



## Nonhazardous Recycled Materials: A Reuse Information System

The construction materials cycle begins with the extraction or harvest of raw materials and transformation to a commodity, which is then incorporated into a finished material or product.

This product is then used for some purpose such as a road, building, or other consumer product. Once the useful life of that structure or product is over, it then becomes a part of the waste stream. That waste

stream can either terminate in a landfill, or the material may be recycled for further use (Figure 1).

Several materials have been considered as candidates for recycling into Texas

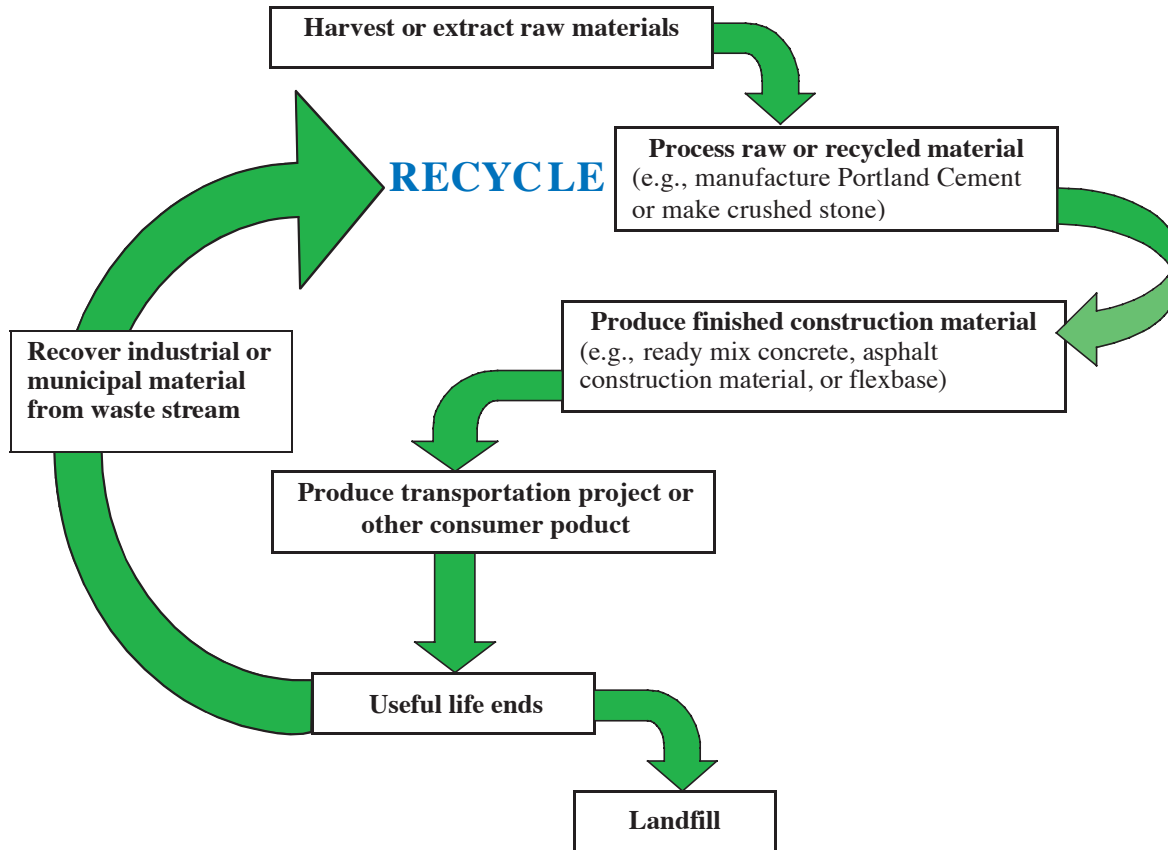


Figure 1. Construction Materials Cycle.



Department of Transportation (TxDOT) projects and have been tested in one or more demonstration projects. Some of these materials include plastics, glass, rubber, recycled asphalt, and slag.

### *What We Did...*

Researchers developed a Nonhazardous Recyclable Materials Information System, in a web-based database format, designed to provide information to designers, suppliers, generators, and processors that produce or furnish raw materials or finished products to TxDOT contractors. This system might have application as an information gathering and dissemination system to help TxDOT meet its regulatory reporting obligations. Initially the focus was on finding data sources for key virgin construction materials and nonhazardous recycled materials (NRMs).

The structure of the system consists of three major parts: user interface, data acquisition and maintenance section, and primary database. The data collection functions are automated using the Internet and e-mail as the means of collecting and checking data. The

user interface is a simple fill-in-the-blank page with drop-down lists. This structure lets the user simply click and select search categories. The data within the system are linked so that users can concurrently display spatial and tabular information in the data set.

The data acquisition module utilizes e-mail as the primary means of locating and collecting data from generators, processors, and suppliers of NRMs and virgin materials. These data reflect active generators of recycled materials only and not potential. A maintenance module collects this information for checking and approval before sending it to the primary database.

Due to the sensitive nature of some of the mapped information, this module is protected by login ID and password. After logging in, users are presented with a link to a series of map layers showing the locations of all identified active NRM producers as well as active and inactive quarries (Figure 2) in the state of Texas. This module is expected to grow after implementation as additional links to useful resources are identified and as other maps are produced.

### *What We Found...*

Recycling or reuse of materials that are currently in the waste stream and directed to sanitary landfills is a technology in its infancy. Reliable infrastructure for collecting raw materials and storing, processing, and remanufacturing usable products is not yet in place for the vast majority of the NRMs considered.

There is a gap in the knowledge about the use of NRMs in transportation construction. Significant questions exist regarding quality standards, chemical compatibility, long-term performance, material stability, and cost-effectiveness. Numerous test and demonstration projects have been undertaken for NRM use in transportation construction. While the results of these projects often have been reported in glowing terms, troublesome issues of special handling and mixing requirements, transport costs, material storage, large volume availability, and overall reliability of the waste stream are not reported. This leaves the impression that a particular NRM application is practical when in fact it is not at all practical in day-to-day construction practice.



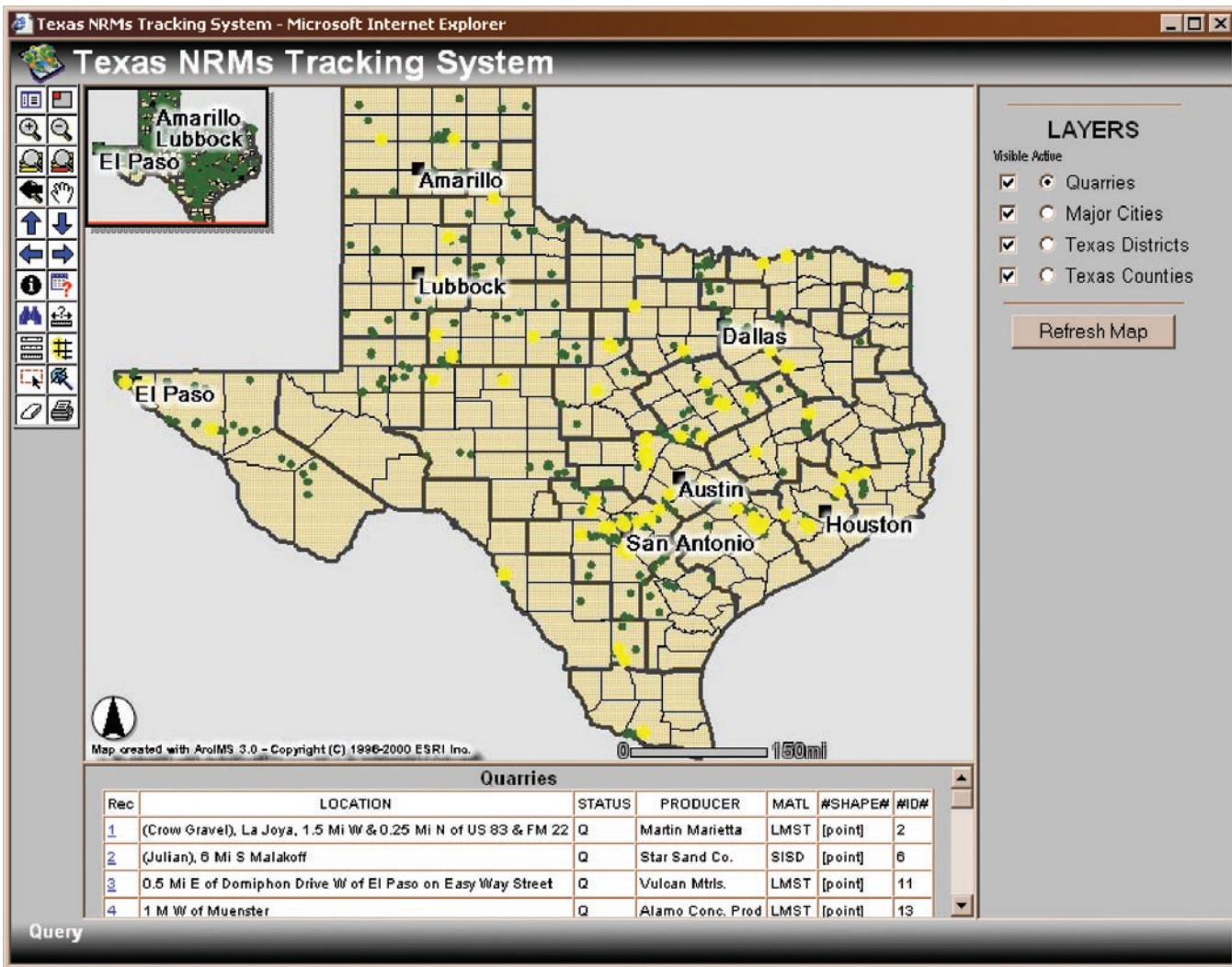


Figure 2. Map of Active and Inactive Quarries in Texas.

### The Researchers Recommend...

The database module that produces the potential market information from the monthly lettings could be of value in stimulating suppliers and processors of NRM-based material to market more effectively to TxDOT contractors. Some consideration might be given to implementing the potential market information system section as part

of the recycling portion of the TxDOT website.

More research is essential for those NRMs for which there is a potentially continuous high-volume waste stream; such as glass containers and scrap tires. This research needs to span the gap between mere possibility and achievable application, and to explore the means to make reuse a practical, cost-effective part of the material production process.



## *For More Details . . .*

The research is documented in Report 0-4249-2, *Information System for Facilitating the Use of Nonhazardous Recycled Materials in Construction*.

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## *TxDOT Implementation Status March 2004*

The research resulted in a Nonhazardous Recyclable Materials Information System, a web-based database that contains data on generators, processors, and suppliers of nonhazardous recycled materials (NRMs) and virgin materials. The research will be used to promote and facilitate the enhanced use of NRMs in Texas.

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