http://www.epa.gov/epa ANSWER/ non-hw/munpl/tires/faq.htm#ques1

The New York State Dept. of Environmental Conservation (NYSDEC) also encourages the beneficial reuse of scrap tires on many projects throughout New York. Chipped and shredded tires have now been used in many civil engineering applications by State and municipal agencies, commercial enterprises and private individuals. A short list of the locations, project applicants, and the types of uses is shown below:

<table>
<thead>
<tr>
<th>NYS Office of General Services</th>
<th>Fill (chips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chautauqua Co.</td>
<td>Baled scrap tires for road base material</td>
</tr>
<tr>
<td>Delaware Co.</td>
<td>Stormwater management (chips) and road base</td>
</tr>
</tbody>
</table>

| (T) Brookhaven
(T) Shu wangi nk
(T) Co lonie
(T) Webb | Berms, erosion control and landfill roads
Fill and erosion control
Landfill roads
Erosion control |

| Arthritis Foundation
Adirondack Int'l Speedway
Casings, Inc. (Catskill)
Chesiertown Conservation Club
Houghton College Equestrian Ctr.
Kingston, NY
National Fuel Supply Corp
Marina at Rouse's Point
Various commercial groups and locations | Barrier wall at racetrack
Barrier wall at racetrack
Drainage layer (substitute for aggregate)
Backstop for shooting range
Surface material for horse arena
Backstop for shooting range
Bedding material for gas pipes (Hamburg)
Breakwater
Playground surface material, landscaping mulch, synthetic lumber |

Reusing Scrap Tires Does Not Threaten Human Health or the Environment
The effect of scrap tires on the quality of ground and surface waters has been measured by many agencies and NYSDOT over the years, and these studies have repeatedly confirmed the absence of serious environmental harm. For example:

- A 1992 Wisconsin Dept. of Transportation study concluded that shredded scrap tires leached far less than other types of wastes, but leachate from the tires did contain somewhat higher concentrations of barium, iron, manganese and zinc.
- A 1991 study by the Scrap Tire Management Council tested ground and whole tire rubber for hazardous constituents and found those compounds only at trace levels in leachate.
- Studies conducted in 1990 and 1992 by the Minnesota and Virginia Departments of Transportation respectively found that scrap tires yielded some metals, notably iron, at very low (acidic) pH values, and small amounts of hydrocarbon oils at very high (alkaline) pH values.
- A comprehensive study at the Univ. of Maine looked at tire chip fills encapsulated by three types of soil. This well-controlled study found slight elevations in iron and manganese but no other constituents were detected.
- A 2002 study at the Univ. of Maine examined the effects of trenches filled with tire chips on local ground water quality and concluded that iron, manganese and zinc were slightly elevated within the trenches, but dropped to background levels in monitoring wells located a few meters away.
- NYSDOT built an interstate highway ramp near Binghamton using about 267,000 scrap tires in a demonstration project and measured the quality of the water above and below the elevation of the tire fill and within the tire pile itself. Water inside the tire fill contained elevated concentrations of iron and manganese, and would be a concern only if drinking water were drawn directly out of the tire fill rather than from the soil or bedrock nearby.

The Scrap Tire Management Council, from the fifth biennial report at the end of 1998, states as follows:

"An important consideration for most civil engineering application is the effect of tire shreds on water quality. Field studies of tire shreds placed above the water table show that tire shreds pose no significant health or environmental risks. For neutral pH conditions (which is normal for most groundwater) there was no evidence that tire shreds increase the concentration of metals of concern in meeting a primary (health based) drinking water standard. In addition, there were no detectable levels of organics released from the tire shreds. Under some conditions, the steel belting exposed at the cut edges of the tire shreds may increase the levels of iron and manganese, but these metals only have a secondary or aesthetic based) drinking water standard. Since these metals are naturally occurring in groundwater in many parts of the country, they are generally not of concern."

Conclusions

Tire shreds used as engineering fill are a viable, environmentally safe solution to the waste tire problem in New York State. This statement is supported by the following points:
- Numerous field and laboratory studies conclude that tire shred leachate only affects secondary drinking water standards (taste, color, odor), and only slightly (increases in iron and manganese).
- Groundwater monitoring on our own projects supports the statement that leachate from tire shred fills is not harmful.
- The DEC, in it’s definition of Beneficial Use, has classified tire shreds as product with a beneficial use. Therefore, it is not classified as a solid waste.
- The DEC has been working very closely with DOT to advance the tire shred initiative, and has been instrumental in the successful application of tire shreds in the pilot project in Broome County, as well as in the recent construction contracts in Clinton and Cattaraugus Counties.
- DOT and DEC have a MOU that explains our relationship in regards to the tire shred initiative. DOT has their full support and cooperation.
- Finally, NYSDOT’s use of recycled materials is common, and encouraged on every level. In fact, care for the environment is one of DOT’s Five Priority Result Areas. Tire shreds joins recycled concrete aggregate, reclaimed asphalt pavement, glass, crumb rubber, plastics, fly ash, micro silica, etc. as yet another successful recycled material.

Additional Support Documents

- Water Quality Effects of Using Tire Chips Below the Groundwater Table, by Lisa A. Downs, Dana N. Humphrey, Lynn E. Katz and Chet A. Rock
- NYSDCMC Part 360 Solid Waste Management Facilities
- MOU between DOT and DEC, dated April 1, 2004.
WATER QUALITY EFFECTS
OF USING TIRE CHIPS BELOW THE GROUNDWATER TABLE

By: Lisa A. Downs, Dana N. Humphrey, Lynn E. Katz, and Chet A. Rock

Department of Civil and Environmental Engineering
University of Maine
Orono, Maine

EXECUTIVE SUMMARY

Many of the 240 million scrap tires generated in the United States each year are disposed of in landfills or open piles. This uses valuable landfill space, creates fire hazards, and provides a breeding place for disease carrying mosquitoes. Alternate uses of scrap tires have been sought including using tires cut into chips as lightweight and insulating fills in roadways, embankments, and retaining walls. These applications may bring tire chips in direct contact with groundwater, raising concerns of possible contamination. The focus of this research was to evaluate the effects of tire chips placed below the water table on groundwater quality.

This study was divided into three parts: (1) laboratory toxicity characteristics leaching procedure (TCLP) tests; (2) laboratory reactor simulation of ground conditions; and (3) small scale field trials. The TCLP tests were used to evaluate potential pollutants from tire chips. The laboratory simulation of ground conditions was a batch reactor study that compared the long-term leachability of tire chips and soil. Finally, small scale field trials were used to evaluate the long-term effect on groundwater quality of using tire chips as a construction material. In these trials 1.5 tons of tire chips were buried below the water table in each of three Maine soil types: marine clay, glacial till, and peat.

TCLP tests are used to determine if a waste is a significant hazard to human health due to leaching of toxic compounds. In addition, TCLP results can be used to give an indication of potential pollutants that may leach from a waste. In this study, the following four tire chip samples were subjected to TCLP testing: unwashed mixed glass and steel belted chips, washed unwashed steel and glass belted chips, unwashed glass belted chips, and washed glass belted chips. Samples were tested washed and unwashed to examine the possibility that pollutants from tire chips could be due to dirt and debris on the surface of the tires rather than the tire itself. Prior to testing, the tire chip size was reduced to passing the 9.5-mm (0.375-in.) sieve as required by the TCLP test protocol.

TCLP results showed that tire chips are not a hazardous waste since concentrations of metals and organics were well below applicable TCLP regulatory limits. Arsenic, mercury, selenium, and silver were below detection limits for all samples. However, low
levels of barium, cadmium, chromium, and lead were detected in leachate extracts from each of the four samples. Thus, tire chips have the potential to leach these compounds. The presence of these compounds was investigated further in subsequent laboratory and field tests. The only TCLP regulated organic compound found in the TCLP extracts was 1,2-dichloroethane with concentrations ranging from ND\(^1\) to 7 \(\mu\)g/L, which is well below the TCLP regulatory limit of 500 \(\mu\)g/L. Several compounds not regulated by TCLP were also found in the extracts. The volatile compound dichloromethane was found at concentrations ranging from 5 to 10 \(\mu\)g/L. In addition, five semivolatile compounds were tentatively identified: 1-(2-butoxyethoxy)-ethanol (ND to 143 \(\mu\)g/L); benzothiazole (200 to 286 \(\mu\)g/L); 1H-isouindole-1,3(2H)-dione (ND to 286 \(\mu\)g/L); 2(3H)-benzoazolone (100 to 286 \(\mu\)g/L); 2,5-cyclohexadiene-1,4-dione (ND to 114 \(\mu\)g/L); and 4-(2-benzothiazolylthio)-morpholine (ND to 143 \(\mu\)g/L). Thus, tire chips have the potential to leach some organic compounds. The presence of these compounds was investigated further in subsequent laboratory batch reactor and field tests.

The laboratory simulation of ground conditions was a batch reactor study. The study was designed to allow direct comparison of the levels of metals and organic compounds that leach from tire chips to the levels that leach from soil. Eight reactors were set up. The reactors were 20 L (5 gal) Pyrex glass jars. Three reactors were controls that contained only soil and water. The three soil types were marine clay, glacial till, and peat. The soil was obtained from each of the three sites chosen for the small scale field trials. Another three reactors were set up with tire chips, soil, and distilled water, one corresponding to each of the control reactors. Two additional reactors contained only tire chips and distilled water. The reactors were stored at ambient temperature in the dark for approximately ten months. The reactors were not mixed or disturbed during that time. At the completion of the storage period, water and soil samples were collected from the reactors. The water samples were analyzed for total and dissolved metal, and volatile and semivolatile organic compounds. The soil samples were digested and analyzed for total metals.

Leaching of metals from tire chips was examined by analyzing soil and water samples taken from the reactors. Results from the soil digestates showed that presence of tire chips increased the concentrations in the clay of manganese, in the till of copper and zinc, and in the peat of barium, chromium, copper, lead, iron, manganese, and zinc. This was evidenced by the concentrations of these metals being higher in digested soil samples taken from reactors with mixtures of soil and chips than for digested soil samples taken from the corresponding control reactors (no tire chips). It appears that peat has a greater tendency to sorb metals released from tire chips than either clay or till.

The water sample results from the laboratory batch reactors showed that the concentration of several metals were increased by leaching from tire chips or leaching from soil due to the environmental conditions created by placing tire chips in contact with soil and water. In some of the tire chip or tire chip/soil mixture reactors, the concentrations of arsenic, barium, chromium, and copper were increased but the levels

\(^1\) ND = not detected
were well below the applicable primary drinking water standards. For all reactors, the levels of cadmium, mercury, and lead were below the test method detection limit. The concentration of iron and manganese were above their secondary, or aesthetic, drinking water standards in reactors containing tire chips or tire chip/soil mixtures. The concentration of zinc was increased, but the levels were well below its secondary drinking water standard. Tire chips also increased the pore water concentrations of calcium, magnesium, and sodium which do not have drinking water standards. The source of the increased levels of calcium, iron, manganese, and zinc appeared to be the tire chips. For barium, calcium, magnesium, and sodium, it could not be determined if the increased levels were due directly to the tire chips or leaching from the soil in response to environmental conditions created by the tire chips. These results suggest that tire chips will not cause primary drinking water standards to be exceeded. However, it is likely that tire chips will cause the secondary drinking water standards for iron and manganese to be exceeded. These laboratory results should be confirmed for field conditions.

The water taken from the reactors was also analyzed for volatile and semivolatile organic compounds. The following volatile compounds and range of concentrations were found in the samples from the tire chip and tire chip/soil mixture reactors but were not found in the reactors containing only soil: benzene (2.5 to 5 μg/L) and cis-1,2-dichloroethene (ND to 3.2 μg/L). The following compounds were below detection limits for all but one sample: bromomethane (one sample had 1.6 μg/L); 1,1-dichloroethane (one sample had 0.6 μg/L); trichloromethane (one sample had 0.8 μg/L); and naphthalene (one sample had 5.3 μg/L). Additional testing would be required to determine if these compounds are leached from tire chips at very low concentrations or if the results could be attributed to testing anomalies. Dichloromethane was found at concentrations ranging from 0.5 to 1.8 μg/L in the soil reactors compared to ND to 1 μg/L in the tire chip and tire chip/soil mixture reactors. Likewise, toluene was found at concentrations ranging from 0.9 to 1.1 μg/L in the soil reactors and the blank, compared to 1.1 to 3.6 μg/L in the tire chip and tire chip/soil mixture reactors. Further testing would be required to determine if dichloromethane and toluene are released from tire chips at low concentrations or if the results could be attributed to testing anomalies. None of the volatile compounds were above drinking water standards (where applicable). Dichloromethane was the only volatile organic compound found in the reactor study that was also found in the TCLP extracts.

Some semivolatile compounds were detected in the reactor study. Aniline was detected in water taken from the reactors with tire chips and tire chip/soil mixtures at concentrations ranging from ND to 47.7 μg/L. In addition, the following semivolatile compounds were tentatively identified in some of the water samples taken from reactors with tire chips and tire chip/soil mixtures: 4-acetyl-morpholine, benzoic acid, and 2(H)-benzothiazolone. The estimated concentration of these compounds ranged from non-detect to 600 μg/L. The compound 2(H)-benzothiazolone was also found in the TCLP extracts.

Small scale field trials were constructed to examine the effect of tire chips on groundwater quality in three Maine soil types: glacial till, marine clay, and peat. At each
Small scale field trials were constructed to examine the effect of tire chips on groundwater quality in three Maine soil types: glacial till, marine clay, and peat. At each site a backhoe was used to excavate a 1.7 m (5.5 ft) to 1.8 m (6 ft) deep trench. The trenches were typically 0.6 m (2 ft) to 0.9 m (3 ft) wide, and 3.3 m (10.8 ft) to 4.6 m (15 ft) long. Approximately 1.4 metric tons (1.5 U.S. short tons) of tire chips were placed in each trench. The tire chips were a mixture of steel and glass belted chips with a majority of the chips having steel wires protruding from the cut edges. About 0.3 m (1 ft) of soil was placed over the tire chips. At the peat site, the tire chips were below the water table for the entire year, however, at the clay and till sites, the water table dropped during the summer resulting in the upper part of the tire chip zone being above the water table for part of the year. At each site, a control well was installed upgradient of the trench, one well was installed directly in the tire chips filling the trench, and wells were installed about 0.6 m (2 ft) and 3 m (10 ft) downgradient of the trench. At the peat site, an additional two wells were installed 0.6 m (2 ft) downgradient of the trench.

Water samples taken from the small scale field trials showed that tire chips increased the levels of some metals with a primary drinking water standard but the concentrations were all below their applicable regulatory limits. Dissolved barium levels as high as 57 μg/L were measured in samples taken from the tire chip filled trenches, however, the drinking water standard for barium is 2000 μg/L, so the measured levels are much too low to be of concern. Dissolved chromium levels ranged from <2 to 7 μg/L in the tire chip filled trenches compared to <2 to 3 μg/L in the control wells. Thus, tire chips may slightly elevate the levels of chromium but the levels are well below the drinking water standard of 100 μg/L. The levels of dissolved arsenic, cadmium, and lead were below the method detection limit for all wells. The levels of dissolved copper were generally below the detection limit or the concentration was higher in the control well than in the well in the tire chips. In summary, for the near neutral pH conditions present in this study, there is no concern that tire chips will release harmful levels of metals with a primary drinking water standard.

The field trials showed that the levels of iron and manganese, which have secondary drinking water standards indicating that they are of aesthetic concern, were increased to levels considerably above their respective standard. Levels of dissolved iron ranged from 4210 to 71700 μg/L in the tire chip filled trenches, which is well above its secondary drinking water standard of 300 μg/L. For comparison, the iron levels in the control wells ranged from 18 to 3160 μg/L. Levels of dissolved manganese ranged from 724 to 3430 μg/L in the tire chips compared to its drinking water standard of 50 μg/L and levels in the control wells of 27 to 666 μg/L. The elevated levels of manganese showed some tendency to migrate downgradient, however, this was not the case for iron. Thus, tire chips should be used below the groundwater table only where higher levels of iron and manganese can be tolerated. Zinc was also increased by tire chips, however, the levels were well below its secondary drinking water standard. Dissolved zinc levels in the tire chips ranged from 5 to 123 μg/L which is much less than its drinking water standard of 5000 μg/L. For comparison, the zinc levels in the control wells ranged from <2 to 9 μg/L. The levels of
Low levels of some volatile organic compounds were detected. Dichloromethane was detected in all samples, including the control wells and blanks. Additional sampling will be performed to determine if this is a laboratory contamination problem. The following additional volatile compounds were detected in wells located in the tire chip filled trench: 1,1-dichloroethane (ND to 14.3 μg/L), cis-1,2-dichloroethane (6 to 85.5 μg/L), 1,1,1-trichloroethane (ND to 5.6 μg/L), benzene (ND to 1.8 μg/L), trichloroethylene (ND to 0.6 μg/L), and toluene (ND to 1.8 μg/L). There is some consistency with the laboratory reactor study which also found low levels of 1,1-dichloroethane, cis-1,2-dichloroethane, benzene, and toluene. For compounds with a drinking water standard, the levels were below the standard except for one sampling date for cis-1,2-dichloroethene when the standard was slightly exceeded. A few other compounds were found in the laboratory blanks at concentrations higher than in the sample wells. These were attributed to laboratory contamination.

Semivolatile organic compounds were also detected at low levels in some wells. The following compounds were present in two or more samples: aniline (ND to 91 μg/L); phenol (ND to 55.2 μg/L); p-cresol (ND to 86 μg/L); benzoic acid (ND to 100 μg/L); and 2(3H)-benzothiazolone (ND to 100 μg/L). This is consistent with the laboratory reactor study which found aniline, benzoic acid, and 2(3H)-benzothiazolone as well as 4-acetyl-morpholine which was not found in the field. However, further sampling is required to clarify the level of release of these compounds. In addition, the following compounds were reported in one well on a single sampling date: cyclohexanol (one sample had 40 μg/L); benzothiazole (one sample had 50 μg/L); 2,6-bis-(1,1-dimethylethyl)-2,5-cyclohexadiene-1,4-dione (one sample had 40 μg/L); 1H-isindole-1,2(2H)-dione (one sample had 40 μg/L); 4-(2-benzothiazolylthio)-morpholine (one sample had 50 μg/L); N-(1,1-dimethylethyl)-formamide (one sample had 30 μg/L); and butanoic acid (one sample had 100 μg/L). Further sampling will be required to determine if these compounds are present in trace amounts or if their presence in a single sample is an experimental anomaly.

In summary, for near neutral pH environments, there is no concern that tire chips will release harmful levels of metals with a primary drinking water standard. However, tire chips placed below the water table do leach iron and manganese at levels that will cause their secondary (esthetic) drinking water standards to be exceeded. Thus, tire chips should be used below the groundwater table only where higher levels of iron and manganese can be tolerated. Tire chips placed below the water table leach low levels of some volatile and semivolatile organic compounds. However, the short monitoring period and scatter of the data made it impossible to determine if the levels were high enough to constitute a potential health hazard. Monitoring of organic levels will be continued to clarify the presence or absence of a potential hazard.
New York State
Department of Environmental Conservation

Division of Solid & Hazardous Materials

6 NYCRR Part 360
Solid Waste Management Facilities
Title 6 of the Official Compilation of Codes, Rules and Regulations
Effective September 29, 1997

Reprinted: March 1998

GEORGE E. PATAKI, Governor
JOHN P. CAHILL, Commissioner
6 NYCRR PART 360
SOLID WASTE MANAGEMENT FACILITIES

Title 6

of the

Official Compilation of Codes, Rules and Regulations

Filed October 28, 1988; Effective December 31, 1988

Revised Effective March 27, 1990
With promulgation of new Subpart 15
Grants for Comprehensive Solid Waste Management Planning

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With repeal of existing Subpart 9 and
promulgation of new Subpart 9
State Assistance for Municipal Landfill Closure Projects

Revised Effective January 35, 1992
With repeal of existing Subpart 10 and
repeal of Subpart 9
Regulated Medical Waste Storage, Containment and Disposal, and
new Subpart 19 Regulated Medical Waste Treatment Facilities

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With adoption of amendments
to existing Subparts 1 through 17

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State Assistance and Loans for Municipal Landfill Closure Projects

Revised Effective January 14, 1995
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Revised Effective November 30, 1996
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With adoption of existing Subpart 9

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Solid & Hazardous Materials

50 Wolf Road
Albany, New York 12233-7250
GENERAL PROVISIONS

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migration, odors and vectors. Termination of use includes those situations where a facility has not received solid waste for more than one year, unless otherwise provided by permit, or if the permit has expired. Termination of use also results from permit denial or order of the commissioner or of a court. Specific closure measures which may also include corrective actions as specified in this Part are subject to approval by the department.

Section 360-1.10 Beneficial use.

(a) Applicability.

(1) This section applies to materials that, before being beneficially used (as determined by the department), were solid waste. This section does not apply to solid wastes subject to regulation under Subpart 360-6 of this Part, except in the manner identified in subdivision 360-1.11(b) of this Part.

(2) Beneficial use determinations granted by the department before the effective date of this section shall remain in effect, subject to all conditions contained therein, unless specifically addressed by subsequent department action.

(b) Solid waste cessation. The following items are not considered solid waste for the purposes of this Part when used as described in this subdivision:

(1) materials identified in subparagraphs 371-1.5(1)(vii)-(viii) of this Title that cease to be solid waste under the conditions identified in those subparagraphs;

(2) compost and other distribution and marketing (D&M) products that satisfy the applicable requirements under Subpart 350-5 of this Part;

(3) undersized wood, wood chips, or bark from land clearing, logging operations, utility line clearing and maintenance operations, pulp and paper production, and wood products manufacturing, where these materials are placed in commerce for service as mulch, landscaping, animal bedding, erosion control, wood fuel production, and bulking agent in a compost facility operated in compliance with Subpart 360-6 of this Part;

(4) uncontaminated newspaper or newspaper when used as animal bedding;

(5) uncontaminated glass when used as a substitute for conventional aggregate in asphalt or subsurface applications;

(6) tire chips when used as an aggregate for road base materials or asphalt pavements in accordance with New York State Department of Transportation standard specifications, or whole tires or tire chips when used for energy recovery;

(7) uncontaminated soil which has been excavated as part of a construction project, and which is being used as a fill material, at place of soil native to the site of disposal;

(8) nonhazardous, contaminated soil which has been excavated as part of a construction project, other than a department-approved or undertaken inactive hazardous waste disposal site remediation program, and which is used as backfill for the same excavation or excavations containing similar contaminants at the same site. Excess materials on these projects are subject to the requirements of this Part. (Note: use of in-place and stockpiled soil from a site being converted to a realty subdivision, as defined by the Public Health Law (16 NYCRR 742), must be approved by the local health department.);

(9) nonhazardous petroleum contaminated soil which has been decontaminated to the satisfaction of the department and is being used in a manner acceptable to the department;

(10) solid wastes which are approved in advance, in writing, by the department for use as daily cover material on other landfill liner or final cover system components pursuant to the provisions of subdivision 360-2.1(w) of this Part when those materials are received at the landfill;

(11) recognizable, uncontaminated concrete and concrete products, asphalt pavement, brick, glass, soil and rock placed in commerce for service as a substitute for conventional aggregate;

(12) nonhazardous petroleum contaminated soil when incorporated into asphalt pavement produced by a producer authorized by the department;

(13) undersized wood combustion bottom ash, fly ash, or combined ash when used as a soil amendment or fertilizer, provided the application rate of the wood ash is limited to the nutrient need of the crop planted on the land on which the wood ash will be applied and does not exceed 16 dry tons per acre per year;

(14) coal combustion bottom ash placed in commerce to serve as a component in the manufacture of roofing shingles or asphalt products, or as a reclamation agent on roadways, parking lots and other driving surfaces;
(13) coal combustion fly ash or gas scrubbing by-products placed in commerce to serve as an ingredient to produce light weight block, light weight aggregate, low-strength backfill material, manufactured gypsum or manufactured calcium chloride; and

(14) coal combustion fly ash or coal combustion bottom ash placed in commerce to serve as a cement or aggregate substitute in concrete or concrete products, as raw feed in the manufacture of cement, or placed in commerce to serve as structural fill within building foundations when placed above the seasonal high groundwater table;

(c) Special reporting requirements. No later than 60 days after the first day of January following each year of operation, the generator of coal combustion ash must submit a report to the department that identifies the respective quantities of coal combustion bottom ash, fly ash, and gas scrubbing by-products it generated during the calendar year to which it pertains and, with respect to coal combustion bottom ash, how much was sent to a manufacturer of roofing shingles or asphalt products, how much was used as a reagent agent on roadways, parking lots, and other driving surfaces, how much was sent to a manufacturer of cement, concrete or concrete products, and how much was used as structural fill; and, with respect to coal combustion fly ash and to gas scrubbing by-products, how much was used to produce light weight block, light weight aggregate, low strength backfill material (stabilized fill), manufactured gypsum or manufactured calcium chloride.

(2) Case-specific beneficial use determinations.

(1) The generator or proposed user of a solid waste may petition the department, in writing, for a determination that the solid waste under review in the petition may be beneficially used in a manufacturing process to make a product or as an effective substitute for a commercial product. Unless otherwise directed by the department, the department may not consider any such petition unless it provides the following:

(i) description of the solid waste under review and its proposed use;

(ii) chemical and physical characteristics of the solid waste under review and of each type of proposed product;

(iii) a demonstration that there is a known or reasonably probable market for the intended use of the solid waste under review and of all proposed products by providing one or more of the following:

(a) a contract to purchase the proposed product or to have the solid waste under review used in the manner proposed;

(b) a description of how the proposed product will be used;

(c) a demonstration that the proposed product complies with industry standards and specifications for that product; or

(d) other documentation that a market for the proposed product or use exists; and

(iv) a demonstration that the management of the solid waste under review will not adversely affect human health and safety, the environment, and natural resources by providing:

(a) a solid waste control plan that describes the following:

(b) the source of the solid waste under review, including contractual arrangements with the supplier;

(2) procedures for periodic testing of the solid waste under review and the proposed product to ensure that the proposed product's composition has not changed significantly;

(3) the dispossession of any solid waste which may result from the manufacture of the product into which the solid waste under review is intended to be incorporated;

(4) a description of the type of storage (e.g., tank or pile) and the maximum anticipated inventory of the solid waste under review (not to exceed 99 days) before being used;

(5) procedures for run-on and run-off control of the storage areas for the solid waste under review; and

(6) a program and implementation schedule of best management practices designed to minimize uncontrolled dispersion of the solid waste under review before and during all aspects of its storage as inventory and/or during beneficial use; and

(a) a contingency plan that contains the information and is prepared in accordance with subdivision 350-1.5(b) of this Part.

(2) The department will determine in writing, on a case-by-case basis, whether the proposal constitutes a beneficial use based on a showing that all of the following criteria have been met:

(i) the essential nature of the proposed use of the material constitutes a reuse rather than disposal;
Honorable Joseph H. Boardman  
New York State Department of Transportation  
Building 5  
Averill S. Harriman State Office Building Campus  
1220 Washington Avenue  
Albany, New York 12232  

Dear Commissioner Boardman:  

As you are aware, the Waste Tire Management and Recycling Act of 2003 (Act) has, for the first time, allowed State government to aggressively address the problem of stockpiled waste tires by providing a funding source for the abatement of these piles and for the development of sustainable markets for waste tires system. The Act directs State agencies to work together to resolve this long-standing problem. With the solid partnership between the New York State Departments of Environmental Conservation (Department), the New York State Department of Transportation (DOT), and other State agencies, we believe that Governor Pataki's program to rid the landscape of these tire piles will be realized.

Since the Act's passage, the Department's Division of Solid & Hazardous Materials and DOT's Technical Services Division have been collaborating on plans to recycle millions of these tires into beneficial uses in State highway construction. Our respective staffs have identified a number of DOT capital projects where shredded tires can be used as a substitute for conventional materials in road embankment construction, and are proceeding with implementation.

The Department is anticipating an aggressive effort for abatement based on the use of millions of shredded tires in the identified DOT projects, and are pleased by DOT's commitment to this process. The availability of this market opportunity through DOT's capital program is crucial for the success of the stockpile abatement program, as few markets currently exist for tire chips from the abatement of tire piles.
Department staff are currently preparing final plans and specifications for competitive bidding on nine high priority projects at sites across New York State. Contracts should be awarded this spring. Tire chips should start to be available for DOT projects in the late spring.

Thanks to DOT’s commitment to the use of shredded tires in highway projects, Governor Pataki’s program for waste tire abatement should make great strides this year.

Sincerely,

Erin M. Croddy
APPENDIX J


TITLE 19
WASTE TIRE MANAGEMENT AND RECYCLING

S. 1406--B
140 A.
2106--B

1 SECTION 27-1901. DEFINITIONS.
2 27-1903. WASTE TIRE MANAGEMENT PRIORITIES.
3 27-1905. MANDATORY TIRE ACCEPTANCE.
4 27-1907. ABATEMENT OF NONCOMPLIANT WASTE TIRE STOCKPILES.
5 27-1909. MARKET DEVELOPMENT.
6 27-1911. PROHIBITION ON LAND BURIAL.
7 27-1913. WASTE TIRE MANAGEMENT AND RECYCLING FEE.
8 27-1915. USE OF WASTE TIRE MANAGEMENT AND RECYCLING FEE FUNDS.

9 WHEN USED IN THIS TITLE:
10 1. "ABATEMENT" MEANS THE REMOVAL OF A SUFFICIENT NUMBER OF WASTE TIRES FROM A NONCOMPLIANT WASTE TIRE STOCKPILE AND RESTORATION OF THE SITE TO A CONDITION THAT IS IN SUBSTANTIAL COMPLIANCE WITH THE RULES AND REGULATIONS ADMINISTERED BY THE DEPARTMENT FOR WASTE TIRE STORAGE FACILITIES.
11 2. "BENEFICIAL USE" MEANS THE USE OF SOLID WASTE MATERIAL, WHICH WOULD OTHERWISE NEED TO BE PLACED IN A LANDFILL OR DISPOSED OF THROUGH NATIVE MEANS, IN SUCH A MANNER THAT THE NATURE OF THE USE OF THE MATERIAL CONSTITUTES A REUSE RATHER THAN DISPOSAL. BENEFICIAL USES INCLUDE INCORPORATION OF A SOLID WASTE MATERIAL, WHICH IS A LEGITIMATE SUBSTITUTE FOR A RAW MATERIAL, INTO A PRODUCT MARKETABLE TO AN END USER.
12 WASTE TIRES WHICH ARE BURNED AS A FUEL FOR THE PURPOSES OF RECOVERING USEABLE ENERGY ARE CONSIDERED TO BE BENEFICIALLY USED ONLY AT THE POINT AT WHICH THEY ARE BURNED.
13 3. "END USE" MEANS THAT A PRODUCT requires no further processing or manufacturing and is used by a consumer for the product's intended application.
14 4. "END USER" MEANS THE ULTIMATE CUSTOMER OF A FINISHED PRODUCT.
5. "NEW TIRES" MEANS TIRES THAT HAVE NEVER BEEN PLACED ON A MOTOR VEHICLE WHEEL RIM OR TIRES PLACED ON A MOTOR VEHICLE PRIOR TO ITS ORIGINAL RETAIL SALE. IT DOES NOT INCLUDE RECAPPED OR RESOLD TIRES.

6. "NONCOMPLIANT WASTE TIRE STOCKPILE" MEANS A FACILITY, INCLUDING A WASTE TIRE STORAGE FACILITY, PARCEL OF PROPERTY, OR SITE SO DESIGNATED BY THE DEPARTMENT IN ACCORDANCE WITH THIS TITLE, WHERE ONE THOUSAND OR MORE WASTE TIRES OR MECHANICALLY PROCESSED WASTE TIRES HAVE BEEN ACCUMULATED, STORED OR BURIED IN A MANNER THAT THE DEPARTMENT OR A COURT OF COMPETENT JURISDICTION HAS DETERMINED VIOLATES ANY JUDICIAL ADMINISTRATIVE ORDER, DECREES, LAW, REGULATION, OR PERMIT OR STIPULATION RELATING TO WASTE TIRES, WASTE TIRE STORAGE FACILITIES OR SOLID WASTE.

7. "RECYCLE" MEANS TO USE RECYCLABLES IN MANUFACTURING A PRODUCT FOR AN END USE OTHER THAN BURNING FOR RECOVERY OF USEABLE ENERGY.

8. "RECYCLABLES" MEANS SOLID WASTE MATERIALS THAT EXHIBIT THE POTENTIAL TO BE USED TO MAKE MARKETABLE PRODUCTS FOR END USERS.

9. "REMOVED FROM SERVICE" MEANS REMOVED WITHIN NEW YORK STATE FROM THE SERVICE FOR WHICH THE TIRES WERE INTENDED TO BE USED WHEN THE TIRES AND TIRE CASINGS WERE SEPARATED FOR RETREADING.

10. "RETAIL SALE" MEANS THE SALE TO ANY PERSON IN THE STATE FOR ANY PURPOSE OTHER THAN RESALE.

11. "TIRE SERVICE" MEANS ANY PERSON OR BUSINESS IN NEW YORK STATE WHO SELLS OR INSTALLS NEW TIRES FOR USE ON ANY VEHICLE AND ANY PERSON OR BUSINESS WHO ENGAGES IN THE RETAIL SALE OF NEW MOTOR VEHICLES. A PERSON WHO IS NOT THE END POINT OF SALE AND ANY GOVERNMENTAL AGENCY OR POLITICAL SUBDIVISION ARE EXCLUDED FROM THIS TERM.

12. "VEHICLE" OR "MOTOR VEHICLE" MEANS ANY DEVICE WHICH BY VIRTUE OF ITS DESIGN COULD QUALIFY FOR REGISTRATION PURSUANT TO SECTION FOUR HUNDRED ONE OF THE VEHICLE AND TRAFFIC LAW.

S. 1406--B

1 13. "WASTE TIRE" MEANS ANY SOLID WASTE WHICH CONSISTS OF WHOLE TIRES OR PORTIONS OF TIRES. TIRE CASINGS SEPARATED FOR RETREADING AND TIRES
3 WITH SUFFICIENT TREAD FOR RESALE SHALL BE INCLUDED UNDER THIS TERM,
4 HOWEVER, CRUMB RUBBER SHALL NOT BE CONSIDERED A SOLID WASTE.
5 14. "WASTE TIRE STORAGE FACILITY" MEANS A FACILITY AT WHICH WASTE
6 TIRES ARE STORED AND FOR WHICH A PERMIT OR REGISTRATION HAS BEEN
7 ISSUED,
8 PURSUANT TO DEPARTMENT REGULATIONS.
9 S 27-1903. WASTE TIRE MANAGEMENT PRIORITIES.
10 IN THE INTEREST OF PUBLIC HEALTH, SAFETY AND WELFARE AND IN
11 ORDER TO
12 CONSERVE NATURAL RESOURCES AND TO PROMOTE RECYCLING AND MARKET
13 DEVELOP-
14 MENT FOR WASTE TIRES, THE STATE OF NEW YORK ESTABLISHES A POLICY
15 ON THE
16 MANAGEMENT OF WASTE TIRES THAT STATES:
17 1. THE WASTE TIRE MANAGEMENT PRIORITIES IN THIS STATE ARE:
18 (A) FIRST, TO REDUCE THE NUMBER OF WASTE TIRES GENERATED;
19 (B) SECOND, TO REMEDIATE WASTE TIRE STOCKPILES IN
20 NONCOMPLIANCE;
21 (C) THIRD, TO RECYCLE WASTE TIRES INTO VALUE-ADDED PRODUCTS;
22 (D) FOURTH, TO BENEFICIALLY USE WASTE TIRES IN AN
23 ENVIRONMENTALLY
24 ACCEPTABLE MANNER, INCLUDING THE BENEFICIAL USE IN CIVIL
25 ENGINEERING
26 APPLICATIONS; AND
27 (E) FIFTH, TO RECOVER, IN AN ENVIRONMENTALLY ACCEPTABLE MANNER
28 CONSISTENT WITH THE PURPOSE OF THIS CHAPTER, ENERGY FROM
29 WASTE TIRES
30 THAT CANNOT BE ECONOMICALLY RECYCLED OR OTHERWISE BENEFICIALLY
31 USED.
32 2. STATE GOVERNMENT MUST MAKE AN ESSENTIAL CONTRIBUTION TO
33 THE DEVELOP-
34 MENT AND IMPLEMENTATION OF ENVIRONMENTALLY, ECONOMICALLY AND
35 TECHNI-
36 CALLLY VAILABLE WASTE TIRE MANAGEMENT PROGRAMS. THE DEPARTMENT
37 SHALL COOP-
38 ERATE WITH OTHER STATE AGENCIES, INCLUDING THE DEPARTMENT OF
39 ECONOMIC
40 DEVELOPMENT, NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT
41 AUTHORITY,
42 THE DEPARTMENT OF TRANSPORTATION, THE NEW YORK STATE THRUWAY
43 AUTHORITY
44 AND THE DEPARTMENT OF HEALTH, TO ENSURE THAT WASTE TIRES ARE
45 EFFECTIVELY
46 MANAGED AND USED IN ENVIRONMENTALLY ACCEPTABLE WAYS CONSISTENT
47 WITH THE
48 PURPOSES OF THIS CHAPTER.
49 S 27-1905. MANDATORY TIRE ACCEPTANCE.
50 ANY TIRE SERVICE SHALL:
51 1. ACCEPT FROM A CUSTOMER, WASTE TIRES OF APPROXIMATELY THE
52 SAME SIZE
53 AND IN A QUANTITY EQUAL TO THE NUMBER OF NEW TIRES
54 PURCHASED OR
55 INSTALLED BY THE CUSTOMER; AND
2. POST WRITTEN NOTICE IN A PROMINENT LOCATION, WHICH MUST BE AT LEAST EIGHT AND ONE-HALF INCHES BY FOURTEEN INCHES IN SIZE AND CONTAIN THE FOLLOWING LANGUAGE:

"NEW YORK STATE LAW REQUIRES US TO ACCEPT AND MANAGE WASTE TIRES FROM VEHICLES IN EXCHANGE FOR AN EQUAL NUMBER OF NEW TIRES THAT WE SELL OR INSTALL. WE ARE REQUIRED TO CHARGE A SEPARATE AND DISTINCT WASTE TIRE MANAGEMENT AND RECYCLING FEE OF $2.50 FOR EACH NEW TIRE WE SELL. ANY ADDITIONAL TIRE MANAGEMENT AND RECYCLING COSTS ARE INCLUDED IN THE ADVERTISED PRICE OF THE NEW TIRE."

S 27-1907. ABATEMENT OF NONCOMPLIANT WASTE TIRE STOCKPILES.

1. NO LATER THAN ONE YEAR FROM THE EFFECTIVE DATE OF THIS TITLE, THE DEPARTMENT SHALL PREPARE AND SUBMIT TO THE GOVERNOR AND THE LEGISLATURE A COMPREHENSIVE PLAN DESIGNED TO ABATE ALL NONCOMPLIANT WASTE TIRE STOCKPILES BY DECEMBER THIRTY-FIRST, TWO THOUSAND TEN. THIS PLAN SHALL ESTABLISH A NONCOMPLIANT WASTE TIRE STOCKPILE ABATEMENT PRIORITY LIST AND SCHEDULE FOR ABATEMENT OF EACH NONCOMPLIANT WASTE TIRE STOCKPILE BASED ON POTENTIAL ADVERSE IMPACTS UPON PUBLIC HEALTH, SAFETY OR WELFARE, THE ENVIRONMENT, OR NATURAL RESOURCES. THE PLAN SHALL ALSO INCLUDE A CENSUS OF COMPLIANT AND NON-COMPLIANT WASTE TIRE STOCKPILES IN

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1 THE STATE AND THE NUMBER OF WASTE TIRES BELIEVED TO BE STORED AT EACH SITE.

2 THE OWNER OR OPERATOR OF A NONCOMPLIANT WASTE TIRE STOCKPILE SHALL, AT THE DEPARTMENT'S REQUEST, SUBMIT TO AND/OR COOPERATE WITH ANY AND ALL REMEDIAL MEASURES NECESSARY FOR THE ABATEMENT OF NONCOMPLIANT WASTE TIRE STOCKPILES WITH FUNDS FROM THE WASTE TIRE MANAGEMENT AND RECYCLING FUND PURSUANT TO SECTION NINETY-TWO-BB OF THE STATE FINANCE LAW.

3 NO LATER THAN TWO YEARS FROM THE EFFECTIVE DATE OF THIS TITLE, THE DEPARTMENT SHALL PUBLISH REQUESTS FOR PROPOSALS TO SEEK CONTRACTORS TO PREPARE WHOLE AND MECHANICALLY PROCESSED WASTE TIRES SITUATED AT NONCOM---
PLIANT WASTE TIRE STOCKPILES FOR ARRANGEMENT IN ACCORDANCE WITH FIRE
SAFETY REQUIREMENTS AND FOR REMOVAL FOR APPROPRIATE PROCESSING,
RECYCLING OR BENEFICIAL USE. DISPOSAL WILL BE CONSIDERED ONLY AS A LAST OPTION. THE EXPENSES OF REMEDIAL AND FIRE SAFETY ACTIVITIES AT A NONCOMPLIANT WASTE TIRE STOCKPILE SHALL BE PAID BY THE PERSON OR PERSONS WHO OWNED, OPERATED OR MAINTAINED THE NONCOMPLIANT WASTE TIRE STOCKPILE, OR FROM THE WASTE TIRE MANAGEMENT AND RECYCLING FUND AND SHALL BE A DEBT RECOVERABLE BY THE STATE FROM ALL PERSONS WHO OWNED, OPERATED OR MAIN- TAINED THE NONCOMPLIANT WASTE TIRE STOCKPILE, AND A LIEN AND CHARGE MAY BE PLACED ON THE PREMISES UPON WHICH THE NONCOMPLIANT WASTE TIRE STOCKPILE IS MAINTAINED AND UPON ANY REAL OR PERSONAL PROPERTY, EQUIPMENT, VEHICLES, AND INVENTORY CONTROLLED BY SUCH PERSON OR PERSONS. MONEYS RECOVERED SHALL BE PAID TO THE WASTE TIRE MANAGEMENT AND RECYCLING FUND ESTABLISHED PURSUANT TO SECTION NINETY-TWO-BB OF THE STATE FINANCE LAW.

4. IF EXECUTION UPON A JUDGMENT FOR THE RECOVERY OF THE EXPENSES OF ANY SUCH REMEDIAL AND FIRE SAFETY ACTIVITIES AT A NONCOMPLIANT WASTE TIRE STOCKPILE IS RETURNED WHOLLY OR PARTIALLY UNSATISFIED, SUCH JUDGMENT, IF DOCKETED IN THE PLACE AND MANNER REQUIRED BY LAW TO MAKE A JUDGMENT OF A COURT OF RECORD A LIEN UPON REAL PROPERTY, SHALL BE A FIRST LIEN UPON SUCH PREMISES, HAVING PREFERENCE OVER ALL OTHER LIENS AND ENCUMBRANCES WHATEVER. NOTWITHSTANDING THE FOREGOING, SUCH LIEN SHALL NOT HAVE PREFERENCE OVER ANY MORTGAGE OR OTHER ENCUMBRANCE FOR THE BENEFIT OF THE STATE OF NEW YORK OR A PUBLIC BENEFIT CORPORATION THEREOF.

5. THE DEPARTMENT SHALL MAKE ALL REASONABLE EFFORTS TO RECOVER THE FULL AMOUNT OF ANY FUNDS EXPENDED FROM THE WASTE TIRE MANAGEMENT AND RECYCLING FUND FOR ABATEMENT OR REMEDIATION THROUGH LITIGATION OR COOPERATIVE AGREEMENTS. ANY AND ALL MONEYS RECOVERED, REPAYED OR REIMBURSED PURSUANT TO THIS SECTION SHALL BE DEPOSITED WITH THE COMPTROLLER AND
6. The Department shall have authority to enter all noncompliant waste tire stockpiles for the purpose of investigation and abatement.

Marketable Development.

No later than one year after the effective date of this Title and continuing annually thereafter, the Department of Economic Development shall:

1. Assist private market development with new technologies for waste tire reuse and recycling with an emphasis on higher-value end uses in order to further create and enhance sustainable markets;

2. Provide industrial and consumer education on other benefits of recycled waste tire product through the preparation of fact sheets and public workshops; and

3. Prepare an annual summary report and analysis of markets and disposition of both New York State stockpiled tires and New York State-generated waste tires. This report shall be submitted to the Department and Legislature by the last day of March of each year.
TIRE SERVICE AT THE TIME THE NEW TIRE OR NEW MOTOR VEHICLE IS PURCHASED.

THE WASTE TIRE MANAGEMENT AND RECYCLING FEE DOES NOT APPLY TO:

(A) RECAPPED OR RESOLD TIRES;

(B) MAIL-ORDER SALES; OR

(C) THE SALE OF NEW MOTOR VEHICLE TIRES TO A PERSON SOLELY FOR THE PURPOSE OF RESALE PROVIDED THE SUBSEQUENT RETAIL SALE IN THIS STATE IS SUBJECT TO SUCH FEE.

1. THE TIRE SERVICE SHALL COLLECT THE WASTE TIRE MANAGEMENT AND RECYCLING FEE FROM THE PURCHASER AT THE TIME OF THE SALE AND SHALL REMIT SUCH FEE TO THE DEPARTMENT OF TAXATION AND FINANCE WITH THE QUARTERLY REPORT FILED PURSUANT TO SUBDIVISION THREE OF THIS SECTION.

(A) THE FEE IMPOSED SHALL BE STATED AS AN INVOICE ITEM SEPARATE AND DISTINCT FROM THE SELLING PRICE OF THE TIRE.

(B) THE TIRE SERVICE SHALL BE ENTITLED TO RETAIN AN ALLOWANCE OF TWENTY-FIVE CENTS PER TIRE FROM FEES COLLECTED.

(C) ANY ADDITIONAL MANAGEMENT AND RECYCLING COSTS OF THE RETAILER SHALL BE INCLUDED IN THE PUBLISHED SELLING PRICE OF THE NEW TIRE.

3. EACH TIRE SERVICE MAINTAINING A PLACE OF BUSINESS IN THIS STATE SHALL MAKE A RETURN TO THE DEPARTMENT OF TAXATION AND FINANCE ON A QUARTERLY BASIS, WITH THE RETURN FOR JANUARY, FEBRUARY, AND MARCH OF A GIVEN YEAR BEING DUE BY APRIL THIRTIETH OF THAT YEAR; THE RETURN FOR APRIL, MAY, AND JUNE OF A GIVEN YEAR BEING DUE BY JULY THIRTY-FIRST OF THAT YEAR; THE RETURN FOR JULY, AUGUST, AND SEPTEMBER OF A GIVEN YEAR BEING DUE BY OCTOBER THIRTY-FIRST OF THAT YEAR; AND THE RETURN FOR OCTOBER, NOVEMBER, AND DECEMBER OF A GIVEN YEAR BEING DUE BY JANUARY THIRTY-FIRST OF THE FOLLOWING YEAR.

(A) EACH RETURN SHALL INCLUDE:

(I) THE NAME OF THE TIRE SERVICE;


(III) THE NAME AND SIGNATURE OF THE PERSON PREPARING THE RETURN;

(IV) THE TOTAL NUMBER OF NEW TIRES SOLD AT RETAIL FOR THE PRECEDING
49 QUARTER AND THE TOTAL NUMBER OF NEW TIRES PLACED ON MOTOR
VEHICLES PRIOR
50 TO ORIGINAL RETAIL SALE;
51 (V) THE AMOUNT OF WASTE TIRE MANAGEMENT AND RECYCLING FEES
DUE; AND
52 (VI) SUCH OTHER REASONABLE INFORMATION AS THE DEPARTMENT OF
TAXATION
53 AND FINANCE MAY REQUIRE.
54 (B) COPIES OF EACH REPORT SHALL BE RETAINED BY THE TIRE
SERVICE FOR
55 THREE YEARS.

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1 IF A TIRE SERVICE CEASES BUSINESS, IT SHALL FILE A FINAL
RETURN AND
2 REMIT ALL FEES DUE UNDER THIS TITLE WITH THE DEPARTMENT OF
TAXATION AND
3 FINANCE NOT MORE THAN ONE MONTH AFTER DISCONTINUING THAT
BUSINESS.
4 4. ALL WASTE TIRE MANAGEMENT AND RECYCLING FEES
COLLECTED BY THE
5 DEPARTMENT OF TAXATION AND FINANCE SHALL BE TRANSFERRED TO
THE WASTE
6 TIRE MANAGEMENT AND RECYCLING FUND PURSUANT TO SECTION NINETY-
TWO-BB OF
7 THE STATE FINANCE LAW.
8 S 27-1915. USE OF WASTE TIRE MANAGEMENT AND RECYCLING FEE FUNDS.
9 FUNDS FROM THE WASTE TIRE MANAGEMENT AND RECYCLING FUND
ESTABLISHED IN
10 SECTION NINETY-TWO-BB OF THE STATE FINANCE LAW, SHALL BE MADE
FOR THE
11 FOLLOWING PURPOSES:
12 1. COSTS OF THE DEPARTMENT FOR THE FOLLOWING:
13 (A) FIRST-YEAR COSTS:
14 (I) ENUMERATION AND ASSESSMENT OF NONCOMPLIANT WASTE TIRE
STOCKPILES;
15 AND
16 (II) AERIAL RECONNAISSANCE TO LOCATE, SURVEY AND
CHARACTERIZE SITES
17 ENVIRONMENTALLY, FOR REMOTE SENSING, SPECIAL ANALYSIS AND
SCANNING;
18 (B) ABATEMENT OF NONCOMPLIANT WASTE TIRE STOCKPILES; AND
19 (C) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.
20 2. COSTS OF THE DEPARTMENT OF ECONOMIC DEVELOPMENT FOR THE
FOLLOWING:
21 (A) CONDUCTING AN UPDATED MARKET ANALYSIS OF OUTLETS FOR
WASTE TIRE
22 UTILIZATION INCLUDING RECYCLING AND ENERGY RECOVERY
OPPORTUNITIES;
23 (B) ESTABLISHMENT OF A PROGRAM TO PROVIDE FUNDS TO
BUSINESSES TO
24 DEVELOP TECHNOLOGY THAT LEADS TO INCREASED MARKETS FOR WASTE
TIRES;
25 (C) FUNDING OF DEMONSTRATION PROJECTS; AND
26 (D) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.
3. COSTS OF THE DEPARTMENT OF TRANSPORTATION FOR THE FOLLOWING:
   (A) FUNDING OF DEMONSTRATION AND OTHER PROJECTS FOR ROAD BASE, PAVING AND OTHER CIVIL ENGINEERING USES; AND
   (B) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.

4. COSTS OF THE NEW YORK STATE THRUWAY AUTHORITY FOR THE FOLLOWING:
   (A) FUNDING OF DEMONSTRATION AND OTHER PROJECTS FOR ROAD BASE, PAVING AND OTHER CIVIL ENGINEERING USES; AND
   (B) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.

5. COSTS OF THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY FOR THE FOLLOWING:
   (A) FUNDING RESEARCH PROJECTS WHICH WILL ENHANCE SUSTAINABLE WASTE TIRE RECYCLING ACTIVITIES; AND
   (B) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.

6. COSTS OF THE DEPARTMENT OF HEALTH FOR THE FOLLOWING:
   (A) RECOMMENDATIONS TO PROTECT PUBLIC HEALTH; AND
   (B) ADMINISTRATION OF REQUIREMENTS OF THIS SECTION.

ANY FUNDS NOT USED FOR A GIVEN YEAR SHALL BE RETURNED TO THE FUND AND BE ADDED TO THE TOTAL FUNDS AVAILABLE FOR DISBURSEMENT IN THE SUCCEEDING YEAR.

S 4. The state finance law is amended by adding a new section 92-bb to read as follows: