FULL REPORT

TIRE FLOW STUDY IN THE TEXAS–MEXICO BORDER REGION

Produced for

United States Environmental Protection Agency, Region 6
&
North American Development Bank

By

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Disclaimer

Integrated Environmental Management Services, S. A. de C.V. (IEMS) was retained by the North American Development Bank (NADB) to conduct the project titled “Tire Flow Study in the Texas-Mexico Border Region” with the financial support of the United States Environmental Protection Agency, Region 6 (EPA).

Although this document has been reviewed by NADB and EPA, assertions and conclusions here contained are from IEMS and do not necessarily represent NADB’s or EPA’s policy; they should not be cited as official NADB or EPA’s assertions. Trade names, equipment and products presented herein do not constitute endorsements from IEMS, NADB or EPA.

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Introduction

Throughout the Texas–Mexico Border Region, a significant number of scrap tire piles exist containing millions of scrap tires. Scrap tire piles pose significant environmental and health risks. For instance, if tire piles catch fire, they can burn for weeks, even months, causing serious air quality problems from dense smoke and noxious fumes. Also, when this occurs, large amounts of liquid waste are generated, which can contaminate the soil, as well as ground and surface waters. Further, these sites are ideal breeding grounds for mosquitoes, rodents, and other vectors of disease; and increase risks of malaria, dengue fever, West Nile Virus, and encephalitis. The health risks are especially of concern because of the proximity of tire piles to communities.

To address this problem, the U.S. and Mexico officials have collaborated through programs such as the Border 2012 Environmental Program, adopted in 2007. This bi-national program aims to protect public health and the environment in the U.S.–Mexico border region within 100-kilometer on each side of the international border. One of the program's key goals is for the two countries to reduce land contamination along their shared border, including tire piles. The Border 2012 program has helped communities on both sides of the U.S.-Mexico border analyze environmental problems, such as waste tires, and evaluate potential solutions.

The primary purpose of this Scope of Work (SOW) was to conduct a used and waste tire flow study in the Texas-Mexico Border Region. The study assessed in a comprehensive manner the current situation of scrap tires in the Texas-Mexico Border Region and suggests actions to address and attenuate the problem. The North American Development Bank (NADB) hired Integrated Environmental Management Services S.A. de C.V. (IEMS) to perform the tasks outlined below to provide the NADB and the U.S. Environmental Protection Agency (EPA) with the information necessary to better understand the nature and logistics of how and where used and waste tires are being transported and stored along the Texas-Mexico Border Region.

IEMS developed a methodology to obtain and report information on the number of used and waste tires that have been transported between Texas and Mexico from 2005 to date. Data was also collected about locations of existing tire piles and estimates of the number of the tires that are being sold, reused, and disposed of in the Texas-Mexico Border Region.

Another component of this study addresses the economic and environmental aspects of tire flow into the Texas-Mexico Border Region.

The economic considerations include the costs to transport the tires, revenue from the sale of the tires, costs of disposal of the tires, costs to remediate disposal sites, and the costs resulting from possible waste tire pile fires.

An evaluation of the existing regulatory structure used by Texas and Mexico to manage used tires along the Texas-Mexico Border Region was necessary to understand the current waste tire management systems. This included investigating and providing an evaluation of current waste tire policies, laws, regulations and procedures along the Texas-Mexico Border Region and making suggestions, if appropriate, for considerations by policy makers.

Tasks Performed

Chapter 1.

Paramount to this study was the development of the method(s) used, with the approval of the NADB and EPA prior to their execution.

Chapter 2.

Estimation of the number of used and waste tires transported into Mexico from Texas, both legally and illegally, since 2005; of the total tires transported into Mexico, estimation of the number of tires sold for reuse, recycling, other tire derived products, and the number properly and illegally disposed of at landfills and dump sites in Mexico:

a. Estimation of the number of tires that are being transported through Texas from other states, which may have either an environmental or economic effect to the Texas-Mexico Border.
b. Look into and estimate if possible the number of tires that are being transported to the Texas-Mexico Border Region from Countries outside the United States.

Chapter 3.

Determination of the ultimate disposal locations of waste tires that are being transported from Texas into Mexico.

Chapter 4.

Estimation and assessment of the environmental/economic impact of the waste tire flow from Texas into Mexico. This assessment considered, but was not limited to, the following determinations:

a. Estimation the amount of revenue per tire, per year since 2005 generated from the sale of used tires to Mexico;
b. Estimation of the disposal cost per tire in Texas and Mexico Border Region;

c. Identification of significant tire piles and estimation of the potential cost to clean up these tire piles in the Texas-Mexico Border Region. This included options for clean-up of those tire piles, e.g. dig a hole and bury or transport to another facility.

d. Estimation of the current potential cost to extinguish fires and remediate environmental, public health, and economic impacts (e.g., crop damage) should any of the major tire piles in the region set ablaze. This included estimates of firefighting agency costs on both sides of the Texas-Mexico Border Region.

e. Provide a history of known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region

f. Estimation of the potential cost to remediate the environmental health threats associated with disease carrying vectors located in tire piles along the Texas-Mexico Border Region.

Chapter 5.

Examination and comparison of the tracking systems used for tracking the sale, import, and export of tires in Texas and Mexico and any Mexican tracking systems.

Chapter 6.

Description in detail of the waste tire management regulatory framework and the regulatory agencies at the federal, state and local level responsible for enforcing waste tire management regulations and laws in Texas and Mexico.

Chapter 7.

Assessing and making recommendations regarding changes to the current Texas and Mexico waste tire policies, laws, regulations and procedures in order to improve waste tire management in the Texas-Mexico Border Region.

Chapter 8.

Identifying, evaluating and making recommendations regarding potential markets for tire-derived products in Mexico, taking into any legal restrictions and regulations, and both economic and environmental impacts.

Chapter 9.

Identifying, evaluating alternatives and making recommendations regarding appropriate tire disposal alternatives in the Texas-Mexico Border Region.

Additionally, IEMS looked into and made recommendations on the status of current levels and activities of sustainability of waste and used tires as it relates to the Texas-Mexico Border Region.

The execution and planning of this study underwent several changes in its methodology and faced limitations due to the security issues currently present in the Mexican side of the Texas-Mexico border. The methodology presented is the one actually executed by IEMS, approved by the NADB and EPA. Limitations are presented in the section of this study to which they correspond.

Results and recommendations obtained from executing the mentioned tasks are presented at the end of each corresponding chapter. Also all conclusions and recommendations are presented in the Executive Summary presented as a separate document.

Chapter 1. Scope of Work

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1 Study scope area

The Texas-Mexico border comprises 1,241 miles along the Rio Grande River and 31 established crossings; 26 of them for vehicles and 5 rail lines. According to the August 1983 La Paz Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area, the "border area" was defined as a "the area situated 100 kilometers (62.5 miles) on either side of the inland and maritime boundaries between the Parties".

For this study, IEMS has chosen a different definition of the border area based on political/administrative divisions (counties on the US side and municipalities on the Mexican one) rather than distance, to facilitate a clear boundary and avoid jurisdiction issues between counties or municipalities. Only those counties and municipalities that make-up the border were chosen as a study area. There are a total of nineteen (19) counties and twenty-two (22) municipalities that form the Texas-Mexico border.

In Mexico the definition of urban area used by the National Institute of Statistics and Geography (INEGI), is any community of over 2,500 inhabitants (INEGI, 2001). The United States Census Bureau defines the line between rural and urban area at 2,500 inhabitants as well (Department of Commerce. Bureau of the Census, 2010).

This study chose to focus on urban areas because one of the magnets for used and waste tire flow are population centers due to their potential large consumption markets, and because the impacts of the tires may be more severe around larger population centers.

Using the definition of urban area both for the U.S. and Mexico, a total of fifty two (52) urban areas were located in the bordering counties/municipalities. Of these, thirty (30) are located around the 26 international crossings, and thus, these were selected for the study. **Table 1.1** presents the scope crossings and related cities.

Table 1.1.
Border cities along the international crossings with population greater than 2,500 inhabitants

	International Crossing	City	County or municipality	State	Population
1	El Paso-Cd. Juarez	El Paso	El Paso	Texas	620,456
2	El Paso-Cd. Juarez	Cd. Juarez	Juarez	Chihuahua	1,321,004
3	Tornillo-Guadalupe	Fabens	El Paso	Texas	8,043
4	Tornillo-Guadalupe	Guadalupe	Juarez	Chihuahua	3,022
5	Presidio-Ojinaga	Presidio	Presidio	Texas	4,699
6	Presidio-Ojinaga	Ojinaga	Manuel Ojinaga	Chihuahua	22,744
7	Del Rio-Cd. Acuña	Del Rio	Valverde	Texas	36,477

Table 1.1. Border cities along the international crossings with population greater than 2,500 inhabitants					
	International Crossing	**City**	**County or municipality**	**State**	**Population**
8	Del Rio-Cd. Acuña	Cd. Acuña	Acuña	Coahuila	134,233
9	Eagle Pass-Piedras Negras I and II	Eagle Pass	Maverick	Texas	27,185
10	Eagle Pass-Piedras Negras I and II	Piedras Negras	Piedras Negras	Coahuila	150,178
11	Eagle Pass-Piedras Negras I and II	Nava	Nava	Coahuila	22,192
12	Eagle Pass-Piedras Negras I and II	Col. Venustiano Carranza	Nava	Coahuila	4,921
13	Dolores-Colombia Solidarity Bridge	Anahuac	Anahuac	Nuevo Leon	16,628
14	Laredo-Nuevo Leredo I, II and IV	Laredo	Webb	Texas	226,124
15	Laredo-Nuevo Leredo I, II and IV	Nuevo Laredo	Nuevo Laredo	Tamaulipas	373,725
16	Falcon Dam	Nueva Cd. Guerrero	Guerrero	Tamaulipas	4,312
17	Roma-Cd. Miguel Aleman	Roma	Starr	Texas	11,335
18	Roma-Cd. Miguel Aleman	Cd. Miguel Aleman	Miguel Aleman	Tamaulipas	19,997
19	Rio Grande-Cd. Camargo	Rio Grande City	Starr	Texas	14,057
20	Rio Grande-Cd. Camargo	Cd. Camargo	Camargo	Tamaulipas	7,984
21	Los Ebanos-Cd. Diaz Ferry	La Joya	Hidalgo	Texas	4,821
22	Los Ebanos-Cd. Diaz Ferry	Cd. Gustavo Diaz Ordaz	Gustavo Diaz Ordaz	Tamaulipas	11,523
23	Hidalgo-Reynosa	McAllen	Hidalgo	Texas	132,225
24	Hidalgo-Reynosa	Reynosa	Reynosa	Tamaulipas	589,466
25	Pharr-Reynosa	Pharr	Hidalgo	Texas	66,231
26	Pharr-Reynosa	Cd. Rio Bravo	Rio Bravo	Tamaulipas	95,647
27	Progreso-Nuevo Progreso	Progreso	Hidalgo	Texas	5,636
28	Progreso-Nuevo Progreso	Nuevo Progreso	Rio Bravo	Tamaulipas	10,178
29	Brownsville-Matamoros	Brownsville	Cameron	Texas	176,859
30	Brownsville-Matamoros	Matamoros	Matamoros	Tamaulipas	449,815

In summary a total of thirty (30) urban areas were chosen, 13 on the U.S. side and 17 on Mexico. The cities chosen are listed below:

Figure 1.1.
Cities Identified in the Texas-Mexico Tire Flow Study.

Texas

1. El Paso
2. Fabens
3. Presidio
4. Del Rio
5. Eagle Pass
6. Laredo
7. Roma
8. Rio Grande City
9. La Joya
10. McAllen
11. Pharr
12. Progreso
13. Brownsville

Mexican States Bordering Texas:

Chihuahua

14. Cd. Juarez
15. Guadalupe
16. Ojinaga

Coahuila

17. Cd. Acuña
18. Piedras Negras
19. Nava
20. Venustiano Carranza

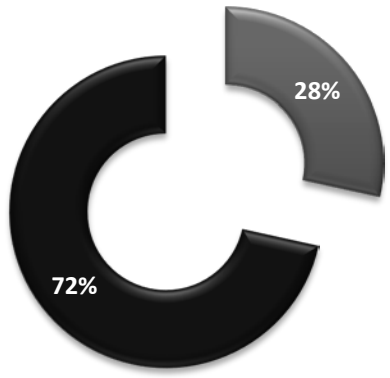
Nuevo Leon

21. Anahuac

Tamaulipas

22. Nuevo Laredo
23. Nueva Cd. Guerrero
24. Cd. Miguel Aleman
25. Cd. Camargo
26. Cd. Gustavo Diaz Ordaz
27. Reynosa
28. Cd. Rio Bravo
29. Nuevo Progreso
30. Matamoros

Figure 1.2.
Tire flow study population distribution



Texas's scope area total population

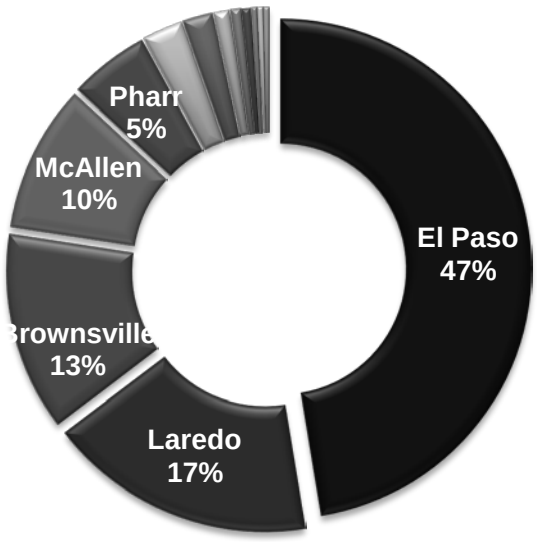
Mexico's scope area total population

More than seventy percent of the population within the study's area is located along the Mexican side of the border as it is shown in **Figure 1.2.**

Of the states on both countries, the population is distributed relatively even between Texas, Chihuahua (Mexico) and Tamaulipas (Mexico), with the remaining residing in Coahuila (Mexico). The state of Nuevo Leon (Mexico) has a smaller Texas border and most of the state's population is concentrated further south of the border and therefore outside of the study area. **Figure 1.3** evidences that almost half of the Texas scope population inhabits in the city of El Paso. Also the south Texas valley cities of Pharr, McAllen and Brownsville encompass more than a quarter of the Texas scope population.

Figure 1.3.
Texas's scope cities population distribution

Presidio 0%
La Joya 0%
Progreso 0%
Fabens 1%
Roma 1%
Rio Grande City 1%
Eagle Pass 2%
Del Rio 3%



As **Figure 1.4** displays Chihuahua encompasses almost one-third of the population of the border and is concentrated mostly (98%) in Ciudad Juarez.

In contrast, the state of Tamaulipas and its corresponding Texas border has a large number of cities and towns in extended metropolitan areas with sixteen (16) international crossings.

The area between El Paso- Ciudad Juarez and Laredo-Nuevo Laredo is sparsely populated including federally protected areas on both sides of the border without significant human population. Over forty percent of the study's population resides in the Ciudad Juarez-El Paso metropolitan area.

The population data was obtained from official sources and is considered to be the most updated. The U.S. population data comes from 2009 and 2010 population estimates. The Mexico population data was obtained from the 2010 population census.

Figure 1.4.
Mexican Cities Population Distribution

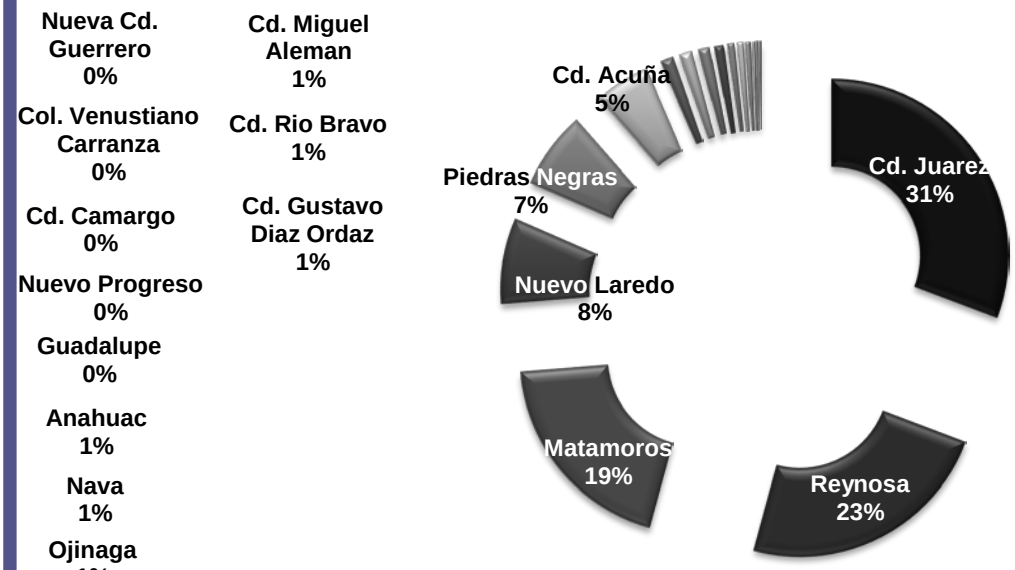
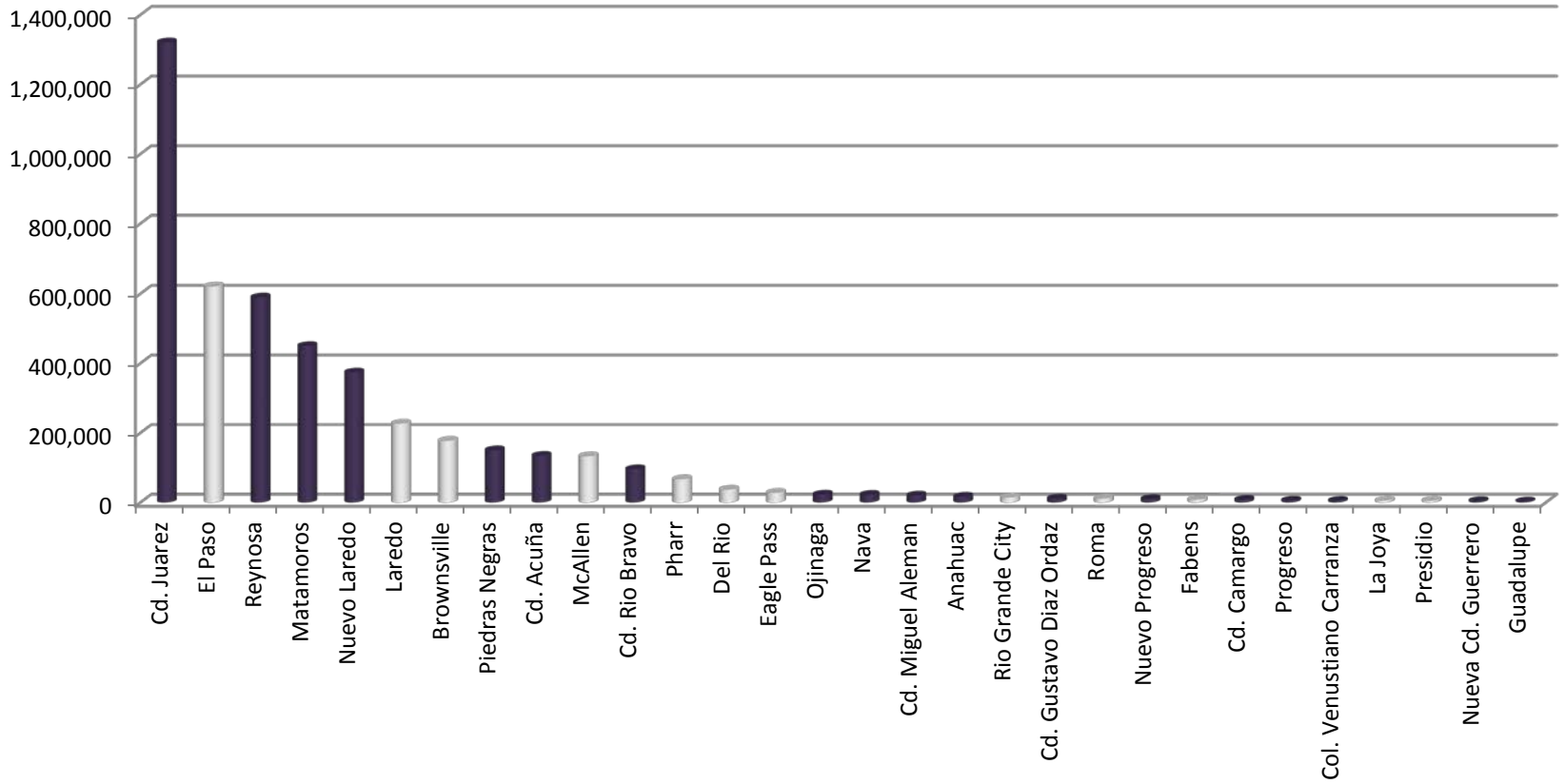


Figure 1.5 displays a chart that aids to visualize which cities concentrate most of the population in the Texas-Mexico border region. Bars in gray represent Texas cities, bars in purple represent Mexican cities.

Figure 1.5.
Population of Selected Urban Areas in both sides of the Texas-Mexico border (inhabitants)



2 Methodology

IEMS' methods are divided as follows: 1) desktop work and 2) field work. Both methods are aimed at acquiring both quantitative and qualitative information.

Data to be collected includes quantitative and qualitative information; some of which was estimated based on observations and interviews. There is a clear distinction on the type of data used so any user can support his assumptions and projections stated in this project.

3 Desktop activities

IEMS envisioned that the use of both desktop-based research and field data would result in a well-rounded study that offers its users a solid platform that reflects the day to day reality of the tire issues along the Texas-Mexico border region.

Desktop-based research consists of the review of available literature sources, electronic correspondence and/or teleconferencing with key stakeholders and design of field-research methodology and procedures.

This was done primarily through telephone calls with Mexican municipal authorities, data base preparation and analysis, consulting written material found in U.S. and Mexican governmental information sources, recognized industry associations, public Geographical Information Systems (GIS), news sources, and related studies in similar regions, among others.

3.1 General information sources

The general information search dealt with the border region and social, economical and environmental characteristics including information about new, used and waste tires and their uses. This information was obtained from U.S. and Mexican governmental sources, industrial associations from both countries and complemented by news articles, academic thesis, and information obtained from telephonic interviews with tire related stakeholders. Sources included:

- ✓ U.S. Census Bureau
- ✓ Mexican Statistics and Geography Institute (*Instituto Nacional de Estadística y Geografia or INEGI*)
- ✓ U.S. and Mexican tire related legislation of all levels of government
- ✓ United States Environmental Protection Agency (*EPA*)
- ✓ Mexican Secretary of Environment and Natural Resources (*Secretaria de Medio Ambiente y Recursos Naturales or SEMARNAT*)
- ✓ Rubber Manufacturers Association (RMA)

- ✓ Mexican National Association of Tire Distributors and Renewal Plants (*Asociacion Nacional de Distribuidores de Llantas y Plantas Renovadoras or ANDELLAC*)
- ✓ Mexican Rubber Industry National Chamber (*Camara Nacional de la Industria Hulera or CNIH*)
- ✓ Telephonic interviews with municipal stakeholders.
- ✓ Fieldwork generated data.

3.1.1 Historical research

Historical research focused on tracing the flow of waste tires across the Texas-Mexico border and with other parts of the world. Sources for this information include telephone interviews, documents by industrial associations and previous related studies of the Texas-Mexico border and of regions similar to the study area.

The U.S.-Mexico border area has been in the past the focus of several environmental studies on the tire movement along and across the border. These studies were given a careful consideration to generate a standardized and defensible method for estimating the waste and used tire generation and demand.

Consulted previous tire flow studies and publications about the Texas-Mexico border include:

- ✓ Border 2012: US-Mexico border scrap tire inventory summary report 2007.
- ✓ Border 2012: U.S.-Mexico environmental program indicators report 2005.
- ✓ Public politics strategy proposal for the integral management of waste tires in the border region (BECC 2008)
- ✓ Scrap Tires in Ciudad Juarez and El Paso: Ranking the Risks by Allen Blackman and Alejandra Palma. September 2002.
- ✓ Innovative and practical approaches to solving border environmental problems 2009.
- ✓ Benítez, Ismael (2008). Evaluación de la Gestión Integral de Residuos Sólidos Urbanos en la Frontera Norte: los casos de Juárez, Reynosa y Tijuana. Tesis de Maestro en Administración Integral del Ambiente. El Colegio de la Frontera Norte, A.C. Mexico. 229 pp.

Consultation of previous tire flow related studies and publications about regions similar to the Texas-Mexico border area covered:

- ✓ California-Mexico border.
- ✓ California.
- ✓ New Mexico.
- ✓ Mexico Federal District.
- ✓ Puerto Rico.
- ✓ Continental United States of America.
- ✓ The Americas

3.1.2 Survey design and analysis

Survey design and analysis were done to gather quantitative and semi-quantitative information regarding used and waste tire management and cross-border flow, as well as its trends/behaviors. Surveys were designed for the following:

Key stakeholders in Texas

a. Texas Commission on Environmental Quality
b. Texas State Health Department
c. Councils of governments.
d. City waste management authorities
e. City vector control authorities
f. City code enforcement authorities
g. Fire department
h. New tire dealers
i. Used tire dealers
j. Tire haulers
k. Collection stations
l. Storage facilities
m. Landfill managers
n. Industry associations
o. Processing and recycling facilities.

Key stakeholders in Mexico

a. Secretary of Economy (*Secretaria de Economia* or SE)
b. Federal Institute of Access to Information (*Instituto Federal de Acceso a la Informacion* or IFAI)
c. Tax Administration Service (*Servicio de Administración Tributaria* or SAT)
d. State of Nuevo Leon Environmental Ministry
e. Customs administrators
f. Municipal waste management authorities
g. Municipal civil guard authorities
h. Landfill managers
i. Processing and recycling facilities
j. Industry associations
k. Non-Government Organizations

These questionnaires were sent via email to all Mexican authorities and stakeholders in the contact directory presented as **Attachments 1 and 2** of this report and were applied individually during U.S. fieldwork. This information was downloaded into Excel worksheets for processing. Questionnaires applied on both countries are presented in **Attachment 3** (Texas) and **Attachment 4** (Mexico) of this report.

3.1.3 Interview planning

The content and style of the interviews (semi-structured) was developed by the team leader with the objective to gather all the information required by the designed surveys and record details that arise during a conversation style approach.

This style was useful during face to face interviews, especially with public officials. Nevertheless, a structured question-answer approach was implemented when time-availability was an issue for the interviewee which was generally the case for business owners and managers as well as for officials interviewed via telephone.

3.1.4 Report write-up

Report write-up was based on the analysis of the information obtained during fieldwork and desktop activities.

Figures and maps were created on a Graphical Interface System software and graphical design software.

3.2 Fieldwork activities

Field-based research consisted of site visits to the thirteen (13) selected Texas cities plus Austin and Houston as well as a visit to Mexico Federal District for interviews with industrial association representatives. The information obtained was both quantitative and qualitative and even though the location of tire piles was requested, the research focused more on obtaining an estimation of the tire flow from Texas to Mexico as well as the state of the market in the study area.

Also during one day face to face quotations were obtained from used tire dealers in the cities of Ciudad Juarez, Reynosa and Matamoros.

The strategies for field work are reported below.

3.2.1 Road reconnaissance

Road reconnaissance trips to the thirteen border cities along the international crossings with population greater than 2,500 were performed on the Texas side of the border.

The visits purpose was to identify the location of waste tire piles, reach relevant stakeholders, and assess the relationships and activities these stakeholders have with waste tires. The trips were of limited utility in identifying larger tire piles as required by the TOR, since most of these are located outside the cities in county back-roads and information on known locations was restricted due to administrative and legal procedures against dumpsite owners. However the remaining goals were fulfilled with these visits. Due to security reasons no fieldwork was performed on the Mexican side of the border.

3.2.2 Interviews with key stakeholders

On the Texas side of the border 122 (one hundred and twenty two) face to face interviews were performed to gather the necessary data required to perform the tasks described above as well as to obtain quantitative and semi-quantitative information and trends/behaviors regarding used and waste tire management and cross-border flow. Emphasis was set for medium and small used tire dealers which represent more than 40% of the interviews.

Refer to **Attachment 5** for detailed information on the Texas fieldwork itinerary which presents date of each interview, interviewer, county, city, type of stakeholder and public authority interviewed. The interviews followed a semi-structured approach described in section 1.2.4 where some questions were planned and given to the interviewee but also additional information was recovered. The duration averaged 20 minutes for non-government officials and approximately 45 minutes with public officials.

The largest new and used tire dealers in each of the cities were sought to obtain estimated numbers from the bigger sellers and decrease the uncertainty gap of not interviewing a 100% of the dealers. All the U.S. cities identified in this study had at least one used tire dealer and was interviewed.

Face to face interviews in Mexico were conducted to:

- ✓ Waste management authorities of Ciudad Juarez and Matamoros
- ✓ Landfill representative of Ciudad Juarez
- ✓ ANDELLAC and CNIH representatives.

During one day face to face used tire price requests were performed in the Mexican cities of Juarez, Reynosa and Matamoros, yet for security reasons other cities and further field data in the Mexican side of the Texas-Mexico border was not requested.

3.3 Safety

The safety of all the personnel involved with the project was of outmost importance, especially those conducting field work activities. Following recommendations by the U.S. Department of State, minimum fieldwork was conducted on the Mexican side of the border.

Most interviews were sent via e-mail with a formal letter explaining the purpose of the project and the organizations involved. This because releasing any type of information represents a potential security threat to the Mexican officials.

Private landfill managers requested an additional letter from the NADB project's commissioner assuring that Integrated Environmental Management Services (IEMS) was hired to gather and perform the present study. It was provided to IEMS from NADB representatives on September 15, 2011 in both English and Spanish. This cooperation request letters are presented in **Attachment 6.**

3.4 Key Stakeholders

In order to assess the actual inflow of used and waste tires into Mexico from Texas a variety of stakeholders was interviewed.

Authorities and industry associations provided general estimations on the flow of these tires into Mexico. Tire dealers and haulers provided other details on the overall tire flow from Texas to Mexico.

All the stakeholders interviewed were asked to sign a permission letter to be quoted on this project; these letters are kept by IEMS as hard-copy and are available upon request.

Other stakeholders that have been identified are junkyard owners, community environmental leaders, and used tire customers.

Chapter 2. Tire Flow Estimation

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1 Description of Tire Flows

As laid out in the terms of reference (TOR) provided by NADB, the purpose of this Chapter is:

"*Estimation of the number of used and waste tires transported into Mexico from Texas, both legally and illegally, since 2005; of the total tires transported into Mexico, estimation of the number of tires sold for reuse, recycling, other tire derived products, and the number properly and illegally disposed of at landfills and dump sites in Mexico";*

a. *Estimate the number of tires that are being transported through Texas from other states, which may have either an environmental or economic effect on the Texas-Mexico Border.*

b. *Look into and estimate if possible the number of tires that are being transported to the Texas-Mexico Border Region from countries outside the United States*".

The movement of tires is presented using a simple diagram, located on the following page as **Figure 2.1**, displaying the origin and destiny of tires used in Texas.

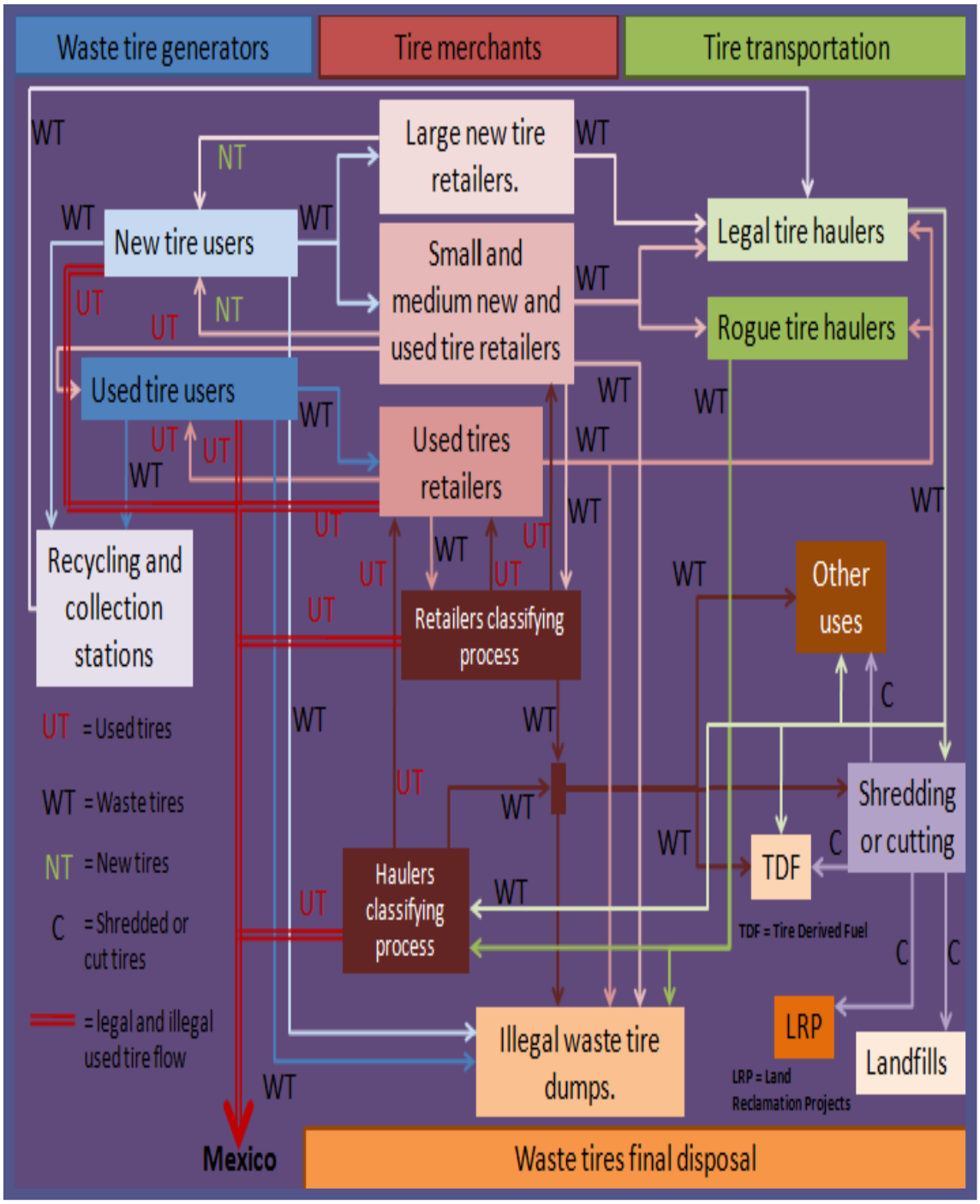
Between 2005 and 2011 the tire flow in the U.S.-Mexico border area, or a section of it, had already been mapped in two previous studies:

- California-Mexico border area. (California Integrated Waste Management Board produced under contract by Institute for Regional Studies of the Californias, San Diego State University , 2009)

- U.S.-Mexico border area. (Border Environment Cooperation Comission or BECC , 2008)

Both studies display very similar flows to that presented by IEMS with the exception of the addition of the classification between waste tires and used tires. This classifying process happens inside the tire merchant and tire transportation facilities (i.e., waste tire generators and transporters).

Figure 2.1.
Tire flow in the State of Texas



The **Figure 2.1** shows that waste tires have their origin at the end of the useful life of new and used tires consumed by used and new tire users. When said users decide to renew their tires they acquire them from large new tire retailers, small and medium new and used tire retailers and/or from used tire retailers.

After the purchase users must decide whether to leave their waste tires or keeping them to illegally dispose of them, store them on their properties or take them to a public recycling or collection station.

Tires left with the retailers have diverse destinations. Large new tire retailers dispose of their waste tires using legal tire haulers that will either process waste tires and/or classify them to reintroduce the reusable ones into the market as used tires.

Small and medium new and used tire retailers as well as used tire retailers: hire legal tire haulers, rogue tire haulers, classify tires to resell the reusable ones, dispose of their waste tires by illegally dumping them or a combination of some or all of these alternatives.

In Texas before landfilling or burying waste tires on Land Reclamation Projects (LRP) they are cut or shredded, except for the case of illegal dumping sites. Waste tires are also sometimes shredded in order to use them as fuel in kilns as Tire Derived Fuel (TDF) or for other uses.

2 Methodology to estimate Tire Flows

There are primarily three distinct tire flows/movements:

1. Texas-Mexico.
2. U.S. -Texas international border.
3. Third country-Texas international border.

The first flow requires different levels of detailing:

a. Legal vs. illegal flow
b. Reuse vs. recycling vs. processing
c. Proper disposal vs. illegal disposal

This chapter identifies the formulas and strategy that are used in estimating the tire flows.

Following sections describe the methods to estimate each of these flows and sub-flows.

2.1 Texas-Mexico

2.1.1 Legal used tire flow

Formula 1.

Annual legal used tire flow = Used tires to be commercialized flow + Used tires in annual legal car imports flow + Commercial used tires import from Texas for re-treading

2.1.1.1 Used tires to be commercialized

The Ministry of Economy (Secretaria de Economia or SE) is in charge of issuing importation permits for three regions in the U.S. – Mexico border. These permits are granted annually according to a global used tire import quota to people or companies dedicated to commercialization of used tires in these areas.

The used tire import quota also determined by the SE is based on:

- ✓ The volume of used tires imported the previous year and
- ✓ Compliance with final disposal legislation. (Secretaria de Economia, 2006)

The regions where used tire importation has been authorized and controlled by the SE are:

4. The state of Baja California.
5. Sonora State[1].
6. Ciudad Juarez, Chihuahua.

Every year the number of authorized used tires for import or used tire import quota is established by the SE and divided between each of the three regions. For the purpose of this study the number of used tires legally imported was based on the quota established at the ports of entry in the region of Ciudad Juarez, Chihuahua, Mexico. This is defined as Ciudad Juarez annual used tire import quota. Note that there is no legal import quota assigned to the rest of the Texas-Mexico border.

Formula 2.

Used tires to be commercialized flow = Ciudad Juarez annual used tire import quota.

[1] The area outlined on: North→border line from the Colorado River to 10km west of Sonoita, Sonora. East→ A straight line from the border line 10km west of Sonoita to the coastline 10km east of Puerto Peñasco. South→ The coastline from 10km west of Puerto Peñasco to the Colorado River. West→ Colorado river from the coastline to the border line. (Secretaria de Economia, 2006).

Used Tire Legal Import Requirements for Commercialization Purposes

According to the Colombia international bridge customs administrator A. Diaz (personal communication, June, 28, 2011) there are several conditions that must be met to legally introduce used tires into Mexico. The legal import requirements are:

i. The used tire importer must be registered, as such, in the used tires importers record, kept by the Central Administration of Accounting and Explanation (Administracion Central de Contabilidad y Glosa or ACCG) of the SAT.
ii. Retain a share of the authorized used tire import quota set by the Mexican Ministry of Economy (Secretaria de Economia or SE) for the year during which the import is performed. The used tire import quota is the maximum number of used tires that can enter through a portion of the U.S.-Mexico border in a particular year. It is specific for the type or origin of the used tires and is valid only for a particular year.
iii. Legal submission of an import petition to the customs authority of the point of entry through which the tires will enter Mexico. This has to be made by a customs agent and comply with the requirements set in the Annex 22 of the General Character Rules Regarding Exterior Commerce (Anexo 22 de las reglas de caracter general en materia de comercio exterior). Note: in order for the customs agent to submit an import petition other legal requirements must be met.
iv. Pay the import tariff (schedule) for each used tire entering Mexico. This varies depending on the year and it is defined in the Import and Export General Tax Law (Ley de los impuestos generales de importación y de exportacion) valid during importation.

Each item legally crossing the Mexican border has a numeric code or tariff item (schedule) assigned to it depending on how it is classified by the Import and Export General Tax Law (Ley de los Impuestos Generales de Importacion y Exportacion or LIGIE). The tariff items (schedules) assigned to used tires are described in **Table 2.1.**

Table 2.1.
Import Tariff assigned to used tires by the LIGIE

			Tax	
Item tariff (schedule) or code	**Description**	**Unit**	**Import**	**Export**
4012.20.01	Used tires of the types used on vehicles for passenger or merchandise transport on roads, including tractors, or on special use vehicles	Piece	AE[2]	Ex.[3]
4012.20.99	Other type of used tires.	Piece	20	Ex.

[2] AE means *Arancel Especifico* or specific tax established in terms of articles 4 fraction I and 12 fraction II of the Exterior Commerce Law *(Ley de Comercio Exterior)*.
[3] Ex. Means exempt.

2.1.1.2 Used Tire Flow for Legal Annual Car Imports

Formula 3.

Used tires in annual legal car imports flow = Annual legal car imports flow X Average number of tires per car

2.1.1.3 Commercial used tires import for retreading

There are a different set of authorizations issued by the SE for the importation of commercial tires for the sole purpose of retreading in a Mexican facility. Only registered tire renovation facilities are assigned a used tires import quota for renovating purposes. Retreading passenger tires although possible is not economically viable (ANDELLAC, 2011). Without this tire renovating industry the commercial carriers in Mexico would go bankrupt given the cost of new tires. (CNIH, Rubber Industry National Chamber , 2011).

Used tires for retreading can be imported into Mexico through any legal port of entry following the used tire legal import requirements for retreading purposes.

For the purpose of this study the following formula will be applied:

Formula 4.

Commercial used tires import for retreading purposes entering from Texas = Used tires imported under legal import requirements for retreading purposes through any legal Texas-Mexico point of entry.

According to what was reported previously used tires to be commercialized may only be imported from the United States through the Ciudad Juarez, a portion of Sonora and Baja California border.

Because of this, all used tires legally imported through any point of entry in the Texas-Mexico border, excepting Ciudad Juarez, will be assumed to be destined to retreading purposes.

Except for the year 2005 when importing used tires for commercialization was not allowed[4], this year all used tires imported through the Texas-Mexico border are assumed to be for retreading purposes.

[4] According to the used tires annual import quotas authorized by the Economy Ministry for Ciudad Juarez. Information obtained through the federal access to public information *institute (Instituto federal de Acceso a Informacion Publica, IFAI*) request code 0001000025412.

Used Tire Legal Import Requirements for Retreading

In addition to the four legal import requirements described previously the import of used commercial tires for retreading is exclusive for persons and entities dedicated to tire retreading.

The authorizations are annual, unchangeable, and defined according to the following formulas:

Companies with importation background:

$$\text{Annual assignation} = \frac{(CI + PT)\,(X)}{2}$$

Where:

CI: Installed capacity in number of pieces.

PT: Total production of vulcanized tires.

PT= PN + PI

PN: Volume of vulcanized tires produced from used tires acquired in the Mexican market in the last 12 months.

PI: Volume of vulcanized tires produced from used tires imported directly by the company in the last 12 months.

X= 0.6 or (PI/PT) whichever is less.

PN and **PI** can never be greater than CI.

Companies without importation background:

$$\text{Annual assignation} = CI \times 0.3$$

For both cases when the amount assigned is a fraction it's rounded up to the next whole number.(Secretaria de Economia, 2006).

2.1.2 Illegal Used Tire Flow

The illegal flow of used and waste tires from Texas is a much more complex issue to estimate. This flow consists of very different streams and each must be estimated separately to determine the overall illegal flow.

This study is based on information obtained from interviews on both sides of the border, data from the Tax Administration System (SAT), National Institute of Geography and Statistics (INEGI), Non Government Organizations, environmental studies and Mexican states public information, among others.

Information obtained from interviews includes tire-flow estimations from Mexican industry representatives and final destinations.

It has been assumed that commercialization for profit is the driving force for the flow of tires. Therefore to estimate the tire flow from Texas into the Texas-Mexico border area it was assumed that:

Formula 5.

Used tire flow = Legal used tire flow + Illegal used tire flow

Formula 6.

Used tire flow is greater than or equal to the theoretical Mexico border area used tire demand.

Formula 7.

$$\text{Theoretical Mexico border area used tire demand} = \frac{\left(\text{Theoretical Mexico border area tire demand} - \text{Estimate of new tires sold in Mexico border area}\right)}{\text{Percentage of useful life remaining on a Type 3 used tire}}$$

Used tires are classified depending on the amount of useful life remaining on their tread and general quality as follows:

Table 2.3.
Commercial classification of used tires (IEMS Texas fieldwork)

Type of used tire	Description
Special	Semi new
Number 1	Aren't toasted or cracked, evenly worn and have 60% of tread remaining.
Number 2	One side is more worn than the other, have 20 to 40% of remaining tread.
Number 3	May be toasted or cracked, have less than 20% of remaining tread.

Formula 8.

Estimate of new tires sold in Mexico border area = New tires sold per vehicle in the state X Vehicles in each municipality

Formula 9.

$$\text{New tires sold per vehicle in the state} = \frac{\text{New tires sold in the state}}{\text{Vehicles in the state}}$$

Formula 10 a.

$$\text{Theoretical Mexico border area tire demand} = \frac{\text{Vehicles in each municipality} \times \text{Tires per car} \times \text{Average annual mileage per tire}}{\text{Average endurance of a new tire sold in Mexico}}$$

or

Formula 10 b.

$$\text{Theoretical Mexico border area tire demand} = \frac{\text{Vehicles in each municipality} \times \text{Tires per car}}{\text{5 years}}$$

The reason two different formulas may be applied to estimate the theoretical Mexico border area tire demand is that tires may degrade more over time from elements exposure than from tread wear due to friction with the road surface.

"*Rubber undergoes profound changes on storage that are accelerated at higher temperatures. Deleterious changes occur in tire properties after storage at ambient temperatures for five years or after use on cars for similar periods* (U.S. Department of Transportation, 2006)".

Basing tire demand only on degradation due to exposure to the ambient elements does not consider tires may be discarded earlier than when they are 5 years old, but neither after this time, yet it provides an estimated number with which stakeholders may work and compare with other estimations.

Formula 11.

$$\text{Illegal used tire flow} \geq \text{Theoretical Mexico border area used tire demand} - \text{Legal used tire flow}$$

Formula 12.

$$\text{Vehicles in each municipality} = \text{Registered vehicles} + \text{unregistered vehicles}^{5}$$

[5] When available.

To estimate the number of illegal and American vehicles in the Mexican border area two different formulas were applied.

Formula 13.

Unregistered vehicles = Illegal vehicles + American vehicles

Each car imported into Mexico through any point of entry in the Texas-Mexico border has at least 4 tires that presumably will eventually be disposed on the Mexican side of the border. For this reason every imported car through the bridges in Chihuahua, Coahuila, Nuevo Leon and Tamaulipas will be considered as four 4 tires.

Based on information from interviews with Mexican industrial associations most tires do not remain within the border area. The largest markets are the bigger cities such as Mexico City, Guadalajara, Monterrey, Puebla among others. One of the industrial associations interviewed estimated that at least 50% of tires that flow from the US into Mexico leave the border region to be sold further inland.

2.1.3 Reuse, Recycling, Raw Material and Energy

After their initial intended use, tires can have a variety of destinations: reused in vehicles, recycled into alternative uses, processed for use as raw material for other products, burned to extract energy or disposed on the land.

Literature has some estimation on the proportion of tires that follow these different paths, and calculations were made using field data.

For the U.S. data are more centrally controlled by the Texas Commission on Environmental Quality (TCEQ) and those numbers were taken.

For Mexico, some municipalities had information on the amount of tires diverted to landfills and cement companies supplied data for the energy stream.

The proportion of tires destined for recycling was estimated based on interviews and news sources; the reused fraction for Mexico is reported by industrial associations to be minimal. Finally the reused fraction in the Texas side of the border was requested through interviews with the tire recyclers and processors in the state.

2.1.4 Proper and illegal disposal

Proper disposal in the U.S. side of the border is well documented by the TCEQ although in the City of Presidio there is no option for proper disposal of tires. Illegal disposal was documented during interviews to local code enforcement authorities and through the interviews with used and new tire dealers.

Data on proper/legal disposal in Mexico were obtained from the local environmental authorities of each municipality.

Although not all Mexican municipalities possess adequate disposal facilities and management procedures, their storage sites for waste tires for the purposes of this study will be considered the proper disposal option for those specific regions.

Attachments 7 and **8** display the proper disposal facilities, the approximate number of waste tires accumulated, location and management procedures in each of the Mexican municipalities.

2.2 Tires from Other U.S. States Arriving to the Texas-Mexico Border through Texas

The origin of used tires in Texas was obtained through interviews with local used tire dealers. There are no tire manufacturing facilities within Texas (interview e-mail with RMA) so all new tires sold or entering the study's scope area is assumed to originate from one of the other 49 states, Canada, or another foreign country.

The origin of used tires that are being transported through Texas from other states, which are considered to have the greatest environmental or economic effect on the Texas-Mexico border based on information obtained through fieldwork on the Texan side of the border are:

- ✓ Alabama
- ✓ California
- ✓ Denver, Colorado
- ✓ Atlanta, Georgia
- ✓ Illinois
- ✓ Louisiana
- ✓ Michigan
- ✓ Minnesota
- ✓ Missouri
- ✓ Las Vegas, Nevada
- ✓ Las Cruces, New Mexico
- ✓ New York
- ✓ Cincinnati and Fostoria, Ohio
- ✓ Pennsylvania

Cities within Texas were mentioned in interviews on 57 occasions, New York on 5, Missouri and Ohio 3 times and the rest of the other states listed above only mentioned on 1 occasion.

On most of the interviews only the state of origin was mentioned by the interviewee. Some states were more mentioned than others as it is shown on the **Figure 2.2.**

This figure represents the states from which used tire dealers obtain their used tires for commercialization on the U.S. side of the Texas-Mexico border area. It's assumed that 74% of the used tire dealers on said area acquire their used tires on Texan cities.

A used tire dealer that obtains used tires from Texas may also acquire used tires from other states. The number of used tires brought to Texas from other parts of the U.S. is yet to be assessed.

No data regarding the number of used tires arriving to the Texas-Mexico border region from other American states was obtained during fieldwork or desktop interviews and activities reason for which it was not possible for IEMS to estimate the number of tires that are being transported through Texas from other states, which may have either an environmental or economic effect on the Texas-Mexico Border. Yet as this section presents a flow and states of origin have been positively identified.

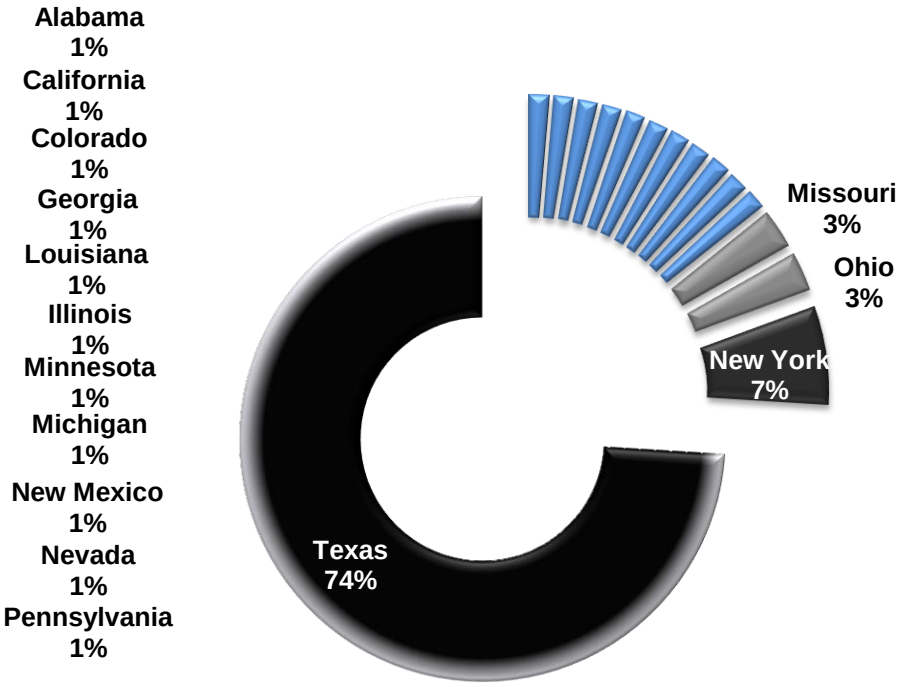
2.3 Third Country-Texas-Texas border

Information on out-of-U.S. origins of used tires was obtained during the Texas interviews. The only third country mentioned, by only 1 of the interviewees, was Canada.

No data regarding the number of used tires arriving to the Texas-Mexico border region from other countries was obtained during fieldwork or desktop interviews and activities.

Because of this, it was not possible for IEMS to estimate the number of tires that are being transported to the Texas-Mexico Border Region from countries outside the United States. Nevertheless the one country mentioned on one occasion during fieldwork activities is presented on **Figure 2.3.**

Figure 2.2.
Used Tires Origin Presented by Used Tire Dealer Interviews



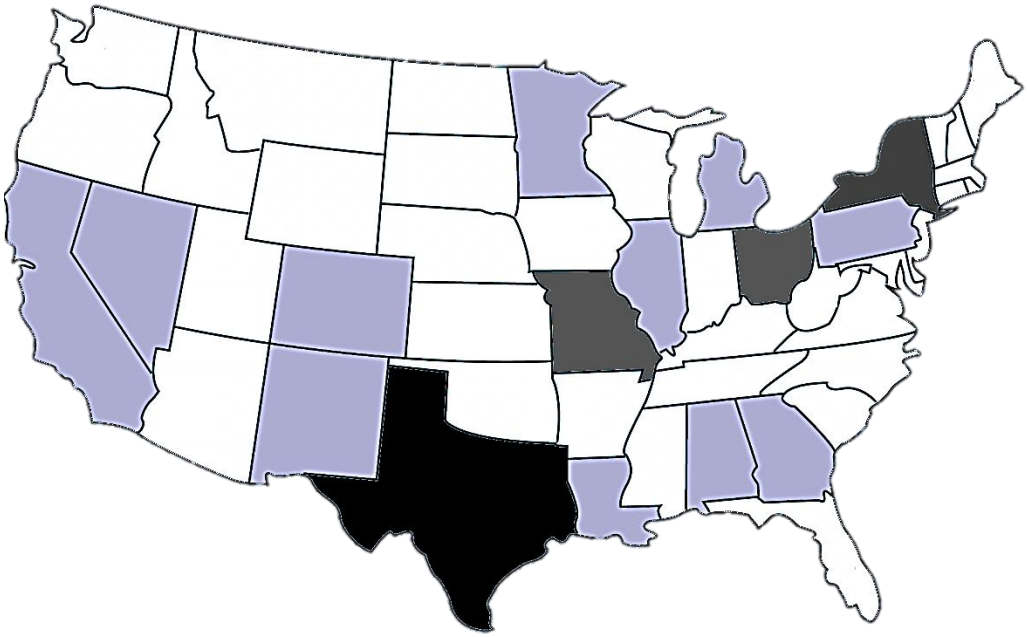
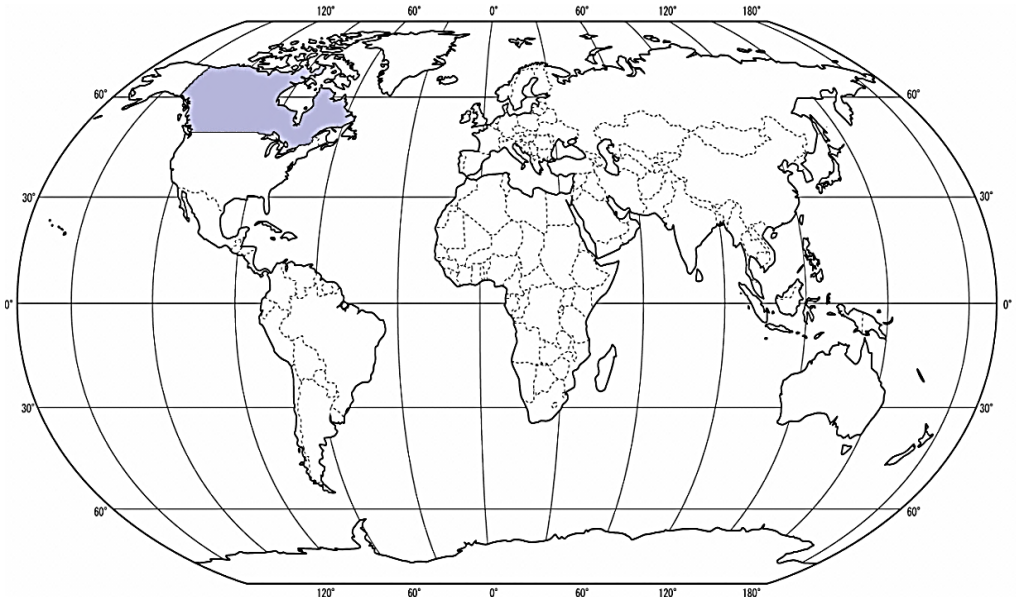


Figure 2.3
Non U.S. Countries Identified as Origin of Used Tires Being Commercialized on the Texas-Mexico Border Area



3 Used and Waste Tires Flow from Texas to Mexico

3.1 Used tires flow

The results of applying Formula 5 for estimating the used tires flow are presented in the table below.

Since the results presented on the **Table 2.3** are not conclusive the **Formula 6** criteria applies and as a result the used tire flow is concluded to be greater than or equal to the theoretical Mexico border area used tire demand which is the following:

Table 2.3.
Estimated number of used and waste tires transported into Mexico from Texas, both legally and illegally, from 2005 to 2011

Year	Used tire flow	=	Legal used tire flow	+	Illegal used tire flow[1]
2005	**913,904**	=	**1,150,217**	+	-236,313
2006	**1,431,049**	=	**4,047,031**	+	-2,615,982
2007	**847,033**	=	**3,830,992**	+	-2,983,959
2008	**997,133**	=	**2,666,779**	+	-1,669,646
2009	**1,227,711**	=	**1,511,013**	+	-283,302
2010	**1,396,641**	=	**1,771,468**	+	-374,827
2011	**1,576,431**	=	**2,175,990**	+	-599,559
Total	**8,389,903**	=	**17,153,490**	+	**-8,763,587**

[1] The negative numbers indicate that the used tire demand can theoretically be supplied by the legal used tire imports.

Table 2.4.
Minimum estimated used tire flow

Year	Theoretical Mexico border area used tire demand (used tires)
2005	913,904
2006	1,431,049
2007	847,033
2008	997,133
2009	1,227,711
2010	1,396,641
2011	1,576,431
Total	**8,389,903**

3.2 Waste tires flow

No evidence or data of relevant waste tire imports was obtained during fieldwork or deskwork activities. Yet it is relevant to note that waste tires may be imported accidentally when importing used tires in wholesale shipments where both types of tires are mixed.

3.3 Legal used tires flow

The following table was created by applying **Formula 1**, employing data obtained from applying **Formulas 2, 3** and **4.**

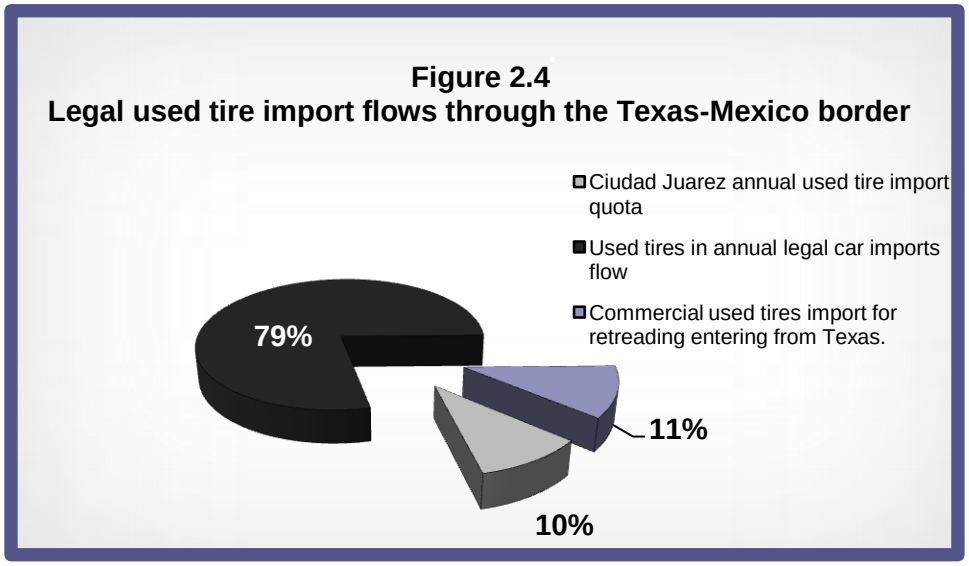
Table 2.5.
Annual legal used tire flow estimations

Year	Annual legal used tire flow	=	Ciudad Juarez annual used tire import quota	+	Used tires in annual legal car imports flow	+	Commercial used tires import for retreading entering from Texas
2005	**1,150,217**	=	0	+	981,760	+	168,457
2006	**4,047,031**	=	340,000	+	3,487,632	+	219,399
2007	**3,830,992**	=	340,000	+	3,216,956	+	274,036
2008	**2,666,779**	=	340,000	+	2,050,160	+	276,619
2009	**1,511,013**	=	340,000	+	871,940	+	299,073
2010	**1,771,468**	=	191,100	+	1,237,316	+	343,052
2011	**2,175,990**	=	198,400	+	1,602,692	+	374,898
Total	**17,153,490**	**=**	**1,749,500**	**+**	**13,448,456**	**+**	**1,955,534**

Note: Cells highlighted in blue present the final results.

The **Figure 2.4** illustrates how legal vehicle imports impact the used tire import flow. Used tires mounted on imported vehicles represent almost 80% of the legal used tires import flow.

Figure 2.4
Legal used tire import flows through the Texas-Mexico border



3.3.1 Ciudad Juarez Annual Used Tire Import Quota

The following table was created by applying **Formula 2**, employing data obtained from the Economy Ministry through IFAI.

Table 2.6.
Ciudad Juarez, Chihuahua
Annual Used Tire Import Quota

Year	Used tires legally imported per year
2005	0
2006	340,000
2007	340,000
2008	340,000
2009	340,000
2010	191,100
2011	198,400
Total	**1,749,500**

Note: Cells highlighted in violet present data employed in further calculations
Source: Internal Commerce and Digital Economy General Direction of the Mexican Ministry of Economy (SE), through the Federal Institute of Information Access (IFAI).

3.3.2 Used Tires in Annual Legal Car Imports Flow

The following table was created by applying **Formula 3**, employing data obtained from the Tax Administration System (SAT) commercial imports balance report.

Table 2.7.
Used Tires Flow For Annual Legal Car Imports

Imported vehicles each year per scope state (Vehicles)					Annual legal car imports flow (cars)	Average number of tires per car (used tires/car)	Used tires in car imports flow (used tires)
State/ Year	Chihuahua	Coahuila	Nuevo Leon	Tamaulipas			
2005	58,482	16,074	26,183	144,701	245,440	4	**981,760**
2006	202,076	46,702	101,275	521,855	871,908	4	**3,487,632**
2007	132,624	28,375	14,351	628,889	804,239	4	**3,216,956**
2008	73,993	15,254	532	422,761	512,540	4	**2,050,160**
2009	42,805	10,338	1,346	163,496	217,985	4	**871,940**
2010	91,073	10,665	1,976	205,615	309,329	4	**1,237,316**
2011p	68543p	8965p	9960p	151056p	238524p	4	**1,602,692**
Total	***669,596***	***136,373***	***155,623***	***2,238,373***	***3199965p***	***4***	***13,448,456***

p= information obtained until August 2011. Used tires in car imports flow data for year 2011 was linearly extrapolated from imports on years 2009 and 2010.

Source: (Tax Administration Service or SAT, 2011)

Note: Cells highlighted in violet present data employed in further calculations.

3.3.3 Commercial Used Tire Import Entering From Texas For Retreading

The following table was created by applying **Formula 4**, employing data obtained from the Tributary Administration System (SAT) commercial imports balance report.

Table 2.8
Import for retreading flow

Year	Used tires import for retreading
2005[1]	168,457
2006	219,399
2007	274,036
2008	276,619
2009	299,073
2010[2]	343,052
2011[2]	374,898
Total[2]	**1,955,534**

[1]Estimated by adding all used tire legal imports through the Texas-Mexico border including the Ciudad Juarez border since no legal import quota existed in 2005 for this area.

[2]From June 2010 to December 2011 import data was obtained through a linear extrapolation with a R^2 of 0.901

Note: Cells highlighted in violet present data employed in further calculations.

From the information presented on **Tables 2.5** thru **2.8**, the **legal flow of used tires from 2005 to 2011** is estimated on:

17,153,490 tires units

3.4 Illegal Used Tire Flow

The results obtained by applying **Formula 11** are shown in **Table 2.9.**

The results obtained from the estimation of the illegal used tire flow being negative shouldn't be interpreted as a negative flow of used tires into Texas, it should be interpreted as a sign that the current used tire imports could theoretically supply the Mexican scope border region used tire demand.

Actually the legal used tire flow could theoretically supply more than two times the estimated used tire demand of the Texas-Mexico border region as the table above displays.

Table 2.9. Theoretical illegal used tire flow			
Year	**Theoretical Mexico border area used tire demand (Used tires)**	**Legal used tire flow (Used tires)**	**Minimum illegal used tire flow (Used tires)**
2005	913,904	1,150,217	**-236,313**
2006	1,431,049	4,047,031	**-2,615,982**
2007	847,033	3,830,992	**-2,983,959**
2008	997,133	2,666,779	**-1,669,646**
2009	1,227,711	1,511,013	**-283,302**
2010	1,396,641	1,771,468	**-374,827**
2011	1,576,431	2,175,990	**-599,559**
Total	**8,389,903**	**17,153,490**	**-8,763,587**

Assessing the reason for this surplus in used tire offer crossing the Texas-Mexico border is not part of this study scope and will not be further addressed. Yet it is important to note that the National Rubber Industry Chamber (*Camara Nacional de la Industria Hulera*, CNIH) associates have detected used tire shipments in large Mexican cities further south of the border such as Guadalajara and the Federal District.

Based on the fact that both fieldwork and desktop interviews with key stakeholders report the existence of an illegal flow of used tires from Texas into Mexico it would be safe to imply that a demand larger than the one of the border area is being supplied by both legal and illegal used tire flows.

As a general conclusion the results obtained from estimating the illegal used tire flow from Texas into Mexico based only on the Mexican border region demand greatly underestimates the actual illegal used tire flow.

3.5 Theoretical Mexico Border Area Used Tire Demand

The following table was created applying **Formula 7.**

Table 2.10. Theoretical Mexico border area used tire demand				
Year	**Theoretical Mexico border area tire demand (New tires)**	**New tires sold in Mexico border area (New tires)**	**Percentage of useful life remaining on a type 3 used tire**	**Theoretical Mexico border area used tire demand (Used tires)**
2005	1,187,359	1,004,579	20%	**913,904**
2006	1,284,582	998,372	20%	**1,431,049**

Table 2.10. Theoretical Mexico border area used tire demand				
Year	**Theoretical Mexico border area tire demand (New tires)**	**New tires sold in Mexico border area (New tires)**	**Percentage of useful life remaining on a type 3 used tire**	**Theoretical Mexico border area used tire demand (Used tires)**
2007	1,143,229	973,822	20%	**847,033**
2008	1,173,809	974,383	20%	**997,133**
2009	1,204,539	958,997	20%	**1,227,711**
2010	1,250,011	970,683	20%	**1,396,641**
2011	1,268,284	952,998	20%	**1,576,431**

3.6 New Tires Sold In Mexico Border Area

The following table was created applying **Formula 8.**

Table 2.11. Estimate of new tires sold in Mexico border area								
State	**Year/ municipality**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Chihuahua	Juarez	416,968	425,118	412,214	421,011	408,506	418,673	397,449
	Ojinaga	6,243	5,992	5,781	5,808	5,681	5,582	5,362
Coahuila de Zaragoza	Acuña	22,784	19,264	19,045	18,196	17,161	17,035	16,503
	Piedras Negras	40,994	33,593	33,584	32,559	31,302	31,478	30,494
	Nava	4,195	4,151	3,998	3,904	3,888	3,832	3,713
Nuevo León	Anahuac	5,072	5,037	4,926	4,989	4,878	4,761	4,619
Tamaulipas	Nuevo Laredo	67,922	67,836	67,459	63,332	61,167	60,379	62,417
	Guerrero	1,595	1,535	1,096	1,181	1,169	1,147	1,088
	Miguel Aleman	9,136	9,040	7,270	7,806	7,610	7,450	7,278
	Camargo	5,695	5,748	4,621	4,963	4,935	4,918	4,982
	Gustavo Diaz Ordaz	5,090	4,907	3,437	3,755	3,743	3,740	3,587
	Reynosa	153,971	155,792	200,467	174,800	178,650	181,047	185,913
	Rio Bravo	26,659	25,660	20,199	22,752	22,404	22,525	22,482
	Matamoros	238,255	234,699	189,725	209,328	207,903	208,116	207,112
	Total	**1,004,579**	**998,372**	**973,822**	**974,383**	**958,997**	**970,683**	**952,998**

Note: Cells highlighted in violet present data employed in further calculations.

3.6.1 New Tires Sold Per Vehicle In The State

The following data was obtained through the application of **Formula 9** using information obtained from ANDELLAC and INEGI.

Table 2.12.
New tires sold per vehicle in the state

Year / New tires sold per vehicle in the state	2005	2006	2007	2008	2009	2010	2011
Chihuahua	0.75	0.68	0.68	0.66	0.63	0.62	0.60
Coahuila de Zaragoza	0.72	0.72	0.70	0.64	0.66	0.64	0.62
Nuevo Leon	0.90	0.81	0.75	0.72	0.69	0.66	0.62
Tamaulipas	0.62	0.57	0.68	0.67	0.64	0.62	0.60

Note: Cells highlighted in violet present data employed in further calculations.

3.6.2 New tires sold in each State

Table 2.13.
New tires sold each year in each State

Year	2005	2006	2007	2008	2009	2010	2011
New tires sold in Chihuahua	750,000	750,000	750,000	750,000	750,000	750,000	750,000
New tires sold in Coahuila de Zaragoza	450,000	450,000	450,000	450,000	450,000	450,000	450,000
New tires sold in Nuevo Leon	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000
New tires sold in Tamaulipas	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Source: (ANDELLAC, 2011)							

3.6.3 Vehicles registered in each State

Table 2.14.
Number of vehicles in each State

Year/ Registered vehicles in the state of	2005	2006	2007	2008	2009	2010	2011 e
Chihuahua	1,001,292	1,105,386	1,099,296	1,135,634	1,181,161	1,207,220	1,250,995
Coahuila de Zaragoza	622,732	626,344	646,417	703,447	679,745	707,121	728,219
Nuevo Leon	1,451,581	1,605,120	1,743,646	1,812,944	1,890,350	1,975,586	2,101,039
Tamaulipas	971,514	1,054,922	876,005	892,820	932,874	969,753	998,188
Source: State and Municipal data base System or SIMBAD, (INEGI, 2005 to 2010)							
2011 e: extrapolated with lineal equations 82% to 97% accurate							

3.6.4 Vehicles in each Municipality

The number of vehicles in each municipality was obtained by applying **Formula 12** in the table below, employing data from INEGI and vehicle emissions studies performed by a NGO and the Mexican National Ecology Institute.

Table 2.15.
Vehicles in each municipality per year

State	Year/ municipality	2005	2006	2007	2008	2009	2010	2011
Chihuahua	Juarez[1]	555,958	625,174	606,197	637,896	648,422	675,280	662,414
	Ojinaga	8,324	8,812	8,501	8,800	9,017	9,003	8,936
Coahuila de Zaragoza	Acuña	31,644	26,756	27,207	28,431	26,002	26,617	26,617
	Piedras Negras	56,936	46,657	47,977	50,873	47,427	49,184	49,184
	Nava	5,826	5,765	5,712	6,100	5,891	5,988	5,988
Nuevo León	Anahuac	5,635	6,218	6,568	6,929	7,070	7,214	7,450
Tamaulipas	Nuevo Laredo	109,552	119,010	99,204	94,525	95,573	97,385	104,028
	Guerrero	2,573	2,693	1,612	1,762	1,827	1,850	1,813
	Miguel Aleman	14,736	15,860	10,691	11,650	11,890	12,016	12,130
	Camargo	9,185	10,084	6,796	7,408	7,711	7,932	8,304
	Diaz Ordaz	8,210	8,609	5,055	5,604	5,848	6,033	5,978
	Reynosa[1]	248,340	273,320	294,804	260,896	279,141	292,012	309,856
	Rio Bravo	42,998	45,018	29,705	33,958	35,007	36,330	37,470
	Matamoros[1]	384,283	411,752	279,007	312,430	324,848	335,670	345,187
Total number of vehicles in all scope municipalities		**1,484,199**	**1,605,727**	**1,429,036**	**1,467,262**	**1,505,674**	**1,562,514**	**1,585,355**

[1] Vehicles in the municipalities of Juarez (Chihuahua), Reynosa and Matamoros (Tamaulipas) consider that the percentage of unregistered and registered vehicles was constant on years 2005 to 2011. The amounts were estimated dividing the registered number of vehicles in a particular year by the registered vehicles percentage measured in vehicular atmospheric emissions studies.

Note: Cells highlighted in violet present data employed in further calculations.

3.6.5 Registered Vehicles

Table 2.16.
Registered Vehicles In Each Municipality

State	Year/ municipality	2005	2006	2007	2008	2009	2010	2011
Chihuahua	Juarez	383,611	431,370	418,276	440,148	447,411	465,943	457,066
	Ojinaga	8,324	8,812	8,501	8,800	9,017	9,003	8,936
Coahuila de Zaragoza	Acuña	31,644	26,756	27,207	28,431	26,002	26,617	26,617
	Piedras Negras	56,936	46,657	47,977	50,873	47,427	49,184	49,184
	Nava	5,826	5,765	5,712	6,100	5,891	5,988	5,988

Table 2.16. Registered Vehicles In Each Municipality								
State	**Year/ municipality**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Nuevo León	Anahuac	5,635	6,218	6,568	6,929	7,070	7,214	7,450
Tamaulipas	Nuevo Laredo	109,552	119,010	99,204	94,525	95,573	97,385	104,028
	Guerrero	2,573	2,693	1,612	1,762	1,827	1,850	1,813
	Miguel Aleman	14,736	15,860	10,691	11,650	11,890	12,016	12,130
	Camargo	9,185	10,084	6,796	7,408	7,711	7,932	8,304
	Diaz Ordaz	8,210	8,609	5,055	5,604	5,848	6,033	5,978
	Reynosa	216,746	238,548	257,299	227,705	243,629	254,862	270,436
	Rio Bravo	42,998	45,018	29,705	33,958	35,007	36,330	37,470
	Matamoros	144,765	155,113	105,106	117,697	122,375	126,452	130,037
Source: State and Municipal data base System (SIMBAD) (INEGI, 2005 to 2011).								
Cells highlighted in red present data from the previous year since INEGI doesn't report data for the year 2011 in the state of Coahuila.								

3.6.6 Unregistered Vehicles

Data regarding the percentage of unregistered vehicles circulating was partially available for the cities of Ciudad Juarez, Reynosa and Matamoros.

Based on **Formula 13,** the percentage USA vehicles and vehicles with no plates or plates from other states are added to estimate the unregistered vehicles percentage in each of the mentioned cities. For the purpose of this study vehicles with plates from other states are considered unregistered.

Table 2.17. Percentages that unregistered vehicles represent in key scope cities									
Circulating vehicles status	**City**	**Matamoros, 2008**			**Reynosa, 2008**			**Ciudad Juarez, 2006**	
	Plates type	**Sample size (circulating vehicles)**	**Percentage**		**Sample size (circulating vehicles)**	**Percentage**		**Percentages reported**	
Registered vehicles	**State**	4,603	24.2%	**38%**	5,512	46.0%	**87%**	26%	**69%**
	Border	2,564	13.5%		4,957	41.3%		43%	
Un registered vehicles	**USA**	4,994	26.2%	**62%**	1,521	12.7%	**13%**	13%	**31%**
	Other[1]	6,864	36.1%		5	0.0%		18%	
	Total	**19,025**	**100.0%**	**100%**	**11,995**	**100.0%**	**100%**	**100%**	**100%**
Source General Direction of Urban and Regional Atmospheric Contamination (Dirección General de Investigación sobre la Contaminación Urbana y Regional) , 2010 Mario Molina Center for Energy and Environmental Strategic Studies A.C., 2006									
[1] Other refers to vehicles with no plates or having plates from other Mexican states.									
Note: Cells highlighted in violet present data employed in further calculations.									

3.7 Theoretical Mexico Border Area Tire Demand

In the following Table **Formula 10b** and its criteria was applied to obtain the reported data.

Table 2.18. Theoretical Mexico border area tire demand

Year	Total number of Vehicles in all scope municipalities	Tires per car	New tires theoretical demand
2005	1,484,199	4	1,187,359
2006	1,605,727	4	1,284,582
2007	1,429,036	4	1,143,229
2008	1,467,262	4	1,173,809
2009	1,505,674	4	1,204,539
2010	1,562,514	4	1,250,011
2011	1,585,355	4	1,268,284

3.8 Reuse, recycling & processing

No relevant information regarding tires sold for reuse, recycling or for other tire derived products in the Texas-Mexico border region was reported or provided by any interviewed stakeholder. For this reason no estimations regarding this subject were made in this report.

3.9 Proper disposal vs. Illegal disposal

3.9.1 Proper disposal

Attachments 7 and 8 display the proper disposal facilities, the approximate number of waste tires accumulated, location and management procedures in each of the Mexican scope municipalities.

3.9.2 Illegally disposed

No conclusive data regarding illegal waste tire disposal was obtained from the interviewed Mexican stakeholders. **Attachments 9, 10 and 11** present maps and potential illegal tire disposal location coordinates on the Mexican side of the Texas-Mexico border region.

Chapter 3. Waste Tires Ultimate Disposal Locations

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1 Chapter Description

"Significant Tire Pile" and **"Dump Sites"** shall be defined as any tire pile or dump site with more than 500 tires.

IEMS created a geo-referenced directory of the tire piles (known) locations in the Mexican side of Texas-Mexico border region (Region) presented as **Attachment 7** of this report. Also a list including who is responsible for site management and the operation inflow and outflow management procedures of each site is presented as **Attachment 8.** A waste tires being transported from Texas into Mexico ultimate disposal locations display map is presented as **Attachment 9** where each pile can be identified through its *Id. Number* using **Attachments 7 and 8** as a reference guide.

In addition a geo-referenced potential waste tire generators location list is presented as **Attachment 10**. A geo-referenced list of possible illegal tire piles is shown as **Attachment 11** and display maps with the identified locations of possible junkyards, possible illegal tire piles and the piles reported on Attachments 9, 10 and 11 are displayed for each Mexican city in the study´s scope as **Attachment 12.**

The methodology developed and activities performed to obtain this information, the results of these methods and their graphical display using Excel tables and Geographical Information systems (GIS) are included in this report.

2 Methodology

IEMS' methods for this Chapter focused on desktop work aimed at acquiring both quantitative and qualitative information.

Data collected includes quantitative and qualitative information; some of which was estimated based on observations and interviews. There is a clear distinction on the type of data used so that NADB and its designated users can support their assumptions and projections stated in this project.

2.1 Desktop Strategies

IEMS envisioned that the use of both desktop-based research and field data would result in a well-rounded study that offers its users a solid platform that reflects the day to day reality of the tire issues along the Texas-Mexico border region.

Desktop-based research consisted on the review of available literature sources, online regional periodic publications, electronic correspondence and/or conferencing with key stakeholders.

This was done primarily through telephone calls with Mexican municipal authorities and key stakeholders, data base preparation and analysis, consulting written material found in U.S. and Mexican governmental information sources, recognized industry associations, public Geographical Information Systems, news sources, and related studies in the region, among others.

Location of waste tire dumps sites was assessed through directions obtained from stakeholders interviewed, the border tire network tire pile database (U.S.-Mexico Border 2012) and online periodic news sources that described the location settings and/or surroundings. A list of the key stakeholders interviewed is presented as **Attachment 2**.

The areas geographical coordinates were obtained using public Geographical Information Systems (GIS), primarily the Google™ Earth software, by visually searching the sites following the directions given by the sources mentioned on the paragraph above.

No fieldwork was performed on the Mexican side of the Region because of security reasons. No confirmation visits, using Global Positioning Systems (GPS) devices were performed in order to verify the accuracy of the data obtained from the sources. Nevertheless only sites that were visually consistent to what was described by the Mexican stakeholders were selected as dump sites.

2.1.1 Review of available literature

The location of waste tires piles along the Texas-Mexico region had been the focus of the following publications:

- Border 2012: U.S.-Mexico Border Scrap Tire Inventory Summary Report. (United States Environmental Protection Agency (EPA), 2007)
- Border Tire Network, Tire Pile Information (Border 2012, 2011)

The tire pile sites reported on the documents above mentioned were taken as a base to perform the actual Chapter 3 in order to determine the final disposal locations of waste tires that are being transported from Texas into Mexico.

2.1.2 Visual search of potential waste tire generators

Based on the Used Tires Legal Car Import Flow, approximately 12,800,000 used tires cross the Texas-Mexico border mounted on imported used American vehicles.

It is presumed that junkyards and used car lots along the Mexican border areas dispose of their waste tires within their own property or indefinitely store them onsite as observed along the US side of the border. This was confirmed by interviews with stakeholders. Note that it was not possible for the authorities to verify if waste tires are accumulated or stored within this business sites unless the piles are visible from outside.

Final disposal authorization of tires along most of the border is not required during the importation of a used vehicle. This is contrary to the requirements for the legal used tire importers in Ciudad Juarez as it is explained in Chapter 2.

Figure 3.1. shows an example of waste tire accumulation with several junkyards. The first image was taken on a presummed illegal tire pile on the outskirts of Reynosa City in the state of Tamaulipas, Mexico (U.S. Geological Survey, 2009). The other two images are of presummed illegal tire sites in Ciudad Juarez in the State of Chihuahua, Mexico (Google™ Earth software, 2008).

Figure 3.1.
Satellite Images of Tire Piles Identified

IEMS performed a visual search of junk yards of all sizes and used car lots on the Mexican cities of the Region using available public Geographical Information Systems (GIS) in order to assess the potential final destination of the used and waste tires mounted on imported vehicles from Texas into Mexico. This list is presented as **Attachment 10** of this Chapter.

Also a geo-referenced list of possible illegal tire piles found during this search is presented as **Attachment 11** of this report. Display maps with the location of all possible junkyards identified as well as possible illegal tire piles and the piles reported on **Attachments 1, 2** and **3** are displayed for each Mexican city in the study scope as **Attachment 12.**

IEMS established criteria to differentiate between normally parked cars and those that are abandoned or have been junked. These criteria consisted of:

- ✓ Vehicles arranged in a way one or more of them wouldn´t be able to be driven out of its location without moving other vehicles.
- ✓ Vehicles visibly broken in pieces and/or surrounded by other junk.
- ✓ Vehicles are not adjacent to a sizeable building as to be a large parking lot.
- ✓ Parking spaces are not painted on the floor and one or more of the above criteria.

These criteria were used with Google™ Earth Software as follows:

1. A search designated area including each urban area was defined and sketched.
2. All major entrance routes and avenues of each city were followed in order to identify Junkyards or used vehicle dealerships outside of the designated areas.
3. A methodical search at an altitude that varied from 250 to 700 meters above ground was performed over the entire designated area.

Chapter 4. Environmental and Economic Impacts of the Waste Tire Flow from Texas into Mexico

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1 Environmental and Economic Impacts of the Waste Tire Flow from Texas into Mexico

This assessment considered, but was not limited to, the following determinations:

a. Estimation the amount of revenue per tire, per year since 2005 generated from the sale of used tires to Mexico;

b. Estimation of the disposal cost per tire in Texas and Mexico Border Region;

c. Identification of significant tire piles and estimation of the potential cost to clean up these tire piles in the Texas-Mexico Border Region. This included options for clean-up of those tire piles, e.g. dig a hole and bury or transport to another facility.

d. Estimation of the current potential cost to extinguish fires and remediate environmental, public health, and economic impacts (e.g., crop damage) should any of the major tire piles in the region set ablaze. This included estimates of firefighting agency costs on both sides of the Texas-Mexico Border Region.

e. Provide a history of known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region

f. Estimation of the potential cost to remediate the environmental health threats associated with disease carrying vectors located in tire piles along the Texas-Mexico Border Region.

IEMS' methodology for this Chapter consisted on desktop and some fieldwork aimed at acquiring both quantitative and qualitative information.

Data collected includes quantitative and qualitative information; some of which was estimated based on observations and interviews. There is a clear distinction on the type of data used so that NADB and its designated users can support their assumptions and projections stated in this project.

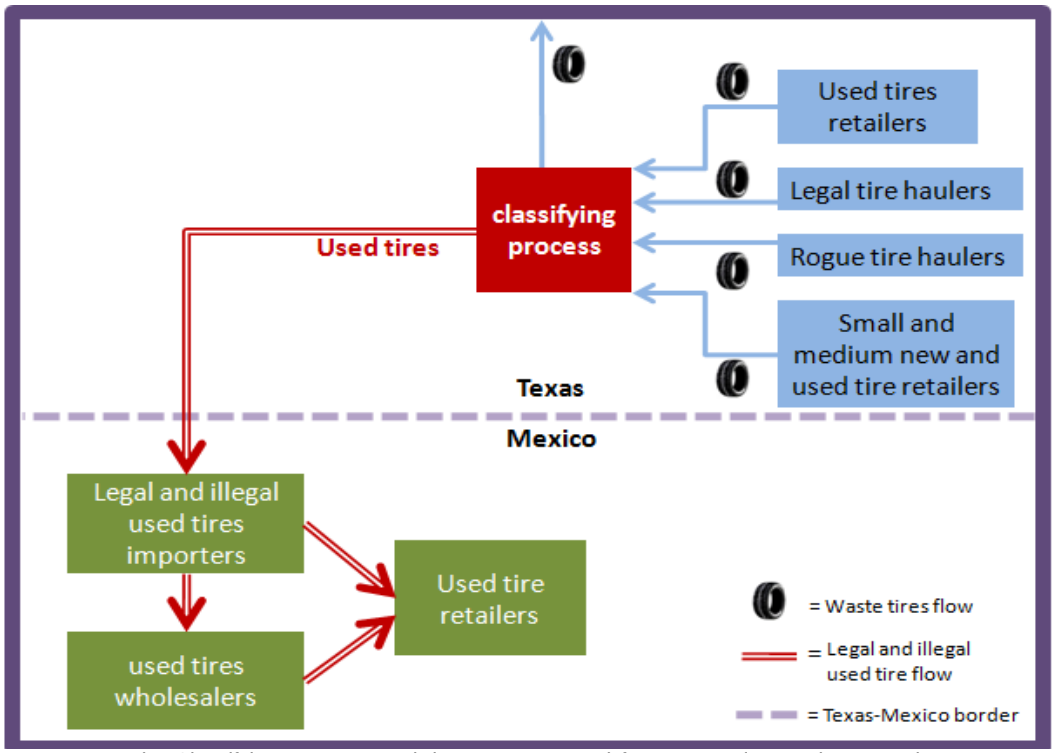
1.1 Revenue per tire, per year since 2005 generated from the sale of used tires to Mexico

To estimate the amount of revenue per tire, per year since 2005 generated from the sale of used tires to Mexico the following definition was considered:

"*Revenue*" is the amount of money received by the whole used tires commercialization chain, from wholesaler in Texas to retailer in Mexico, during a specific period of time. As presented on **Figure 4.1.** of this report and **Figure 2.1.** of the Chapter 2 Report, used tires are reintroduced into the market, with commercialization purposes, after being separated from waste tires. Before this classification process, used tires are considered a residue (waste tires). For this reason the wholesale price at which used tires are acquired by the person performing the classification process is considered to be of $0 US dollars for the purposes of this study.

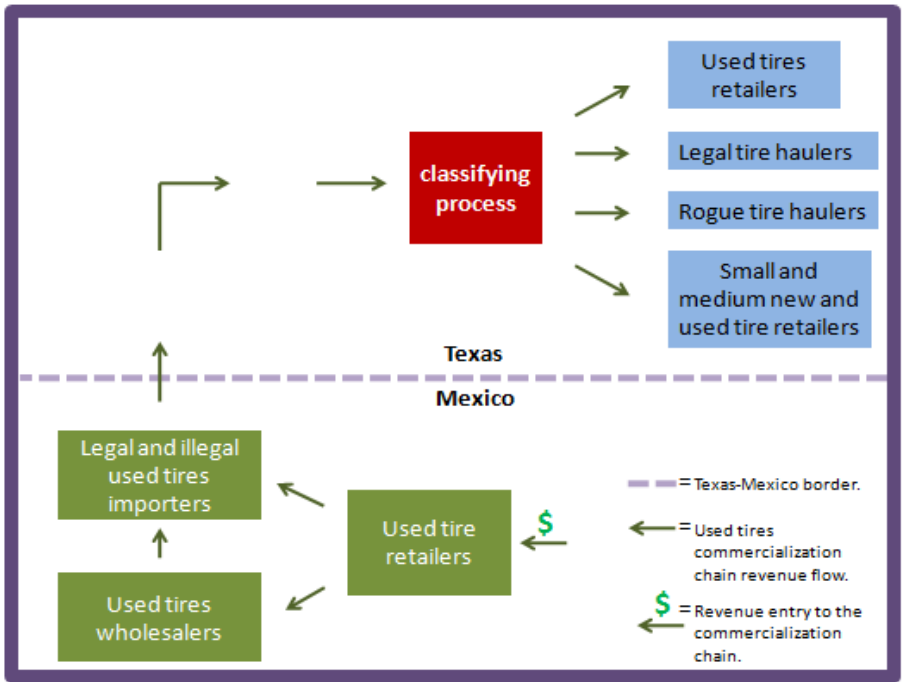
Based on the past statement the only revenue contemplated for the commercialization chain of used tires, from wholesaler in Texas to retailer in Mexico, will be the one obtained through the retailing of used tires in the Mexican side of the border. A diagram explaining this thoroughly is following presented as **Figure 4.2.**

Figure 4.1.
Diagram of the used tire flow from Texas into Mexico with commercialization purposes



In the Classifying process used tires are separated from waste tires and sent to the Mexican market, before this classifying process they are all considered waste tires for the purposes of this study.

Figure 4.2.
Texas-Mexico used tires commercialization chain revenue flow diagram



1.1.1 Revenue per tire of year 2012

Based on the past statement the actual, year 2012 up to March, revenue per tire was estimated as follows:

Estimating the amount of revenue per tire, per year since 2005 to 2011 generated from the sale of used tires to Mexico using the data obtained from fieldwork face to face quotations posses a large amount of uncertainty. This given the fact that the sources of data about past price variations are vague estimations performed by the Mexican used tire dealers during face to face quotation requests.

In order to perform the required estimation IEMS assumed that the data obtained from the used tire retailers is accurate. Because no price increase rate or specific increase dates were obtained, IEMS estimated a revenue range, rather than a single number, of what the revenues per tire may have been in any determined period of time between January 2005 and April 2012.

Also the exact proportion of type 2 and type 3 used tires loaded in the trucks that transport used tires from Texas into Mexico is unknown, nevertheless fieldwork in the Mexican side of the border revealed that both types of used tires are crossing the border.

To estimate the revenue per tire IEMS estimated the mean revenue for each rim size and type of used tires that are commonly crossed. Afterwards, based on the fieldwork reported tire size preferences of Mexican used tire consumers, estimated the mean revenue per tire of all tires sold in the Mexican side of the border by type. Finally the range mentioned above, rather than an exact amount, is presented to shed some light on what is the minimum and maximum plausible real value of the mean revenue per tire from 2005 to 2012.

Another factor affecting the revenue obtained from the export of used tires to the Mexican side of the border, from Texas, is the dollar exchange value in reference to the Mexican peso. An increase in the dollar value decreases the revenue and the other way around, if dollar value decreases the revenue is maximized.

The mean revenue range's minimum and maximum extremes to estimate the revenue per tire of years 2005 to 2012 are based on three factors:

1. How the US dollars exchange value has varied in reference to the Mexican peso in the 2005 to 2012 period of time.
2. The quality and remaining tread (type) of the used tires in the Texas-Mexico tire flow.
3. The increase of used tire prices since 2005, reported by used tire dealers in the Mexican side of the border.

The lowest revenue per tire per year was estimated based on the following:

- ✓ The highest daily dollar value exchange of each year.
- ✓ That all used tires sold are type 3 (0% to 20% of remaining tread).
- ✓ That the lowest price reported, by used tire dealers in Mexican scope cities, for type 3 used tires was charged.

In the other hand, the highest revenue per tire per year was estimated based on the following:

- ✓ The lowest daily dollar value exchange of each year.
- ✓ That all used tires sold are type 2 (20% to 40% of remaining tread).
- ✓ That the highest (current) price reported, by used tire dealers in Mexican scope cities, for type 2 used tires was charged.

The following assumptions are also considered:

- ✓ Mexican's rim size preferences when buying used tires haven't changed since 2005.

Questions applied to used tire retailers can be consulted on **Attachment 13** of this report. The mathematical formulas employed to estimate the price range are the following:

Formula 1.

$$\text{Lowest revenue per tire per year (US dollars / used tire)} = \sum_{i=1}^{n} \left(\text{Mexican's specific rim size preference when buying used tires (percentage)} \times \text{Lowest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)} \right)_i$$

n= rim sizes considered

Formula 2.

$$\text{Mexican's specific rim size preference when buying used tires (percentage)} = \left(\prod_{i=1}^{n} \text{Rim size preference per representative city when buying used tires from retailers whose used tires come from USA (percentage)} \right)^{\Lambda\ 1/n}$$

n= number of Mexican representative scope cities.

Formula 3.

$$\text{Rim size preference per representative city when buying used tires from retailers whose used tires come from USA (percentage)} = \frac{\text{Mentions of a specific rim size}}{\sum_{i=1}^{n} \left(\text{Mentions of a specific rim size} \right)_i} \times 100\%$$

n= amount of rim sizes considered

Formula 4.

$$\text{Mentions of a specific rim size} = \sum_{i=1}^{n} \left(\text{Specific rim size mentioned, as more sold, by used tire dealers, in a Mexican representative city, whose used tires come from USA} \right)_i$$

n= number of quotations

Specific rim size mentioned, as more sold, by used tire dealers, in a Mexican representative city, whose used tires come from USA → Quotations from used tire retailers in representative Mexican scope cities

Formula 5.

$$\text{Lowest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)} = \frac{\text{Lowest mean revenue per tire in Mexican scope cities}_i \text{ (Mexican pesos / used tire)}}{\text{(FIX) maximum daily value of the US dollar in a specific year of the 2005 - 2012 period (Mexican pesos / US dollar)}}$$

(FIX) minimum and maximum daily values of the US dollar in a specific year of the 2005 - 2012 period (Mexican pesos / US dollar) → Bank of Mexico, BANXICO (FIX), 2005-2012

Formula 6.

$$\text{Lowest mean revenue per tire in Mexican scope cities}^{i} \text{ (Mexican pesos / used tire)} = \left(\prod_{i=1}^{n} \text{Minimum mean revenue per tire in a specific Mexican city}_i \text{ (Mexican pesos /used tire)} \right) \Lambda\ 1 / n$$

n= number of Mexican representative scope cities.

Formula 7.

$$\text{Minimum mean revenue per tire in a specific Mexican city}^{i} \text{ (Mexican pesos / used tire)} = \frac{\text{Current mean revenue of type 3 used tires per rim size in a specific Mexican scope city (Mexican pesos /used tire)}}{1 + \text{Mean price increase in a Mexican representative scope city since 2005 (percentage)}}$$

Formula 8.

$$\text{Highest revenue per tire per year (US dollars / used tire)} = \sum_{i=1}^{n} \left(\text{Mexican's specific rim size preference when buying used tires (percentage)} \times \text{Highest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)} \right)_i$$

n= rim sizes considered

Formula 9.

$$\text{Highest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)} = \frac{\text{Highest mean revenue per tire in Mexican scope cities}_i \text{ (Mexican pesos / used tire)}}{\text{(FIX) minimum daily value of the US dollar in a specific year of the 2005 - 2012 period (Mexican pesos / US dollar)}}$$

Formula 10.

$$\text{Highest mean revenue per tire in Mexican scope cities}_i \text{ (Mexican pesos / used tire)} = \left(\prod_{i=1}^{n} \text{Current mean revenue of type 2 used tires per rim size in a specific Mexican scope city}_i \text{ (Mexican pesos /used tire)} \right) \Lambda \ 1/n$$

n= number of Mexican representative scope cities.

Formula 11.

$$\text{Current mean revenue per tire in a specific Mexican scope city}_i \text{ (Mexican pesos /used tire)} = \left(\prod_{i=1}^{n} \text{Retail price obtained from a used tire dealer in a Mexican representative scope city}_i \text{ (Mexican pesos /used tire)} \right) \Lambda \ 1/n$$

Retail prices obtained from a used tire dealer in a Mexican representative scope city$_i$ (Mexican pesos /tire) → Quotations from used tire retailers in representative Mexican scope cities$_i$

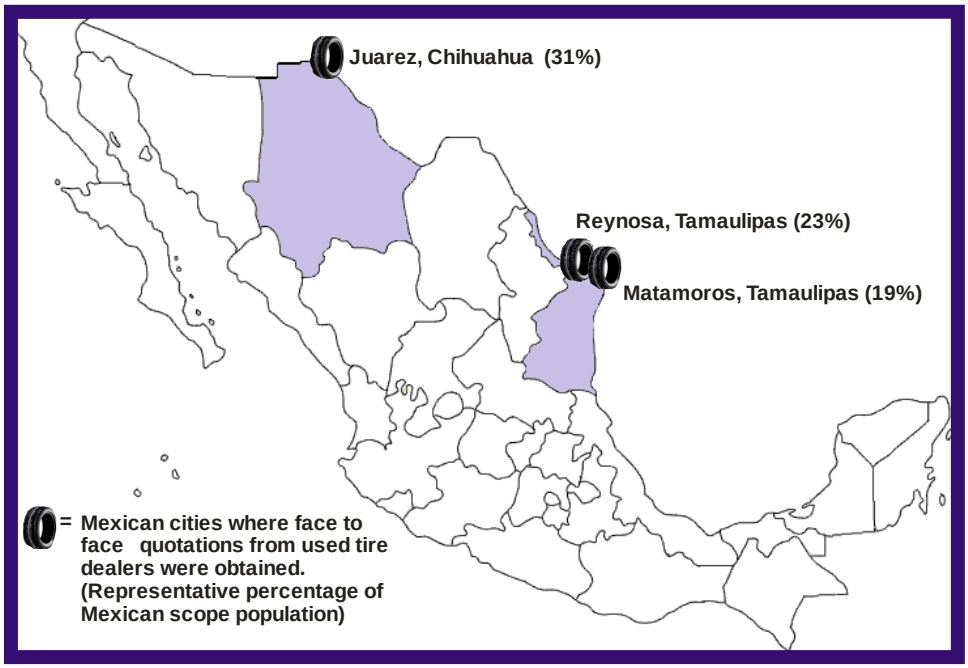
Retail prices of used tires in the Mexican side of the Texas-Mexico border selected municipalities were obtained from the following sources:

- ✓ Face to face verbal quotation from used tire retailers.

Note: The business name and locations whose quotations were obtained are available upon request from the North American Development Bank (NADB).

Quotations were obtained from the representative Mexican scope cities presented on **Figure 4.3.**

Figure 4.3.
Representative Mexican scope cities where face to face quotations were obtained from used tire dealers



73% of the Mexican scope population was represented in this fieldwork. (INEGI, 2010)
Note: Due to security reasons, activities for obtaining verbal quotations from used tire dealers in the Mexican side of the Texas-Mexico border were suspended, limiting the representativity of the data obtained to said percentage.

Formula 12

Mean retail price in Mexican representative scope cities $_i$ (Mexican pesos / used tire) $= \left(\prod_{i=1}^{n} \right.$ Current mean revenue per tire in a specific Mexican scope city$_i$ (Mexican pesos / used tire) $\left. \right) \Lambda\ 1 / n$

n= number Mexican representative scope cities selected for this study (Refer to **Figure 4.3.**).

Formula 13.

Mean price increase in a Mexican representative scope city since 2005 (percentage) $= \left(\prod_{i=1}^{n} \right.$ Price increase reported by used tire dealers from 2005 to 2012 (percentage) $\left. \right) \Lambda\ 1 / n$

n= number of quotations from used tire dealers in a specific representative Mexican scope city whose used tires are imported from U.S.A.

Formula 14 .

(Arithmetic) mean price increase in a Mexican representative scope city since 2005 (percentage)

$$= \frac{\left(\sum_{i=1}^{n} \text{Price increase reported by used tire dealers from 2005 to 2012 (percentage)} \right)_i}{n}$$

n= number of quotations from used tire dealers in a specific representative Mexican scope city whose used tires are imported from U.S.A.

Price increase reported by used tire dealers from 2005 to 2012 (percentage) → Quotations from used tire retailers in representative Mexican scope cities$_i$

Questions applied when obtaining quotations from used tire retailers in the Mexican side can be consulted on **Attachment 13** of this report.

1.2 Disposal cost per tire in Texas and Mexico Border Region

To estimate the disposal cost per tire in Texas and Mexico Border Region; the following definition was considered:

"Disposal cost" is the amount of money paid in order to properly dispose of a waste tire according to the federal and state legislation considering the region's infrastructure and economic limitations.

1.2.1 Texas Border Region

Disposal costs from the Texas border region were obtained through fieldwork interviews applied to used tire dealers, question number 20 of the "Used tire dealers proposed questionnaire" presented on **Attachment 3** of this report. The Texas cities where the interviews were performed are reported on Chapter 1.

1.2.2 Mexico Border Region

Information from Mexico's border region was obtained from the Municipal Ecology Directors presented on the **Attachment 2** of this report by applying the deskwork remote interviews titled *"Cuestionario Detallado Para Autoridades Ambientales Municipales (Ecologia)"* presented on the **Attachment 4**.

1.3 Potential clean up costs of significant tire piles

In order to identify significant tire piles and estimate the potential cost to clean up these tire piles in the Texas-Mexico Border Region; including options for clean-up of those sites (e.g. dig a hole and bury or transport to another facility), the following definition is necessary:

"*Significant Tire Pile"* and *"Dump Sites*" are defined as any tire pile or dump site with more than 500 tires.

The cleanup strategies contemplated were based from the following sources:

- ✓ Scrap Tire Cleanup Guidebook (United States Environmental Protection Agency, 2006)
- ✓ Guide for the establishment of a waste tire temporary storage center (Natural Resources and Environment Secretariat (*Secretaria de Medio Ambiente y Recursos Naturales, SEMARNAT))*
- ✓ Official Mexican Standard NOM-002- STPS -2010 issued by the Work and Social Foresight Secretariat (Secretaria del Trabajo y Prevision Social, STPS) which states the "Safety-prevention and protection against fires in work centers". (Work and Social Foresight Secretariat (Secretaria del Trabajo y Prevision Social, STPS), 2010)
- ✓ Tire pile fires; Prevention, Response, Remediation (Environmental Engineering and Contracting, Inc., 2002)
- ✓ The Prevention & Management of Scrap Tire Fires (Scrap Tire Management Council, 2000) obtained from the Rubber Manufacturers Association (RMA).
- ✓ IEMS experience on previous hydrocarbon contamination remediation projects.
- ✓ Quotations from local businesses.

Several cleanup techniques and variations are viable depending on each site characteristics, the following are five basic steps designed by IEMS to simplify the cleanup strategy options:

Figure 4.4.
IEMS defined basic steps for identified dump sites cleanup

Each step was identified and selected through the review of the literature mentioned above, and each one has a significant purpose:

1.3.1 Fire planning and prevention:

According to the literature consulted. Both in the USA and Mexico tire piles tend to set ablaze when cleaning activities are in place, it is basic not only to be prepared for this situation but also do everything possible to prevent it. In this step the cost to prevent fires during cleanup activities will be defined and reported.

Image 4.1.
Tire fire in Nuevo Laredo, Tamaulipas (August 22, 2011).

300,000 waste tires burned in the municipal waste tire storage center. The fire was accidentally caused by people burning tires to extract the metal in them in order to sell it. It happened during site cleanup activities endangering equipment and personnel. (Elizondo, 2011)

1.3.1.1 Tire fires causes in the Texas –Mexico border region

In order to create a fire prevention plan it is necessary to identify the most common tire fire causes in the Texas-Mexico border region. Tire fire causes in order of number of mentions by fire department representatives in Texas scope cities are:

1. Trash fires.
2. Grass fires.

with 7 and 4 mentions correspondingly.

Image 4.2.
Alton, Texas (April 13, 2011)

According to news sources 190,000 tires were ignited by a grass fire caused by illegal trash burning. (The monitor, Naxiely Lopez, 2011)

Two (2) causes of tire fires were reported in the remote interviews performed to Civil Guard and firemen representatives of the Mexican scope cities presented on the **Attachment 1** of this report.

Tire fire causes in order of number of mentions by civil guard representatives in Mexican scope cities are:

- Trash fires.
- Tire burning for metal extraction.

with two mentions each.

Trash fires causes

People burn trash for various reasons, either because it is easier than hauling it to the local disposal site or to avoid paying for regular waste collection service. (United States Environmental protection Agency (EPA), 2012)

Waste tires may be semi-buried, among or adjacent to regular household trash dumped either on an illegal dump or at the municipal dump, when garbage is ignited also waste tires ignite.

Image 4.3.
Tire fires started in trash dumps

Top right Image: Reynosa, Tamaulipas (April 24, 2012). Tire fire started in "La Anacuas" municipal trash dump. *(EnLineaDIRECTA, 2012)*. Bottom Image: Laredo, Tamaulipas (August 22, 2011). Tire fire in the municipal tire storage center, accidentally caused by people burning tires to extract the metal in them in order to sell it. (Elizondo, 2011)

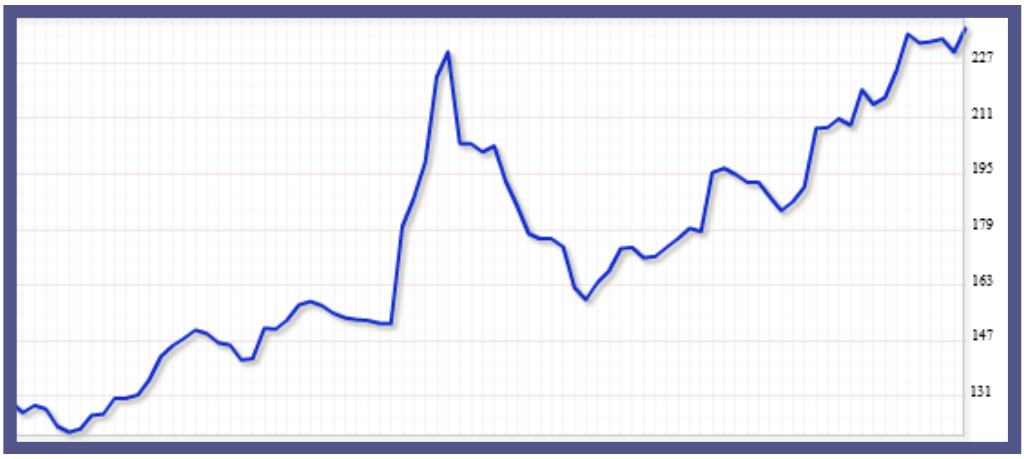
Tire burning for metal extraction causes

According to Mr. J Francisco Martha Hernandez, General Director of the Mexican Rubber Industry National Chamber (CNIH) a common radial truck tire posses from 6 to 7 kilograms (13 to 15 pounds) of steel wire in its structure. A passenger tire as a maximum posses 1.5 kg of steel wire per tire.

Steel prices in Mexico from January 2005 to March 2012 have increased in 76.98% (National Geography and Statistics Institute (Instituto Nacional de Estadistica y Geografia, INEGI), 2012)[1]. For this reason people has been more and more attracted to burning tires in order to sell the metal wire obtained from them.

[1] National Index of prices to producers (monthly), Intermediate goods and commodities, commodities consumed by activity branch, R46 Iron and steel basic industries.

Figure 4.5.
May 2005 to March 2012 commodities consumed



Commodities consumed by Iron and steel basic industries obtained from the monthly National Index of prices to producers for intermediate goods and commodities. Index based on December 2003 as 100, with no units. (National Geography and Statistics Institute (Instituto Nacional de Estadistica y Geografia, INEGI), 2012)

Grass fire causes

Most grass fires are caused by human activities. According to the National Forest Commission (Comisión Nacional Forestal, CONAFOR, 2012) in the year 2011 only 2% of the wild fires in Mexico were caused by nature.

Grass can work as a spreading medium from a controlled fire area to a tire pile area as it occurred in the Alton, Texas tire fire in 2011 **Image 4.2.**

1.3.1.2 Fire outbreak avoidance

As presented previously trash fires, grass fires and Tire burning for metal extraction are caused directly by humans or by human activities reason for which the following measures t prevent fire outbreaks are considered by IEMS during the cleanup activities.

Site vegetation and trash cleanup

Waste tires shall be separated from vegetation or any other flammable material by at least 40 feet. (12.2 meters). All access areas and setbacks between tire storage and the property boundary should be free of all vegetation. (Environmental Engineering and Contracting, Inc., 2002)

The past statement includes separating all trash from the waste tires. Fire must not be used to remove vegetation, trash or any other flammable material.

Site access control

To prevent any person from setting the tires on fire a fence surrounding the property should be placed, recommended characteristics are:

- The site should be surrounded by a chain-linked fence at least 6.6 feet (2 meters) high with intruder controls on top.[2]
- The site should be adequately secured to prevent access when the facility is closed.
- After hours security and/or patrols to help reduce the threat of arson. Guard dogs have been efficiently used at some sites but raise liability issues.
- Edges of a 10-foot (3 meters) high tire storage unit shall not be closer than 50 feet (15.2 meters) to the perimeter fence.

Source: (Environmental Engineering and Contracting, Inc., 2002)

1.3.1.3 Tire Piles Fire Risk Estimation

Appendix A of Mexican standard NOM-002-STPS-2010 displays the **Table 4.1** as a guideline to establish the Fire Risk of a facility:

Table 4.1.
Classification of a Fire Risk according to NOM-002-STPS-2010

Concept	Fire Risk	
	Ordinary	High
Built surface (m^2)	Less than 3,000	Equal or more than 3,000
Flammable gases inventory (litters)	Less than 3,000	Equal or more than 3,000
Flammable liquids inventory (litters)	Less than 1,400	Equal or more than 1,400
Combustible liquids inventory (litters)	Less than 2,000	Equal or more than 2,000
Combustible solids inventory including furniture in the work center (Kilograms, Kg)	Less than 15,000	Equal or more than 15,000
Pyrophoric and explosive materials (Kg)	Doesn´t apply	Any amount

(Secretaria del Trabajo y Prevision Social, STPS, 2010)

[2] Although Environmental Engineering and Contracting, Inc recommends a fence of at least 10 feet (3 meters) high. IEMS considers that any person with the will to enter the site will not be stopped by an extra meter, especially if he decides to cut the fence in order to enter. IEMS considers the fence should be tall enough to keep any guard dog from leaving the site.

"*Because most tire stockpiles contain mixtures of various tire sizes, density is normally expressed in terms of the passenger tire equivalent (PTE), which is equal to 20 pounds (9.07 Kg) by definition* (United States Environmental Protection Agency, 2006)".

Based on the previous statement the following formulas were applied to classify the fire risk of significant tire piles as Low or High Fire Risk workplaces:

Formula 15.-

Tire pile approximate weight (Kilograms)	=	Approximate number of waste tires accumulated. (Tires)	X	Passenger Tire Equivalent, PTE (20 pounds / Tire)	X	0.453592 (Kilograms/ pound)

Based in the estimated tire pile approximate weight in kilograms the following conditional was applied:

Formula 16.-

Conditional	Logic test			True	False
If	Tire pile approximate weight (Kilograms)	<	15,000 (kilograms)	"Low"	"High"

The results of applying this formulas on each significant tire pile are presented as **Attachment 14** of this document which reports each dump site fire Risk.

In summary, as a rule of thumb, any tire pile with more than 1600 tires could be classified as of High Fire Risk by Mexican standards.

1.3.1.4 Defining means for fire extinction

Type of fire occurring on tire fires

Fire consists on the quick oxidation of combustible materials releasing light and heat. It is classified as follows: (Work and Social Foresight Secretariat (Secretaria del Trabajo y Prevision Social, STPS), 2010)

a) Class A fire: It's the one which manifests on solid combustible materials, generally of organic nature, and on its combustion embers are normally formed.

b) Class B fire: It's the one presented on combustible or flammable liquids and flammable gases.

c) Class C fire: It's the one involving machines, equipment and energized electric facilities.

d) Class D fire: It's the one in which combustible metals are involved, such as magnesium, titanium, zirconium, sodium, lithium and potassium.

e) Class K fire: It's the one presented basically on kitchen facilities, involving combustible substances such as: animal fats and vegetal oils. Class K fires occur on fat storage facilities and their behavior is different to other fuels.

"*Rubber tires are made of very combustible compounds, including carbon, oil, benzene, toluene, rubber, and sulfur. The EPA does not consider scrap tires as a hazardous waste. However, once ignited, the tire product breaks down into hazardous compounds including gases, heavy metals, and oil* (Environmental Engineering and Contracting, Inc., 2002)". "*Potentially creating an oil fire that helps to both fuel and spread the scrap tire pile fire* (Environmental Protecion Agency, 2000)".

According to the past statements and classifications: tire fires would correspond essentially on their initial stages to class A fires and once oil and flammable gases are released during the combustion class B fires would also be present. Therefore class A and B fire extinguishers are required by law to be available on the sites.

Table 4.2. obtained from NOM-002-STPS-2010 is presented to explain what kind of extinguishing agent is used in the combat of each type of fire:

Table 4.2.
Class of fire and applicable extinguishing agent

Extinguishing agent	Fie Class A	Fie Class B
Water	Yes	No
Dry chemical agent type ABC	Yes	Yes
Dry chemical agent type BC	No	Yes
Carbon dioxide (CO_2)	No	Yes
Clean agents*	Yes	Yes
Mechanical foam	Yes	Yes
Special Agents	No	No
Wet chemical	Yes	Yes

* Halon based clean agents use has been gradually restricted until they are eliminated, in compliance with Montreal protocol[3], because these compounds deplete the earth's ozone layer.

[3] The Montreal Protocol on substances that deplete the ozone layer. Published on January 25, 1988 in the Mexican Federation's Official Journal (Diario Oficial de la Federacion, DOF). Signed in 1987 by the USA. Entered into force on January 1, 1989.

As **Table 4.2.** shows, highlighted in blue, are extinguishing agents which combat both class A and B fires. Quotations for installing fire extinguishers of any of these types of extinguishing agents on tire pile sites during cleanup activities were requested.

Number of extinguishers required by law

The number of extinguishers to be placed on a tire pile site should be decided based on workers to labor in the area to prevent an over estimation yet according to the Mexican standard NOM-002-STPS-2010 in the tire piles work areas (tire storage area and processing area) fire extinguishers for class A and B must be placed as follows:

a) At least place one extinguisher for every 300 square meters (3,229.2 square feet) if the estimated fire risk of the site is ordinary.
b) At least place one extinguisher for every 200 square meters (2,152.8 square feet) if the estimated fire risk of the site is high.
c) Not to exceed the maximum reachable distance indicated on 2 presented below:

Table 4.3.
Maximum reachable distance to a extinguisher

Fire risk	Classes A, C y D		Class B	
	m	ft	m	ft
Ordinary	23	75.5	15	49.2
High	23	75.5	10*	32.8*

* Extinguishers for high fire risk and B class, can be located at a maximum reachable distance of 15m (49.2 ft) as long as they are of the mobile kind.

The latest satellite images available were consulted in order to estimate the perimeter, area and places where it would be necessary to install a fire extinguisher in accordance to NOM-002-STPS-2010.

Perimeters, areas and distances were estimated using the Google Earth Pro® software.

1.3.2 Fumigation:

Deskwork and fieldwork interviews reported that, besides fires, mosquitoes are the most common dangers present on tire piles in the Texas-Mexico border area. Literature consulted reports the common presence of snakes and other wildlife (United States Environmental Protection Agency, 2006) and also the presence of poisonous insects and hives is considered latent as **Figure 4.6** indicates.

Figure 4.6.
Reported tire dump impacts ordered by number of mentions by Mexican scope cities municipal Ecology and Civil Guard representatives

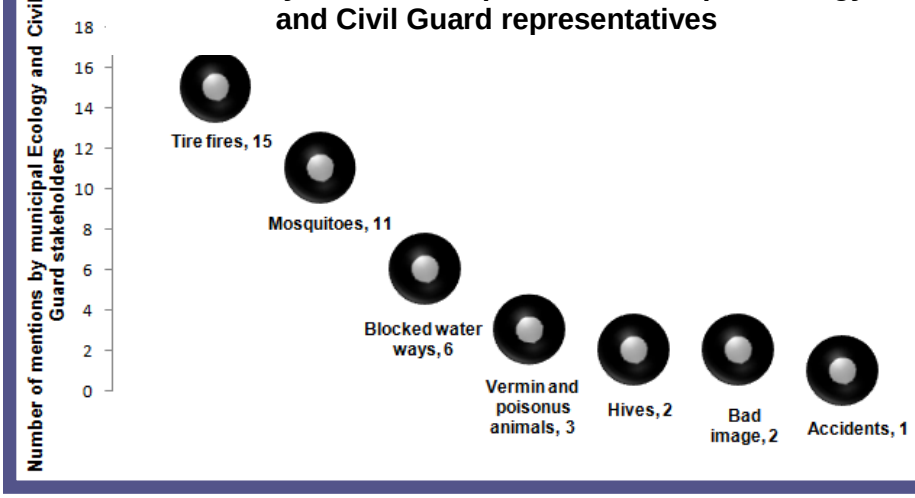
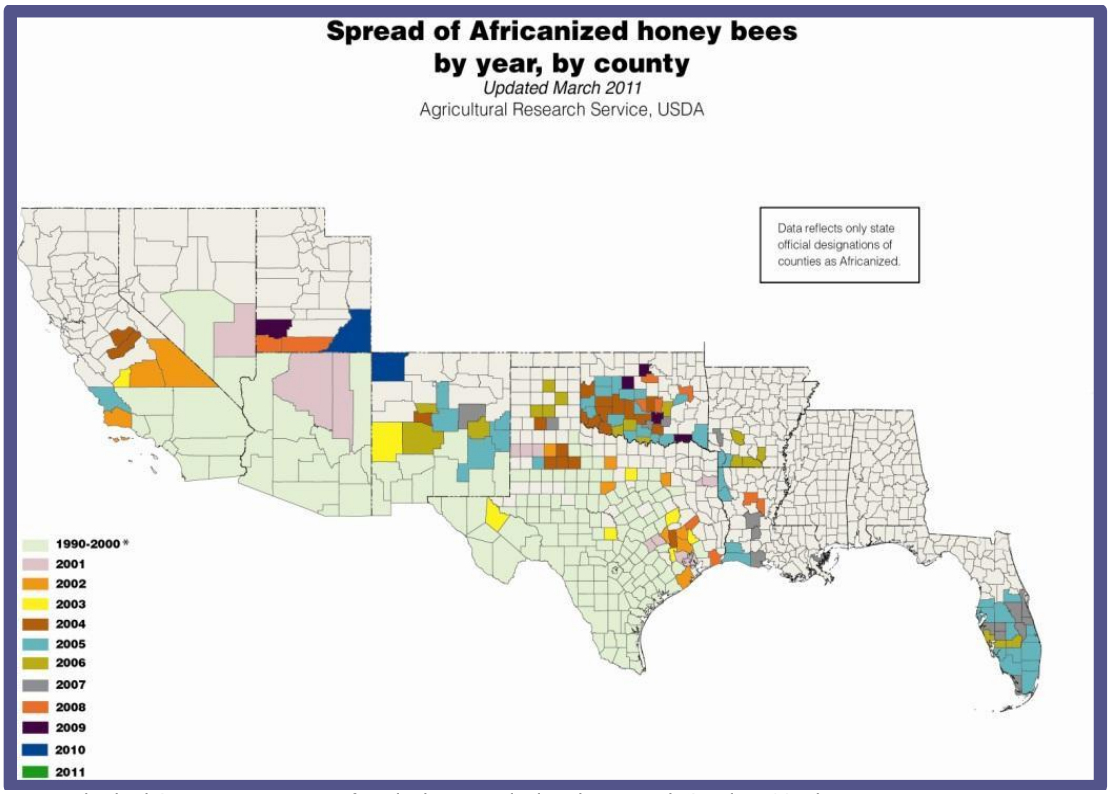


Figure 4.7.
Spread of Africanized honeybees by year, by county



(United States Department of Agriculture, Agricultural Research Service, 2011)

As **Figure 4.6.** reports, mosquitoes are the second most mentioned impact caused by tire piles. Also civil guard municipal authorities of Ojinaga (Chihuahua) and Anahuac (Nuevo León) reported bee hives in tire piles as one of the main issues caused by waste tires in their municipalities. As **Figure 4.7** displays; since 1990 the entire Texas-Mexico border region reports the presence of Africanized bees.

Because worker safety in the picking and handling of waste tires is of outmost importance mosquitoes, vermin, poisonous animals and hives altogether should be eliminated by fumigating the tire piles before the cleanup personnel is in contact with them. This action will also avoid the accidental spreading of vector contained illnesses (i.e. Dengue, West Nile Virus), when transporting the tires into other regions during waste tire transport.

The following are the requirements contemplated by IEMS for said activity:

1.3.2.1 Hiring a licensed exterminator

Mexican law requires exterminators to count with a sanitary license issued by the Federal Commission for the Protection Against Sanitary Risks (Comision Federal Para La Proteccion Contra Riesgos Sanitarios, México, COFEPRIS) in order to perform “Urban fumigation, disinfection and plague control services” (*Servicios Urbanos De Fumigacion, Desinfeccion Y Control De Plagas*) according to articles 198 fractions III, 204 and 373 of the Mexican General Health Law (*Ley General de Salud).*

In addition each Mexican state within the study’s scope may possess its own controls for plague exterminators so a second license issued by state authorities may be required as well.

For the above exposed **all fumigation activities must be performed by trained and licensed personnel** in order to:

“Avoid the risk of pesticides being applied without adequate equipment or facilities with the chance of intoxicating the general population or occupationally exposed personnel.” *(Comision Federal para la Proteccion Contra Riesgos Sanitarios*, COFEPRIS)

In order to obtain fumigation costs IEMS requested, through remote phone calls, entrance permits to the dump sites.

This with the purpose of allowing the visit of three local licensed exterminators and they could prepare a quotation. But no answer or permit was received from said stakeholders.

Because of the above mentioned the dump sites fumigation costs were estimated based on quotations requested to fumigate an area of one hectare (10,000 square meters, 2.47 acres) covered with waste tires.

The real fumigation costs must be obtained by each municipal authority when the decision to commence cleanup activities of their corresponding site is taken.

When this occurs the chemical must be selected by the exterminator; although he must take into account at least the following requirements:

- Extermination of all mosquitoes, bees, wasps, arachnids and insects in general.
- Non toxicity to humans by any way of exposure (i.e. dermal contact, inhalation, ingestion, etc)
- Using a biodegradable chemical. (This should be desirable, but the decision has to be finally taken by the professional hired for this purposes.)

Also even after fumigation activities have been performed, according to the literature consulted, all cleanup personnel as a precaution should apply the following exposure control measures:

- Wear heavy gloves, long sleeves, pants and boots to protect from animal bites and scratches.
- Identify the nearest medical facility capable of treating bites and other injuries.
- Insect repellent use.

1.3.3 Diminishing volume

Transportation costs associated to moving whole tires, which occupy a great volume with a small amount, can be drastically reduced when their volume is reduced.

The diminishing volume options contemplated are two:

1. Sidewall removing.
2. Shredding.

1.3.3.1 Sidewall removing

Passenger tire sidewalls are easily removable, even by hand using a retractable knife or a linoleum knife. For more information refer to **Attachment 15**.

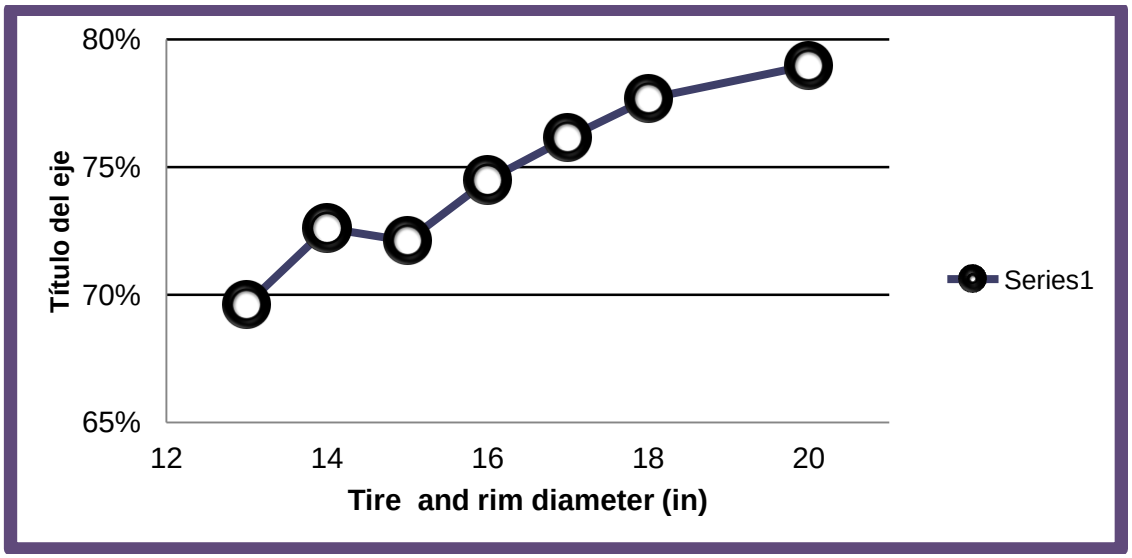
This is possible because radial passenger tires contain metal wire only in the tread of the tire but not in the sidewalls. Automatic sidewall removing machines are also available on the market at very accessible prices.

Image 4.4.
Worker removing waste tires sidewalls in order to diminish their volume

Commercial tires employed on goods transportation contain metal wire on both tread and sidewalls making it impossible to remove their sidewalls by hand. The automatic sidewall removing machine for these kind of tires are different and more expensive than passenger tire sidewall removing machines.

By removing a tire's sidewalls its volume can be significantly lowered mostly depending on its rim size and how it is packed for transportation. The following figure represents graphically this statement:

Figure 4.8.
Volume reduction of waste tires by removing the sidewalls and packing tightly

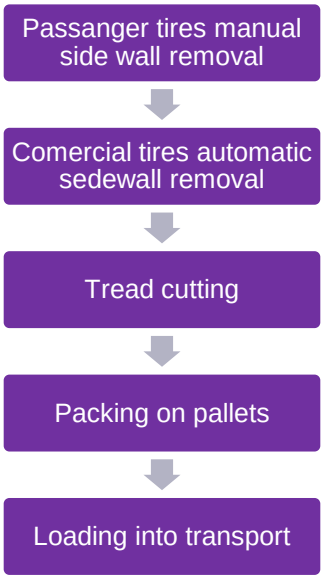


The reduction depends on the tire diameter and can theoretically vary from 70% to 79%. IEMS' basis for these estimations can be consulted on **Attachment 16**.

As an advantage sidewall removing machines are less pricy than shredding machines.

Process steps considered for sidewall removing operations are explained in **Figure 4.9.** Facilities, equipment and materials required for each activity are:

Figure 4.9.
Process diagram for waste tires sidewall removal



Manual sidewall removal:

- ✓ 40 linoleum knives per person.
- ✓ Shade tent.

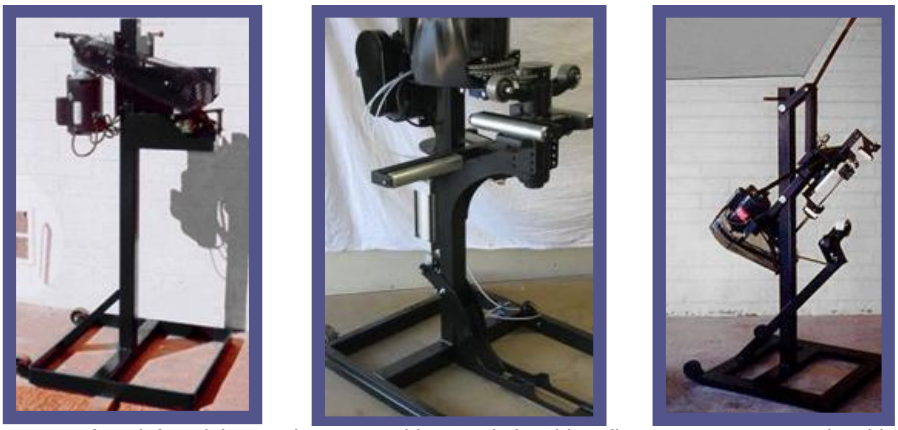
Automatic sidewall removers:

- ✓ Automatic truck tire sidewall remover.
- ✓ Shade tent.
- ✓ Electricity source.

Tread cutting:

- ✓ Automatic tread cutter.
- ✓ Shade tent.
- ✓ Electricity source.

Image 4.5.
Tire sidewall remover machines



Present from left to right: tread cutter machine, truck tire sidewall remover, passenger tire sidewall remover
Technical brochures and quotations are available on ***Attachment 17.***

Packing on pallets:

- ✓ Pallets

Loading into transport:

- ✓ Pallet jack

Advantages:

- Extreme volume diminishing percentages.
- Low initial investment in equipment (No heavy equipment and machinery required).
- Low energy input requirements thus reducing operation costs and green house gases emissions.

Disadvantages:

- Personnel requirements with their related labor law costs.
- Passenger and commercial tires require different cutting equipment.

1.3.3.2 Shredding

Advantages:

- Extreme volume diminishing percentages.
- Can diminish both passenger and commercial waste tires.
- Low personnel requirement.

Disadvantages:

- High initial investment in equipment.
- High energy input requirements thus increasing operation costs and green house gases emissions.

Image 4.6.
Hogzilla® shredding machine used to shred waste tires to landfill them afterwards

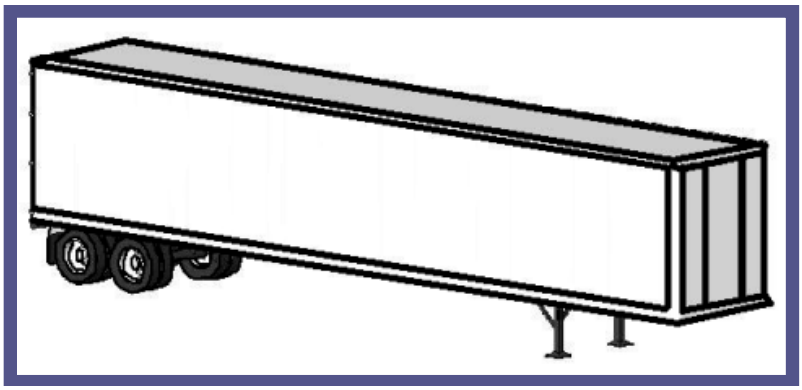
1.3.4 Transport

Unless disposal sites or recycling facilities are adjacent to the pile site; waste tires need to be moved requiring infrastructure, equipment, personnel and energy to do so. IEMS assessed different transport options available.

The most economically and logistically viable can be selected for each site. In this study the train and truck options were the ones evaluated.

Quotations from trucking companies were obtained for the transport of 53' HC Container.

Image 4.7.
53' HC Container trailer diagram



The amount of whole tires that a container can fit depends largely on the arrangement of the tires inside it can vary from 1050[4] to 1800[5] tires in a 53' HC Container

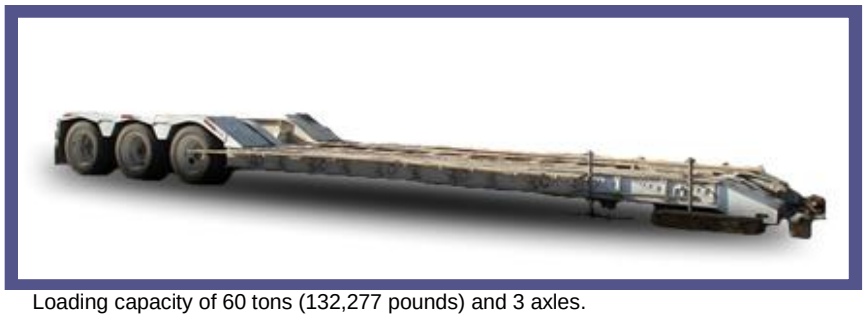
Quotations from rail companies were obtained for 5,000 and 6,000 cubic feet (141.58 and 169.90 cubic meters) containers depending on the route.

Image 4.8.
5,000 cubic feet container diagram

Additionally, quotations from trucking companies were requested for heavy loading platforms (20 to 60 tons).

[4] Number of tires per truck trip sent from Matamoros (Tamaulipas) to Monterrey (Nuevo Leon) by municipal authorities.
[5] Max loading capacities for domestic trailers 53' HC CONTAINER - 1800 UNITS (Approximate), Lakin tires wholesaler quotation.

Image 4.9.
11.2 meters (36.7 feet) long platform



Loading capacity of 60 tons (132,277 pounds) and 3 axles.

1.3.4.1 Other transportation variables

Other variables besides the transportation costs per tire affect the decision making process regarding type of vehicle and routes which are:

- Maximum road weight limits. Site's access roads and freeways should be technically able to withstand the weight of the transportation vehicles, especially when loaded. And vehicles brute weight [6]must comply with Mexican weight limits legislation that applies.

- Security issues. Transport companies may be reluctant to travel into certain border municipalities or through some routes.

1.3.5 Process or disposal

Processing or disposing of waste tires in an environmental, social and economically viable way is necessary in order to make sure the damages are not just being spread, moved or exchanged for new impacts to the environment and or the population.

Different processing and disposal options currently employed in the Mexico border area were considered in order to visualize the most sustainable solutions in the social, economic and environmental triple bottom line.

The reason for which whole tire burial will not be contemplated as an option is explained in the following statement:

Scrap tires are not desirable in standard landfills because, when buried, the tires tend to trap air and "float", which interferes with future landfill reclamation operations. As permitted landfill space diminishes, it is necessary to limit the types of accepted material to those better suited to future reclamation. (Environmental Engineering and Contracting, Inc., 2002)

[6] Addition of the vehicle weight plus the cargo weight (Mexico Secretariat of Communications and Transport, SCT, 2006)

Disposal options currently available in the Mexican side of the Texas-Mexico border area are:

1. Landfills. Quotations from public and private landfills in the Mexican scope area and logistically viable locations outside this area were obtained.
2. Tire derived fuel in cement kilns. Quotations and supply plans were consulted with the cement companies and their tire derived fuel suppliers in the Mexican scope area and logistically viable locations outside this area were obtained.

1.4 Current potential cost to extinguish fires and remediate environmental, public health, and economic impacts should any of the major tire piles in the region set ablaze.

The required estimation was separated in two different sections which are presented as follows:

1.4.1 Current potential cost to extinguish fires should any of the major tire piles in the region set ablaze.

In order to estimate the current potential cost to extinguish fires and remediate environmental, public health, and economic impacts (e.g., crop damage) should any of the major tire piles in the region set ablaze, remote and face to face interviews were performed with civil guard and fire department representatives as it is explained in detail on Chapter 1.

Key stakeholders interviewed include the Civil Guard and/or Firefighter representatives for the selected Mexican municipalities and fire department representatives of the Texas selected cities.

To review the subjects and questions applied in the Mexican side of the border please refer the questionnaire titled *Anexo: cuestionario para protección civil detallado"* located on **Attachment 4**.

Likewise, to review what was asked in the Texas side of the border please refer to the questionnaire titled "Proposed questionnaire for fire departments" located on **Attachment 3** of this document.

Mexican civil guard, firemen and municipal environmental authorities do not estimate or keep track of the costs inherent to the fires they attend to, in order to estimate the costs required by this Chapter, IEMS based the calculation on the personnel, time and equipment employed in extinguishing previous tire fires in the Mexican side of the Texas-Mexico border.

Texas side of the border firefighting agency costs are also presented as a reference, since the firefighting cooperation activities have been suspended in some cities due to security reasons. This means Texas firefighters do not cross over anymore to the Mexican side of the border to aid in fire extinguishing activities. According to said interviews the main costs involved in combating tire fires are the ones corresponding to the following items:

Texas:

- Personnel wages represents the main cost of attending to a fire.
- Equipment.
- Foam

Mexico:

Most civil Guard representatives ignore the costs of combating fires in their municipalities the items mentioned by them which represent a cost are:

- Fuel
- Personnel
- Equipment
- Machinery
- Extinguishing agents

The cost for attending tire fires reported by said departments are presented in this chapter. Additional cost estimations were also performed for the Mexican data due to a lack of information reported by civil guard representatives.

1.4.2 Current potential cost to remediate environmental, public health, and economic impacts should any of the major tire piles in the region set ablaze

Byproducts of a tire pile fire that present a significant risk to the environment and the responders to a tire pile fire are (Environmental Engineering and Contracting, Inc., 2002):

- Pyrolytic oil
- Ash
- Smoke

1.4.2.1 Pyrolytic oil impact description, assessment and remediation techniques

Pyrolytic oil impacts

"Pyrolytic oil is generally formed during the equilibrium/pyrolysis combustion stage of a tire fire, in which fuel combustion and heat production equalizes, combustion produces enough heat to consume most of the combustion products, and downward pressure of the tire pile causes an increase of run-off oil

flow. (United States Fire Administration,USFA, 1998) As tires burn, they can theoretically release 2.0 gallons of pyrolytic oil per tire, potentially creating an oil fire that helps to both fuel and spread the scrap tire pile fire (Environmental Protecion Agency, 2000). Previous tire pile fires have generated as much as 10-14 million gallons of pyrolytic oil (Environmental Protecion Agency, 2000)

Pyrolytic oil is basically a free-flowing tar that contains (Horrigan, 1999):

1. Naphthalene
2. Anthracine
3. Benzene
4. Thiazoles
5. Amines
6. Ethyl benzene
7. Toluene
8. Total Petroleum Hydrocarbons
9. Cadmium
10. Chromium
11. Nickel
12. Zinc

Measures should be taken to protect all workers or personnel who may come in contact with the oil. Primary routes of exposure to workers are dermal contact and ingestion of contaminated soil and water (surface water and run-off water) (United States Fire Administration,USFA, 1998).

Other environmental concerns associated with pyrolytic oil include contamination of soil and water, including surface water and groundwater. Pyrolytic oil is capable of traveling significant distances over land depending on local topography, migrating downward through soil into groundwater, and entering surface waterways. Oil can also flow underground through a permeable soil horizon or other preferential pathway.

Therefore, soil, surface water and groundwater can all become contaminated by pyrolytic oil during a tire fire. (Environmental Engineering and Contracting, Inc., 2002)

Pyrolytic oil impact assessment and remediation

Environmental Site Assessment: Phase 1

In order to assess the extent of the impacts caused by pyrolitic oil runoff from a tire fire IEMS considers necessary the engagement of an environmental professional with credentials to perform a Phase I Environmental Site Assessment Process (Phase 1 ESA) in accordance to ASTM E1527-05 standard.

"The goal of the processes established by this practice is to identify recognized environmental conditions (RECs). REC means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws.

The term is not intended to include de *minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de *minimis* are not RECs" (ASTM International, 2005).

Due to copyright a copy of ASTM E1527-05 Standard is not attached to this report.

Sampling

For every REC identified during the phase 1 Assessment activities sampling should be performed and analyzed in order to confirm the presence of contamination above legal limits.

Sampling should be conducted for the substances enumerated above. Depending on the RECs identified water sampling (surface and underground) may be necessary as well.

Site Characterization and remediation

If contamination is confirmed by the sampling activities a full extent site characterization should be performed in accordance to Official Mexican Standard NOM-138-SEMARNAT/SS-2003.

Said standard states Maximum Permissible Limits of Hydrocarbons on soil and the specifications for its characterization and remediation *(Norma Oficial Mexicana Nom-138-SEMARNAT/SS-2003, Límites Máximos Permisibles de Hidrocarburos En Suelos y las Especificaciones para su Caracterización y Remediación.)* These activities will have to be performed in order to precisely measure the vertical and horizontal extent of the contamination.

Given each site unique characteristics (soil, topography, subsoil, rainfall, history of past activities, etc) it is not feasible to estimate characterization and remediation costs of a situation that has not been assessed with the past mentioned activities of this section. In order to shed some light in the magnitude of the costs of said activities IEMS will present price ranges based on its professional experience in the matter.

1.4.2.2 Ash

"Ash is a byproduct of combustion, and represents a great hazard to responders. Ash typically contains heavy metals such as:

1. Lead.
2. Arsenic.
3. Zinc.

Which are released from the tires in particulate form. The primary routes of exposure for ash include ingestion, dermal contact, and inhalation. Due to the airborne nature of ash, measures should be taken to protect not only responders and other workers within the exclusion zone, but consideration should also be given to any personnel in the support zone and the public.

Ash can contaminate the soil or equipment when it settles out of the sky. Environmental impacts of ash can also be exacerbated by response activities. For example, ash can be carried downstream with surface run-off of foam or other fire suppressant materials, and can enter streams or other surface waterways. Tracks and wheels of heavy equipment used to fight the tire fire can churn up the ground and either push or mix ash into the surficial soil.

Ash impact assessment and remediation

Eventually ashes will settle above the ground or surface waters, reason for which the Environmental professional in charge of performing the Phase I Environmental Site Assessment described above should also look for accumulations or signs of contamination by ashes in order to identify potential RECs related to them both in soil and water.

In case ash related RECs are identified during the Phase 1 ESA, sampling and analysis to confirm contamination with each of the substances enumerated previously should also be performed.

Given each site unique characteristics (soil, topography, subsoil, rainfall, infrastructure, hydrology, etc) it is not feasible to estimate characterization and remediation costs of a situation that hasn't been assessed with the past mentioned activities of this section. In order to shed some light in the magnitude of the costs of said activities IEMS will present price ranges based on its professional experience in the matter.

1.4.2.3 Smoke

"The smoke generated by a tire pile fire contains numerous hazardous compounds that pose a significant potential health hazard to downwind receptors. Smoke does not only affect the on scene responders, but has the potential to travel great distances and affect the general population downwind of the tire pile fire." (Environmental Engineering and Contracting, Inc., 2002)

"*Recognizing the dangers to health and environment associated with tire fires, the Tacoma-Pierce County Health Department (TPCHD) conducted a study on hazardous airborne chemical compounds. TPCHD published a report that identified, through a series of screening steps, a subset of 34 target compounds (weighted based on toxicity and expected ambient air concentrations) that should be considered for air monitoring during a tire fire* (Adolfson Associates, Inc. & Kim Coble, 1994)" (Environmental Protection Agency, 1997) A copy of this 34 target compounds list is presented as **Attachment 18** of this Chapter.

Smoke impact assessment and remediation

IEMS performed a literature search regarding the health hazards associated to the exposure to these substances by:

- Inhalation
- Dermal contact
- Eye contact

Later on the effects were catalogued as carcinogenic and non carcinogenic, this because for non carcinogenic effects a threshold exists. This threshold refers to a dosage limit considered "safe". In an exposure to a dosage below or equal to this limit the organism presents no toxicological effects. (Urkiza, 2009)

For carcinogenic effects theoretical models consider that a threshold dosage does not exist. Reason for which not mattering how small the dosage to which the organism is exposed the risk to develop cancer always exist, even if the exposure occurred a long time ago. (Urkiza, 2009)

From the 34 target compounds IEMS select 11 compounds based on the emission factor availability and concentrations measured within 305 m (1000 feet) of the fire.

- Acenaphthylene
- Benzene
- Butadiene
- Carbon tetrachloride
- Chloroform
- Methylene chloride
- Phenol
- Styrene
- 1,1,2-Trichloroethane
- Toluene
- o-Xylene

In order to know to what concentration of each of the target compounds people adjacent to a tire fire are exposed IEMS used two sources:

1. Open burning: ambient concentrations measured downwind of a tire fire <305 m (1000ft) (Environmental Protection Agency, 1997)
2. Contaminants air dispersion computer modeling using the following software:
    a. Areal Locations of Hazardous Atmosphere (ALOHA) developed jointly by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA).

Threat zones were calculated based on the toxicological parameters define as follows in the **Table 4.4.**

Table 4.4. **Toxicological Parameter**	
IDHL (*Immediately Dangerous to Life and Health*)	An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere

Once this parameter was identify for each compound an analysis of the probable health hazards was developed for each site, in case of a fire.

Other assumptions were made during analysis process :

- All the tires of the pile were burned.
- Weather conditions are considered as the more probable worse scenario, a hot dry day, with a atmospheric stability D.
- The report acknowledges that particulate matter containing PAHs and heavy metals are known tire fire emissions, however because of the lack of PM monitoring data, these compounds were not addressed
- An one hour exposure is assumed for all cases.

Later on IEMS performed a literature search to assess the health impacts of each substance if inhaled. Finally a quotation to treat each health effect was obtained from specific physicians.

IEMS based on the quotations obtained and the mapping (through modeling) of the air pollution extent where concentrations of each pollutant are above the Immediately Dangerous To Life or Health Concentrations (IDLH) will estimate the number of endangered people and the potential current potential cost to remediate public health impacts caused by smoke.

1.5 History of known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region

In order to identify the ecosystems found on the study's scope area the following sources were consulted:

- ✓ Olson's World Ecosystem Complexes Map
- ✓ Google Earth® Software

Once the Texas-Mexico Border Region's ecosystems were identified, a worldwide search of regions with similar natural characteristics was performed in order to identify population centers which could present waste tire management problems i.e. cities; and therefore possess documents regarding health hazards associated to them.

A literature search regarding waste tires and the health hazards associated to them in the identified population centers allowed IEMS to produce a summary report about the history of known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region.

1.6 Estimate the potential cost to remediate the environmental health threats associated with disease carrying vectors located in tire piles along the Texas-Mexico Border Region.

Two viral diseases are the main environmental health threats associated with disease carrying vectors located in tire piles, both are transmitted by mosquitoes.

To obtain information related to this section the following key stakeholders in the Texas-Mexico border area were consulted:

Texas
- ✓ Texas Department of State Health Services
- ✓ Vector Control inspectors
- ✓ Health Department local offices

Mexico
- ✓ Tamaulipas Health secretariat
- ✓ Nuevo Leon Health secretariat
- ✓ Coahuila Health secretariat
- ✓ Chihuahua Health secretariat

These key departments were asked to deliver information regarding Dengue and West Nile Virus recorded cases from 2005 to this day within the study's scope regions, and the treatment costs for said diseases.

Information was also obtained from the following sources:

- Specific action program 2007-2012 Dengue (Mexican Health Secretariat, Secretaria de Salud, 2008)
- United States Center for Disease Control and Prevention (CDC)
- World Health Organization (WHO)

Based on the clinical frame and number of cases of each disease quotations for the treatment medicines were obtained from pharmacies in order to assess the potential cost to remediate the environmental health threats associated with disease carrying vectors located in tire piles along the Texas-Mexico Border Region.

1.6.1 Dengue Fever

Dengue is transmitted by the bite of an *Aedes* mosquito infected with any one of the four Dengue viruses. It occurs in tropical and sub-tropical areas of the world. Symptoms appear 3-14 days after the infective bite. Dengue fever is a febrile illness that affects infants, young children and adults.

Image 4.10.- Aedes aegypti mosquito

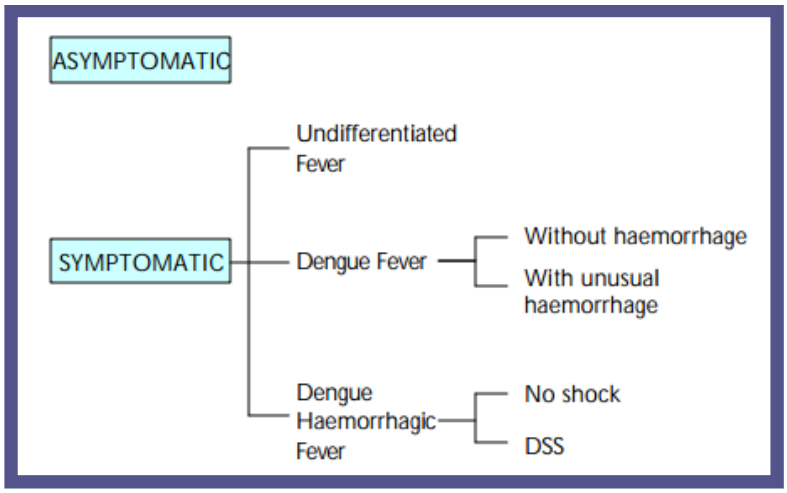
(Medical Assistance Institute of Buenos Aires, IOMA)

There are four distinct, but closely related, serotypes of the virus that cause Dengue (DEN-1, DEN-2, DEN-3 and DEN-4). Recovery from infection by one provides lifelong immunity against that particular serotype. However, cross-immunity to the other serotypes after recovery is only partial and temporary. Subsequent infections by other serotypes increase the risk of developing severe Dengue.

Dengue should be suspected when a high fever (40°C/ 104°F) is accompanied by two of the following symptoms: severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands or rash. Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito.

Figure 4.10. presents the different manifestations Dengue infections may present and their denomination. They may vary from asymptomatic (no manifestations) to Dengue hemorrhagic fever (DH).

Figure 4.10.
Manifestations of Dengue virus infections



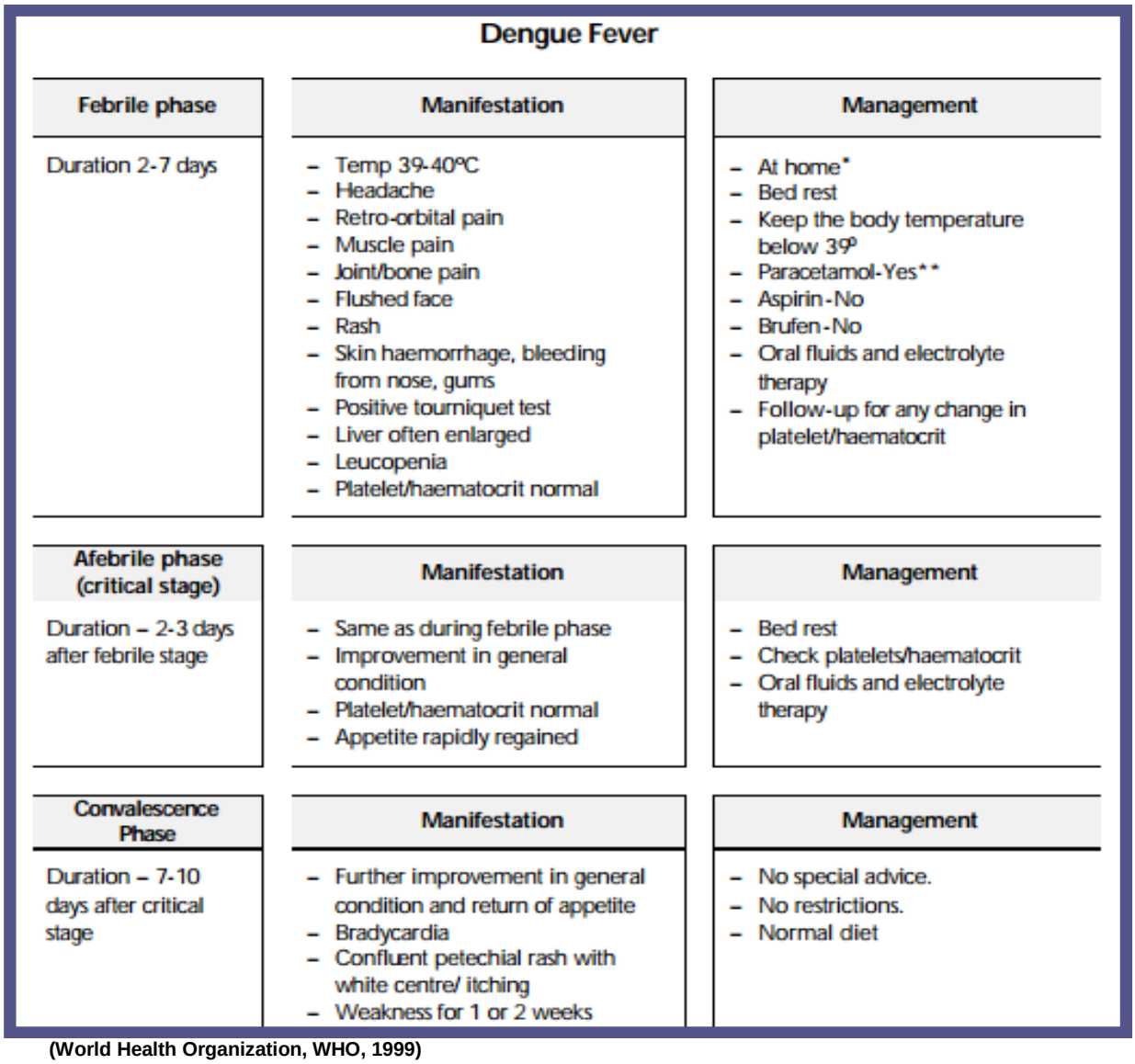
(World Health Organization, WHO, 1999)

As **Figure 4.11.** presents Dengue Fever (DF) can be treated at home by administering Paracetamol and oral fluids to the patient. The cost of these treatments was obtained by IEMS to estimate Dengue Fever treatment costs.

Severe Dengue, also known as DH (fever, abdominal pain, vomiting, bleeding) is a potentially lethal complication, affecting mainly children. Early clinical diagnosis and careful clinical management by experienced physicians and nurses increase survival of patients. It requires hospitalization.

Severe Dengue is a potentially deadly complication due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment. Warning signs occur 3–7 days after the first symptoms in conjunction with a decrease in temperature (below 38°C/ 100°F) and include: severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums, fatigue, restlessness, blood in vomit. The next 24–48 hours of the critical stage can be lethal; proper medical care is needed to avoid complications and risk of death. About 2.5% of those affected die.

Figure 4.11.
Dengue fever management chart



Dengue Fever

Febrile phase	Manifestation	Management
Duration 2-7 days	– Temp 39-40ºC – Headache – Retro-orbital pain – Muscle pain – Joint/bone pain – Flushed face – Rash – Skin haemorrhage, bleeding from nose, gums – Positive tourniquet test – Liver often enlarged – Leucopenia – Platelet/haematocrit normal	– At home* – Bed rest – Keep the body temperature below 39º – Paracetamol-Yes** – Aspirin - No – Brufen - No – Oral fluids and electrolyte therapy – Follow-up for any change in platelet/haematocrit

Afebrile phase (critical stage)	Manifestation	Management
Duration – 2-3 days after febrile stage	– Same as during febrile phase – Improvement in general condition – Platelet/haematocrit normal – Appetite rapidly regained	– Bed rest – Check platelets/haematocrit – Oral fluids and electrolyte therapy

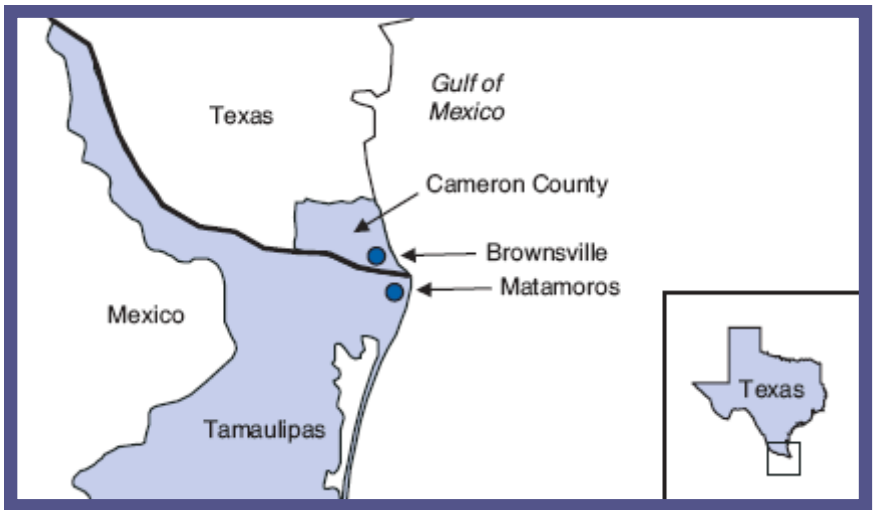
Convalescence Phase	Manifestation	Management
Duration – 7-10 days after critical stage	– Further improvement in general condition and return of appetite – Bradycardia – Confluent petechial rash with white centre/ itching – Weakness for 1 or 2 weeks	– No special advice. – No restrictions. – Normal diet

(World Health Organization, WHO, 1999)

Hospitalization Costs for DH were obtained from the Mexican states health ministries in order to estimate the DH treatment costs.

The last reported continental US Dengue outbreak was in south Texas in 2005. (US Center for Disease Control and Prevention, CDC)

Figure 4.12.
Jurisdictions affected by Dengue fever outbreak in the Texas-Mexico border, 2005.



(US Center for Disease Control and Prevention, CDC)

1.6.2 West Nile Virus

According to the CDC West Nile Virus (WNV) is transmitted to humans through mosquito bites. Mosquitoes become infected when they feed on infected birds that have high levels of WNV in their blood. Infected mosquitoes can then transmit WNV when they feed on humans or other animals.

WNV is not contagious from person to person and there is no evidence that a person can get infected by handling live or dead infected birds.

Most WNV infected humans have no symptoms. A small proportion develops mild symptoms that include fever, headache, body aches, skin rash and swollen lymph glands. Less than 1% of infected people develop more severe illness that includes meningitis (inflammation of one of the membranes covering the brain and spinal cord) or encephalitis. The symptoms of these illnesses can include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. Of the few people that develop encephalitis, a small proportion die but, overall, this is estimated to occur in less than 1 out of 1000 infections.

There is no specific treatment for WNV infection or vaccine to prevent it. Treatment of severe illnesses includes hospitalization, use of intravenous fluids and nutrition, respiratory support, prevention of secondary infections, and good nursing care. Medical care should be sought as soon as possible for persons who have symptoms suggesting severe illness.

Data regarding detected WNV cases from 2005 to 2012 was requested to Mexican state health secretariat *(Secretaria de Salud, SS)* directors no response from any state was obtained.

In order to estimate the approximate number of cases which occurred on the Mexican side of the border IEMS applied the following formulas:

Formula 17.

$$\text{West Nile Virus occurrence in a Texas border city in a specific year (cases detected / inhabitants)} = \frac{\text{Cases detected in a Texas border city in a specific year (WNV cases)}}{\text{Texas border city population (inhabitants, in the same specific year)}}$$

Formula 18.

$$\text{Estimated WNV occurrence (WNV cases)} = \text{West Nile Virus occurrence in a Texas border city in a specific year (cases detected / inhabitants)} \times \text{Population of the adjacent Mexican city (inhabitants, in the same specific year)}$$

The past two formulas are based on IEMS' hypothesis stating:

Since, geographically, border cities only divided by the Rio Grande River form only one metropolitan area. The number of cases per inhabitant on one side should be similar to the number of cases on the other side.

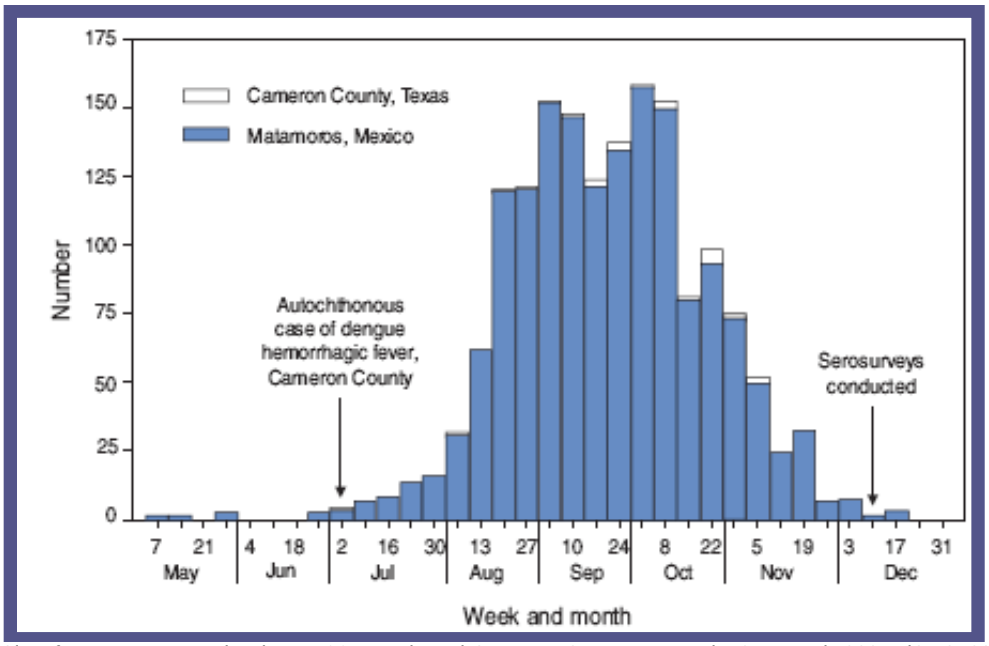
IEMS supports this affirmation on data obtained from the 2005 Dengue outbreak in the border adjacent cities of Brownsville, Texas and Matamoros, Tamaulipas, where a mosquito transmitted disease presented itself on both sides of the border simultaneously, with even more intensity in the Mexican side of the Texas-Mexico border. This fact suggests that the past two formulas may underestimate the number of WNV cases presented on Mexican cities.

The **Figure 4.13**, created by the CDC, illustrates the number of cases on both cities of the border on the 2005 Dengue outbreak:

Number of cases for each Texas county were obtained from the annual repot maps published on the CDC web page such as the one presented on **Figure 4.14.** of this Chapter.

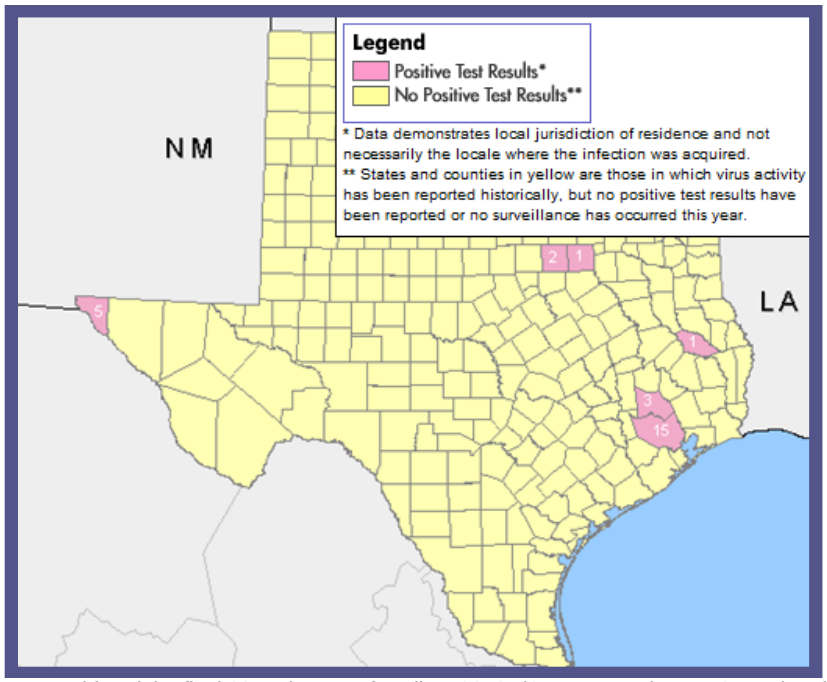
WNV hospitalization costs quotations were requested to El Paso hospitals since most Texas cases occur in said county.

Figure 4.13.
Number of cases of Dengue fever, by week of report



City of Matamoros, Mexico (n= 1,596 cases), and Cameron County, Texas (n=25 cases), 2005. (CDC, 2007)

Figure 4.14.
Number of WNV cases reported in Texas counties for 2011-2012.



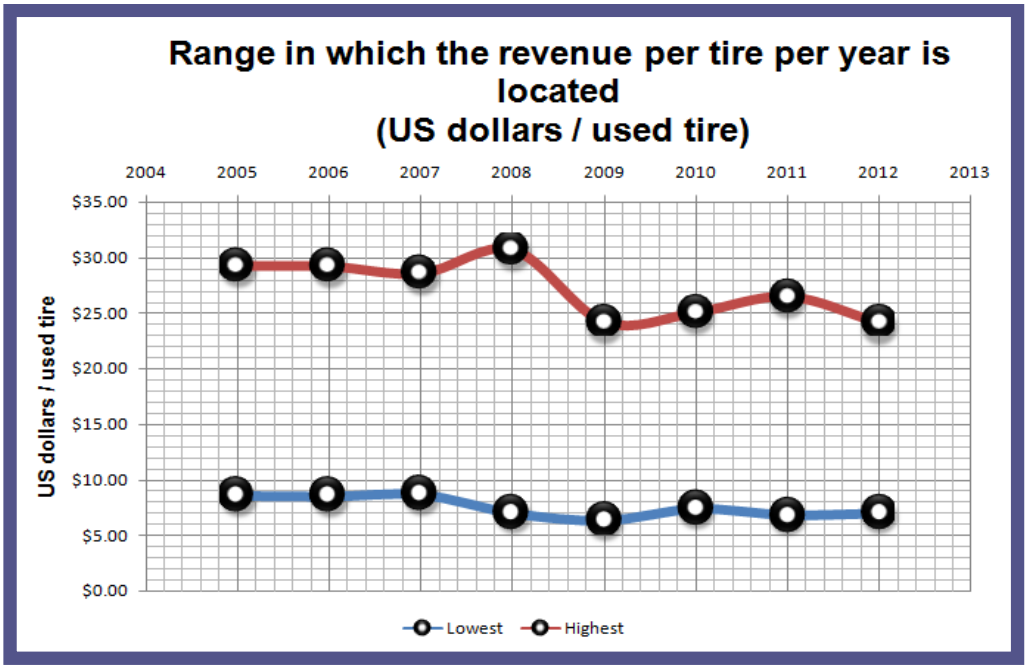
These data are considered the final 2011 data as of April 17,2012. (Center For Disease Control and Prevention, 2012)

2 Assessment of environmental and economic impacts

2.1 Revenue per tire generated from the sale of used tires to Mexico (per year since 2005)

As explained on previously, IEMS estimated a revenue range, rather than a single number, of what the revenues may have been in any determined period of time between January 2005 and April 2012.

Figure 4.15
Presents the lowest and highest estimated revenue per tire per year since 2005.



The mean revenue range's minimum and maximum extremes to estimate the revenue per tire of years 2005 to 2012 are based on the following factors:

1. How the US dollars exchange value has varied in reference to the Mexican peso in the 2005 to 2012 period of time.
2. The quality and remaining tread (type) of the used tires in the Texas-Mexico tire flow.
3. The increase of used tire prices since 2005, reported by used tire dealers in the Mexican side of the border.

Table 4.5. Revenue per tire per year range (US dollars / used tire)		
Year	**Highest**	**Lowest**
2005	$29.21	$8.55
2006	$29.15	$8.49
2007	$28.52	$8.66
2008	$30.66	$7.01
2009	$24.14	$6.35
2010	$25.01	$7.40
2011	$26.44	$6.85
2012	$24.08	$7.00

Results from the application of **Formula 1** are shown in **Table 4.6**.

Table 4.6. Lowest revenue per tire per year (US dollars / used tire)					
Rim size	**R 13**	**R 14**	**R 15**	**R 16**	**Lowest revenue (US dollars / used tire)**
Remaining tread / year	**0-20%**	**0-20%**	**0-20%**	**0-20%**	
2005	$0.86	$3.13	$3.58	$0.98	$8.55
2006	$0.86	$3.11	$3.56	$0.97	$8.49
2007	$0.87	$3.17	$3.62	$0.99	$8.66
2008	$0.71	$2.57	$2.93	$0.80	$7.01
2009	$0.64	$2.33	$2.66	$0.72	$6.35
2010	$0.75	$2.71	$3.10	$0.84	$7.40
2011	$0.69	$2.51	$2.87	$0.78	$6.85
2012	$0.71	$2.56	$2.93	$0.80	$7.00

Formula 2 results obtained are presented in the following table.

Table 4.7. Mexican's specific rim size preference when buying used tires (percentage)				
Rim size / municipality	**Rim 13**	**Rim 14**	**Rim 15**	**Rim 16**
Juarez	17%	44%	33%	6%
Reynosa	10%	30%	40%	20%
Matamoros	8%	42%	42%	8%
Geometric mean	**11%**	**38%**	**38%**	**10%**
			error	**3%**

Information obtained from the application of **Formulas 3** and **4** are shown in **Tables 4.8** thru **4.10.**

Table 4.8. Reynosa's rim size preference				
Rim size /Quotation No.	**Rim 13**	**Rim 14**	**Rim 15**	**Rim 16**
1		1	1	
2			1	1
3	1	1	1	
4		1	1	
5				1
Number of mentions	1	3	4	2
Preference (%)	**10%**	**30%**	**40%**	**20%**

Table 4.9. Juarez' rim size preference				
Rim size /Quotation No.	**Rim 13**	**Rim 14**	**Rim 15**	**Rim 16**
1	1	1	1	
2			1	
3		1		1
4		1		
5	1	1	1	
6	1	1		
7		1	1	
8		1	1	
9		1	1	
Number of mentions	3	8	6	1
Preference (%)	**17%**	**44%**	**33%**	**6%**

Table 4.10. Matamoros' rim size preference				
Rim size /Quotation No.	**Rim 13**	**Rim 14**	**Rim 15**	**Rim 16**
1		1	1	
2		1	1	
3	1	1	1	1
4		1	1	
5		1	1	
Number of mentions	1	5	5	1
Preference (%)	**8%**	**42%**	**42%**	**8%**

The application of **Formula 5** resulted in the following information.

Table 4.11.
Lowest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)

Rim size	R 13	R 14	R 15	R 16
Remaining tread / year	0-20%	0-20%	0-20%	0-20%
2005	$7.74	$8.21	$9.38	$10.01
2006	$ 7.68	$ 8.16	$ 9.32	$ 9.94
2007	$ 7.83	$ 8.31	$ 9.50	$ 10.13
2008	$ 6.34	$ 6.73	$ 7.69	$ 8.20
2009	$ 5.74	$ 6.09	$ 6.96	$ 7.43
2010	$ 6.69	$ 7.10	$ 8.12	$ 8.66
2011	$ 6.19	$ 6.57	$ 7.51	$ 8.02
2012	$ 6.33	$ 6.72	$ 7.68	$ 8.19

Results obtained from **Formulas 6** and **7** are presented in the following **Table 4.12.**

Table 4.12.
Minimum mean revenue per tire in a specific Mexican city [i] (Mexican pesos / used tire)

Rim size	R 13	R 14	R 15	R 16	R 17
Remaining tread /municipality	0-20%	0-20%	0-20%	0-20%	0-20%
Juarez	$123	$130	$141	$196	$205
Reynosa	$77	$77	$85	$85	$98
Matamoros	$72	$82	$102	$89	$92
Lowest mean revenue per tire in Mexican scope cities i (Mexican pesos / used tire)	**$88**	**$94**	**$107**	**$114**	**$123**

Table 4.13 presents the highest revenue per tire per year obtained through **Formula 8.**

Table 4.13. Highest revenue per tire per year (US dollars / used tire)					
Rim size	**R 13**	**R 14**	**R 15**	**R 16**	**Highest net revenue (US dollars / used tire)**
Remaining tread / year	**20%-40%**	**20%-40%**	**20%-40%**	**20%-40%**	
2005	$2.95	$10.86	$12.15	$3.25	$29.21
2006	$2.95	$10.84	$12.12	$3.24	$29.15
2007	$2.88	$10.60	$11.86	$3.17	$28.52
2008	$3.10	$11.40	$12.75	$3.41	$30.66
2009	$2.44	$8.98	$10.04	$2.69	$24.14
2010	$2.53	$9.30	$10.40	$2.78	$25.01
2011	$2.67	$9.83	$10.99	$2.94	$26.44
2012	$2.43	$8.95	$10.01	$2.68	$24.08

Information used and results obtained from the application of **Formula 9** are presented in the following tables.

Table 4.14. Highest mean revenue per rim size of used tire in the 2005-2012 period in representative Mexican scope cities (US dollars / used tire)				
Rim size	**R 13**	**R 14**	**R 15**	**R 16**
Remaining tread / year	**20%-40%**	**20%-40%**	**20%-40%**	**20%-40%**
2005	$26.45	$28.47	$31.84	$33.34
2006	$26.40	$28.41	$31.77	$33.28
2007	$25.82	$27.79	$31.08	$32.55
2008	$27.76	$29.88	$33.41	$35.00
2009	$21.86	$23.53	$26.31	$27.55
2010	$22.65	$24.38	$27.26	$28.55
2011	$23.94	$25.77	$28.81	$30.18
2012	$21.80	$23.46	$26.24	$27.48

Table 4.15. FIX daily exchange values (Mexican pesos / US dollar)				
year	Minimum		Maximum	
	Date	Exchange value	Date	Exchange value
2005	06/12/2005	$ 10.4097	06/01/2005	$ 11.4018
2006	01/02/2006	$ 10.4303	20/06/2006	$ 11.4809
2007	01/11/2007	$ 10.6639	16/08/2007	$ 11.2676
2008	05/08/2008	$ 9.9180	21/11/2008	$ 13.9183
2009	04/12/2009	$ 12.5969	02/03/2009	$ 15.3650
2010	26/04/2010	$ 12.1575	25/05/2010	$ 13.1819
2011	02/05/2011	$ 11.5023	25/11/2011	$ 14.2443
2012	09/03/2012	$ 12.6299	02/01/2012	$ 13.9342
Source: (Bank of Mexico, BANXICO (FIX), 2005-2012)				

To estimate the Highest mean revenue per tire it was obtained from **Formula 10**; results are presented in **Table 4.16**.

Table 4.16. Highest mean revenue per tire in Mexican scope cities (Mexican pesos / used tire)					
Rim size		Rim 13	Rim 14	Rim 15	Rim 16
No.	Remaining tread / Municipality	20%-40%	20%-40%	20%-40%	20%-40%
1	Juarez	$355	$346	$382	$452
2	Reynosa	$248	$265	$279	$297
3	Matamoros	$237	$284	$342	$312
Highest mean revenue per tire in Mexican scope cities (Mexican pesos /used tire)		**$275.33**	**$296.36**	**$331.40**	**$347.10**

Used tires retail prices are presented by city of interest as estimate with the use of **Formulas 11**, **13** and **14**, in the following tables.

Table 4.17.
Juarez, Chihuahua used tire retail prices for a specific rim size and type from used tire retailers whose used tires come from USA (Mexican pesos /used tire)

Rim size		R 13		R 14		R 15		R 16		R 17		Origin of used tires	Price increase since 2005
No.	Remaining tread / type of quotation	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%		
1	Face to face	$275	$400	$275	$400	$275	$400	$400	$450	$400	$450	USA	40%
2	Face to face	$120	$280	$120	$180	$180	$325	$350	$350	$350	$350	USA	80%
3	Face to face	$180	X	$180	X	$180	X	$180	X	$180	X	USA	50%
4	Face to face	$165	$300	$225	$400	$225	$400	$300	$400	$300	$400	USA	15%
5	Face to face	$150	X	$200	X	$250	X	X	X	X	X	USA	150%
6	Face to face	$250	$400	$250	$400	$250	$400	$350	$500	$350	$500	USA	125%
7	Face to face	$290	$350	$250	$350	$250	$350	$340	$340	$300	$500	USA	50%
8	Face to face	$275	$425	$275	$425	$275	$425	$425	$800	$650	$650	USA	150%
Current mean revenue (Mexican pesos / used tire)		**$203**	**$355**	**$215**	**$346**	**$233**	**$382**	**$325**	**$452**	**$339**	**$466**	**Mean price increase since 2005**	**65%**

Table 4.18.
Reynosa, Tamaulipas used tire retail prices for a specific rim size and type from used tire retailers whose used tires come from USA (Mexican pesos /used tire)

Rim size		R 13		R 14		R 15		R 16		R 17		Origin of used tires	Price increase since 2005
No.	Remaining tread / type of quotation	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%		
1	Face to face	X	$200	X	$200	X	$215	X	$250	X	$300	USA	0%
2	Face to face	$100	$250	$100	$300	$100	$300	$100	$300	$130	$300	USA-Local	50%
3	Face to face	$100	$250	$100	$250	$150	$300	$150	$350	$200	$400	USA	100%
4	Face to face	$100	$250	$100	$250	$100	$250	$100	$250	$100	$250	USA	0%
5	Face to face	$150	$300	$150	$350	$150	$350	$150	$350	$150	$500	USA	67%
Current mean revenue (Mexican pesos / used tire)		**$111**	**$248**	**$111**	**$265**	**$122**	**$279**	**$122**	**$297**	**$141**	**$339**	**Mean price increase since 2005***	**43%**

*An arithmetic mean operation, instead of a geometrical mean, was employed to estimate the average prices increase since year 2005 because of the precense of zeros in the input data.

Table 4.19.
Matamoros, Tamaulipas used tire retail prices for a specific rim size and type from used tire retailers whose used tires come from USA (Mexican pesos/used tire)

Rim size		R 13		R 14		R 15		R 16		R 17		Origin of used tires	Price increase since 2005
No.	Remaining tread / type of quotation	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%		
1	Face to face	$150	$250	$150	$300	$150	$350	$150	$350	$150	$500	USA	0%
2	Face to face	$60	$300	$80	$350	$200	$400	$100	$300	$120	$300	USA	100%
3	Face to face	$50	$200	$50	$200	$50	$200	$50	$200	$50	$200	USA	33%
4	Face to face	$180	$250	$250	$350	$300	$475	$300	$400	$300	$400	USA	30%
5	Face to face	$100	$200	$100	$250	$100	$350	$100	$350	$100	X	USA	0%
Current mean revenue (Mexican pesos / used tire)		**$96**	**$237**	**$108**	**$284**	**$135**	**$342**	**$118**	**$312**	**$122**	**$331**	**Mean price increase since 2005***	**33%**

*An arithmetic mean operation, instead of a geometrical mean, was employed to estimate the average prices increase since year 2005 because of the presence of zeros in the input data.

Mean retail price in Mexican representative scope cities obtained through the application of **Formula 12** is presented in **Table 4.20.**

Table 4.20.
Mean retail price in Mexican representative scope cities [i]
(Mexican pesos/used tire)

Rim size		R 13		R 14		R 15		R 16		R 17	
No.	Remaining tread /Municipality	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%	0-20%	20%-40%
1	**Juarez**	$203	$355	$215	$346	$233	$382	$325	$452	$339	$466
2	**Reynosa**	$111	$248	$111	$265	$122	$279	$122	$297	$141	$339
3	**Matamoros**	$96	$237	$108	$284	$135	$342	$118	$312	$122	$331
Mean retail price in Mexican representative scope cities [i] (Mexican pesos / used tire)		**$129**	**$275**	**$137**	**$296**	**$157**	**$331**	**$167**	**$347**	**$180**	**$374**

2.2 Disposal cost per tire in Texas and Mexico Border Region

Contrary to the Mexican side of the border in Texas private disposal companies as well as local authorities are the ones in charge of the collection and disposal of waste tires. The price charged to a waste tire generator depends on confidential agreements between each waste tire management company and each generator. Prices charged by public landfills and collection centers are fix. Large new tire retailers have corporate agreements with a single authorized hauler which provides the waste tire collection service in all of their stores and information regarding the cost per tire is kept confidential by both parties. Disposal cost per tire on Texas cities of said border region reported by local authorities and small and medium generators are reported as **Attachment 19** of this report.

Although private companies are seldom involved, in the Mexican side of the border Municipal authorities are the ones in charge of the waste tire storage and disposal sites, specifically the Ecology and/or municipal services departments.

Each Mexican municipality posses a different approach regarding how waste tires are collected, disposed and stored. The disposal cost per tire in the Mexican side of the Texas-Mexico border region on the sites made available, to generators and general population by said authorities, are presented as **Attachment 20**. Information regarding the cleanup of municipal storage centers is estimated latter on this Chapter.

2.3 Potential cost to clean up significant tire piles in the Texas-Mexico Border Region

Activities such as fire prevention, fumigation and volume diminishing should be addressed by each stakeholder depending on his own criteria.

Waste tire disposal fees at appropriate disposal sites in the Mexican side of the border area are presented on **Attachment 49** of this report.

The transportation costs to the closest appropriate disposal sites are presented on **Table 4.21** based on quotations obtained from trucking companies:

Table 4.21.
Estimated transportation costs to closest appropriate disposal sites

Id #	Destination[1]		Accumulated waste tires (tires)	Equip.	State of tire	Estimated number of travels	Cost per travel	Total Transportation Cost (USD)
	Disposal Site	City						
1	CEMEX Plant	Monterrey, NL.	2,500,000	Truck	Whole	1667	$ 829.07	$ 1'382,067.86
				Train	Whole	1008	$1,480.00	$ 1'491,840.00
				Truck	Cut/Shred	1042	$ 829.07	$ 863,896.05
				Train	Shred	323	$1,480.00	$ 478,040.00
35	GCC Plant	Samalayuca Chih	2,500,000	Truck	Whole	---	---	$ 0.000
				Train	Whole	---	---	$ 0.000
				Truck	Cut/Shred	---	---	$ 0.000
				Train	Shred	---	---	$ 0.000
3	CEMEX Plant	Monterrey, NL.	550,000	Truck	Whole	367	$ 350.00	$ 28,450.00
				Train	Whole	222	$1,272.92	$ 82,587.50
				Truck	Cut/Shred	230	$ 350.00	$ 80,500.00
				Train	Shred	71	$1,272.92	$ 90,377.08
36	CEMEX Plant	Monterrey, NL.	400,000	Truck	Whole	267	$ 829.07	$ 21,363.00
				Train	Whole	162	$1,480.00	$ 39,760.00
				Truck	Cut/Shred	167	$ 829.07	$ 38,455.51
				Train	Shred	52	$1,480.00	$ 76,960.00
31	Landfill[2]	Acuña, Coah.	200,000	Truck	Whole	---	---	$ 0.000
				Train	Whole	---	---	$ 0.000
				Truck	Cut/Shred	---	---	$ 0.000
				Train	Shred	---	---	$ 0.000
32	Landfill[2]	Piedras Negras, Coah	115,500	Truck	Whole	---	---	$ 0.000
				Train	Whole	---	---	$ 0.000
				Truck	Cut/Shred	---	---	$ 0.000
				Train	Shred	---	---	$ 0.000
8	CEMEX Plant	Monterrey, NL.	100,000	Truck	Whole	67	$ 350.00	$ 3,450.00
				Train	Whole	41	$1,272.92	$ 52,189.58
				Truck	Cut/Shred	42	$ 350.00	$ 14,700.00
				Train	Shred	13	$1,272.92	$ 16,547.92
4	CEMEX Plant	Monterrey, NL.	50,000	Truck	Whole	34	$ 350.00	$ 11,900.00
				Train	Whole	21	$1,272.92	$ 26,731.25
				Truck	Cut/Shred	21	$ 350.00	$ 7,350.00
				Train	Shred	7	$1,272.92	$ 8,910.42
34	APASCO Plant	Ramos Arizpe, Coah.	50,000	Truck	Whole	34	$1,959.63	$ 66,627.47
				Train	Whole	---	---	---
				Truck	Cut/Shred	21	$1,959.63	$ 41,152.26
				Train	Shred	---	---	---

Table 4.21.
Estimated transportation costs to closest appropriate disposal sites

Id #	Destination[1]		Accumulated waste tires (tires)	Equip.	State of tire	Estimated number of travels	Cost per travel	Total Transportation Cost (USD)
	Disposal Site	City						
2	CEMEX Plant	Monterrey, NL.	32,000	Truck	Whole	22	---	---
				Train	Whole	13	$1,329.33	$ 17,281.23
				Truck	Cut/Shred	---	---	---
				Train	Shred	5	$1,329.33	$ 6,646.63
15	CEMEX Plant	Monterrey, NL.	13,000	Truck	Whole	9	---	---
				Train	Whole	6	$1,160.13	$ 6,960.80
				Truck	Cut/Shred	---	---	---
				Train	Shred	2	$1,160.13	$ 2,320.27
12	CEMEX Plant	Monterrey, NL.	3,000	Truck	Whole	2	---	---
				Train	Whole	2	$1,115.02	$ 2,230.03
				Truck	Cut/Shred	2	---	---
				Train	Shred	1	$1,115.02	$ 1,115.02
7	CEMEX Plant	Monterrey, NL.	1,000	Truck	Whole	1	$ 350.00	$ 350.00
				Train	Whole	1	$1,272.92	$ 1,272.92
				Truck	Cut/Shred	1	$ 350.00	$ 350.00
				Train	Shred	1	$1,272.92	$ 1,272.92
33	APASCO Plant	Ramos Arizpe, Coah.	1,000	Truck	Whole	1	$ 565.28	$ 565.28
				Train	Whole	1	$6,757.26	$ 6,757.26
				Truck	Cut/Shred	1	$ 565.28	$ 565.28
				Train	Shred	1	$6,757.26	$ 6,757.26
11	CEMEX Plant	Monterrey, NL.	800	Truck	Whole	1	---	---
				Train	Whole	1	$1,115.02	$ 1,115.02
				Truck	Cut/Shred	1	---	---
				Train	Shred	1	$1,115.02	$ 1,115.02

* Means data was not confirmed with a key stakeholder, it is presented as it was obtained from previous tire pile inventories.

Tire sites 16 to 30 are not located within the study's selected search area but are located within 100km from the Texas-Mexico border.

The information presented on this Table was obtained through remote interviews with the key stakeholders mentioned on the **Attachment 4** of the Texas-Mexico Border Region Report

Nuevo Laredo tire pile was cleaned up during the writeup of this Report according to the remote interview applied to the municipal Environment and Climate Change Coordinator on April 20, 2012.

Prices in red are subject to KCSM FSC

Prices in blue are subject to negotiations with Ferromex

Prices don't include VAT.

[1] Disposal sites selected according to cheaper transportation cost.

[2] Transportation costs for Acuña, Juarez and Piedras Negras are not considered due to landfill being in the same city.

2.4 Current potential cost to extinguish fires and remediate environmental, public health, and economic impacts should any of the major tire piles in the region set ablaze.

2.4.1 Cost to extinguish fires in the Texas-Mexico border area

The **Table 4.22.** represents an abstract of the responses given for Mexican civil guard; the personnel cost was obtained considering Mexican minimum wage as $4.77 (US dollars) for 8 hours, the salary per hour is about $0.59 USD.

Table 4.22.
Summary of Resources to extinguish fires given by Mexican civil guard

City	State	Number of tire fires attended since 2005	Resources to extinguish fires			
			Time	Personnel	Personnel Cost (USD)[+]	Extinguishing agents
Ojinaga	Chihuahua	----	1.5 to 2 h	----	----	Water / Foam
Nava	Coahuila	90	1 to 3 h	5	$ 3 - 9	Water / Foam
Acuña	Coahuila	210	20 min to 1 h	----	----	Water / Foam
Piedras Negras	Coahuila		1 to 2 h	3	$ 1.8 - 3.6	Water / Foam
Anahuac	Nuevo Leon	Rarely	0.5 to 1 h	3	$ 1 - 1.8	Water / Foam
Nuevo Laredo	Tamaulipas	Rarely	----	----	----	Water / Foam
Guerrero	Tamaulipas	72	12 to 24 h	6	$ 43 - 85.8	Water / Foam
Gustavo Díaz Ordaz	Tamaulipas	300	----	6	----	Water / Foam
Río Bravo	Tamaulipas	Frecuently	20 to 30 min	3	$1	Water / Foam

[+] *Personnel cost was estimated as follow:* $Number\ of\ personnel \times salary\ per\ hour \times Time$

The responses given for the Texas side of the border firefighting agency are given in the **Table 4.23**; according with the interviewee, to estimate the personnel cost it was considered $35 USD per hour per person and $75 USD per hour to estimate de extinguishing agents cost; although global cost was given.

Table 4.23.
Summary of Resources to extinguish fires given by Texas firefighting agency

City	Number of tire fires attended since 2005	Resources to extinguish fires				
		Time	Number of Personnel	Personnel Cost (USD)	Extinguishing agents	Extinguishing agents cost (USD)
Brownsville	6	6 to 8 h	18	$4000 to $5000	4 Engines and 3000 gall of water	$450 to 600
Laredo	30	45 min to 1 h	4	$90 to 140 +	Water / Foam	$50 to 75 *
Mc Allen	18	----	---	----	Water / Foam	$2,500 to 6,000
Rio Grande	72	----	15	----	90 gall of foam and 700 gall of water	$10,000 to 12,000
Del Río	One in the landfill	----	----	----	Water / Foam	$6,000 to 7,000
Eagle Pass	120	20 min to 2 h	6	$70 to 420 +	15 gall of foam and 2 engines	$25 to 150 *

+ *Personnel cost was estimated as follow:* $Number\ of\ personnel \times salary\ per\ hour \times Time$
* *Extinguishing agents cost was estimated as follow:* $Cost\ for\ extinguishing\ agents\ per\ hour \times Time$

2.4.2 Public health impacts remediation costs

2.4.2.1 Pyrolytic oil and ash

In order to identify the best remediation techniques and their estimated costs IEMS consulted the US Federal Remediation Technologies Roundtable (FRTR), Table 3-2 Remediation Technologies Screening Matrix and Reference Guide[7], and selected the following remediation options:

In situ biological treatment: Phytoremediation

"Phytoremediation is a process that uses plants to remove, transfer, stabilize, and destroy contaminants in soil and sediment. Contaminants may be either organic or inorganic." (FRTR)

Table 4.24.
FRTR reported remediation costs estimates for phytoremediation (US dollars)

RACER PARAMETERS	Small site		Large site	
	Easy	Difficult	Easy	Difficult
Cost per cubic foot	**$18**	**$66**	**$4**	**$14**
Cost per cubic meter	**$626**	**$2,322**	**$147**	**$483**

RACER means Remedial Action Cost Engineering Requirements

[7] Matrix may be consulted online on www.frtr.gov

Ex-situ physical/chemical treatment: Chemical oxidation

"Reduction/oxidation chemically converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are ozone, hydrogen peroxide, hypochlorites, chlorine, and chlorine dioxide." This treatment is assuming an excavation.

"Estimated costs range from $190 to $660 per cubic meter ($150 to $500 per cubic yard)." (FRTR)

Excavation, Retrieval & Offsite disposal

"Contaminated material is removed and transported to permitted off-site treatment and disposal facilities. Pretreatment may be required."

Cost estimates for excavation and disposal range from $300 to $510 per metric ton ($270 to $460 per ton) depending on the nature of hazardous materials and methods of excavation. These estimates include excavation/removal, transportation, and disposal at a permitted facility. Additional cost of treatment at disposal facility may also be required. (FRTR)

2.4.2.2 Smoke

Recognizing the dangers to health and environment associated with tire fires, the Tacoma-Pierce County Health Department (TPCHD) conducted a study on hazardous airborne chemical compounds. TPCHD published a report that identified, through a series of screening steps, a subset of 34 target compounds (weighted based on toxicity and expected ambient air concentrations). (Environmental Protection Agency, 1997)

IEMS performed a literature search regarding the health hazards associated to the exposure to these substances by:

- Inhalation
- Dermal contact
- Eye contact

Later on the effects were catalogued as carcinogenic and non carcinogenic, this because for non carcinogenic effects a threshold exists. This threshold refers to a dosage limit considered "safe". In an exposure to a dosage below or equal to this limit the organism presents no toxicological effects. (Urkiza, 2009). For carcinogenic effects theoretical models consider that a threshold dosage doesn't exist. Reason for which not mattering how small the dosage to which the organism is exposed the risk to develop cancer always exist, even if the exposure occurred a long time ago. (Urkiza, 2009).

In order to know to what concentration of each of the target compounds people adjacent to a tire fire are exposed IEMS used the following:

- Open burning: ambient concentrations measured downwind of a tire fire <305 m (1000ft) (Environmental Protection Agency, 1997)

Since the concentrations reported by TPCHD, measured at a distance of 1000 feet from tire pile fires, did not reach the threshold health affecting level called Immediately Dangerous to Life and Health (IDLH) no simulations were required to conclude that no severe health damages to the general population. Although sensitive population exposed to smoke may present minor health effects such as irritation on eyes or respiratory ways.

2.5 History of known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region

Over the past decade American used vehicles imports, explosive population growth and a steady demand for used American tires in Mexico have contributed to the proliferation of scrap tires on the Texas–Mexico border.

Most of the major border cities host piles containing from tens of thousands to millions of tires, and a few of the largest cities are home to piles ten times as large. Tire piles, legal or illegal, pose at least two health threats: pests and fire.

Tire piles easily accumulate rain and organic matter transported by wind and, therefore, become ideal incubators for mosquito larvae. As leaf litter decays, the microorganisms that grow on it serve as food for the mosquito larvae. Furthermore, tires absorb heat, which helps accelerate the larval growth.

Tire piles have also been identified as breeding ground for vermin (rodents and other pests) due to the combined presence of water, heat, and shade. (Secretaría de Medio Ambiente, 2002)

Mosquito-borne diseases include Dengue, encephalitis, malaria, and yellow fever. (Moore & Mitchell, 1997) Globally, Dengue is currently the most important of all vector-borne viral diseases in terms of human morbidity and mortality, with *Aedes aegypti* and *Aedes albopictus*, the mosquito vector for the Dengue viruses, found in more than 100 tropical countries (Cortez Florez, 2001). In areas where *Ae. aegypti* is abundant, this species might be expected to play a far more important role in Dengue transmission than *Ae. albopictus* (Moore & Mitchell, 1997).

Dengue can produce a spectrum of clinical illness, ranging from a nonspecific viral syndrome to severe and fatal hemorrhagic disease.

Although Dengue fever is not usually fatal, Dengue hemorrhagic fever (DHF) and Dengue shock syndrome can be. On average, 5% of hospitalized cases result in death. The majority of fatalities occur among children younger than 15 years (Lloyd, 2003).

For example, the California Department of Health Services reports that preliminary surveillance data showed that several of California's 50 species of mosquitoes breed in tires (California Integrated Waste Managment Board, 2009).

In 2002, the Department of Health Services' Vector-Borne Disease Section identified five discarded truck tires, one of which yielded seven *Aedes albopictus* larvae after being tested. The *Aedes albopictus*, was initially detected in 2001 in Los Angeles and Long Beach, according to a 2003 Department of Health Services report. The most immediate concern in California, however, is the potential role of waste tires in the spread of the West Nile Virus. According to the Department of Health Services, this mosquito-borne disease reached the United States in 1999 and has since spread to 48 states.

In 2004, it had been detected in 56 of California's 58 counties with nearly 600 identified cases of persons afflicted by the disease. In 2008, 35 cases of West Nile Virus were reported for San Diego County alone. Fortunately, the arid conditions of California lower the risk of adequate mosquito habitat in tire piles in the region.

However, a year with more precipitation or development of tire piles in locations where they would trap water from stormwater runoff would be a matter of concern (Reyes Tomassini, 2009).

Other example is China, where the rapid development of automobile industry and increasing vehicle possession has brought a serious problem with the generation of waste tires since 1978.

In 2004 China generated more than 112 million waste tires and this number increased by two digital places each year.

Although Authorities have improved many ways in waste tire resource comprehensive utilization, only 65% of them are used, contributing to storing and stockpiling of waste tires and the inherited problems previously mentioned (Wang, Xu, & Xuan, 2009).

In south China, where the predominant ecosystem is known as Paddyland, three proven outbreaks of Dengue fever and one confirmed epidemic of Dengue hemorrhagic fever have occurred since 1978.

The first of these took place in Shiwan town, Foshan city, Guangdong Province (population 24,464) in 1978 with 583 hospitalized patients; three patients (0.5%) died.

A local outbreak of Dengue due to virus type 1 occurred in Shiqi town, Zhongshan County, Guangdong Province, from September to November 1979. A total of 496 cases were reported and there were no complications or deaths.

A large epidemic of Dengue occurred on Hainan Island in 1980 with a total of 437 468 cases with a morbidity level of 8097 per 100 000 population; there were 64 deaths. The disease spread to Guangzhou and other cities in Guangdong Province, as well as to some cities in Guangxi Autonomous Region with 2549 cases and one death.

In September 1985 an outbreak of a febrile illness began in Zhan County, Hainan Island, and spread throughout the coastal areas of the island in 1986 involved 13 counties and cities. In contrast to previous epidemics, many of the patients presented Dengue Hemorragic Fever. A total of 113 589 cases were reported (morbidity rate, 1876 per 100 000), with 289 deaths (Qiu, Gubler, Liu, & Chen, 1993). Since 1986, there have been reports of sporadic cases or small outbreaks of Dengue in Guangzhou city, Guangdong Province, and Hainan Island.

Guangdong has been a major province in China affected by Dengue fever outbreaks in addition to Fujian, Zhejiang and Jiangsu provinces since 1990 with a total of 11 844 cases of Dengue fever, with 3 deaths, in the period of 1990-2005 (Jian-feng, et al., 2007).

The association of the abovementioned mosquitoes and other mosquito species with tire piles as breeding ground, along with the potential for transmittal of West Nile Virus and other diseases, make waste tire management and tire pile reduction a public health issue..

Tire piles are typically high-priority targets of efforts to prevent or slow outbreaks of mosquito-borne diseases. Unfortunately, treating them with insecticides is problematic. It is difficult to penetrate tire piles to the depths where mosquitoes breed.

Also, mosquitoes are developing resistance to many widely used insecticides. Finally, insecticides used to suppress adult mosquitoes are environmentally hazardous, and those used to suppress larvae are costly. Thus, mitigating mosquito-borne diseases may require completely removing tire piles (Blackman & Palma, 2002).

Tire piles also pose a major environmental threat given their risk of burning. Tire piles burn intensely due to their high per-pound heat output. For example, the energy content of tires is 14,000–15,000 British thermal units (Btus) per pound, as compared to 8,000–12,000 per pound of coal (California Integrated Waste Managment Board, 2009).

The environmental impact of tire fires ranges from moderate to severe effects on air, water, and soil pollution. Tires do not combust completely and, as a result, produce both conventional air pollutants and hazardous air pollutants; along with solid and liquid waste.

Tire fire smoke contains irritating chemicals, particulate matter, and carcinogens. A 1997 USEPA report indicated that tire fire emissions are significantly more toxic than emissions from coal-fired utilities with pollution controls.

Identified health effects from exposure to such compounds include irritation of mucous membranes (eye, nose, and throat), exacerbation of asthma symptoms and respiratory conditions, and potential exacerbation of preexisting heart disease (California Integrated Waste Managment Board, 2009).

Tire fires also cause water and land contamination. A standard automobile tire generates about two gallons of oil when burning and liquefying.

The burning of large tire piles, then, could potentially result in the leaching of large amounts of toxic oil into the soil and possibly into the aquifers.

If soil becomes contaminated with oil, its microbiological quality is reduced and plant growth is depressed, diminishing the health and productive capacity of the land.

Remediation is generally difficult, and the sites of many tire fires have been designated as hazardous waste cleanup sites (Blackman & Palma, 2002).

An example of the potential extent of a tire fire is the one which engulfed the S.F. Royster Tire Disposal Facility in Tracy, California, in San Joaquin County. The facility stored an estimated 7 million tires that burned for more than two years.

Local, state, and federal authorities worked together to conduct emergency response activities. They determined that the best course of action was to let the fire burn itself out.

The decision was based primarily on concerns that water hosing the fire might produce excessive amounts of hazardous wastewater. In December 2001, state and local agencies completely extinguished the fire and remediation efforts followed.

The Board estimated that the fire contaminated an area of some 564,000 ft^2, or 13 acres (California Integrated Waste Managment Board, 2009).

To address the long-term economic impacts of a tire fire, the highly toxic emissions of the smoke plume must be considered significant ozone pollution contributors in the wider air basin.

Ground-level ozone, or “bad” ozone, is formed when volatile organic compounds—such as benzene and butadiene, which are components of tire fire smoke—react with sunlight and nitrogen oxide in the earth’s lower atmosphere. High ozone concentrations reduce crop yield and result in losses to consumer and producer welfare (California Integrated Waste Managment Board, 2009).

In summary, known environmental health hazards associated with past or current waste tire piles located in regions with ecosystems similar to the Texas-Mexico Border Region are the following:

- ✓ Mosquito transmitted diseases such as Dengue fever and West Nile Virus.
- ✓ Carcinogenic compound emissions when tires are burned.
- ✓ Increase in ground level ozone when tires are burned.
- ✓ Soil and water contamination with toxic oil which leaches when tires are burned.

Identified health effects from exposure to emissions from tire fires include irritation of mucous membranes (eye, nose, and throat), exacerbation of asthma symptoms and respiratory conditions, and potential exacerbation of preexisting heart disease.

2.6 Potential cost to remediate the environmental health threats associated with disease carrying vectors located in tire piles along the Texas-Mexico Border Region

To obtain information related to health threats remediation costs associated with Dengue and West Nile Virus, the following key stakeholders in the Mexico were consulted:

- Tamaulipas Health Secretariat
- Nuevo Leon Health Secretariat
- Coahuila Health Secretariat
- Chihuahua Health Secretariat

These key departments were asked to deliver information regarding Dengue and West Nile Virus recorded cases from 2005 to this day within the study’s scope regions, and the treatment costs for said diseases.

2.6.1 Dengue

2.6.1.1 State of Tamaulipas

Mr. Juan Francisco Castañon Barron, Chief of the Vector State Department of Tamaulipas Health Secretariat delivered data from all municipalities in the State of Tamaulipas regarding Dengue Fever and Dengue Hemorrhagic Fever from 2005 to half 2011, which was the most recent available data. No West Nile Virus data was provided. The following tables contain detected dengue fever and dengue hemorrhagic fever cases in study's scope regions in the State of Tamaulipas.

Table 4.25.
Detected dengue fever and dengue hemorrhagic fever cases in study's scope regions in the State of Tamaulipas. (2005-2007)

Municipality	2005			2006			2007		
	DF	DHF	TOTAL	DF	DHF	TOTAL	DF	DHF	TOTAL
Camargo	0	1	1	0	0	0	9	3	12
Diaz Ordaz	0	0	0	0	0	0	1	4	5
Matamoros	1160	438	1598	14	10	24	46	21	67
Miguel Aleman	0	1	1	0	0	0	8	2	10
Nuevo Laredo	1	2	3	1	0	1	360	142	502
Reynosa	143	62	205	27	9	36	448	198	646
Rio Bravo	2	3	5	1	3	4	9	2	11
Guerrero	0	0	0	0	0	0	0	0	0
Total	5069	1832	6901	151	46	197	1406	516	1922

Table 4.26.
Detected dengue fever and dengue hemorrhagic fever cases in study's scope regions in the State of Tamaulipas. (2008-2011)

Municipality	2008			2009			2010			2011		
	DF	DHF	TOTAL	DF	DHF	TOTAL	DF	DHF	TOTAL	DF	DHF	TOTAL
Camargo	0	0	0	0	0	0	0	0	0	0	0	0
Diaz Ordaz	0	0	0	0	0	0	0	1	1	0	0	0
Matamoros	257	231	488	46	29	75	23	3	26	2	0	2
Miguel Aleman	0	0	0	0	0	0	0	0	0	0	0	0
Nuevo Laredo	4	3	7	9	0	9	2	1	3	0	0	0
Reynosa	284	105	389	81	35	116	29	14	43	15	0	15
Rio Bravo	4	2	6	5	1	6	107	99	206	0	1	1
Guerrero	0	0	0	0	0	0	0	0	0	0	0	0
Total	1014	522	1536	696	215	911	409	168	577	78	15	93

DF = Dengue Fever Cases
DHF = Hemorrhagic Fever Cases

Formula 19.

$$Total = DF + DHF$$
$$(persons)$$

Mr. Juan Francisco Castañon Barron also provided information on length of hospitalization times and its corresponding costs. On average it is known that Dengue Hemorrhagic Fever patients need between 4-7 days to recover from illness which translates into $5,000 - $8,000 pesos for hospitalization costs. There are no specific antiviral medicines for dengue, doctors prescribe medicine to counteract disease symptoms such as painkillers and antipyretics, Parecetamol is highly recommended as it fulfills both functions, as well as electrolyte drinks

For cost estimation, treatment cost (TrC) of $130 pesos[8] and hospitalization cost (HC) of $5,000 pesos will be used per patient. Costs can be higher according to patient critical condition.

The following tables contain detected dengue fever and dengue hemorrhagic fever costs in study's scope regions in the State of Tamaulipas.

Table 4.27.
Dengue fever and dengue hemorrhagic fever costs in study's scope regions in the State of Tamaulipas (2005-2006)

Municipality	2005			2006		
	TrC	HC	TC	TrC	HC	TC
Camargo	$130	$5,000	$5,130	$0	$0	$0
Diaz Ordaz	$0	$0	$0	$0	$0	$0
Matamoros	$207,740	$2,190,000	$2,397,740	$3,120	$50,000	$53,120
Miguel Aleman	$130	$5,000	$5,130	$0	$0	$0
Nuevo Laredo	$390	$10,000	$10,390	$130	$0	$130
Reynosa	$26,650	$310,000	$336,650	$4,680	$45,000	$49,680
Río Bravo	$650	$15,000	$15,650	$520	$15,000	$15,520
Guerrero	$0	$0	$0	$0	$0	$0
Total	**$235,690**	**$2,535,000**	**$2,770,690**	**$8,450**	**$110,000**	**$118,450**

Table 4.28.
Dengue fever and dengue hemorrhagic fever costs in study's scope regions in the State of Tamaulipas (2007-2008)

Municipality	2007			2008		
	TrC	HC	TC	TrC	HC	TC
Camargo	$1,560	$15,000	$16,560	$0	$0	$0
Diaz Ordaz	$650	$20,000	$20,650	$0	$0	$0
Matamoros	$8,710	$105,000	$113,710	$63,440	$1,155,000	$1,218,440

[8] Estimated price for 2 Paracetamol boxes ($25 Mexican pesos each) and eight rehydration powder beverages ($10 pesos each) in a Reynosa convenience drugstore.

Table 4.28.
Dengue fever and dengue hemorrhagic fever costs in study's scope regions in the State of Tamaulipas (2007-2008)

Municipality	2007			2008		
	TrC	HC	TC	TrC	HC	TC
Miguel Aleman	$1,300	$10,000	$11,300	$0	$0	$0
Nuevo Laredo	$65,260	$710,000	$775,260	$910	$15,000	$15,910
Reynosa	$83,980	$990,000	$1,073,980	$50,570	$525,000	$575,570
Río Bravo	$1,430	$10,000	$11,430	$780	$10,000	$10,780
Guerrero	$0	$0	$0	$0	$0	$0
Total	**$162,890**	**$1,860,000**	**$2,022,890**	**$115,700**	**$1,705,000**	**$1,820,700**

Table 4.29.
Dengue fever and dengue hemorrhagic fever costs in study's scope regions in the State of Tamaulipas (2009-2011)

Municipality	2009			2010			2011		
	TrC	HC	TC	TrC	HC	TC	TrC	HC	TC
Carmargo	$0	$0	$0	$0	$0	$0	$0	$0	$0
Diaz Ordaz	$0	$0	$0	$130	$5,000	$5,130	$0	$0	$0
Matamoros	$9,750	$145,000	$154,750	$3,380	$15,000	$18,380	$260	$0	$260
Miguel Aleman	$0	$0	$0	$0	$0	$0	$0	$0	$0
Nuevo Laredo	$1,170	$0	$1,170	$390	$5,000	$5,390	$0	$0	$0
Reynosa	$15,080	$175,000	$190,080	$5,590	$70,000	$75,590	$1,950	$0	$1,950
Río Bravo	$780	$5,000	$5,780	$26,780	$495,000	$521,780	$130	$5,000	$5,130
Guerrero	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$26,780**	**$325,000**	**$351,780**	**$36,270**	**$590,000**	**$626,270**	**$2,340**	**$5,000**	**$7,340**

Notes:
TrC = Treatment Cost ($130 pesos per patient)
HC = Hospitalization Cost ($5,000 per patient)
TC = Total Cost
Costs can be higher according to patient critical condition.

Formula 20.

$$\text{TrC} = \text{Inhabitants sick Total} \times \text{Treatment Cost per Patient}$$

$$\text{HC} = \text{Inhabitants sick of DHF} \times \text{Hospitalization Cost per Patient}$$

$$\text{Total Cost (TC)} = \text{TrC} + \text{HC}$$

2.6.1.2 State of Nuevo Leon

Mr. Rafael Hernandez Flores, Public Health Director of the Nuevo Leon State was contacted but no data was provided during the preparation of this report.

2.6.1.3 State of Coahuila

Ms. Bertha Cristina Castellanos Muñoz, Health Secretary of the Coahuila State was contacted but no data was provided during the preparation of this report.

2.6.1.4 State of Chihuahua

Mr. Noe Gerardo Marquez Castro, Vectors Responsible of the Chihuahua State was contacted by phone and reported there were no dengue or West Nile virus cases from 2005 to date. No written information was received.

2.6.2 West Nile virus

Formulas 17 and 18 of this chapter were employed to estimate the number of WNV cases in Mexican border municipalities based on border counties reported cases. The results of these estimations are presented only for border counties which presented at least one WNV case from 2005 to 2011.

Table 4.30.
Estimated West Nile Virus cases in Matamoros

Year	Mexican Border Municipality of Matamoros		US Border Cameron County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	462157	0	370735	0	0
2006	467564	4	376882	3	7.96E-06
2007	472971	5	382703	4	1.05E-05
2008	478379	0	389164	0	0
2010	489193	0	406220	0	0
Total WNV Ocurrence		**9**		**7**	

Table 4.31.
Estimated West Nile Virus cases in Rio Bravo

Year	Mexican Border Municipality of Rio Bravo		US Border Hidalgo County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	106842	0	665475	0	0
2006	109125	1	683719	2	2.93E-06
2007	111409	1	701862	3	4.27E-06
2008	113692	0	721275	0	0
2010	118259	0	774769	0	0
Total WNV Ocurrence		**2**		**5**	

Table 4.32.
Estimated West Nile Virus cases in Reynosa

Year	Mexican Border Municipality of Reynosa		US Border Hidalgo County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	526888	0	665475	0	0
2006	543289	2	683719	2	2.93E-06
2007	559689	3	701862	3	4.27E-06
2008	576090	0	721275	0	0
2010	608891	0	774769	0	0
Total WNV Ocurrence		**5**		**5**	

Table 4.33.
Estimated West Nile Virus cases in Gustavo Diaz Ordaz

Year	Mexican Border Municipality of Gustavo Diaz Ordaz		US Border Hidalgo County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	15028	0	665475	0	0
2006	15177	1	683719	2	2.93E-06
2007	15327	1	701862	3	4.27E-06
2008	15476	0	721275	0	0
2010	15775	0	774769	0	0
Total WNV Ocurrence		**2**		**5**	

Table 4.34.
Estimated West Nile Virus cases in Miguel Aleman

Year	Mexican Border Municipality of Miguel Aleman		US Border Webb County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	24020	0	220968	0	0
2006	24619	0	225985	0	0.00E+00
2007	25218	1	230848	1	4.33E-06
2008	25817	1	235937	1	4.23842E-06
2010	27015	1	250304	1	3.99514E-06
Total WNV Ocurrence		**3**		**3**	

Table 4.35.
Estimated West Nile Virus cases in Nuevo Laredo

Year	Mexican Border Municipality of Nuevo Laredo		US Border Webb County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	355827	0	220968	0	0
2006	361468	0	225985	0	0.00E+00
2007	367109	2	230848	1	4.33E-06
2008	372751	2	235937	1	4.23842E-06
2010	384033	2	250304	1	3.99514E-06
Total WNV Ocurrence		**6**		**3**	

Table 4.36.
Estimated West Nile Virus cases in Juarez

Year	Mexican Border Municipality of Juarez		US Border El Paso County		
	Population (Inhabitants)	Estimated WNV Ocurrence	Population (Inhabitants)	WNV Cases	WNV / Inhabitant
2005	1313338	21	708683	11	1.55217E-05
2006	1317097	28	720756	15	2.08E-05
2007	1320855	68	727828	37	5.08E-05
2008	1324614	0	738416	0	0
2010	1332131	0	800647	0	0
Total WNV Ocurrence		**117**		**63**	

The following considerations were taken in count to make the estimations:

- No West Nile Virus human infection cases were detected in 2009 and 2011.
- West Nile Virus human infection cases were detected only in Cameron, Hidalgo, Webb and El Paso Border Counties from 2005 to 2012.
- Mexico 2005 Population data was obtained from 2005 Population and Housing Count (Conteo de Población y Vivienda 2005) published by INEGI.
- Mexico 2010 Population data was obtained from 2010 General Census of Population and Housing (Censo General de Población y Vivienda 2010) published by INEGI.

- Mexico Population data from 2006 to 2008 was interpolated using 2005 Population Count data and 2010 Population Census data.
- U.S. 2010 population data was obtained form 2010 United States Census published by U.S. Census bureau.
- U.S. Population data from 2005 to 2008 was obtained from population estimates published by U.S. Census Bureau.
- Mexico Estimated WVN occurrence was rounded up to the nearest whole number.

Although symptoms and general treatments for WNV are publicly available all cases require different levels of medical care and costs can be very high depending on complications. Also WNV time of recovery varies greatly on a case by case basis.

For the reasons above stated; standard treatment costs and time for recovery of WNV cases are not available on public literature and are were not provided by health stakeholders on neither side of the border.

Chapter 5. Comparison between Texan and Mexican Tire Tracking Systems

1 Methodology

IEMS' methods for this Chapter focused on deskwork and fieldwork aimed at acquiring theoretical information and fieldwork confirmation of its application.

There is a clear distinction on the type of data used so that NADB and its designated users can support their assumptions and projections stated in this project.

IEMS envisioned that the use of both desktop-based research and field data would result in a well-rounded study that offers its users a solid platform that reflects the day to day reality of the tire issues along the Texas-Mexico border region.

1.1 Desktop Strategies

To obtain the information required, IEMS performed the following activities:

- ✓ Face to face interviews with industry key stakeholders.
- ✓ Face to face interviews with Texas local environmental authorities in the scope's selected fieldwork cities reported on Chapter 1 Report.[1]
- ✓ Remote interviews with the Mexican Ecology municipal authorities reported on **Attachment 1** of this report.
- ✓ Consulted previous studies focused on tracing the flow of waste tires across the Texas-Mexico Border and similar regions in both countries and the regulatory framework described by them.
- ✓ Reviewed the existing regulatory structure used by Texas and Mexico to manage used tires along the Texas-Mexico Border Region.

The last one includes an investigation of current waste tire policies, laws, regulations and procedures along the Texas-Mexico Border Region in international, federal, state and local levels applying to it described in detail on the Chapter 6 Report.

1.1.1 Face to face interviews

To obtain the information required IEMS interviewed face to face the following key tire industry stakeholders and government agencies representatives:

[1] Environmental authorities of the Texan cities of Fabens, La Joya and Progreso were not interviewed.

Texas

On the Texas side of the border the government key stakeholders below were interviewed: (Presented by Name, Department and position)

- Texas Commission on Environmental Quality (TCEQ) in Austin, Texas:
  - ✓ Frank Espino, Scrap Tire Management Program, Program support. (Austin)

- Texas Commission on Environmental Quality (TCEQ), Region 6, in El Paso, Texas:
  - ✓ Joseph Miller, Office of Compliance and Enforcement, Environmental Investigator.
  - ✓ Pamela Aguirre, Small Business and Local Government Assistance, Compliance Assistance Specialist.
  - ✓ Victor Hugo Valenzuela, Intergovernmental Relations / Border Affairs Division, Lead Border Coordinator.

- The city of El Paso, Texas.
  - ✓ Ellen A. Smyth, Environmental Services Department Director.
  - ✓ Manuel Morales, Environmental Services Department, Code compliance Supervisor
  - ✓ Karl Rimkus, Environmental Services Department, Senior Environmental Scientist.
  - ✓ Valerie A. Joosten, Environmental Services.
  - ✓ Marty Howell, Sustainability Manager.

- The city of Presidio, Texas.
  - ✓ Ramon Rodriguez, Code Enforcement Officer.
  - ✓ Marco A. Baeza, City Administrator.

- City of Del Rio, Texas.
  - ✓ Dharell G. Campbell, Jr, Refuse Department, Landfill Coordinator.

- City of Eagle Pass, Texas.
  - ✓ Lusio Covarrubias, Public Works.
  - ✓ Esteban Chavarria, Recycling Center, Recycling Supervisor.
  - ✓ Jose A. Jimenez, Code Compliance.

- City of Laredo, Texas.
  - ✓ Rafael Cisneros, Jr. Environmental health Services, Sanitarian III.
  - ✓ Louie Zapata, Office of the Webb County Attorney, Chief Investigator.

  - ✓ Luis Perez-Garcia III, Building Development Services, Environmental Engineer.
  - ✓ Riazul I. MIA, Environmental Services Department, Director.
  - ✓ Stephen Geiss, Solid Waste Services, Manager.

- City of Roma, Texas.
  - ✓ Jorge L.Muñoz, Public Works Director.
  - ✓ Mary Pilon, City Hall, Administrative Assistant.

- Rio Grande City, Texas.
  - ✓ Fernando Guerra, Public Works Director.
  - ✓ Elisa Y, Beas, Planning Director.
  - ✓ Gilbert Millan Jr. Planner / Code Enforcement Officer.

- City of McAllen, Texas.
  - ✓ Delilah Martinez, E.I.T., CFM, Stormwater / Environmental Education Manager.
  - ✓ Josh Ramirez, Director of Environmental & Health.

- City of Pharr, Texas.
  - ✓ Edward M. Wylie, Community Planning and Development, Assistant Director.
  - ✓ Heriberto Longoria, Community Planning and Development, Health Coordinator.
  - ✓ Rene Saenz Jr., Public Works, Assistant Director.

- City of Brownsville, Texas.
  - ✓ Santiago Navarro, Public Works Department, Assistant Director.

Authorities in the cities of Fabens, Progreso and La Joya were unable to provide interviews on the day said cities were visited. The population represented by said cities represents less than 1.5% of the selected Texas scope population according to the U.S. Census 2010. For this reason IEMS considers data representativity is not affected.

Mexico

- Rubber Industry National Association (Camara Nacional de la Industria Hulera, CNIH):
  - ✓ Mr. J. Francisco Martha Hernandez, General Director.
  - ✓ Mr. Miguel Bernal Siurob, Technical Manager.

- Tire Distributors and Renewal Facilities National Association (Asociacion Nacional de Distribuidores de Llantas y Plantas Renovadoras, ANDELLAC):
  - ✓ Mr. Ruben L. Albarran, General Director

1.1.1.1 Literature sources

The following local enforcement publication was consulted:

- ✓ Ockels H. John (2009). Local control of illegal dumping. (Texas 2010 edition). Sherman, Texas: John Ockels. (Ockels, 2009)

1.1.1.2 Other sources consulted

For Texas the other sources consulted are:

- ✓ United States Department of Transportation (DOT)
- ✓ Rubber Manufacturers Association (RMA)
- ✓ National Traffic and Motor Vehicle Safety Act
- ✓ Federal Digital System
- ✓ Texas Department of Transportation
- ✓ Environmental Protection Agency EPA

2 Tracking systems

In the study area, tires sold, imported and exported can be classified as:

- New
- Used

Although waste tires are likely to be sold, imported or exported if mixed with used tires, special handling waste tracking systems for them are required; which are presented in detail on the Chapter 6 Report.

2.1 Texas tracking systems

2.1.1 New tires sales tracking systems

Tire sale tracking systems are regulated at federal level by the National Traffic and Motor Vehicle Safety Act section 30117**,** presented as follows**:**

TITLE 49 - TRANSPORTATION
SUBTITLE VI - MOTOR VEHICLE AND DRIVER PROGRAMS
PART A - GENERAL
CHAPTER 301 - MOTOR VEHICLE SAFETY
SUBCHAPTER II - STANDARDS AND COMPLIANCE
HEAD- SEC. 30117. PROVIDING INFORMATION TO, AND MAINTAINING RECORDS ON, PURCHASERS
-STATUTE- b

Which states:

"A manufacturer of a motor vehicle or tire (except a retreaded tire) shall cause to be maintained a record of the name and address of the first purchaser of each vehicle or tire it produces…"

"Each distributor and dealer whose business is not owned or controlled by a manufacturer of tires to give a registration form (containing the tire identification number) to the first purchaser of a tire. The Secretary shall prescribe the form, which shall be standardized for all tires and designed to allow the purchaser to complete and return it directly to the manufacturer of the tire. The manufacturer shall give sufficient copies of forms to distributors and dealers."

Limited definitions to section 30117 statute b:

"First purchaser" means the first purchaser of a motor vehicle or motor vehicle equipment other than for resale;

A brand name owner of a tire marketed under a brand name not owned by the manufacturer of the tire is deemed to be the manufacturer of the tire;

A manufacturer of a motor vehicle in or on which original equipment was installed when delivered to the first purchaser is deemed to be the manufacturer of the equipment; and a retreader of a tire is deemed to be the manufacturer of the tire.

2.1.2 Used tires sales tracking systems

No used tire tacking systems were reported to be used by the used tire dealers interviewed during fieldwork activities in the Texas scope cities.

2.1.3 New and used tires Import and export tracking systems

"The Harmonized Commodity Description and Coding System" generally referred to as "Harmonized System" or simply "HS", is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). It comprises about 5,000 commodity groups; each identified by a six digit code, arranged in a legal and logical structure and is supported by well-defined rules to achieve uniform classification. The system is used by more than 200 countries and economies as a basis for their Customs tariffs and for the collection of international trade statistics. Over 98 % of the merchandise in international trade is classified in terms of the HS.

The HS contributes to the harmonization of Customs and trade procedures, and the non-documentary trade data interchange in connection with such procedures, thus reducing the costs related to international trade.

It is also extensively used by governments, international organizations and the private sector for many other purposes such as internal taxes, trade policies, monitoring of controlled goods, rules of origin, freight tariffs, transport statistics, price monitoring, quota controls, compilation of national accounts, and economic research and analysis. The HS is thus a universal economic language and code for goods, and an indispensable tool for international trade." (World Customs Organization (WCO))

New and used tires are classified in chapter 40, "Rubber and articles thereof", and their tariff schedules or codes start with the four numbers, or heading:

New tires→ 4011 (United States International Trade Commission, 2012)
Used tires→4012 (United States International Trade Commission, 2012)

Attachment 21 of this Chapter displays the specific tariff codes assigned to each type of new and used tires, in order to track their import and export by the United States of America and by Mexico.

2.2 Mexico's tire tracking systems

2.2.1 Sales tracking systems

No new or used tires tracking systems are applied neither by the industry nor any level of government.

2.2.2 New and used tires Import and export tracking systems

The same Harmonized system described on previously developed by the World Customs Organization is applied by Mexico's federal government Tributary Administration System *(Sistema de Administracion Tributaria, SAT)* to track the import and export of used and new tires.

An additional used tire tracking system is employed by the Economy Secretariat to ensure the proper disposal of used tires legally imported through the El Paso-Ciudad Juarez border.

The Secretary of Economy (*Secretaria de Economia* or SE) is in charge of issuing importation permits for three regions in the U.S. – Mexico border. These permits are granted annually according to a global *used tire import quota* to people or companies dedicated to commercialization of used tires in these areas.

The *used tire import quota* also determined by the SE is based on:

1. The volume of used tires imported the previous year and
2. Compliance with final disposal legislation. (Secretaria de Economia, 2006)

The regions were used tire importation has been authorized and controlled by the SE are:

1. The state of Baja California.
2. Sonora State.[2]
3. Ciudad Juarez, Chihuahua.

Every year the number of authorized used tires for import or *used tire import quota* is established by the SE and divided between each of the three regions. For the purpose of this study the number of used tires legally imported was based on the quota established at the ports of entry in the region of Ciudad Juarez, Chihuahua, Mexico. This is defined as *Ciudad Juarez annual used tire import quota.*

2.2.2.1 Used Tire Legal Import Requirements for Commercialization Purposes

According to the Colombia international bridge customs administrator A. Diaz (personal communication, June, 28, 2011) there are several conditions that must be met to legally introduce used tires into Mexico. The legal import requirements are:

I. The used tire importer must be registered, as such, in the used tires importers record kept by the Central Administration of Accounting and Explanation (*Administracion Central de Contabilidad y Glosa or ACCG*) of the SAT.

II. Retain a share of the authorized used tire import quota set by the Mexican Secretary of Economy (*Secretaria de Economia* or SE) for the year during which the import is performed. The used tire import quota is the maximum number of used tires that can enter through a portion of the U.S.-Mexico border in a particular year. It is specific for the type or origin of the used tires and is valid only for a particular year.

III. Legal submission of an import petition to the customs authority of the point of entry through which the tires will enter Mexico. This has to be made by a customs agent and comply with the requirements set in the Annex 22 of the General Character Rules Regarding Exterior Commerce (***Anexo 22*** *de las reglas de caracter general en materia de comercio exterior*)

Note: in order for the customs agent to submit an import petition other legal requirements must be met.

[2] The area outlined on: North→border line from the Colorado River to 10km west of Sonoita, Sonora. East→ A straight line from the border line 10km west of Sonoita to the coastline 10km east of Puerto Peñasco. South→ The coastline from 10km west of Puerto Peñasco to the Colorado River. West→ Colorado river from the coastline to the border line. (Secretaria de Economia, 2006).

IV. Pay the import tariff (schedule) for each used tire entering Mexico. This varies depending on the year and it is defined in the Import and Export General Tax Law (*Ley de los impuestos generales de importación y de exportacion)* valid during importation.

Each item legally crossing the Mexican border has a numeric code or *tariff item*(schedule) assigned to it depending on how it is classified by the Import and Export General Tax Law *(Ley de los Impuestos Generales de Importacion y Exportacion* or LIGIE). The *tariff items* (schedules) assigned to used tires are:

Table 5.1.
Import Tariff (schedule) Assigned to Used Tires by the LIGIE and the WCO harmonized system

			Tax	
Item tariff (schedule) or code	**Description**	**Unit**	**Import**	**Export**
4012.20.01	Used tires of the types used on vehicles for passenger or merchandise transport on roads, including tractors, or on special use vehicles.	Piece	AE[3]	Ex.[4]
4012.20.99	Other type of used tires.	Piece	20	Ex.

2.2.2.2 Commercial used tires import for retreading

There are a different set of authorizations issued by the SE for the importation of commercial tires for the sole purpose of retreading in a Mexican facility. Only registered tire renovation facilities are assigned a *used tires import quota for renovating purposes.* Retreading passenger tires although possible is not economically viable (ANDELLAC, 2011). Without this tire renovating industry the commercial carriers in Mexico would go bankrupt given the cost of new tires. (CNIH, Rubber Industry National Chamber , 2011)

Used tires for retreading can be imported into Mexico through any legal port of entry following the used tire legal import requirements for retreading purposes.

[3] AE means *Arancel Especifico* or specific tax established in terms of articles 4 fraction I and 12 fraction II of the Exterior Commerce Law *(Ley de Comercio Exterior)*.
[4] Ex. Means exempt.

2.2.2.3 Used Tire Legal Import Requirements for Retreading

In addition to the four legal import requirements described previously, the import of used commercial tires for retreading is exclusive for natural and legal persons/entities dedicated to tire retreading.

The authorizations are annual, unchangeable, and defined according to the following formulas:

a) **Companies with importation background:**

$$\text{Annual assignation} = \frac{(CI + PT)(X)}{2}$$

Where:

CI: Installed capacity in number of pieces.

PT: Total production of vulcanized tires.

PT= PN + PI

PN: volume of vulcanized tires produced from used tires acquired in the Mexican market in the last 12 months.

PI: volume of vulcanized tires produced from used tires imported directly by the company in the last 12 months.

X= 0.6 or (PI/PT) whichever is less.

PN and **PI** can never be greater than **CI.**

b) **Companies without importation background:**

Annual assignation = CI x 0.3

For both cases when the amount assigned is a fraction it rounded up to the next whole number.(Secretaria de Economia, 2006)

The same import tariffs presented on **Table 5.1** of this report are employed to track the import of commercial used tires for retreading purposes.

Chapter 6. Waste Tire Management Regulatory Framework

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1 Methodology

IEMS' methods for this Chapter focused on deskwork and fieldwork aimed at acquiring theoretical information and fieldwork confirmation of its application.

There is a clear distinction on the type of data used so that NADB and its designated users can support their assumptions and projections stated in this project.

IEMS envisioned that the use of both desktop-based research and field data would result in a well-rounded study that offers its users a solid platform that reflects the day to day reality of the tire issues along the Texas-Mexico border region.

1.1 Desktop Strategies

To obtain the information required, IEMS performed the following activities:

- ✓ Performed remote interviews with the Mexican Ecology municipal authorities reported on **Attachment 4** of the document.
- ✓ Consulted previous studies focused on the waste tire management regulatory framework and regulatory agencies.
- ✓ Reviewed the existing regulatory structure used by Texas and Mexico to manage used tires along the Texas-Mexico Border Region.

The last one includes an investigation of current waste tire policies, laws, regulations and procedures along the Texas-Mexico Border Region in international, federal, state and local levels applying to it.

This chapter presents a list of the laws and articles related to the management and disposal of tires in both countries; the complete content is shown in **Attachment 22** of this document.

1.1.1 Consulted regulatory framework from previous tire flow studies and publications regarding the Texas-Mexico border

- ✓ Border 2012: US-Mexico border scrap tire inventory summary report 2007. (Border 2012, 2007)
- ✓ Border 2012: U.S.-Mexico environmental program indicators report 2005. (Border 2012, 2006)
- ✓ State of the border region indicators report 2010. (Border 2012, 2011)

- ✓ Public politics strategy proposal for the integral management of waste tires in the border region. (Border Environment Cooperation Commission or BECC , 2008)
- ✓ *Thesis: Evaluation of the solid urban waste integrated management on the northern border: Juarez, Reynosa and Tijuana cases.* (Benitez, 2008)
- ✓ Certification document for the handling and disposal of used tires in Ciudad Juarez, Chihuahua. (Ciudad Juarez, Chihuahua city Council, 2001)

1.1.2 Legislation databases consulted

The following compilations were reviewed in order to encompass all the treaties, laws, legal Regulations and standards applying to the waste tire management and the regulatory agencies at the federal, state and local level responsible for enforcing it in Texas and Mexico:

- ✓ Treaties in force, a list of treaties and other international agreements of the United States in Force on January 1, 2011.[1] (United States Department of State, 2011)
- ✓ International treaties celebrated by Mexico. Secretaria de Relaciones Exteriores (SRE) web page. (Exterior Relations Ministry (SRE), 2012)
- ✓ General Direction of Compilation and consultation of the National Juristic Order (Direccion General De Compilacion y Consulta del Orden Juridico Nacional).

1.2 Fieldwork Strategies

Fieldwork performed in order to obtain information regarding this Chapter was the same as the one applied on order to obtain tire tracking systems information described on Section 2 of the Chapter 5: face-to-face interviews with key tire industry stakeholders and government agencies representatives.

[1] This publication lists treaties and other international agreements of the United States on record in the Department of State on January 1, 2011, which had not expired by their own terms or which had not been denounced by the parties, replaced, superseded by other agreements, or otherwise definitely terminated.

2 International treaties

2.1 NAFTA

Chapter Nine: Standards-Related Measures
Article 913: Committee on Standards-Related Measures

2.2 North American Agreement on Environmental Cooperation

Article 5. Government enforcement action
Article 10. Council Functions
Article 37. Enforcement principle

2.3 Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area

Article 8.

2.4 Basel Convention about Control of Transboundary Movements of Hazardous Wastes and their Disposal

Article 4
Article 5.
Article 10.

2.5 Customs Convention for the Temporary Importation of Private Road Vehicles.

Article 26.
Article 27.

2.6 Convention on Combating Bribery of Foreign Public Officials in International Business Transactions

Article 1.
Article 3.

2.7 World Health Regulations

ANNEX 1 – B. Core capacity requirements for designated airports, ports and ground crossings
ANNEX 5 – Specific measures for vector-borne diseases

2.8 Guidance Manual for the Control of Transboundary Movements of Recoverable Wastes

ANNEX C: OECD consolidated list of wastes subject to the amber control procedure

B3140. Waste pneumatic tires, excluding those destined for Appendix 5A operations

2.9 United Nations Convention on the Law of the Sea

PART XII: Protection and preservation of the marine environment
SECTION 6. Enforcement
Article 217. Enforcement by flag States
Article 218. Enforcement by port States
Article 219. Measures relating to seaworthiness of vessels to avoid pollution

3 American regulatory framework

3.1 Federal Law

3.1.1 US Disposal of Solid Waste Code – Section 6002 - 101

(e) GUIDELINES

3.2 State laws

3.2.1 State of Texas

3.2.1.1 Texas Health and Safety Code 361.112 - Storage, Transportation, and Disposal of Used or Scrap Tires

TEXAS CODES
HEALTH AND SAFETY CODE
TITLE 5
Subtitle B
CHAPTER 361
Subchapter C
361.112 - Storage, Transportation, and Disposal of Used or Scrap Tires
Current as of: 2009

3.3 Local Law

Based on Code of Ordinances for the following cities.

3.3.1 City of El Paso

3.3.1.1 Chapter 9.04 - Solid Waste Management

ARTICLE I - General Provisions
9.04.010 - Creation and purpose of department
9.04.020 - Definitions.
9.04.030 - Applicability.
9.04.040 - Purpose.

ARTICLE II - Municipal Solid Waste and Recyclable Materials Generated at Residential Properties
9.04.050 - Applicability.
9.04.060 - Accumulation and storage.
9.04.070 - Collection provider.
9.04.080 - Disposal provider.

ARTICLE III - Solid Waste and Recyclable Materials Generated at Commercial Properties and Mixed-Use Properties
9.04.150 - Applicability.
9.04.160 - Accumulation and storage.
9.04.170 - Collection provider.
9.04.180 - Disposal provider.
9.04.200 - Authority to mandate collection.

ARTICLE V - Identification as Recyclable Materials for Commercial Collection
9.04.350 - Identification as recyclable materials.

ARTICLE VI - Other Waste
9.04.380 - Other waste.

ARTICLE VII - Haulers
9.04.390 - Hauler permit required.
9.04.400 - Hauler permit term.
9.04.410 - Hauler permit application, issuance, and appeal procedures.
9.04.420 - Permitted vehicle requirements.
9.04.430 - Cart, container, and roll-off requirements.
9.04.440 - Transporting waste.
9.04.450 - Disposal of solid waste.
9.04.460 - Hauler records.
9.04.470 - Violations.
9.04.480 - Suspension, revocation of hauler permit; appeals.
9.04.490 - Ownership of solid waste and recyclable materials.
9.04.500 - Permitted hauler recycling rebate.
9.04.510 - Emergency powers; right to assume collection.

ARTICLE VIII.-Designated or Authorized Municipal Solid Waste Facilities
9.04.520 - Designated municipal solid waste facility.

ARTICLE IX - Fees and Payments Procedures
9.04.530 - Fees general.
9.04.540 - Permit fees.
9.04.550 - Disposal Fees.
9.04.570 - Solid waste management fund.

ARTICLE X – Enforcement
9.04.600 - General authority.
9.04.610 - Authority to issue citations.
9.04.630 - Other penalties.

ARTICLE XI - Exclusive Franchise

ARTICLE XII - Exclusive Hauler

ARTICLE XIII - Litter and Illegal Dumping
9.04.670 - Litter and illegal dumping prohibited.

ARTICLE XV - Prohibited Accumulation of Solid Waste, Recyclable Materials, or Other Waste
9.04.800 - Applicability.
9.04.810 - Responsibility for prohibiting accumulation of solid waste, recyclable materials, or other waste.

ARTICLE XVI - Unsecured Loads
9.04.820 - Applicability.
9.04.830 - Unsecured loads prohibited.

ARTICLE XIX – Severability
9.04.950 - Severability.
9.04.961 - Types of permits.
9.04.962 - Application for permits.
9.04.963 - Vehicle standards and markings.
9.04.964 - Term of permit.
9.04.965 - Permit transferability.
9.04.966 - Violation of permit.
9.04.967 - Appeal from denial, suspension, revocation.

3.3.2 City of Del Rio

3.3.2.1 CHAPTER 24 - Solid Waste

ARTICLE I. - In General

Sec. 24-1.- Definitions.
Sec. 24-1.1.- Exemption to applicability of chapter.
Sec. 24-2.- Collection limitation.
Sec. 24-3.- Littering—Prohibited.
Sec. 24-10.- Landfill site fees; disposal of garbage.

ARTICLE II. – Containers
Sec. 24-21.- Prohibited use.
Sec. 24-22.- Tampering.
Sec. 24-23.- Required.
Sec. 24-24.- Specifications.
Sec. 24-25.- Location.
Sec. 24-26.- Condemnation.

ARTICLE III. - Garbage Collection Services
Sec. 24-41.- Garbage fee imposed.
Sec. 24-42.- Rates.
Sec. 24-42.1.- Outside city limits.
Sec. 24-42.2.- Franchise fee.
Sec. 24-43.- Collection of charges; statement.
Sec. 24-44.- Due date.
Sec. 24-45.- Rules.

3.3.3 City of Eagle Pass

3.3.3.1 CHAPTER 14 - Municipal Solid Waste [26]

Sec. 14-1. - Short title.
Sec. 14-2. - Purpose and intent.
Sec. 14-3. - Applicability**.**
Sec. 14-4. - Definitions.
Sec. 14-5. - Garbage and rubbish—Procedures for residential property refuse collection.
Sec. 14-6. - Residential brush/bulky waste collection procedures**.**
Sec. 14-9. - General prohibitions and enforcement.
Sec. 14-10. - Schedule of rates/fees.
Sec. 14-11. - Billing and collection.
Sec. 14-12. - Exclusive franchise.
Sec. 14-13. - Exclusive hauler.
Sec. 14-14. - Franchise required for collector other than the city.
Sec. 14-15. - Certificate of occupancy.
Sec. 14-16. - Severability.

3.3.4 City of Laredo

ARTICLE IV. - *Tire Business Registration Program*

Sec. 15-59. - Definitions.

Sec. 15-60. - Tire business registration program.
Sec. 15-61. - Tire business and mobile tire repair road service units application.
Sec. 15-62. - Terms of registration.
Sec. 15-63. - Denial of permit or renewal; suspension or revocation of permit.
Sec. 15-64. - Fees.
Sec. 15-65. - Disposal of tires.
Sec. 15-66. - Penalty for violation.
Sec. 15-67. - Injunctive relief.
Sec. 15-68. - Severability.

3.3.4.1 ARTICLE V. - Dengue Fever Prevention [45]

Sec. 15-75. - Definitions.
Sec. 15-76. - Accumulation of tires and other containers; inspection of premises.
Sec. 15-77. - Penalty.

3.3.5 City of McAllen

3.3.5.1 CHAPTER 90 - Solid Waste

ARTICLE I. - In General
Sec. 90-2. - Purpose of chapter.

ARTICLE II. - Collection
DIVISION 1. – Generally
Sec. 90-26. - Duty of city to collect and remove.
Sec. 90-27. - Certain persons to provide own facilities for removal of trees, etc.
Sec. 90-28. - Removal of brush, soil, and trash resulting from land clearing or yard levelling operations.
Sec. 90-29. - Removal of waste, debris, and materials after construction or general cleanup operations**.**
Sec. 90-30. - Removal of automobile bodies, bulky wastes, industrial wastes, etc.

DIVISION 2. – Containers
Sec. 90-41. - Containers required ; proper use of same.

ARTICLE III. - Charges and Billing
DIVISION 1. – Generally
Sec. 90-66. - Levy and assessment**.**

DIVISION 2. – Rates

Sec. 90-75. - Citizen collection station.
Sec. 90-80. - Rates for, commercial and other properties not described in sections 90-75 through 90-79.
Sec. 90-83. - Property where no garbage or trash collects.
Sec. 90-84. - Rates for commercial trash, roll-off pickups, and disposal service.

DIVISION 3. - Billing Procedure
Sec. 90-96. - Billing; when due and payable; collection.
Sec. 90-97. - Payment of bills.
Sec. 90-98. - Roll-off services—Billing and payment of bills.

ARTICLE IV. - Private Roll-Off Collection And Disposal Services [111]
Sec. 90-121. - City to provide garbage, brush and recyclable collection services; exceptions; license required.
Sec. 90-122. - Application generally; limitations and conditions; permit fee; nontransferability of permit; posting of permit sticker on vehicles; appeal of denial of permit.
Sec. 90-123. - Equipment requirements and restrictions for permittees.
Sec. 90-124. - Duties, authority of director of finance.

ARTICLE V. - Miscellaneous
Sec. 90-146. - Authorized disposal of waste.
Sec. 90-147. - Anti-scavenging.
Sec. 90-148. - Penalty for violation of chapter.

3.3.6 City of Pharr

3.3.6.1 ORDINANCE NO. O-2010-33

TIRE BUSINESS AND TIRE HAULER REGISTRATION

Sec 26-186 Purpose and Intent
Sec. 26-187 Definitions
Sec. 26-188 Residential Property
Sec. 26-189 Tire Business Permits
Sec. 26-190 Tire Hauler Permit
Sec. 26-191 Denial of Permit or renewal; suspension or revocation of permit.
Sec. 26-192 Destruction of Tires
Sec 26-193 Storage of Tires
Sec. 26-194 Disposal of Tires
Sec. 26-195 Disposal Records/Transmittal Manifest
Sec 26-200 Administration/Enforcement
Sec. 26-201 Violations and Penalties
Sec. 26-202 Injunctive Relief

3.3.7 City of Brownsville

3.3.7.1 CHAPTER 82 - Solid Waste

ARTICLE I. - In General
Sec. 82-1. - Definitions.
Sec. 82-2. - Penalty; citation for violation.
Sec. 82-3. - Containers for materials.
Sec. 82-4. - Collection by sanitation service from residences and duplexes.
Sec. 82-7. - Materials not handled by sanitation service.
Sec. 82-8. - Processing and disposal of materials.

ARTICLE II. - Rates And Charges
Sec. 82-36. - Charges for sanitation service**.**
Sec. 82-37. - Method of charging and billing for disposal of solid waste materials.
Sec. 82-38. - Service charges for maintenance of city easements and rights-of-way.
Sec. 82-39. - Service charges for funding of federal unfunded environmental compliance mandates.

ARTICLE III. - Disposal Siting
Sec. 82-56. - Definitions.
Sec. 82-57. - Applicability.
Sec. 82-58. - Disposal of solid waste allowed.
Sec. 82-59. - Disposal of solid waste prohibited.
Sec. 82-60. - Variance.

4 Mexican Regulatory framework

4.1 Federal laws

4.1.1 General Law for the Prevention and Integrated Management of Wastes

TITLE FIRST: General Dispositions.
SINGLE CHAPTER: Objective and scope of application of the law
Article 5

TITLE THIRD: Classification of wastes
SINGLE CHAPTER: Purposes, criteria and General Basis
Article 19

TITLE SIXTH: Prevention and integrated Management of solid urban wastes and special management wastes.
SINGLE CHAPTER
Article 95
Article 96
Article 97
Article 98

4.1.2 Regulation of the General Law for the Prevention and Integrated Management of Wastes

TITLE FIRST: Preliminary Dispositions
Article 8
Article 9
Article 11
Article 12
Article 14
Article 15

TITLE SECOND: Management Plans
Chapter I Generalities
Article 18

TITLE FOURTH: Hazardous wastes
Chapter II Generators Categories and Registration
Article 42

TITLE SIXTH: Polluted site remediation
Chapter II Remediation Programs
Section V Remediation Proposals
Article 143

4.2 State and local laws

4.2.1 Chihuahua

4.2.1.1 State laws

Law of Ecological Equilibrium and Environmental Protection of the State of Chihuahua

TITLE FIRST: General Dispositions
Article 5
Article 8

TITLE SEVENTH: Environmental Protection
CHAPTER I: Prevention and control of pollution of the atmosphere.
Article 98

CHAPTER III: Noise, vibration, odors, and energy pollution control
Article 117

TITLE EIGHT: Regulations of activities that may cause harmful effects.
CHAPTER III: Municipal services
Article 129

CHAPTER VI: Wastes Classification
Article 148

CHAPTER VII: Integration of waste management programs
Article 150

CHAPTER VIII: Management plans
Article 152
Article 155

CHAPTER IX: Prevention and urban solid and special management wastes integrated management.
Article 156
Article 157
Article 158
Article 159

4.2.1.2 Local laws

City of Juarez

Municipal Regulation of Ecology and Environmental Protection of the Municipality of Juarez, Chih.

TITLE FIRST: Generalities
Chapter I Ecological terms definitions
Article 1

Chapter II General Provisions
Article 7
Article 9

TITLE SECOND: Air quality
Chapter I Emitting Sources
Article 11

TITLE FOURTH: Ecologic Policy Instruments
Chapter II: Environmental Impact
Article 127

TITLE FIFTH: Environmental Protection
Chapter I Non-Hazardous Solid Wastes
Article 137
Article 138
Article 139
Article 140
Article 141
Article 142
Article 144
Article 145
Article 146
Article 147

Construction Regulation municipality of Juarez, State of Chihuahua

TITLE FIRST: Administrative dispositions
CHAPTER 22- Requirements of the constructions destined for warehouses

City of Ojinaga

Regulation of the public cleaning service for the municipality of Ojinaga

EIGHTH CHAPTER: Final disposition of non-hazardous solid waste
Article 33

NINTH CHAPTER: Treatment of non-hazardous solid waste.
Article 37

4.2.2 Coahuila

4.2.2.1 State laws

Law of Ecological Equilibrium and Environmental Protection of the State of Coahuila

TITLE FIRST: General Dispositions
CHAPTER I: Objectives and Definitions
Article 3

CHAPTER II: The Distribution and Coordination Competencies
Section I: The Attributes of Authorities
Article 10
Article 11

Section II: Coordination of Competencies between the State and Municipalities
Article 12

CHAPTER IV: The instruments of environmental policy state
Section II: Programs of Ecological Ordering State and Municipal
Article 25

TITLE FOURTH: The environmental protection
CHAPTER I: General Dispositions
Article 99

CHAPTER II: Prevention and control of pollution of the atmosphere
Section II: Control of Emissions from Stationary Sources
Article 113

CHAPTER III: The noise, the vibration, the energies of heat and light, the smells and the visual pollution
Article 126

CHAPTER V: The prevention and pollution control of soil and organic deterioration in urban areas
Section I: Management and Disposal of Non-Hazardous Waste
Article 142
Article 143
Article 144
Article 145
Article 146
Article 147
Article 148
Article 149
Article 150

Law for the Prevention and Integrated Management of Wastes of the State of Coahuila

TITLE FIRST: General Dispositions
SOLE CHAPTER: Subject to this Law
Article 1
Article 2

TITLE SECOND: Distribution of competencies and coordination of authorities.
First Chapter: Authorities and Powers
Article 5
Article 6
Article 7
Article 8

TITLE THIRD: Instruments of Prevention Policy and Integral Management of Waste

FIRST CHAPTER: State Program for Prevention and Integrated Waste Management

Article 11
Article 12
Article 13

SECOND CHAPTER: Management Plans
Article 14
Article 16
Article 18
Article 19

THIRD CHAPTER: Instruments to encourage prevention and integrated waste management
Article 22
Article 23
FOURTH CHAPTER: From Environmental Culture
Article 24

TITLE FOURTH: The Integral Management Waste
FIRST CHAPTER: From Waste Classification
Article 29

SECOND CHAPTER: General Obligations of Waste Generators
Article 32
Article 33
Article 34

TITLE FIFTH: Integrated Waste Management
FIRST CHAPTER: Of the authorizations
Article 37
Article 38

SECOND CHAPTER: Phases of Integrated Waste Management
Article 43
Article 51
Article 53
Article 54

TITLE SEVENTH: Safety measures, penalties, and repair of damage and resource review
SIXTH CHAPTER: Public Information
Article 80

Regulation of the Ecological Balance and Environmental Protection Law of the State of Coahuila de Zaragoza on matter of Environmental Impact

THIRD CHAPTER: Works and activities that require authorization in Environmental Impact and Exceptions
Article 7

FIFTH CHAPTER: Procedure for evaluation of Environmental Impact Manifest
Article 23

Regulation of the Ecological Balance and Environmental Protection Law of the State of Coahuila de Zaragoza on matter of Contaminants Emissions and Transfer Registry

FIRST CHAPTER: General Provisions
Article 3

SECOND CHAPTER: Attributions on Registry of Emissions and Pollutant Transfer.
Article 4
Article 5
Article 7
Article 8

SECTION II: Conformation of the State Information Database.
Article 10
Article 11

4.2.2.2 Local laws

City of Acuña

Regulation of Ecology of the Municipality of City of Acuña, Coahuila.

CHAPTER II: Distribution and Coordination of Competencies.
SECTION I: Powers of the Authorities.
Article 8

FOURTH TITLE: From Environmental Protection.
CHAPTER I: General Provisions.
Article 70

CHAPTER II: Prevention and Control of Atmospheric Pollution.
SECTION II: Control of Emissions from stationary sources.
Article 84
Article 90

CHAPTER V: Prevention and Control of Pollution of Soil and ecological deterioration in urban areas.
SECTION I: Handling and Disposal of Non-Hazardous Waste.
Article 129
Article 130
Article 132
Article 133
Article 135
Article 136
Article 137
Article 140
Article 163

Piedras Negras

Regulation of Ecology and Environmental Protection of the Municipality of Piedras Negras, Coahuila.

CHAPTER II: Distribution and Coordination of Competencies
SECTION I: Powers of the Authorities.
Article 8
Article 90
Article 96

CHAPTER IV: Prevention and Control of Water Pollution.
Article 124

CHAPTER V: Prevention and Control of Pollution of Soils and ecological deterioration in urban areas.
SECTION I: Handling and Disposal of Non-Hazardous Waste.
Article 135
Article 136
Article 137
Article 138
Article 139
Article 140
Article 141
Article 143
Article 169

Nava

No regulatory waste tire management regulatory framework or agencies found in Nava legislation.

4.2.3 Nuevo Leon

4.2.3.1 State Laws

Environmental Law of the State of Nuevo Leon

TITLE FIRST: General Dispositions
CHAPTER I: Preliminary Norms
Article 3

CHAPTER II: Prevention and control of pollution to the atmosphere.
Section II: Prevention and control of pollutants emissions from fixed sources
Article 143

CHAPTER IV: Prevention and control of pollution of the soil
Article 166
Article 167
Article 168

CHAPTER V: Management and Integrated Waste Management.
Article 169
Article 170
Article 172
Article 172-Bis
Article 172-Bis 1
Article 173
Article 174
Article 175
Article 176
Article 177
Article 179
Article 180
Article 181-Bis
Article 181 Bis 1

TITLE SIXTH: Inspection and surveillance, security measures, sanctions and appeal of discontent
Chapter III: Administrative sanctions
Article 236
Article 237

Law of the Environment and Natural Resources Protection Agency

CHAPTER I: General dispositions
Article 5

CHAPTER II Attributions and structure of the Agency
Article 8
Article 16

Regulation of the Environmental Law of the State of Nuevo Leon

TITLE SECOND: Evaluation of Environmental Impact
CHAPTER I: Authorizations
Article 6
Article 11

TITLE FOURTH: Self-Regulatory Instruments
CHAPTER II: Environmental Audits Development
Article 88

TITLE SIXTH: Environment Protection
FOURTH CHAPTER: Prevention and Control of Pollution on the Ground and Integrated Waste Management

Article 186
Article 187
Article 191
Article 192
Article 193
Article 195
Article 197
Article 206

TITLE SEVENTH
SINGLE CHAPTER: State Environmental Information System and Natural Resources
Article 217

TITLE EIGHT: Record pollutant release and transfer of contaminants
CHAPTER II: The formation of the state information database register
Article 225

4.2.3.2 Local Laws

Anahuac

Civil Guard Regulation

Article 42

4.2.4 Tamaulipas

4.2.4.1 State Laws

Environmental Protection Law for the sustainable development of the State of Tamaulipas.

TITLE FIRST: General Provisions
SINGLE CHAPTER
Article 3

TITLE SECOND: Competence Distribution and Coordination
CHAPTER I: Competence Distributions
Article 5
Article 6

TITLE FOURTH: Environmental Policy Instruments
CHAPTER V: Environmental impact assessment
Article 34
TITLE SEVENTH: Environmental protection and regulation
CHAPTER I: Prevention and control of Atmospheric pollution.
Article 115

CHAPTER V: Special management and urban solid wastes
Article 138
Article 139
Article 140
Article 141
Article 143
Article 144
Article 145
Article 146
Article 147
Article 148

TITLE TENTH: Social participation
CHAPTER II: State and Municipal Ecology Committee
Article 161

TITLE ELEVENTH: Inspection and surveillance, security measures and sanctions
CHAPTER III: Administrative sanctions
Article 173

Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas

TITLE FIRST: General Provisions
CHAPTER I: Introductory rules
Article 4

TITLE SECOND: Competence Distributions
SOLE CHAPTER: Competences
Article 6
Article 7

TITLE FIFTH: Environmental Protection
CHAPTER IV: High Risk Activities
Article 95
Article 96

CHAPTER V. Management and non-hazardous waste disposal
Article 97
Article 98
Article 99
Article 100
Article 102
Article 103
Article 104

Code for Sustainable Development of the State of Tamaulipas

TITLE FOURTH: Integrated management of wastes
CHAPTER II: Classifications
Article 136

CHAPTER III: General Obligations
Article 139
Article 140

4.2.4.2 Local laws

Nuevo Laredo

Regulations for the Ecological Equilibrium and Environmental Protection in the Municipality of Nuevo Laredo, Tamaulipas

TITLE FIRST: Generalities
CHAPTER II: Definitions
Article 6

CHAPTER III: Powers and functions of the City Hall
Article 9
TITLE SECOND: Ecological Regulations and Land Use
CHAPTER II: Soil and Natural Resources protection
Article 27
Article 27 BIS

TITLE TENTH: Safety measures
Article 179

Guerrero

No regulatory waste tire management regulatory framework or agencies found in Guerrero legislation.

Miguel Aleman

No regulatory waste tire management regulatory framework or agencies found in Miguel Aleman legislation.

Camargo

No regulatory waste tire management regulatory framework or agencies found in Camargo legislation.

Gustavo Diaz Ordaz

No regulatory waste tire management regulatory framework or agencies found in Gustavo Diaz Ordaz legislation.

Reynosa

Regulation for the Ecological Equilibrium and Environmental Protection in the Municipality of Reynosa, Tamaulipas

TITLE FIRST
SINGLE CHAPTER: General Provisions
Article 6

TITLE THIRD
SINGLE CHAPTER: Municipal authority attributions
Article 10

TITLE FIFTH
CHAPTER II: Atmospheric pollution prevention and control
Article 78
CHAPTER III: Soil and subsoil pollution and prevention and urban solid wastes management
Article 100
Article 101
Article 102
Article 103
Article 104
Article 105
Article 106
Article 107
Article 111

Rio Bravo

Regulation for the Ecological Equilibrium and Environmental Protection in the Municipality of Rio Bravo, Tamaulipas

TITLE FIRST: General provisions
CHAPTER I: General Guidelines
Article 4

CHAPTER III: Environmental protection local authority competence
Article 8

TITLE THIRD: Environmental Protection
CHAPTER II: Urban and suburban area common provisions
Article 50
CHAPTER IV: Atmospheric environmental protection
Article 60

CHAPTER VI: Soil protection and Urban solid wastes management
Article 83
Article 84
Article 89
Article 90
Article 93
Article 94
Article 95

Matamoros

Regulation for the Equilibrium and Environmental Protection in the Municipality of Matamoros, Tamaulipas

TITLE FIRST
CHAPTER I: General Provisions
Article 3
Article 4

CHAPTER III: Environmental control Direction
Article 9

TITLE THIRD
CHAPTER II: Soil and subsoil prevention and control of pollution.
Article 50
Article 51
Article 52
Article 53

Article 54
Article 55
Article 56
Article 57
Article 58

5 Enforcement agencies

5.1 U.S. Enforcement Agencies

Two different levels of authority are involved in the main enforcement of applicable requirements for the management of scrap tires in the U.S. territory, as identified in the following sections:

5.1.1 Federal

The Federal authority is the Environmental Protection Agency (www.epa.gov).

5.1.2 State

Environmental Authority at State level in Texas is the Texas Commission on Environmental Quality (http://www.tceq.state.tx.us/).

5.2 Mexican Enforcement Agencies

Three different levels of authority are involved in the main enforcement of applicable requirements for the management of scrap tires in the Mexican territory:

5.2.1 Federal

The Federal authority is the Mexican Secretary for the Environmental and Natural Resources (*Secretaria del Medio Ambiente y Recursos Naturales,* SEMARNAT) (www.semarnat.gob.mx). The prosecutor agency at the service of SEMARNAT for the supervision of the applicably of federal regulations is the PROFEPA (*Procuraduria Federal de Proteccion al Ambiente*).

5.2.2 State

Four Mexican States are involved in the Texas-Mexico border area as previously identified. Each State with an environmental office, identified as follows:

- ✓ State of Coahuila Environmental Office (*Secretaria del Medio Ambiente de Coahuila,* SEMAC) (http://www.semac.gob.mx/).
- ✓ State of Chihuahua Urban Development and Ecology Office (*Secretaria de Desarrollo Urbano y Ecologia*, SEDUE) (www.chihuahua.gob.mx).
- ✓ State of Nuevo Leon Environment Protection and Natural Resources Agency (*Subsecretaria de Proteccion al Medio Ambiente y Recursos Naturales*, SPMARN) (www.nl.gob.mx).
- ✓ State of Tamaulipas Urban Development and Environment Office (*Secretaria de Desarrollo Urbano y Medio Ambiente*, SEDUMA) (seduma.tamaulipas.gob.mx).

5.2.3 Municipal

Municipal Ecology and public Works departments are in charge of tire management enforcement in a municipal level when waste tires are generated as municipal solid waste.

Chapter 7. Recommendations regarding changes to the current Texas and Mexico Waste Tire Policies, Laws, Regulations and Procedures

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1 Recommendations

IEMS identified on Chapter 6 the existing legal framework and based on information obtained through deskwork and fieldwork interviews which involved all the members on the tire disposal cycle, the main regulatory issues were identified and their potential solutions or improvements are reported in this Chapter.

Table 7.1.
Recommendations regarding changes to the current Texas and Mexico waste tire policies, laws, regulations and procedures

No.	Impact	Cause(s)	Recommendations
1	Tire fires	➢ Trash fires ➢ Tire burning for metal extraction ➢ Grass fires	✓ CPR dead tires campaign ✓ Tire fire prevention measures ✓ Tire ordinance-passing-training-enforcement
2	Mosquitoes	➢ Water accumulation inside whole tires	✓ CPR dead tires campaign ✓ Tire ordinance-passing-training-enforcement
3	Blocked water ways	➢ Illegal dumping of whole tires	✓ CPR dead tires campaign ✓ Tire ordinance-passing-training-enforcement ✓ Make access difficult to sensitive spots
4	Bad image, Hives, Vermin and poisonous animals	➢ Whole tire dumping or improper storage	✓ CPR dead tires campaign ✓ Tire ordinance-passing-training-enforcement
5	Used tires lack of tracking	➢ No manifest given when reinserted into the market	✓ Include the number of resold used tires in their annual report to the TCEQ scrap tire program.
7	Tire piles	➢ High disposal costs. ➢ No available recycling markets.	✓ CPR dead tires campaign ✓ Market recommendations of Chapter 8.

1.1 CPR dead tires campaign

CPR stands for Cut-Pack-Recycle which are basic steps IEMS identified in order to facilitate waste tire handling.

Dead tires is the name given by Texas used tire dealers to tires that are no longer reusable.

1.1.1 Cut

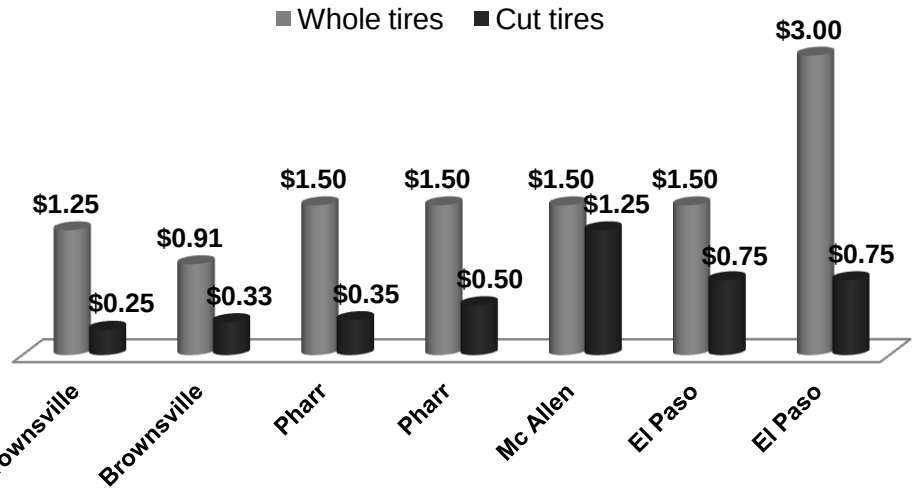
Cutting refers to the act of removing the sidewalls of a waste tire.

It can be accomplished manually using a linoleum knife or cutter or by means of a machine, necessary especially for cutting commercial truck tires.

Cutting a tire provides the following benefits:

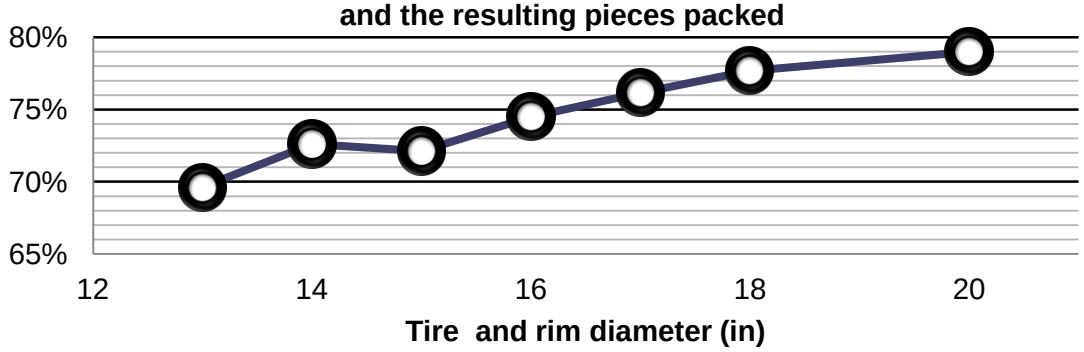
- Retained water inside waste tires is easier to remove.
- Disposal fee reduction (In Texas up to 80% and average savings of 55%, refer to **Figure 7.1**).
- Volume reduction ranging from 70% to 79% depending on the tire size demanding less storage area and diminishing transportation costs (**Figure 7.2**).
- Increase recycling and marketing options

Figure 7.1.
Comparison of the disposal fees for whole and cut tires in several Texas border cities (US dollars / tire)



Note: to consult the estimation table where this figure was obtained refer to **Attachment 23** of this report.

Figure 7.2.
Approximated waste tires volume reduction when sidewalls are removed and the resulting pieces packed



Note.- Refer to **Attachment 15** and **16** to consult estimations performed to obtain **Figure 7.2**.

1.1.2 Pack

Packing refers to the act of storing in an ordered fashion the cutting resulting pieces to take advantage of their reduced volume.

Stacked tire sidewall rings (top left), ordered and stacked tread rings (top right), diagram of tied up tread rings (middle left), diagram of stacked cut tread rings (bottom).

Figure 7.3.
Diagram showing different ways of stacking waste tires

On **Figure 7.3** pictures and diagrams it is easy to notice the volume reduction advantages obtained when tire sidewalls are removed as well as several packing alternatives.

Packing the resulting cut tire pieces provides the following benefits:

- Diminish the storage area required.
- Increase storage order.
- Diminish transporting cost per tire.
- Facilitate the loading and unloading into transport vehicles. (Either by hand or stacking on standard pallets)

1.1.3 Recycle

Waste tires tread and sidewalls can have different alternative uses than whole tires depending on whether they belonged to passenger of commercial truck tires. Recycling involves classifying activities based on whether they came from commercial or passenger tires, tread quality and dimensions.

The following tread quality classification is suggested:

A type

No visible wiring is observed, when sliding a plastic bag across the surface (in any direction) it isn't cut or damaged meaning a person can handle the tread without using gloves without hurting his skin.

Image 7.1.
Example of a type A waste tire tread.

B type

Tread presents visible wiring and/or when sliding a plastic bag across the surface (in any direction) it is cut or damaged meaning a person cannot handle the tread without using gloves.

Image 7.2.
Examples of type B tire treads.

Dimensions and tire of origin classification is only relevant on specific recycling options.

1.2 Tire fire prevention measures

According to what was explained on Chapter 4, the following fire prevention measures should be implemented in every tire storage site, plus the local, state and federal fire prevention requirements.

Image 7.3.
Used tire dealer waste tires storage site surrounded by tall grass.

1. Waste tires should be separated from vegetation or flammable material by at least 40 feet. (12.2 meters).

2. Every tire storage site should be fenced or surrounded by walls at least 2m tall, barb wired on the top, and have access doors with control such as locks. This with the objective to prevent the entrance of arsonists.

Image 7.4.
Example of a barb wired fence.

1.3 Tire ordinance[1]

The tire ordinance recommended is based on the regulations already in place in the cities of Laredo[2] and Pharr[3], Texas. These ordinances both share the sections marked on blue on the following table:

Table 7.2. Comparison of tire ordinances sections	
Laredo	**Pharr**
	Purpose and intent
Definitions	Definitions
	Residential property
Tire business registration program	Tire business permits
Tire business and mobile repair road service units application	
Terms of registration	
Denial of permit or renewal; suspension or revocation of permit	Denial of permit or renewal; suspension or revocation of permit

[1] Based on the City of Pharr Tire Ordinance application technique provided by Mr. Rene Saenz Jr. Public Works Assistant Director of the city of Pharr on a face to face interview performed on September 12, 2011.
[2] Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.
[3] Ordinance No. 0-2010-33

Table 7.2. Comparison of tire ordinances sections	
Laredo	**Pharr**
Fees	
	Tire hauler permit
	Destruction of tires
	Storage of tires
Disposal of tires	Disposal of tires
	Disposal records/Transmittal Manifest
	Administration/Enforcement
Penalty for violations	Violations and penalties
Injunctive relief	Injunctive relief
Severability	

Tire ordinances common sections are:

1. Definitions.
2. Denial of permit or renewal; suspension or revocation of permit.
3. Disposal of tires.
4. Penalties.
5. Injunctive relief.

A comparison of the content of each common ordinance is presented on **Attachment 24**. In summary the Pharr ordinance presents a more specific approach, especially on violations and penalties, and covers more tire related issues than the Laredo ordinance.

Both cities report significant waste tire management improvement when applying their own tire ordinances. IEMS recommends that each city, county or municipality in the Texas-Mexico border facing tire related issues to pass an ordinance which as a minimum contains the enumerated sections and their common content presented on **Attachment 24** of this report.

This suggestion should be considered, taking into account that always the opinion of a professional legal ordinance advisor should be obtained when an ordinance is to be written and passed. This recommendation doesn't replace the need of legal professional counseling when writing an ordinance or any other legal document.

Naturally it would also be desirable to consider including all of the recommendations presented in this report in the tire ordinances. These recommendations should be carefully reviewed by a professional experienced in law making of each country and consulted with all involved entities, public or private, before passed.

1.3.1 Passing

The city of Laredo set the example on the Texas-Mexico border area by passing a tire ordinance; afterwards it was followed by the city of Pharr. Other cities such as El Paso are in process of passing one. The stakeholders interviewed in said cities highlighted the benefits of possessing a specific legal framework for waste tire management in their areas because it facilitates antidumping enforcement and prevention.

Specific stakeholders consulted regarding tire ordinances:

- City of Laredo, Texas.
  - Rafael Cisneros, Jr. Environmental health Services, Sanitarian III.
- City of Pharr, Texas.
  - Rene Saenz Jr., Public Works, Assistant Director.

1.3.2 Training

The person in charge of setting up, direction and enforcement of the tire ordinance should perform the following activities:

1. The regulated entities have to be notified and trained on the purposes, scope and application of the tire ordinance. To effectively perform this, the following activities are suggested:
   - Summon a meeting with the waste tire generators, haulers and processors of the area. Present the tire ordinance and provide a copy of it. Finally request them to sign a confirmation of notification and training by means of a list of assistance. (The presence and coverage of the event by the local media is desirable).
   - Perform a visit to each tire generator, signal it location by means of a GPS, provide a copy of the ordinance and have them sign of reception and give them a period of time to comply. (six months).

2. Enforcement agents training. Passing an ordinance is not effective if the following agencies do not know its purpose and scope. The following agencies and agents should be educated on the tire ordinance purpose, scope and application:
   - Enforcing agency personnel.
   - Special commission personnel.
   - Code enforcement agents.
   - Fire department.
   - Police department.
   - Vector control and health departments.

3. Also after the enforcing personnel has been trained in the purposes, scope and application of the tire ordinance, the training on these subjects of the Municipal judges is key:

The success or failure of a tire ordinance relies on the consequences faced by violators. The municipal court will have the final word on whether a civil penalty should be applied or not as well as its severity.

An untrained or unwilling to punish judge may let go violators without any punishment discouraging and disempowering enforcement agencies and officers and sending the wrong message to the regulated entities which may think complying is not necessary.

1.3.3 Enforcement

Immediately after the time given to the regulated entities to comply with the new legislation has passed, tire ordinance enforcement agents should visit all notified regulated entities and inspect their compliance if any violation is identified the corresponding fine or consequence should be applied with zero tolerance.

Periodic visits should be performed, at least annually to ensure a continued compliance and application of the tire ordinance.

New regulated entities identified should be trained and afterwards also be visited

1.4 Make access difficult to sensitive dumping spots

Although tire dumping always generates negative impacts, these are exacerbated when it occurs on waterways causing their course reduction or blocking.

Make access difficult:

In most cases illegal dumping takes very little effort. Many areas continue to experience illegal dumping problems after being cleaned up.

Effective structural solutions will increase the effort and risk of being caught thereby deterring offenders. Structural solutions can reduce accessibility to popular sites for illegal dumping. A clean up plus:

- Introducing signs.
- Lighting.
- Barriers.
- Landscaping.
- Increasing the visibility.

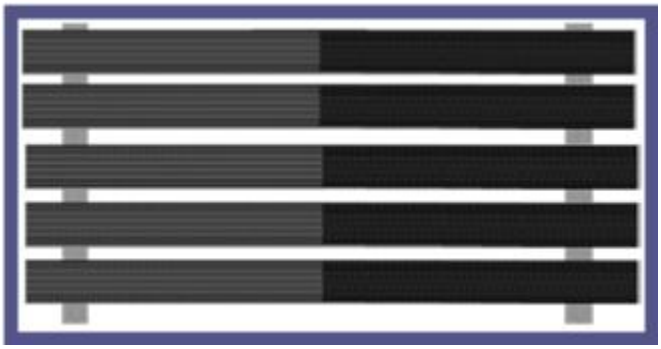
of a site can contribute to reducing or eliminating continued dumping. (Department of Environment and Climate Change (DECC) New South Wales Government, 2008)

Attachment 25 of this report shows an extract of Chapter 4 (Illegal dumping prevention techniques) of the document:

- Crackdown on Illegal Dumping - Handbook for Local Government (Department of Environment and Climate Change (DECC) New South Wales Government, 2008)

The document describes experiences and suggestions on access control techniques and their efficiency in preventing dumping

Image 7.5.
Diagram of a tire tread fence easily manufactured and that could potentially be used as an indestructible materials fence by government agencies.



Further information is available on Chapter 8 Markets report.

1.5 TCEQ scrap tire program modification

Transporters, scrap tire facilities, and storage sites must file annual reports to the Texas Commission on Environmental Quality (TCEQ). Current Scrap tire annual reports do not include reselling used tires as an option, meaning that waste tires which are reported to be disposed of could actually be reinserted into the market.

By counting the number of waste tires reused a more realistic number of properly processed tires will be at hand. As well as facilitating the tracking of used tires and their actual generation within Texas.

No modification of the report format is required.

A copy of the TCEQ 2011 Scrap Tire Transporter Annual Report format is presented as **Attachment 26** of this document.

Chapter 8. Recommendations Regarding Potential Markets for Tire-Derived Products in Mexico

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1 Methodology

1.1 Alternatives identification

In order to identify potential markets for tire-derived products in Mexico, IEMS deemed necessary first to define what a market is. For the purposes of this Chapter markets are defined as follows:

- Markets are any tire derived application where waste tires can be put to a new use, different than their original and the end user or processor economically compensates their tire derived raw materials supplier.

- In other words, revenue is obtained by the generator and/or processor for the sale of these applications or tire derived products.

- The search for markets for tire-derived products was performed on deskwork research and interviews with key stakeholders in the Mexican and Texas sides of the border as well as ideas developed by IEMS' team.

- Deskwork research included a search on the World Wide Web, the Green pages directory of sustainable business, previous tire market studies, as well as periodic publications, remote interviews with large recyclers and online trade pages.

The markets signaled as "bulk" are the ones that could supply the existing scrap tire uses previously reported in the study Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (Gray, 2010) performed for the border area.

1.2 Alternatives description

A list of identified potential markets for tire-derived products in Mexico is presented. Afterwards, each alternative is described based on available literature and web sources.

Descriptions are intended to illustrate regarding the tire derived product applications and uses, how it is obtained, benefits and issues. Sources of all information are appropriately quoted to facilitate to stakeholders to further research and learn on the application of their choice.

1.3 Market recommendations

Each stakeholder should decide what market is more attractive to him based on his own considerations. Nevertheless IEMS recommendations are based on the following criteria:

- Markets which require the minor equipment investment and provide the higher income per tire (high market price) were selected as the most recommendable markets.
- Estimated incomes per tire which are minor than the income theoretically obtained from the burning of tires for metal extraction were not considered recommendable.
- By doing this discrimination the market thrive to burn waste tires for metal extraction would theoretically be discouraged because a higher income could be obtained through alternative recommended markets.
- Alternatives which imply higher green house gas emissions per tire processed are considered less recommendable.

1.4 Social considerations

1.4.1 Legal considerations

Only Mexican legal framework was considered for this Chapter. To identify legal restrictions and regulations, concerning the markets identified a search was performed on Mexican Official Standards (*Normas Oficiales Mexicanas*, NOMs), International treaties signed by Mexico, federal, state and local Mexican laws. The results of this search are presented. It is relevant to note that a general principle of the Mexican legal system states:

- “For individuals what is not expressly forbidden is allowed” by Hans Kelsen.
- Meaning that unless any of the identified markets and related activities are specifically regulated and sanctioned, it is legal to pursue them.
- Also the Mexican General Law for the Prevention and Integrated Management of Wastes (Ley General para la Prevención y Gestion Integral de Residuos, LGPGIR) establishes the bases to:
- “Promote the valorization of wastes, as well as the market of byproducts, under environmental, technologic and economic efficiency criteria and adequate financing”.

This means that all recycling markets identified, as long as they promote energy and raw materials savings without affecting health, ecosystems or their elements, are allowed.

The focus of this search is to shed some light on legal restrictions concerning each alternative rather than encompassing the whole legal framework of each market. For this reason only restrictions and specific regulations are reported as requested by the terms of reference of this study.

1.4.2 Social impact assessment (SIA)

It is not within the scope of this Chapter to perform a social impact assessment for each alternative for each location within the Texas-Mexico border area. Yet it would be recommendable for each project to perform one prior to make any decision regarding a processing project.

By identifying impacts in advance:

- Better decisions can be made about which interventions should proceed and how they should proceed; and
- Mitigation measures can be implemented to minimize the harm and maximize the benefits from a specific planned intervention or related activity (Vanclay, SIA principles, 2003).
- In order to aid stakeholders to assess social impacts the SIA is described according to the international principles of the social impact assessment emitted by the International Association for Impact Assessment (IAIA) (Vanclay, SIA principles, 2003):
- "Social Impact Assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment." (Vanclay, SIA principles, 2003).

Since decisions based on the information presented in this Chapter will possibly cause future planned interventions such as the mentioned on the definition above, IEMS will present the bases of a social impact assessment and useful data in order for each stakeholder to perform its own local social impact assessment on the area to be impacted by their planned projects.

A convenient way of conceptualizing social impacts is as changes to one or more of the following (Vanclay, SIA principles, 2003):

- People's way of life – that is, how they live, work, play and interact with one another on a day-to-day basis;
- Their culture – that is, their shared beliefs, customs, values and language or dialect;
- Their community – its cohesion, stability, character, services and facilities;
- Their political systems – the extent to which people are able to participate in decisions that affect their lives, the level of democratization that is taking place, and the resources provided for this purpose;
- Their environment – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
- Their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;
- Their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;
- Their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.

1.5 Economic impact considerations

1.5.1 Required equipment investment per market

To make evident the difference in amount of economic investment required by each raw material state, the necessary investments on equipment to process waste tires was obtained from previous studies and quotations from manufacturers.

The equipment necessary was determined according to market tire derived raw materials specifications such as:

- Tire part;
- Type of tire where the raw material originated;
- Particle size;
- Metal content;
- Fiber content.

This estimation considers the required machinery to modify waste tires in order to obtain the raw materials as the market demands them. It does not include secondary equipment, land, vehicles or facilities.

1.5.2 Estimated income per tire

IEMS searched and obtained from:

- Online trading websites;
- Online retail stores;

the market prices paid for each tire derived raw material, or similar products when the market price of the raw material or product was not available.

This was done to highlight markets which provide the highest revenue per tire, potentially maximizing the potential income of recyclers and or waste tire generators through the revalorization of their waste tires.

1.5.2.1 Income obtained when burning tires for metal extraction

To be able to discriminate between an acceptable income per passenger tire equivalent (PTE) from a non acceptable income per PTE, the income obtained through selling the tire wire obtained after burning a passenger tire was estimated and set as a sustainability threshold .

This income was estimated based on the prices market currently pays for scrap tire wire in the Mexican scope cities. Although it should be periodically estimated due that prices continuously change.

1.6 Environmental impact considerations

Since all alternatives identified are actually recycling activities, all alternatives provide the positive environmental impacts and benefits of:

- ✓ Waste reduction.
- ✓ Tire pile mitigation which means a reduction in soil pollution.
- ✓ Prevent atmospheric and potentially water contamination by eliminating tire piles which could burn.
- ✓ Savings in disposal fees.
- ✓ Diminish the environmental impacts of virgin materials extraction and transportation.
- ✓ Savings in landfill space.

Yet health and environment issues have been presented though time regarding tire derived products. IEMS performed a search of serious publications and studies and selected the one that was considered to be performed in the most scientific rigor in order to assess if health and environmental risks may present in any of the identified markets.

1.6.1 Estimated green house emissions per tire processed

Based on electrical energy consumption and processing speed a comparison of estimated green house gas emissions per passenger tire equivalent processed was performed to identify the less pollutant alternatives.

Emission per kilowatt-hour were the ones reported for the Mexican Federal Commission of Electricity (Comision Federal de Electricidad, CFE) estimated by the Technicians and Professionals in Energetic Application Association (Asociacion de Tecnicos y Profesionistas de Aplicacion Energetica, ATPAE), which is of 0.6539 Kilograms of equivalent CO2 per kilowatt-hour.

2 Markets identified

As previously mentioned, for the purposes of this report markets are defined as any tire derived application where waste tires can be put to a new use, different than their original and the end user or processor economically compensates their tire derived raw materials supplier.

In other words, revenue is obtained by the generator and/or processor for the sale of these applications or tire derived products. So based on the past definition the identified markets on the Texas-Mexico border area are the following:

1. Passenger tire sidewalls (bulk).
2. De-beaded passenger sidewalls (bulk).
3. Passenger tire sidewalls' bead wire (bulk).
4. Tire treads (bulk).
5. Tire derived geo cells (TDGC).
6. Steel belted rubber for rammed-earth encased walls.
7. Landscaping edging.
8. Tire fences.
9. Tire derived aggregates (TDA) (bulk).
10. Ground rubber for rubberized asphalt (RA) (bulk).
11. Ground rubber for athletic and recreational surfaces (bulk).
12. Rubber mulch (bulk).
13. Ground rubber for molded and extruded products (bulk).

During this search a pattern was identified and products could be catalogued by the state of the raw material needed by them, it could be:

- ✓ Shredded or ground rubber.
- ✓ A specific part of a whole tire (i.e. tread, sidewalls, tread with one sidewall, etc).

Even on markets of the same product variations exist on the characteristics of the ground rubber, some of these variations are:

- ✓ Ground rubber sizes “mesh”;
- ✓ Metal content;
- ✓ Fiber content;
- ✓ Rubber color, among others.

2.1 Passenger tire sidewalls

Bulk[1] passenger tire sidewalls can be considered a source of any of the following raw materials:

Source of rubber

Present in most of the passenger tire sidewall’s body. Such as bead filler, abrasion gum strip, sidewall and sidewall reinforcements since all are made of some kind of rubber. (© 2012 Modified, Source Interlink Media, 2008).

Source of metal

Present in the sidewall’s bead wire which is a high-strength steel cable. (How stuff works Inc, 2008-2012)

Source of synthetic fibers

Present at the tire’s body plies. The most common ply fabric is polyester cord. (How stuff works Inc, 2008-2012)

Source of thermal energy

Tires have a heat content of 14,000 to 15,500 British thermal units per pound (Btu/pound) (7,800 to 8,600 kilocalories per kilogram [kcal/ kg]), depending on the type of tire and the amount of reinforcing wire that has been removed. By comparison, another solid fuel commonly displaced by use of tires as an energy resource is coal that typically contains 10,000 to 13,000 Btu/pound (5,550 to 7,200 kcal/kg) (EPA, 2010). Tire derived fuel (TDF) is further explained on the following Chapter 9.

[1] Bulk = in large amounts or volume.

Image 8.1.
Passenger tire sidewalls slit at the shoulder[2] ready to be transported at a processors site in El Paso, Texas, USA.

Other uses

Passenger tire sidewalls are employed in the creation of diverse handcrafts.

Image 8.2.
Rubber garden jars made out of tire treads and sidewalls.

[2] Shoulder of a tire is the part where the sidewalls meet the tread. (Discount tire, 2012)

2.1.1 How to obtain passenger tire sidewalls

Sidewalls from passenger tires can be easily obtained by cutting through the tires shoulder using a knife. Also sidewall removing machines of different models and brands are available in the market. (refer to **Attachment 31** for examples of sidewall removing machines.)

Truck tire sidewalls can only be removed from a tire employing a truck tire sidewalls remover.

2.1.2 Benefits from recycling tire sidewalls

The benefits identified are:

- Sidewalls are easily removed from a tires body using a linoleum knife or a sidewall removing machine.
- Sidewalls can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.1.3 Issues related to recycling tire sidewalls:

The following related to recycling tire sidewalls issues were detected:

- Need of a shredding machine capable of shredding rubber with metal content.
- Rubber obtained contains metal traces even if magnetic separation is applied.
- Demand may not be locally available.

2.1.4 Legal restrictions and regulations on the sale of passenger tire sidewalls

No specific legal restrictions or regulations were found regarding this activity.

Note that open air burning of tires or of any of their pieces is illegal in all states of the Mexican side of the border. See **Attachment 33** for specific legislations.

2.2 De-beaded passenger tire sidewalls

Bulk[3] de-beaded passenger tire sidewalls can be considered a source of any of the following raw materials:

Source of rubber

Present in most of the passenger tire sidewall's body. Such as bead filler, abrasion gum strip, sidewall and sidewall reinforcements since all are made of some kind of rubber. (© 2012 Modified, Source Interlink Media, 2008).

Tire sidewalls which have been de-beaded are considered a source of rubber of major quality since no metal will be present on the final raw material once shredded. Rubber obtained from De-beaded sidewalls is an alternative where magnetically separated materials are not acceptable.

Source of synthetic fibers

Present at the tire's body plies. The most common ply fabric is polyester cord. (How stuff works Inc, 2008-2012)

Source of thermal energy

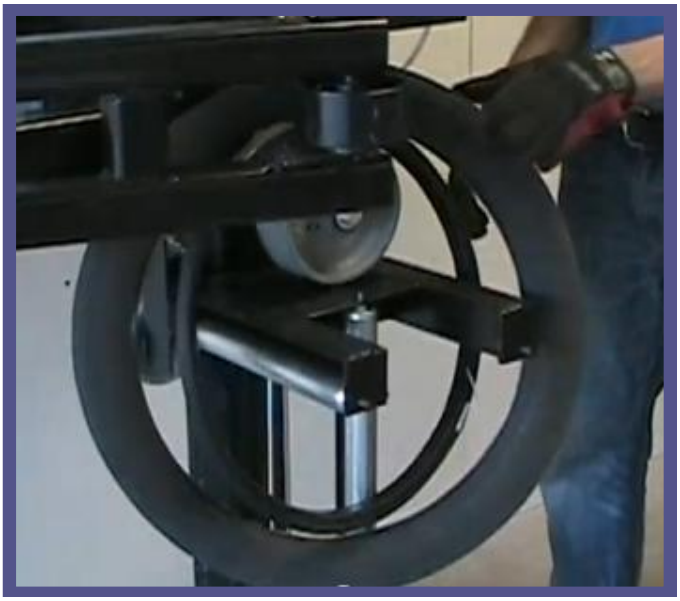
Tires have a heat content of 14,000 to 15,500 British thermal units per pound (Btu/pound) (7,800 to 8,600 kilocalories per kilogram [kcal/ kg]), depending on the type of tire and the amount of reinforcing wire that has been removed. By comparison, another solid fuel commonly displaced by use of tires as an energy resource is coal that typically contains 10,000 to 13,000 Btu/pound (5,550 to 7,200 kcal/kg) (EPA, 2010). Tire derived fuel (TDF) is further explained on Chapter 9.

Other uses

Passenger tire sidewalls are employed in the creation of diverse handcrafts and pet biting toys.

[3] Bulk = in large amounts or volume.

Image 8.3.
Bead wire removing machine separating tire slit sidewall from bead wire.



Courtesy of Engineering and Equipment Co. (EECO).

2.2.1 How to obtain de-beaded passenger tire sidewalls

Sidewalls from passenger tires can be easily obtained by cutting through the tires shoulder using a knife. Also sidewall removing machines of different brands and models are available in the market. Truck tire sidewalls can only be removed from a tire employing a truck tire sidewall removing machine.

Once sidewalls have been separated from the tire tread bead may be removed employing a de-beading machine (refer to **Attachment 31** for examples of tire sidewall removing and de-beading machines).

2.2.2 Benefits from recycling passenger tire de-beaded sidewalls

The benefits identified are:

- Sidewalls are easily removed from a tires body using a linoleum knife or a sidewall removing machine.
- De-beaded passenger tire sidewalls are a source or non metallic content rubber which has a higher market value.
- Bead wire removed can be sold as scrap steel.
- Less powerful shredding equipment is necessary since rubber and fiber are the only constituents of passenger tire sidewalls.

- Tire sidewalls can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.2.3 Issues related to recycling passenger tire de-beaded sidewalls

The following related to recycling tire sidewalls issues were detected:

- Demand may not be locally available

2.2.4 Legal restrictions and regulations on the sale of passenger tire de-beaded sidewalls

No specific legal restrictions or regulations were found regarding this activity.

2.3 Passenger tire sidewall bead wire

The bead is a rubber-coated steel cable whose function is to ensure that the tire remains attached to the wheel rim (How stuff works Inc, 2008-2012). Bead wire removed from passenger, light truck and heavy truck tires is a source of the following raw materials:

Source of metal

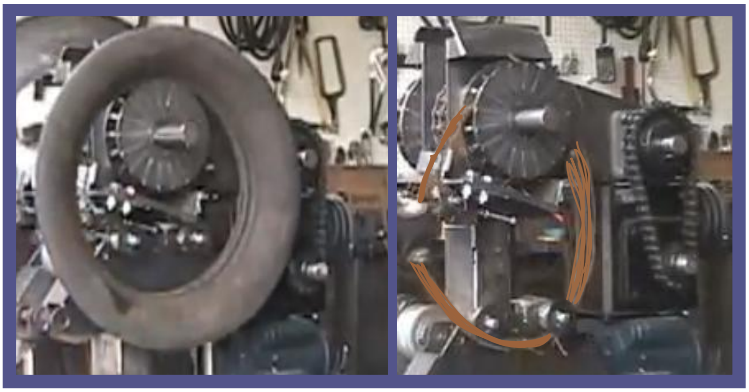
Present in the sidewall's bead wire which is a high-strength steel cable. (How stuff works Inc, 2008-2012).

Note: The act of burning tires for metal extraction is one of the main causes of tire pile fires in Mexico's border area. The municipality of Nuevo Laredo, Tamaulipas, Mexico has forbidden scrap metal businesses from purchasing tire metal in an attempt to stop tire burning activities.

2.3.1 How to obtain tire beads

De-beading machines are commonly employed for this purpose. No manual techniques were identified in this study's desktop and fieldwork activities. Depending on the machine specifications bead wire may be removed from a whole tire or from a slit from the shoulder of a tire's body (refer to **Attachment 31** for examples of tire sidewall removing and de-beading machines).

Image 8.4.
Bead wire removed from a tire sidewall by a de-beading machine.



Courtesy of Engineering and Equipment Co. (EECO).

2.3.2 Benefits from recycling tire beads

The benefits identified are:

- Attractive purchase prices from diverse buyers are available in most large cities of the Mexican side in the Texas-Mexico border area.
- Tire sidewalls to obtain bead wire can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.3.3 Issues related to recycling tire sidewalls

The following related to recycling tire sidewalls issues were detected:

- Specialized equipment is required to remove the sidewall's bead wire. **Attachment 31** presents quotations and information regarding bead wire removing equipment.
- If the rubber was set on fire to obtain the steel bead wire a large amount of carcinogenic and toxic gases and liquids are released, additionally it is one of the main causes of tire pile fires in the Mexican side of the scope border area.

2.3.4 Legal restrictions and regulations on the sale of passenger tire sidewalls' bead wire

No specific legal restrictions or regulations were found regarding this activity.

Note that open air burning of tires or of any of their pieces is illegal in all states of the Mexican side of the border. See **Attachment 33** for specific legislations.

2.4 Tire treads

Bulk[4] tire treads can be considered a source of any of the following raw materials and tire derived products:

Source of tire derived geo cells

Which are cylindrical tension-bands created from used auto tires from which both sidewalls have been removed (REAGCO, 2011). They are used for soil stabilization and on civil engineering projects. Further information is presented in the following section.

Source of molds for rammed earth tire walls

Tire treads perform the function of a mold that can take the pressure generated by fill dirt being hit by a sledgehammer in order to compress it.

In order to build a rammed earth structure, temporary forms are needed in which the soil may be compressed. Generally, rammed earth walls are simple to construct, requiring only a form to mold the dirt in and the soil itself (Zimmerman, 2011). Detailed information is presented on the following sections.

[4] Bulk = in large amounts or volume.

Image 8.5.
Passenger tire treads.

Source of landscape edging

Whole or cut tire treads can be used to separate the different landscaping components of a garden, such as flowerbeds, dirt and gravel areas roads, grass, tree beds, mulched areas, etc. Certain precautions to eliminate scratching risk from exposed wires have to be additionally implemented. More information is provided in the following sections.

Source of fencing components

The creation of fences using cut tire treads is an innovative solution developed by IEMS' team. No knowledge of its application in the Texas-Mexico border or elsewhere was found. Nevertheless it is presented as a potentially large market once its viability is confirmed through testing and pilot applications. More information on this alternative market is presented in following sections.

Source of rubber

The actual tire tread it's basically a mixture of various synthetic and natural rubbers. (How stuff works Inc, 2008-2012)

Source of metal

The tire belt, which is made of steel is meant to provide reinforcement to the section that's directly underneath the tread. (How stuff works Inc, 2008-2012)

Source of synthetic fibers

Present at the tire's body plies. The most common ply fabric polyester cord. (How stuff works Inc, 2008-2012)

Source of thermal energy

Tires have a heat content of 14,000 to 15,500 British thermal units per pound (Btu/pound) (7,800 to 8,600 kilocalories per kilogram [kcal/ kg]), depending on the type of tire and the amount of reinforcing wire that has been removed. By comparison, another solid fuel commonly displaced by use of tires as an energy resource is coal that typically contains 10,000 to 13,000 Btu/pound (5,550 to 7,200 kcal/kg) (EPA, 2010). Tire derived fuel (TDF) is further explained on the following Chapter 9.

2.4.1 How to obtain tire treads

Passenger tire treads can be obtained by cutting through the tire shoulders in order to separate the sidewalls from the tread. In order to cut away the sidewalls a knife or a sidewall removing machine may be employed.

Truck tire treads may only be obtained employing a truck tire sidewall removing machine. Information regarding examples of sidewalls removing machines is presented on **Attachment 31**.

2.4.2 Benefits from recycling tire treads

The benefits identified are:

- High value products such as TDGC, landscape edging, and fence railings can be locally obtained at very low costs.
- The use of treads as rammed earth walls molds presents an opportunity for low income families without access to commercial building materials or for enthusiasts of eco-friendly buildings.
- Passenger tire treads may be easily obtained using a knife to slit through a passenger tire shoulders.
- Transportation of tire treads is cheaper than transportation of whole tires due to extreme volume reductions.
- Tire cylinders, with sidewalls removed, can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.

- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.4.3 Issues related to recycling tire treads

The following related to recycling tire treads issues were detected:

- If the rubber was set on fire to obtain the steel belts a large amount of carcinogenic and toxic gases and liquids are released, additionally burning of tires to extract the metal in the is one of the main causes of tire pile fires in the Mexican side of the border area.
- Rubber obtained would present metal traces lowering its market value and increasing rubber production costs if metal is removed.
- Some markets may not be locally available.

2.4.4 Legal restrictions and regulations on the sale of tire treads

No specific legal restrictions or regulations were found regarding this activity.

Note that open air burning of tires or of any of their pieces is illegal in all states of the Mexican side of the border. See **Attachment 33** for specific legislations.

2.5 Tire Derived Geo Cells

Geo cells are widely recognized in the construction industry as a permanent soil stabilization best management practice (BMP) used for a variety of applications including : Roadway load support and stabilization, erosion control, soil stabilization on steep slopes, revetments and flexible channel lining systems, earth retention structures (CDOT, 2006).

2.5.1 Tire Derived Geo Cylinders (TDGC)

By removing one or both sidewalls of a tire, slit at the shoulder, the remaining tread cylinder can be used as a geo cell, herein the name tire derived geo cell or tire derived geo cylinder (TDGC).

2.5.1.1 How to obtain TDGC

By removing one or both sidewalls of a tire, slit at the shoulder, the remaining tread cylinder can be used as a geo cell. Passenger tire sidewalls can be removed manually employing a knife, or automatically employing sidewall removing machines.

In order to remove the sidewalls of a truck tire a truck tire sidewall removing machine must be employed. Information regarding examples of sidewall removing machines is presented on **Attachment 31**.

TDGC applications have been successfully implemented in Serdang, Selangor, Malaysia by only removing one of the tire's sidewalls and attaching each geo cell using a Polypropylene rope of 12 mm of diameter. This mat design was used as earth reinforcement for repairing tropical residual soil slopes (Bujang B. K. Huat, 2008).

2.5.1.2 Benefits from TDGC applications

The benefits identified are:

- Use of TDGC as road base strengthening in Mexican scope municipalities could completely remediate all identified tire piles. **Attachment 34** presents these estimations.
- Local materials and soils may be used as TDGC fill material eliminating the need of transport and mining of aggregates from distant locations thus eliminating the transport and mining environmental and economic impacts.
- Reduced cost of materials and construction since both scrap tires and backfill soils can be recycled local materials.
- The construction of the system is relatively simple. It doesn't require skilled workers or heavy machinery.
- A problem causing waste is converted into a high value engineering input which improves the quality of life and safety of its users.
- Current retail price of commercial geo cells in the Mexican border area is of $14.04 USD5 ($194.4 pesos)6 per square meter while TDGC are virtually free in the same area.
- Large number of applications in civil engineering projects.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.
- Tire cylinders, with sidewalls removed, can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.

[5] A quotation for commercially available geo cells is available in **Attachment 38.**
[6] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).

- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.5.1.3 Issues related to TDGC

The following related to TDGC issues were detected:

- Some tire derived geo cell technology applications are patented in the United States, such as the Mechanical concrete® application (U.S. Patent 7,470,092 B2), which is presented with more detail below.
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil. Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

  Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil. In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard. Rubber mulch and TDGC are derived from tires for this reason on mediums with acidic pH it is not recommended to apply TDGC.

2.5.1.4 Legal restrictions and regulations regarding TDGC

No specific legal restrictions or regulations were found regarding this activity.

2.5.2 TDGC Mechanical Concrete®

In the United States the state of West Virginia is the pioneer in TDGC application on civil engineering projects. Samuel G. Bonasso a civil engineer native of West Virginia, U.S., patented a specific waste tire derived product application, commercially named Mechanical Concrete® (*U.S. Patent 7,470,092 B2)*.

Mechanical Concrete® is built with cylindrical tension bands created from used auto tires from which both sidewalls have been removed. When appropriately sized stone aggregate is poured into the cylinders, the stones tightly lock together and behave as a solid, immovable mass: Mechanical Concrete®. This construction method uses less stone, requires no compaction or curing, and is instantly ready to support construction loads (REAGCO, 2011). It is a way of binding crushed stone aggregates together into a load bearing cellular building unit. The Mechanical Concrete® unit can support compressive loads and resist lateral soil pressure. It is basically a compressive material. It confines the stone within a TDGC. (REAGCO, 2011). The TDGC performs functions similar to the cement / water mixture, the rebar and the formwork in hydraulic cement concrete. It actually improves the load bearing capacity of the aggregate material be it sand, stone or sandy clay. (REAGCO, 2011).

It is the tensile strength of the Mechanical Cement® cylinder (TDGC) that generally defines the overall strength of Mechanical Concrete® and not the crushed stone. The preferred cylinder is made from a recycled auto or truck tire with both sidewalls removed, meaning a TDGC. (REAGCO, 2011)

Mechanical Concrete® geo-cylinder confinement system has many economical and beneficial uses reported by its patent holder. Rural and heavy duty road base, gas well pad, mechanically stabilized earth retaining wall systems (MSE) and bearing wall applications have been currently implemented.

Image 8.6.
Mechanical Cement® and Mechanical Concrete® images.

Image 8.7.
Application of Tire Derived Geo Cells in the construction of a 430 foot coal haul road from the Maidsville, WV (REAGCO, 2011).

Top left: cylinder placement; top right: grading;
low left: finished road; low right: road in use.

Image 8.8.
TRIAD Consulting Engineers parking lot, Morgantown, WV (REAGCO, 2011).

Image 8.9.
Bowie, Inc. Sorbello Gas Well service pad, Clarksburg, WV (REAGCO, 2011).

Potential applications of mechanical concrete TDGC include:

Load Support for:

- Paved and Unpaved road sub-base, base, and shoulders
- Unpaved and Paved Low Volume Road intersection interfaces
- Railroad ballast
- Industrial and mining roadways
- Rail road ballast bed stabilization, repair and reconstruction
- Conveyor foundations
- Bridge piers
- Underwater foundations

Earth Retaining Walls and Free Standing Load Bearing Walls

- MSE & Gravity Retaining Walls
- Industrial and commercial building and other load bearing walls and foundations
- Mining protective walls and sound wall structures
- Dams, ponds, levees, embankment construction
- Industrial Security walls and sound walls

Channel and Slope Protection

- Drainage control structures
- Bridge pier scour protection
- Erosion control structures to reduce and absorb water runoff velocity energy
- Storm water retention
- Channel, Slope and Embankment stabilization and Restoration

Other Uses

- Helipads
- Oil and Natural Gas Drill Pads
- Airfield Construction
- Overflow parking site stabilization
- Emergency Vehicle Road Entrances
- Energy Absorbing Highway and Transportation Crash Barriers
- Natural stone golf cart paths, cycle and walking paths and trails that support natural drainage patterns
- Permeable structures for highway, railway and trail slippage repair and reconstruction
- Military force protection

2.5.2.1 How to obtain Mechanical Concrete®

By filling tire derived geo cylinders (TDGC) with stone aggregates, sand, or other granular soil materials.

For structural applications and foundations the stone aggregate placed inside the geo cylinders shall be limestone or other suitable virgin or recycled stone, recycled asphalt pavement, industrial slag or stone aggregate with a comparable compressive strength. In remote areas, local river gravel may be used.

For highway use the size of the stone shall conform to AASHTO coarse aggregate size number 57 or number 3 or another selected relatively uniform sized stone particle gradation approved by the engineer. The engineer may specify the use of sand, indigenous granular soil materials or the recycling of existing roadway or shoulder stone base be placed in the geo cylinders if the material is suitable and without excessive clay fines.

For roadway bases and site stabilization, unless otherwise specified, the size of the stone shall conform to AASHTO coarse aggregate size number 57.

Attachment 35 presents a of the general specifications for the construction of Mechanical Concrete® geo cylinder confinement systems for roadway base or shoulders, gravity retaining walls or mechanically stabilized earth (MSE) walls, load bearing walls, abutments or load bearing pier foundations.

Attachment 36 displays a questionnaire answered by Mr. Bonasso explaining the necessary steps U.S. inhabitants and organizations should follow in order to start implementing mechanical concrete®, as well as a list of references who have already employed this technology in previous projects.

2.5.2.2 Benefits from Mechanical Concrete® (MC) applications

Additional to TDGC applications advantages. Benefits reported by Reinforced Aggregates Company (REAGCO) on the implementation of MC technology on road bases are the following:

- Road base load tested to greater than HS 20 wheel loads (Bonasso, 2008).
- Using a tire tread cylinder, i.e. any standard automotive tire with both sidewalls removed, in a construction application; i.e. where the supported vertical loads are in the range of 100psi, 7 TSF; provides a rugged, very conservative materials engineering approach (Bonasso, 2008).
- Tire-derived-geo-cylinders economically create a virtually indestructible base so it basically eliminates most road maintenance problems.
- Can be used effectively and economically in nearly all construction, on-road or off-road applications for a maximum wheel loading of 50,000lbs.
- Over triples the usual maximum load carrying capacity of sandy, granular, and graded stone materials.
- Less general labor and less skilled labor are required.
- Consumes less energy in its construction process since it can use smaller equipment.
- Requires no compaction, vibration, forms or rebar.
- Reuses a ready-made cylinder that is a low cost, combination stay-in-place form and reinforcing element.
- Uses the compressive load bearing capacity of low-cost stone aggregates or other recycled or earthen aggregate materials.

- It is simple to understand and use so it improves construction worker productivity. Speeds-up and facilitates the construction process.
- Common infrastructure problems such as potholes and ruts are virtually eliminated.
- When compared to the cost of retaining walls, bearing walls and foundations, roads and site stabilization made of conventional concrete or compacted stone; Mechanical Concrete® can deliver a minimum 25% savings. In many cases this savings can be as high as 50%. In road construction the savings can be 25 to 30% or more depending on the aggregate used.

Additional potential benefits identified include:

- Public and private budgets would increase economic efficiency by being able to build and maintain more structures with same budget.
- On site soil can be used as aggregate eliminating the need of transport and mining of aggregates from distant locations thus eliminating the transport and mining environmental and economic impacts.
- Require low energy input for their manufacture and can even be handmade employing a knife (refer to **Attachment 15** for additional information).
- Comparing with the current retail price of geo cells in the Mexican border area of $14.04 USD ($194.4 pesos)7 per square meter versus the maximum retail price per cylinder recommended by REAGCO of $3 USD ($41.54 pesos)8 per cylinder ($5.38 USD or $74.5 pesos per square meter) tire derived geo cells (TDGC) are 61% more economic.
- In Mexico where TDGCs are a free to use technology the cost of acquiring them is practically the labor cost of manually cutting a tire using a knife or the labor and cost of investment on an automatic tire sidewall remover, since manually removing both sidewalls to a passenger tire rim 15 takes a little over 2 minutes savings are expected to be even greater than the ones estimated on the last paragraph depending on workers salary.
- Presented on **Attachment 37** of this Chapter is a letter signed by Aaron C. Gillispie, who in 2008 worked as the director of the West Virginia Department of Transportation (WVDOT) Materials control, Soils and Test Division, approving the material application on a per project basis of Mechanical concrete®, dated on October 09, 2008.[9]

[7] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).
[8] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).
[9] The originality of the letter was corroborated by IEMS on a telephonic conversation with Mr. John Taylor on June 19, 2012. No signed confirmation format was asked to Mr. Taylor.

Commercial geo cell mat quotations are available on **Attachment 38** of this report. TDGC recommended retail prices are presented on the questionnaire presented on **Attachment 36** Time to remove a tires sidewall is presented on **Attachment 15**.

2.5.2.3 Issues related to Mechanical Concrete®

The following related to Mechanical concrete® issues were detected:

- ***Tire derived geo cylinder technology is patented in the United States*** (U.S. Patent 7,470,092 B2). **Attachment 36** presents a questionnaire applied to Samuel G. Bonasso, patent owner, regarding what has to be done in order to be able to implement this technology in the USA.
- It should be implemented using accepted civil engineering design techniques, processes and traditional construction techniques.

2.5.2.4 Legal restrictions and regulations regarding Mechanical Concrete®

No specific legal restrictions or regulations were found regarding this activity.

2.6 Steel belted rubber for rammed earth tire walls

In order to build a rammed earth structure, temporary forms are needed in which the soil may be compressed. Generally, rammed-earth walls are simple to construct, requiring only a form to mold the dirt in and the soil itself. Tires perform the function of a mold that can take the pressure generated by fill dirt being hit by a sledgehammer in order to compress it.

Load bearing walls

Based on the tests and analysis of R14 and R15 rammed-earth encased tire walls, it is believed that they are capable of providing safe and reliable support in single story homes (Zimmerman, 2011).

2.6.1 How to build using rammed earth tire walls

The most common method of building rammed earth tire walls is to place a used tire on the ground, fill the tire with dirt and compress the dirt with a hammer. Cardboard is often placed in the bottom of a tire before the dirt is placed in it to prevent the soil from falling out as it is compacted. This process is repeated until the tire is completely filled with compacted soil. The tires must be filled to at least 95 percent compaction. (Zimmerman, 2011)

An individual tire is placed on the running axis of the wall; it is filled and compacted in that position. Other tires are then placed and filled next to the first tire. Once one row of tires is complete, another row is placed on top of the first row, but staggered in alternate lay from the first row, like bricks. In order for this to happen, half tires must be used. However, they cannot be filled cut in half because there would be no supporting structure to hold the dirt as it is compacted. Instead, tires are cut and screwed into whole tires. (Zimmerman, 2011)

As with any construction a proper technique is imperative for security's sake. Building instructions are available in various online and literature sources, some specific ones being the following:

- ✓ Earthship, volumes 1 and 3, by Michael Reynolds;
- ✓ The Tire House Book, by Ed Paschich and Paula Hendricks.

2.6.2 Benefits of structures built using rammed earth tire walls

The benefits identified are:

- Incombustible (Zimmerman, 2011).
- Thermally massive10 (Zimmerman, 2011).
- Nearly soundproof (Zimmerman, 2011).
- They often are quite strong and durable (Zimmerman, 2011).
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.
- Tire cylinders, with sidewalls removed, can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

[10] Thermal mass absorbs or 'slows down' the passage of heat through a material and then releases that heat when the surrounding ambient temperature goes down. Rammed earth behaves as heavyweight masonry with a high thermal mass. (Downton, 2010)

2.6.3 Issues of structures built using rammed earth tire walls

The following issues of structures built using rammed earth tire walls were detected:

- Ramming earth is labor intensive.
- As with any construction a proper technique is imperative for security's sake.
- Thick walls diminish internal living spaces on buildings with small lots.

2.6.4 Legal restrictions and regulations regarding rammed earth tire walls

No specific legal restrictions or regulations were found regarding this activity.

Note that community restrictions on specific building materials in specific urban areas may apply.

The fact that specific regulations on rammed earth tire walls were not found does not imply construction permits and licenses are not required. At all times any construction should comply with laws, rulebooks, security requirements and any other regulation applying.

2.7 Tree and landscaping tire tread edging

Landscaping using tire derived products is a proven and current use of waste tires, mostly in the form of tire derived rubber mulch. Garden edging is a new application developed by IEMS' team.

No knowledge of its application in the Texas-Mexico border or elsewhere was found. Nevertheless it is presented as a potentially large market once its viability is confirmed through testing and pilot applications, which are strongly suggested but not part of this study's scope.

2.7.1 How to obtain tire derived tree and landscape edging

By removing one or both sidewalls of a tire, slit at the shoulder, the remaining tread cylinder can be directly used as tree edging placing it on the desired tree location and afterwards planting the tree within the cylinder. Type A treads (with no exposed wires) should be used for safety reasons.

Passenger tire sidewalls can be removed manually employing a knife, or automatically employing sidewall removing machines. In order to remove the sidewalls of a truck tire a truck tire sidewall removing machine must be employed. Information regarding examples of sidewall removing machines is presented on **Attachment 31**.

To obtain tire derived landscape edging tread cylinders must be cut employing a tread cutting machine. The resulting tread bands will have on each extreme exposed wires exactly where the cutting took place, these wires should be covered in order to make tire derived landscape edges safe.

A way of covering the exposed wires on each extreme is to use a rubber piece of any source glued to each extreme using rubber cement[11]. As with all tire derived products color may be changed by painting using 100% exterior acrylic paint or any other appropriate dye.

Image 8.10.
Diagram of the application of tire treads in landscape edging applications.

2.7.2 Landscape edging benefits

The benefits identified are:

- Edging permanently defines the landscape bed, so that continual reshaping of the bed is virtually eliminated.
- Significant savings in maintenance expenses will be achieved as landscape edging eliminates the continual spading of the bed edge by hand or using power edgers.
- Edging assures crisp, clean lines will be maintained throughout the landscape bed, ensuring the original design intent is maintained.
- Edging blends architectural details with the landscape beds, building a properly designed and balanced landscape.

[11] Performing a preliminary testing is recommended before a mass application of this tire derived product is employed

- Landscape is truly defined by proper separation of lawn, flowerbeds and aggregates and edging will achieve those goals.
- When various aggregates are used in a contained area, edging is the only way to assure a permanent separation.
- Properly installed, quality landscape bed edging gives clarity and significantly increases the level of visual aesthetics and adds value to the business or residence (Dreamscape outdoor living and garden Inc., 2005).

Additional benefits identified include:

- Long lasting product materials, virtually indestructible.
- Use of low carbon footprint product since required energy input to produce it is minimum compared to extruded and molded ground rubber products.
- With a relatively low investment an almost ubiquitous residue becomes a highly valued product.
- Because of its relatively low required investment it can represent a viable market solution to the waste tire problems occurring on the Texas-Mexico border, especially on the Mexican side where municipal solid waste management budgets are significantly lower.
- Municipalities, cities and counties can improve the public landscaping on parks and public areas with a minimum investment, avoiding tire disposal costs which burden them nowadays.
- Tire tread cylinders, with sidewalls removed, can be available with no investment costs through a Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Using 100 percent acrylic exterior house paint the edging can be colored as desired.
- Since passenger tire sidewalls can be removed using a linoleum knife, the required investment on equipment can be significantly lowered to $3,400 USD ($43,350 Mexican pesos)[12] for a passenger tire tread cutting machine as **Attachment 30** of this report displays (refer to **Attachment 15** report for additional information on cutting the sidewalls of a passenger tire).
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

[12] All pesos values were estimated based on an exchange value of $12.75 Mexican pesos / US dollar (FIX) for March 2012. (Bank of Mexico (BANXICO), 2012)

- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.7.3 Issues from tree and landscape edging using cut tires

The following issues of tree and landscape edging using cut tires were detected:

- Accidentally exposed wires could harm people or animals.
- Possible human health hazards. It has been thoroughly investigated for similar applications of tire derived rubber products, such as playgrounds and athletic fields, in the document "Review of the Human Health & Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields (ChemRisk, Inc., 2008)", where it was concluded that "No adverse human health or ecological health effects are likely to result from these beneficial reuses of tire materials; and while these conclusions are supported by existing studies or screening risk assessments, additional research would provide useful supplemental data regarding the safety of recycled tire products and enhance the weight of evidence used in risk communication (ChemRisk, Inc., 2008)".
- Since recycled tire rubber has been deemed non dangerous for human health or the environment in playgrounds, which are located in parks and gardens, it is IEMS's opinion that cut tire treads (with a protection installed on each extreme to prevent wires to be exposed) will be as safe for humans and the environment as both applications evaluated by ChemRisk. Yet it is presented since social rejection may occur.
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil.

Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil.

In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard. Rubber mulch and cut treads are derived from tires for this reason on mediums with acidic pH it is not recommended to apply tread landscape edging.

2.7.4 Legal restrictions and regulations regarding landscape edging

No specific legal restrictions or regulations were found regarding this activity.

2.8 Tire tread fences

The creation of fences using cut tire treads is an innovative solution developed by IEMS' team. No knowledge of its application in the Texas-Mexico border or elsewhere was found. Nevertheless it is presented as a potentially large market once its viability is confirmed through testing and pilot applications, which are strongly suggested but not part of this study's scope.

Fence applications would vary depending on the separation between treads and their parallel number.

2.8.1 How to obtain tread fences

Attachment 39 of this report displays the tread theoretical cut tread length and width of the most common tire sizes sold in the United States and popular sizes in the Mexican side of the border.

Image 8.11.
Illustration of livestock fence railings created using cut tire treads.

Image 8.12.
Diagram of tread hog fence.

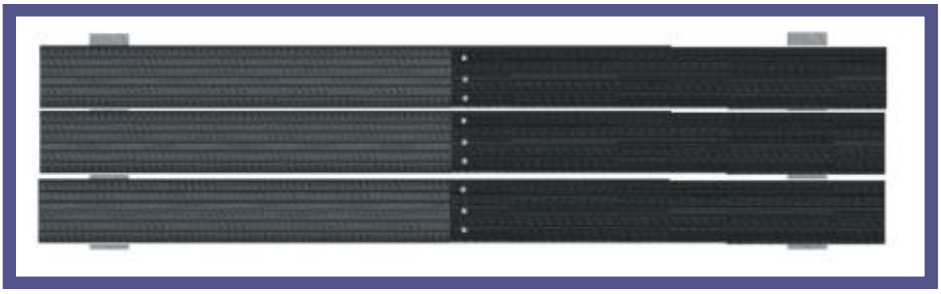
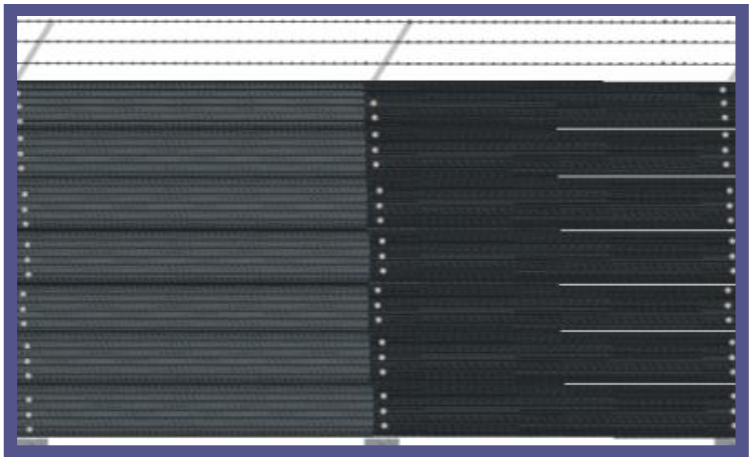


Image 8.13.
Diagram of intruder control fence with barbed wire placed on top.



Hypothetically cut treads cut be attached in order to create a continuous band or strip that could be tensed and would allow a post separation similar than other applications with the fence benefits described below on **Attachment 40** of this report.

Also each treads could be attached from post to post for a stronger structure which would require a larger number of poles as **Image 8.13** diagram displays.

Image 8.14.
Diagram of a tread band assembled using rivets on tread extremes.

2.8.2 Benefits expected from cut tire tread fencing

The benefits identified are:

- As it is presented in **Attachment 40,** cut tread fences known features comply with the ideal livestock fence characteristics, except for the breaking strength with which it is rated as medium, yet it's still higher than high tensile wire fences.
- Since fencing usually represents a rather large investment on most farms, it is especially important to select a fence that is affordable, easy to maintain, durable and, most importantly, keeps livestock in. (Michael J. Buschermohle) Since cut tire treads are a recovered waste and weatherproof since are made steel belted rubber which makes them very durable if their applicability is tested and approved they will represent an important waste tire application market.
- Board fences are very attractive, quite strong and are safe for animals. They are typically used as border fences around the farm or the home. They can be built to any height. The price of lumber, nails, paint and other materials along with the labor required makes the cost of these fences considerably higher than most permanent wire fences. Upkeep is also high, especially if untreated lumber is used. (Michael J. Buschermohle) Cut tire tread fences may lower labor and inputs costs making them more affordable than treated wood applications with similar performance except on strength.
- For intruder control, cut tread fences would have the added value of being more resilient to vandalism or entrance attempts by cutting them than other kinds of fences, such as chain link which can be easily cut with manual tools.

- Tread fences could potentially comply with the *Texas Agriculture Code, Title 6. Production, Processing, and Sale of Animal Products. Subtitle B. Livestock, Chapter 143. Fences; Range Restrictions. Subchapter A. Fencing of Cultivated Land. Sec. 143.001. Sufficient Fence Required*, which states that "Except as provided by this chapter for an area in which a local option stock law has been adopted, each gardener or farmer shall make a sufficient fence around cleared land in cultivation that is at least five feet high and will prevent hogs from passing through." which means they may have a potential large demand on the US side of the border once compliance and cost reductions are proven.
- Tread fences wouldn't be see through, providing more privacy to the protected area.
- Long lasting product materials, virtually indestructible.
- Use of a recycled product which avoids the use of virgin materials such as wood.
- Use of low carbon footprint product since the required energy input to produce it is minimum (refer to **Figure 8.5**).
- With a relatively low investment an almost ubiquitous residue becomes a highly valued product.
- Because of its relatively low required investment it can represent a viable market solution to the waste tire problems occurring on the Texas-Mexico border, especially on the Mexican side where municipal solid waste management budgets are significantly lower.
- Municipalities, cities and counties can fence municipal properties using waste tires with a minimum investment.
- The tire dump sites reported on the Chapter 3 may be fenced using this technology to avoid arson.
- Tire cylinders, with sidewalls removed, can be available with no investment costs through a dead tire Cut-Pack-Recycle (CPR) campaign implemented in coordination with waste tires generators.
- Using 100 percent acrylic exterior house paint the fence can be colored as desired.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.
- Since passenger tire sidewalls can be removed using a linoleum knife, the required investment on equipment can be significantly lowered to $3,400 USD for a passenger tire tread cutting machine as **Attachment 30** of this report displays (refer to **Attachment 15** report for additional information on cutting the sidewalls of a passenger tire).

- They require low energy input.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.

2.8.3 Issues related to tread fences

The following issues were detected regarding the application of tread fences:

- Un-tested application.
- Strength may not be suitable for cattle handling facilities.

2.8.4 Legal restrictions and regulations regarding fencing using cut tire treads

No specific legal restrictions or regulations were found regarding this activity.

2.9 Tire derived aggregate (TDA)

Tire derived aggregate (TDA) is an engineered product made by cutting scrap tires into 25- to 300-millimeter (mm) pieces. Depending on particle sizes TDA is classified on types A and B (Gray, 2010).

Type A TDA

Type A TDA is appropriate for a range of drainage applications in layers up to 1 m (3.3 feet) thick. Potential drainage applications include (Gray, 2010):

- ✓ Drainage layers within landfill leachate collection and removal systems.
- ✓ Permeable aggregate for landfill gas collection layers and trenches.
- ✓ Free draining aggregate for edge drains for roadways.

- ✓ Permeable backfill for exterior walls below the ground surface.
- ✓ Septic system drain fields.
- ✓ Landfill gas collection systems.

Type B TDA

Type B TDA is used for lightweight fill applications in layers up to 3 m (10 feet) thick. Fill applications include (Gray, 2010):

- ✓ Lightweight fill for highway embankments.
- ✓ TDA and TDA soil mixtures have been used as a replacement for conventional soil in embankment construction.
- ✓ Compressible layers behind integral abutment and rigid frame bridges.
- ✓ Backfill for retaining walls, bridge abutments, and sheet-pile walls.
- ✓ Limit the depth of frost penetration and to provide drainage during the spring thaw.
- ✓ Use as drainage layers in landfills, septic system drain fields, and highway edge drains.
- ✓ A TDA layer beneath the stone ballast of rail lines reduces off-site vibrations.

2.9.1 How to obtain tire derived aggregate

TDA with a maximum size of about 75 mm (3 inches) is referred to as type A TDA. TDA with a maximum size of about 300 mm (12 inches) is referred to as Type B TDA (Gray, 2010).

Guidelines and construction specifications are available to help engineers take advantage of the special engineering properties of TDA. Most important of these is ASTM International Standard D6270-98 Standard Practice for Civil Engineering Applications of Scrap Tires. This document lists the typical geotechnical properties of TDA, applicable test methods, and construction guidelines. (Gray, 2010)

Three TDA projects in 1995 and 1996 underwent internal heating reactions, which prompted development of engineering guidelines to limit internal heating of TDA fills. The guidelines, as well as discussion of possible causes, are available on the following source document:

- ✓ Scrap Tires: Handbook on Recycling Applications and Tire Derived Aggregate and Whole Tires for Civil Engineering Applications. (Gray, 2010).

This publication also provides guidelines for landfill leachate collection and removal systems, landfill gas collection systems, drainage applications for major highways, drainage applications for small-scale municipal construction, drainage applications for septic system drain fields, TDA as lightweight fill, testing facilities design, among other valuable information.

2.9.2 Benefits from using TDA in specific applications

The benefits identified are:

- TDA provides many solutions to geotechnical challenges since it is lightweight: 50 pounds per cubic foot or 0.8 macrograms per cubic meter (mg/m^3) (Gray, 2010).
- Produces low lateral pressures on walls (as little as one-half that of soil) (Gray, 2010).
- Is a good thermal insulator (eight times better than soil) (Gray, 2010).
- Has high permeability (more than 1 centimeters per second [cm/s] dependent on TDA size) (Gray, 2010).
- Has good shear strength (Gray, 2010).
- Absorbs vibrations (Gray, 2010).
- Moreover, each cubic meter of TDA fill contains the equivalent of 100 passenger car tires (Gray, 2010).
- It is used to improve the stability of embankments constructed on weak marine clay.
- Cost reduction. When used in appropriate applications, TDA's special properties can greatly reduce construction costs. TDA is generally cost competitive for projects that require use of lightweight fill material for embankment construction. Moreover, use of TDA in drainage applications is cost effective in areas where there is a limited supply of conventional drainage aggregate (Gray, 2010).
- Small scale applications can be implemented by municipal officials such as public works directors.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.

- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.9.3 Issues arising from using TDA in specific applications

Three main issues regarding the use of TDA were detected:

- Economics. The economics of using TDA for civil engineering applications depend on the local costs to produce TDA and the local costs for competing alternative construction materials. TDA is not a generally cost-effective substitute for conventional earth fill (Gray, 2010).
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil. Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

  Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil.

  In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard. Rubber mulch and TDA are derived from tires for this reason on mediums with acidic pH it is not recommended to apply TDA.
- Sophistication.
  - Design and engineering considerations must be considered and implemented in order to avoid TDA fill to heat up internally.

- The level of sophistication in specific applications varies. Some applications are for large civil engineering projects that must be designed by qualified engineering professionals.
- Self- heating internal reactions

2.9.4 Legal restrictions and regulations regarding TDA

No specific legal restrictions or regulations were found regarding this activity.

2.10 Ground rubber for Rubberized Asphalt (RA)

Rubber modified asphalt is the product of mixing crumb rubber from scrap tires or other sources with asphalt. This can be done at varying rubber to asphalt ratios dependent on its intended use (Gray, 2010). It is used as asphalt pavement for roads.

2.10.1 How to obtain ground rubber for rubberized asphalt

Each state in the United States has established its own ground rubber specifications with variations for alternative applications. The Arizona process typically uses 16-30 mesh ground rubber with low limits for residual wire and fiber. Terminal blending in Florida initially used fine-mesh, such as minus 80 mesh (the minus implies that it is finer than 80 mesh since material has passed through a 80 mesh screen) ground rubber, but found that minus 40 mesh performed well with lower cost and better availability (Gray, 2010).

Polymer/rubber blends vary widely, with some technologies pre-treating the rubber to enhance its reactivity in the asphalt (Gray, 2010). The following is a brief description of the three major rubber modified asphalt technologies.

The Arizona process

It involves mixing and reacting rubber with asphalt binder in specialized equipment at the paving site.

Ground rubber normally represents about 20 percent of the asphalt binder mix, significantly increasing the viscosity of the binder. Greater viscosity allows a higher concentration of binder to be used in the asphalt mix, resulting in a stronger and more durable pavement (Gray, 2010).

Terminal Blending

Terminal blending involves blending rubber into the asphalt binder in a mixing tank at the asphalt supply terminal, then transporting it to the job site, thereby reducing the need for specialized equipment at the site. The terminal blending mix must be continuously mixed to keep the suspended rubber from settling out prior to transport. Rubber usage levels are specified to meet design performance characteristics for the pavement (Gray, 2010).

Rubber/Polymer Blends

Styrene-butadiene-styrene (SBS) block copolymers are also used as additives in asphalt to improve performance. However, proponents believe that addition of a combination of both the SBS block copolymer and rubber to the asphalt enhances the performance more than either material can when they are added separately. The technology uses a low percentage of rubber to partially displace normal polymer addition levels (Gray, 2010).

2.10.2 Benefits obtained from paving using RA

The following benefits were identified:

- Performance. Roads using the Arizona and terminal blend processes have been documented to last longer than traditional asphalt, sometimes dramatically longer, but this performance has not been universal (Gray, 2010).
- Cost. Use of thinner rubber modified asphalt lifts (layers) can turn cost into an advantage where applicable and accepted (Gray, 2010).
- Noise and accident reductions. The availability of rubber, polymer, and rubber/ polymer blend technology is also playing a role in development of pavement design alternatives that can reduce road noise levels and improve the safety of highways. Noise reduction and increased safety are accomplished through use of open-graded friction course (OGFC) pavement using large, uniformly graded aggregate. Rainwater flows through the resulting top layer of pavement (the friction coarse) and out to the sides of the roadway. This reduces hydroplaning and enhances driver visibility through a reduction in water spray from the vehicle tires. The open structure also creates an acoustic surface that absorbs and deflects some sound and reduces road noise for nearby residents (Gray, 2010).
- Improves the flexibility and tensile strength of the asphalt mix reducing the appearance of cracks due to fatigue or temperature changes. (Transport and communications secretariat, SCT).
- Waste reduction. Reuse of a raw material that was considered a waste.

- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.10.3 Issues arising from paving using RA

The following issues from paving using RA were detected:

- Poor performance has been attributed to improper installation, weather conditions, bed preparation, and aggregate grading (Gray, 2010).
- Florida found that rubber modified asphalt performed well, but that polymers out-performed terminal-blended rubber modified asphalt for some high-traffic applications (Gray, 2010).
- The installed cost of an equivalent thickness of rubber modified asphalt is generally 10 to 100 percent higher than unmodified asphalt, as previously discussed. Since transportation departments' budgets are fixed, higher cost forces less paving and can cause short-term problems even if it has long-term benefits (Gray, 2010).

2.10.4 Legal restrictions and regulations regarding RA

The following standards were found applicable:

- ✓ Standard N.CMT.4.05.002/01 Quality of modified asphalt materials.
- ✓ Standard N.CMT.4.05.002/06 Quality of modified asphalt materials.
- ✓ Standard M.MMP.4.05.022/02 Separation in modified asphalt cement.
- ✓ Standard M.MMP.4.05.023/02 Resilience on modified asphalt cement.
- ✓ Standard M.MMP.4.05.024/02 Elastic recovery by torsion on modified asphalt cement.

No other legal restrictions or regulations were found regarding this activity.

2.11 Ground rubber for athletic and recreational surfaces

2.11.1 Synthetic sports turf

The current generation of artificial sports turf uses 7.6-cm (3-inch)-long strands of green polyethylene embedded in a porous backing to form a carpet like structural framework for the turf system. The carpet is spread over a sophisticated drainage system capable of removing rain water rapidly and is in-filled with silica sand, ground rubber, or layers of each (Gray, 2010).

The polyethylene grass-like blades add containment to the ground rubber, and the rubber provides cushioning while the combined synthetic turf system bears the physical forces of athletic activity (Gray, 2010).

Synthetic sports turf is mostly used in football stadiums but now this can be used on a wide range of sports fields at all levels of play, like American football, field hockey, baseball, etc (Gray, 2010).

2.11.1.1 How to obtain ground rubber for athletic and recreational surfaces

The type and size of the ground rubber vary depending on the turf manufacturer. Some use primarily cryogenic ground rubber produced by freezing shredded rubber before it is fractured in a high-speed hammer mill, a machine that pulverizes the rubber into fine particles.

The resulting product has smooth sides and tends to flow easily when applied to a sports field. Others use “ambient” rubber, produced in a series of shear and compression equipment at ambient temperatures. This product tends to have a more irregular surface shape with a more cohesive consistency. A “crambient” product made by a primary cryogenic process followed by secondary ambient processing to yield hybrid performance characteristics is also used (Gray, 2010).

Piece size requirements for ground rubber also vary by turf manufacturer. The most common distributions of piece sizes for sports fields are 14- 30 mesh and 10-14 mesh. “Mesh” is a term used to describe size and is equal to the number of holes per inch that the material can pass through.

The specifications also generally require removal of virtually all the reinforcing fabric and wire that is initially present in scrap tires. Approximately 3 pounds of ground rubber are generally used per square foot of synthetic turf, depending on the manufacturer, design, and desired surface characteristics (Gray, 2010).

2.11.1.2 Benefits obtained from using ground rubber for athletic and recreational surfaces

The following benefits were identified:

- Injury/Health. Studies indicate that frequency of injury is similar for both type of surfaces (natural turf and synthetic), but that the severity of injuries is worse on natural grass turf. There are more head, neural, and ligament injuries on natural grass, while there are more epidural, muscle trauma, and temperature related injuries on synthetic turf (Gray, 2010)..
- Economics. Synthetic turf's higher initial cost is offset by reduced maintenance associated with water, fertilizer, pesticides, cutting, turf replacement, and manpower (Gray, 2010)..
- Availability. Conversely, synthetic turf drains rapidly, allowing use quickly after heavy downpours. In addition, synthetic grass turf can reportedly tolerate up to 3,000 hours of use per year, about four times more use than natural grass turf, allowing the fields to be used more heavily for different sports (Gray, 2010).
- Tire pile abatement. A typical field may use up to 12,000 passenger tires (Astro Turf, LLC).
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.11.1.3 Issues arising from using ground rubber for athletic and recreational surfaces

The following issues were detected:

- Elevated Turf Temperature
- Organic Chemical Emissions

- Studies indicate that a range of organic compounds may be emitted onto or from the surface of ground rubber pieces (Gray, 2010).
- The pieces of black rubber and colored synthetic turf blades absorb light energy and become warmer than ambient temperatures (Gray, 2010).
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil. Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

  Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil.

  In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard. Rubber mulch and ground rubber are derived from tires for this reason on mediums with acidic pH it is not recommended to apply ground rubber for athletic and recreational purposes.

These last two risks have been thoroughly investigated and results presented in the document “Review of the Human Health & Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields (ChemRisk, Inc., 2008) concluded that “No adverse human health or ecological health effects are likely to result from these beneficial reuses of tire materials. While these conclusions are supported by existing studies or screening risk assessments, additional research would provide useful supplemental data regarding the safety of recycled tire products, and enhance the weight of evidence used in risk communication (ChemRisk, Inc., 2008)”.

2.11.1.4 Legal restrictions and regulations regarding ground rubber for athletic and recreational surfaces

No specific legal restrictions or regulations were found regarding this activity.

2.11.2 Playground safety surfaces

In order to avoid injuries derived from falls from playground equipment the areas under and surrounding them are covered with surfaces with high shock absorbing properties. The three playground cushioning alternatives involving ground rubber in different forms are (Gray, 2010):

1. Loose fill;
2. Pour-in-place; and,
3. Molded tiles.

2.11.2.1 How to obtain rubber for playground safety surfaces

A range of ground rubber piece sizes is used in each of these playground surfaces. The following describes the main applications.

Loose fill

Manufacturing appropriate sizes for loose fill is controlled by the need to separate and remove virtually all reinforcing wire from the scrap tire to avoid puncture wounds or injury. Heavy bead wire around the rim of a tire is removed by de-beading equipment before tires are processed or by magnets after processing. The material must be free of particles smaller than 20 mesh to minimize dust generation and small particles that cling to skin and clothes like dirt. Residual fluff from reinforcing fabric in tires is sometimes left in the ground rubber; it may improve resiliency, but it may also decrease the flash point of the mixture and allow it to be ignited by vandals more readily (Gray, 2010).

It is simply ground rubber about 1 cm (3/8 inch) in size with virtually all of the reinforcing wire removed. Some loose fill is made from fabric reinforced truck tires or off-road tires to be sure that no wire is present. Also fabric is removed to improve the efficiency and effectiveness of the binder (Gray, 2010).

It is spread under and around playground equipment. The ground rubber loose fill is normally placed over a substrate that freely drains liquids with a wooden border to keep loose fill from spreading away from the playground area. Tires are black, but loose fill can also be colored before it is installed to improve the aesthetic appearance of the playground (Gray, 2010).

Pour in place

Pour-in-place generally use 3 to 10 mm (3/8 to 1/8 inch) ground rubber. Fabric is removed to improve the efficiency and effectiveness of the binder, and the wire must be removed to minimize scrapes and cuts. A layer of colored synthetic rubber, known as EPDM (ethylene propylene-diene monomer rubber) or M-class rubber is commonly added to the ground rubber surface to add color and enhance surface aesthetics (Gray, 2010).

Pour-in-place installations use a polyurethane binder to bond ground rubber or buffing from tire retread operations into a protective surface mat 5 to 10 cm (2 to 4 inches) thick. The ground rubber and polyurethane binder are commonly mixed on site in a portable cement mixer and then trowel into place (Gray, 2010).

A surface layer of colored ethylenepropylene-diene monomer (EPDM) rubber is generally bonded to the ground rubber base to provide distinctive colored surface patterns or pictures. Pour-in-place is normally installed over a hard surface such as asphalt to provide a stable foundation. Installation should be designed and tested to provide fall protection from heights associated with the various equipment at the playground (Gray, 2010).

Molded tiles

Tiles generally use 3 to 10 mm (3/8 to 1/8 inch) ground rubber. Fabric is removed to improve the efficiency and effectiveness of the binder, and the wire must be removed to minimize scrapes and cuts. A layer of colored synthetic rubber, known as EPDM (ethylene propylene-diene monomer rubber) or M-class rubber is commonly added to the ground rubber surface to add color and enhance surface aesthetics (Gray, 2010).

Tiles 3-5, are typically 1/3 to 2/3 m (1 to 2 foot) squares and 5 to 10 cm (2 to 4 inches) thick and are commonly glued to a hard sub-base such as asphalt. Each tile is designed and manufactured to provide a durable surface that meets specific cushioning specifications (Gray, 2010).

2.11.2.2 Benefits obtained from applying rubber for playground safety surfaces

The following benefits were identified:

- Higher fall protection. A 14-cm (6-inch)-thick layer of loose fill generally provides protection for falls from critical heights of about 3 m (10 to 12 feet), about double the height for an equivalent thickness of traditional materials (Gray, 2010).
- Durability. Rubber is flexible, resilient, and durable, properties that make it a good outdoor cushioning material. Some loose-fill playgrounds have been in place for more than 10 years with minimal need to add more ground rubber to replace material lost. The longevity of pour-in-place and tile surfaces is controlled by the effectiveness of the installation, binder, foundation, and usage, but manufacturers typically project a duration of more than 5 years (Gray, 2010).
- Light colors can decrease light absorption and lower the surface temperature in warm weather.

- Accessibility. Accessibility of equipment by children in wheelchairs or on crutches can be an important consideration. Loose fill's excellent cushioning characteristics also make it less stable under point loads such as wheel chairs, but some products have reportedly passed tests that demonstrate accessibility. Pour-in-place and tiles have excellent accessibility, so some playgrounds use them for access pathways and around some of each equipment type to assure access. Loose fill is used in other areas to control cost (Gray, 2010).
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.11.2.3 Issues that may arise from applying rubber for playground safety surfaces

The following issues were detected:

- Flammability. Tire rubber has a flash point of more than 290° Celsius (550° Fahrenheit), higher than dry wood chips, and so is not readily ignitable. Fires have occurred in loose-fill installations, but there were no injuries or environmental damage other than initial smoke (Gray, 2010).
- Latex Sensitivity. A small percentage of people are sensitive to the latex present in some types of rubber. CalRecycle tested for latex sensitivity in styrenebutadiene rubber (SBR) derived from scrap tires as part of its comprehensive review of ground rubber playground surfacing. The testing showed no sensitivity using established testing procedures on SBR and EPDM ground rubber, and no documented cases were found in a literature search (California Integrated Waste Management Board, 2007). Yet it is presented since social rejection may present.

- Toxicity. Toxicity and environmental questions associated with ground rubber have been raised for playground applications as well as for synthetic turf (Gray, 2010). This risk has been thoroughly investigated and results presented in the document "Review of the Human Health & Ecological Safety of Exposure to Recycled Tire Rubber found at Playgrounds and Synthetic Turf Fields. (ChemRisk, Inc., 2008)", where its was concluded that "No adverse human health or ecological health effects are likely to result from these beneficial reuses of tire materials; and while these conclusions are supported by existing studies or screening risk assessments, additional research would provide useful supplemental data regarding the safety of recycled tire products and enhance the weight of evidence used in risk communication (ChemRisk, Inc., 2008)'.
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil. Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

  Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil. In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard. Rubber mulch and ground rubber are derived from tires for this reason on mediums with acidic pH it is not recommended to apply ground rubber for playground safety surfaces.

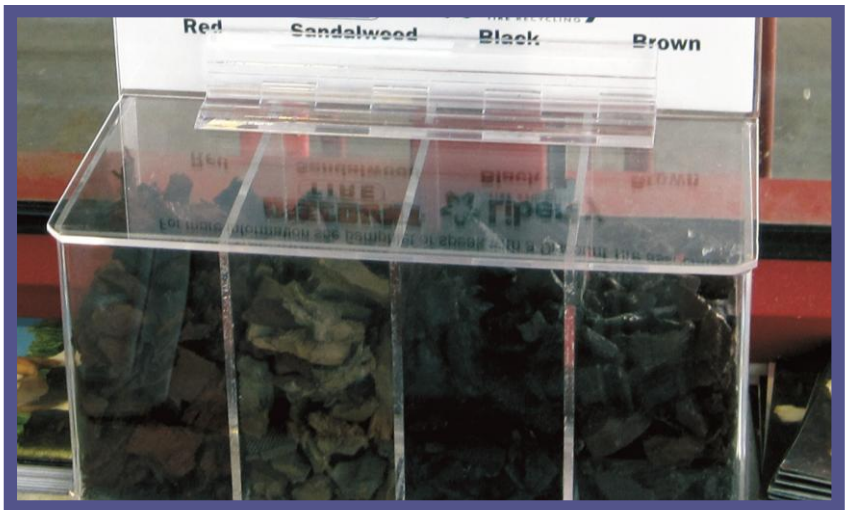
2.11.2.4 Legal restrictions and regulations regarding applying rubber for playground safety surfaces

No specific legal restrictions or regulations were found regarding this activity.

2.12 Rubber mulch

Mulch is any material applied to the garden in order to retain soil humidity and suppress weeds. It also has esthetical purposes. It can be made of leaves, gravel, wood chips and rubber, among other many materials, which normally are locally available.

Image 8.15.
Rubber mulch in wood like colors sold in Texas.



2.12.1 How to make rubber mulch

Today's colored mulch is 1 - 2.5 cm (3/8 to 1 inch) chips made from scrap tires with 99 percent of the reinforcing wire removed. It is manufactured in many pleasing colors to simulate wood chips or to provide coordinating and contrasting colors (Gray, 2010).

2.12.2 Benefits of rubber mulch

The following benefits were identified:

- Control weeds (Gray, 2010),
- Resist mold (Gray, 2010).
- Retain moisture (Gray, 2010),
- Requires infrequent addition (Gray, 2010).
- Does not harbor insects or attract neighborhood animals (Gray, 2010).
- Waste reduction. Reuse of a raw material that was considered a waste.

- It is becoming an established product with increasing representation in major high-volume retailers throughout the United States. If current growth rates continue, colored rubber mulch could become a large, high-value market for small scrap tire chips (Gray, 2010).
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Diminish the environmental impacts of virgin materials extraction and transportation.
- Savings in landfill space.
- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.12.3 Issues that arise from using rubber mulch

The following issues were detected:

- Flammability. Limited tests have shown that colored mulch has an ignition temperature above 290° Celsius (550° Fahrenheit), so flammability is comparable to dry wood chips (Gray, 2010).
- Temperature. Black ground rubber pieces absorb light and can heat up. Although colored mulch does not absorb as much energy thereby reducing the temperature increase (Gray, 2010).
- Zinc Leaching. Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil. Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).
- Zinc concentrations in rubber mulch leachate increase as the pH lowers and temperature increases. Zinc concentrations of rubber mulch leachate may be higher than 20 mg/L (Kanematsua, 2010) which, as a reference, is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996 of Zinc concentrations in water discharges on national water bodies or soil.

In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed 10mg/L (Kanematsua, 2010) the maximum daily authorized average concentrations of Zinc in waste water discharges according to the mentioned standard.

2.12.4 Legal restrictions and regulations regarding rubber mulch

No specific legal restrictions or regulations were found regarding this activity.

2.13 Ground rubber for molded and extruded products

Molded products are created when heated rubber is pressed into a mold or through a die cast to shape it into a new product. Extrusion normally involves using a screw system to mix, heat, and force a raw material through a die to produce a continuous shape (Gray, 2010). This market is very versatile and can create a wide variety of products.

Molded crumb rubber for example can be transformed into items such as pavers, tiles, splash guards, tree rings, curbing, mats, wheels for trash cans, traffic cones, vehicle bumpers, wheels, mud flaps, etc.

Long items such as hoses, weather stripping, tubes, molding, belting, pet toys, car bumpers, gaskets, garden hoses, complex components for medical and electrical equipment, synthetic woods, shingles and other structural materials are made by extrusion processes (Gray, 2010).

Image 8.16.
Mud flaps can be potentially manufactured from ground crumb rubber.

Image 8.17.
Vehicle weather stripping made of extruded rubber.

2.13.1 How to obtain ground rubber for molded and extruded products

Ground rubber specifications for this market segment depend on the process, product, and economics. Desired product characteristics control the size requirements for ground rubber pieces used in these applications (Gray, 2010).

Different producers in the same crumb market (e.g. molded products) may require different crumb sizes to produce their unique products. As a result, it appears to be difficult to generalize particle size requirements in each crumb market (Sunthonpagasit, 2002).

Any residual wire or fiber can accelerate wear, or damage extrusion heads and equipment (Gray, 2010).

Molded Products

There are many variations in molding technology, all using a similar basic process. A primary raw material or mixture is pretreated to allow it to flow into a mold where the material is cured, cooled, and released from the mold to yield a solid designed shape that meets defined specifications.

Pretreatment can involve heat, mixing, and additives to create a semi-viscous homogeneous raw material. Once it has been introduced into the mold, temperature, pressure, and reaction time allow the material to solidify. There are also broad variations in degree of automation, balancing capital and labor costs for a specific operating environment (Gray, 2010).

Larger piece size reduces binder requirements and retains the characteristics of rubber, but the resulting product has less bonding strength and coarser surface texture. Finer particles (10 to 40 mesh) require more binder, with its associated strength, and yield a smoother surface that can approach virgin materials. Wheels and vehicle mud flaps are two examples of products that require such fine particles (Gray, 2010).

Bound Systems

Bound or bonded rubber products generally refer to use of polyurethanes, sulfur, latex, or other ingredients to bond particulate materials into a desired product. This is sometimes done using pressure and temperature to increase density or optimize efficiency. Larger piece size reduces binder requirements and retains the characteristics of rubber, but the resulting product has less bonding strength and coarser surface texture. Playground safety tiles are an example of an appropriate use of about 0.5 cm (¼ inch) rubber (Gray, 2010).

Extrusion

Long items such as hoses, weather stripping, tubes, molding, and belting are commonly made by extrusion processes. There are also many variations of this technology, but it normally involves using a screw system to mix, heat, and force a raw material through a die to produce a continuous shape. This process is sensitive to multiple parameters and requires fine mesh ground rubber (30 to 200 mesh) (Gray, 2010).

2.13.2 Benefits from creating molded and extruded products from ground rubber

The following benefits were identified:

- Low-Cost Raw Material. Ground rubber can be a low-cost raw material with many of the intrinsic performance properties of rubber.
- This market is very versatile and can create a variety of products.
- Waste reduction. Reuse of a raw material that was considered a waste.
- Tire pile mitigation which means a reduction in soil and water pollution.
- Prevent atmospheric, soil and potentially water contamination by eliminating tire piles which could burn.
- Savings in disposal fees.
- Savings in landfill space.
- Diminish the environmental impacts of virgin materials extraction and transportation.

- Green Building certification. Facilities earn more points for the US Green Building Council's LEED® certification program or for any other green building certification standard.

2.13.3 Issues involved in creating molded and extruded products from ground rubber

The following issues were detected:

- Displacement Challenges. Making any new product can involve substantial investment in processing technology, equipment, optimization, product testing, distribution, and marketing. All require time and resources that are often underestimated. Incorporating ground rubber into an existing formulation can pose similar challenges, especially in process optimization and product testing.
- A good understanding of existing products, performance requirements, processing technology, and economics is critical to developing these applications successfully. It typically takes a committed effort over a period of time to be successful (Gray, 2010).
- Any residual wire or fiber can accelerate wear, or damage extrusion heads and equipment (Gray, 2010).
- This technology can be labor intensive in its basic form (Gray, 2010).
- Mixtures. Rubber generally functions as filler in mixtures with plastics. Thermoset rubber and thermoplastics do not naturally bond, resulting in significant changes in the performance characteristics of plastics when rubber is added. Impact resistance normally increases, but other critical properties such as tensile strength and elongation decrease significantly, thereby decreasing the strength of the resulting product (Gray, 2010).

  New tires can contain from 5% to 10% of recycled rubber, if more than that is added the tire will fail (Information provided by Francisco Martha Hernandez, general director of the Mexican rubber industry national chamber in a face to face interview).

  Tire rubber dust can be de-vulcanized at very high cost, it would be over than 3 times more expensive than virgin materials. (Information provided by Francisco Martha Hernandez, general director of the Mexican rubber industry national chamber in a face to face interview).

  Ground rubber for extruded products could also be presented as a separate market since additional equipment is necessary in order to achieve the fine mesh required by these applications (30-200 mesh).

2.13.4 Legal restrictions and regulations regarding creating molded and extruded products from ground rubber

No specific legal restrictions or regulations were found regarding this activity.

3 Market recommendations of tire derived products in Mexico

Each stakeholder should select the market that better suits him/her needs, the purpose of this section is to present the evaluation results in order to aid in the market selection process.

3.1 Tire derived products market prices

The following attachments present information on market prices for the identified tire derived products:

- **Attachment 27.** Estimated and consulted market prices of tire derived products currently supplying the identified markets.
- **Attachment 28.** Daily prices of tire derived products and parts during May 2012.
- **Attachment 29.** Potential revenue per passenger tire equivalent (PTE) for each market and formulas applied to obtain each.
- **Attachment 32,** Scrap tire wire purchase prices in the Mexican side of the Texas-Mexico border region.

3.2 Required investments on equipment

The following attachments present information on equipment necessary to produce each of the identified tire derived products. It is relevant to note that the amounts presented are for equipment only, not including required land, facilities, secondary equipment, production costs, etc:

- **Attachment 30.** Matrix of required equipment per type of product.
- **Attachment 31.** Equipment quotations and pricing sources.

From the identified existing and potential markets the most expensive to access, based only on required investment on equipment, are the following (refer also to **Figure 8.3**):

- Type B tire derived aggregate (TDA) (bulk)
- Type A tire derived aggregate (TDA) (bulk)

- Ground rubber for Rubberized Asphalt (RA) (bulk)
- Ground rubber for Athletic and recreational surfaces (bulk).
- Rubber mulch (bulk).
- Ground rubber for molded and extruded products (bulk).

From the identified existing and potential markets the most accessible ones, based only on required investment on equipment, are the following (refer also to **Figure 8.4**):

- Passenger tire sidewalls (bulk).
- Tire-derived-geo-cylinders, (TDGC).
- Steel belted rubber for rammed-earth encased walls.
- Tire treads (bulk).
- Passenger tire de-beaded passenger sidewalls (bulk).
- Passenger tire sidewalls' bead wire (bulk).
- Cut tire tread tree and landscape edging
- Cut tire tread fencing.

3.3 Recommendations

A) The income per tire of any promoted market should be higher than the amount paid for the steel present in the tire to discourage tire open burning for metal extraction.

One of the main causes of tire fires, as Chapter 4 reports, is tire burning for metal extraction. This, as pointed in Chapter 4, is caused by the need to obtain resources through the sale of the steel wire embedded inside tires.

According to Mr. J Francisco Martha Hernandez, General Director of the Mexican Rubber Industry National Chamber (CNIH) a common radial truck tire posses from 6 to 7 kilograms (13 to 15 pounds) of steel wire in its structure and a passenger tire, as a maximum, posses 1.5 kg (3.3 pounds) of steel per tire.

For example: scrap tire wire bought in Reynosa[13], Tamaulipas, Mexico at a price ranging between $2.6 and $3.2 Mexican pesos per kg[14] ($0.085 and $0.105 USD per pound)[15] with an estimated mean of $2.92 Mexican pesos per kg ($0.096 USD per pound). So the potential income per passenger tire by burning it for metal extraction is $4.38 Mexican pesos per passenger tire ($0.316 USD per passenger tire) in Reynosa.

B) Zinc leaching should be considered an Environmental Issue of Concern (EIC)on some tire derived products

Since the following tire derived applications will be in direct contact with rain water and soil, it was considered relevant to consider this EIC also for them. Tire applications where zinc leaching may occur:

- Tire derived geo cells (TDGC).
- Landscaping edging.
- Tire derived aggregates (TDA) (bulk).
- Ground rubber for rubberized asphalt (RA) (bulk).
- Ground rubber for athletic and recreational surfaces (bulk).
- Rubber mulch (bulk).

IEMS recommends that the Environmental Impact Assessment (EIA) performed for the application of any of the markets mentioned above should consider the impact caused by Zinc leachate from tire rubber when in contact with water. And propose mitigation alternatives to prevent contamination of soil and ground or surface water.

A mitigation alternative envisioned by IEMS is that tire manufacturers should lower zinc content in them.

C) To implement CPR dead tires campaigns, or similar, in the Texas-Mexico scope areas

A CPR dead tires campaign promotes waste tire generators to:

1. **CUT.** Slit passenger waste tires on the shoulder to remove both sidewalls “Cut”.
2. **PACK.** Order and pack the resulting tread cylinders and sidewalls in a way the volume they occupy is minimum “Pack”.

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[13] The prices for Reynosa are used as reference due to the fact that in that municipality the highest price per kilogram of tire wire is paid, for further information refer to **Attachment 32** of this report.

[14] Prices obtained on June 25, 2012 through telephonic quotations with scrap companies located on the municipalities of Reynosa, Nuevo Laredo, Matamoros and Juarez. Exact sources on **Attachment 32.**

[15] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).

3. **RECYCLE.** Recycle themselves or send the packed tire pieces to a recycling facility “Recycle”.

Image 8.18.
English version example of a CPR dead tires campaign advertisement.

Image 8.19.
Spanish version example of a CPR dead tires campaign advertisement.

3.3.1 How to implement a CPR dead tires campaign

The images presented above are only examples to illustrate how a CPR campaign could be promoted by imitating cardiopulmonary resuscitation signs.

In IEMS' opinion each individual community should perform the following based on what it's presented in this document and other sources they consider appropriate:

- Decisions need to be deduced from principles, and principles need to be derived from core values. Only by first establishing the core values of the community of practice, then deriving the principles, and only then developing guidelines, can truly appropriate guidelines emerge.
- Guidelines and principles must be developed in participatory processes, include the people to whom the guidelines are directed. These are the people who ultimately need to develop 'ownership' of the guidelines if they are to be adopted and be utilized. (Vanclay, SIA principles, 2003)

By implementing a CPR dead tires campaign the following benefits could be obtained:

- ✓ Eliminate mosquito breeding areas. Mosquitoes commonly use water accumulated in the inner side of tires' sidewalls to lay their eggs but tires without sidewalls don't accumulate water so mosquitoes can't breed in them.
- ✓ Health benefits. By eliminating mosquitoes breeding sites, their related diseases such as Dengue Fever and West Nile Virus are also fought.
- ✓ Storage space required by waste tires is greatly reduced.
- ✓ Transportation costs are reduced.
- ✓ Disposal fees are reduced.
- ✓ Promoting a Cut-Pack-recycle (CPR) campaign among waste tire generators would make tire derived cylinders (treads) and slit sidewalls available to recyclers, authorities and processors without the need of investing resources such as time, labor and money in sidewall removing activities.

Recommendations on disposal and transportation savings when sidewalls are removed from waste tires will discussed on following Chapters. Packing alternatives for cut tires was discussed previously.

Also by implementing a CPR dead tires campaign recyclers, authorities and processors would have direct and cheap access to:

- Tire derived geo cells for civil engineering projects.
- Steel belted rubber for rammed earth tire walls.
- Slit sidewalls ready for de-beading.
- Packaged tire treads ready for transportation to processing or disposal sites at lower costs than when transporting whole waste tires.

Image 8.20.
Used tire dealership cutting tires' sidewalls in Brownsville, Texas.

4 Markets evaluation

4.1 Legal evaluation

While none of the proposed market alternatives is illegal in Mexico, some alternatives are more heavily regulated and or restricted than others.

A general prohibition throughout the Mexican side of the border is the burning of tires in open air. **Attachment 33** of this report presents laws and regulations regarding the burning of tires in all of the Mexican scope.

It is relevant to note that what is presented is not the legal framework of each market. Only laws, regulations and standards which apply specifically to a tire derived product are encompassed in this evaluation.

Only for the Selling or Installing Rubberized Asphalt (RA) option, specific legal regulations were found, as discussed in the corresponding section. These regulations are focused on ensuring the quality control of the modified asphalt created in part of tire ground rubber.

It should be noted that even if no specific regulations were found, it doesn't mean general regulations and laws don't apply. The purpose of this search was to identify regulations that applied specifically to tire derived products, apart from the general regulations which apply to a traditional application.

For example, the fact that no specific regulation was found regarding the installation of tire derived geo cells (TDGC) in a road sub-base means that the installation should comply with all the legal framework applying to road sub base construction and its specs, but no regulation applies only to TDGC. In other word: TDGC will compete in an equal legal framework with all traditional alternatives for sub base construction.

4.2 Economic evaluation

4.2.1 Market prices per tire

Attachment 27 presents the prices currently paid for each tire derived product identified. Since some of these products are not yet available on the market, the prices presented for these are the ones paid for similar products with which they would compete.

Figure 8.1 displays the potential income per Passenger Tire Equivalent[16] (PTE) received when supplying each of the identified markets enumerated on section 3.

The specific amounts and formulas applied to create this figure are available on **Attachment 29.**

It is relevant to note that the following are considered to use de-beaded tire sidewalls as rubber source[17]:

- Ground rubber for athletic and recreational surfaces.
- Molded and extruded products.

Meaning that an alternative income for the tire treads sale can be obtained depending on the market supplied with them.

Also in the figure, violet bars represent consulted current prices of the tire derived products on existing markets. Gray bars represent estimated prices, based on what similar products, are currently worth in the market.

4.2.2 Required equipment investment per market

In order to supply any of the identified markets reported on chapter 3, waste tires require modifications in order to comply with the demand specific needs. The equipment necessary to perform said modifications greatly varies in size, complexity, required energy input, required investment, labor needs, etc.

[16] Because most tire stockpiles contain mixtures of various tire sizes, density is normally expressed in terms of the passenger tire equivalent (PTE), which is equal to 20 pounds by definition. (US EPA, 2006)

[17] Magnetically separated materials are not acceptable.

The estimated economic investment on equipment to modify waste tires according to current and potential markets demands is presented on **Figure 8.2.**

This figure displays the required investment on equipment, not including the required facilities, labor, energy inputs, secondary equipment, etc. Specific amounts can be consulted on **Attachment 30** of this report, quotations and sources for equipment pricing are presented on **Attachment 31** of this report.

Rubber for extruded products is presented on a separate column in **Figure 8.2** because mesh size required can be as low as 200 mesh, to obtain this mesh size it is required additional equipment which would further elevate the investment required. Since no quotations were obtained for this specific equipment it is only noted that the market which requires the largest investment on equipment is the ground rubber for extruded products.

The section below evaluates in more depth which markets require large investments on equipment to process tires.

4.2.3 Most expensive markets to enter based on equipment required investment

Based on the information presented on **Figure 8.2** it is visible that some markets require larger initial investments on processing equipment than others.

Of the identified existing and potential markets the most expensive to access, based only on required investment on equipment, are the following:

- Type B tire derived aggregate (TDA) (bulk)
- Type A tire derived aggregate (TDA) (bulk)
- Ground rubber for Rubberized Asphalt (RA) (bulk)
- Ground rubber for Athletic and recreational surfaces (bulk).
- Rubber mulch (bulk).
- Ground rubber for molded and extruded products (bulk).

The following graph, **Figure 8.3,** illustrates the investment required by these more expensive markets to access.

Figure 8.3 still shows significant variations on investment required between type B TDA and the other most expensive markets to supply. It also makes evident that for ground rubber markets and type A TDA the investment is over $600,000 US dollars for equipment only.

Figure 8.1.
Potential income per passenger tire equivalent on each market

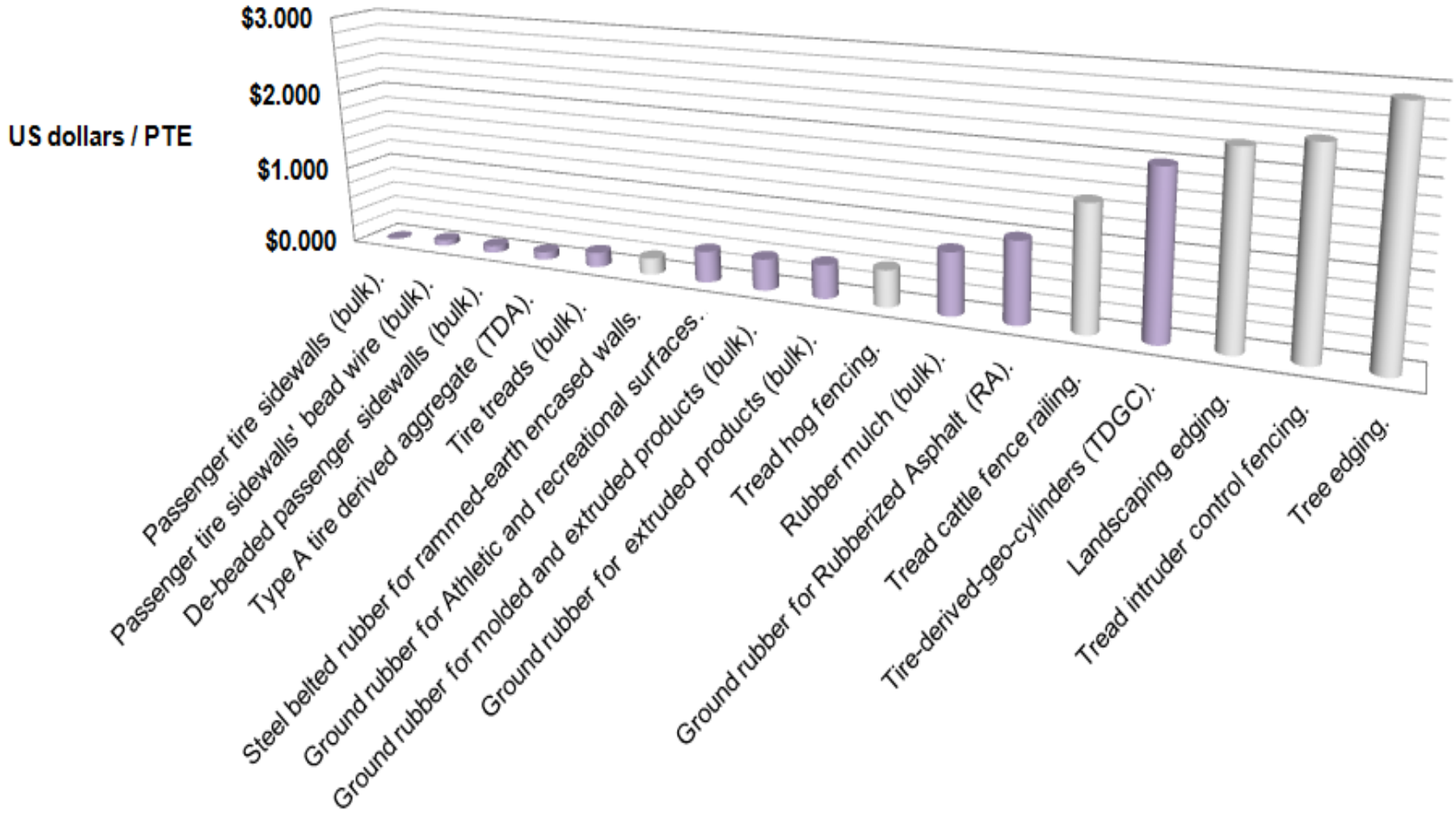
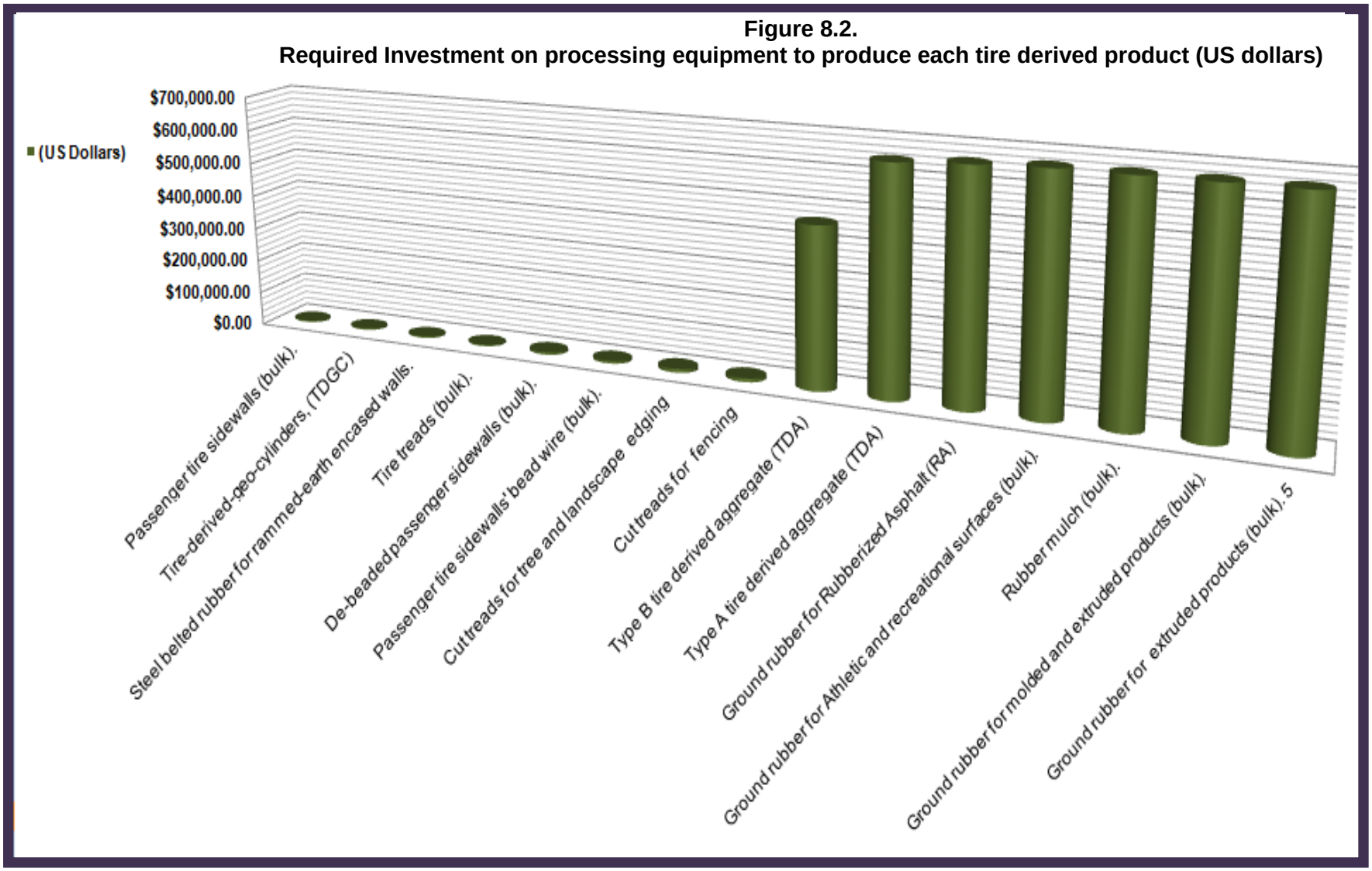


Figure 8.2.
Required Investment on processing equipment to produce each tire derived product (US dollars)



The purpose of this information is for stakeholders to have readily available information on the "buy in" cost in equipment only to supply any of these markets. Data presented only encompasses equipment, not including land, facilities, secondary equipment, etc. Equipment pricing may vary.

The section below evaluates in more depth the markets which require less investment on equipment in order to be supplied with tire derived products.

4.2.4 Most accessible markets based on equipment required investment

From the identified existing and potential markets, the most accessible ones based only on required investment on equipment are the following:

- ✓ Passenger tire sidewalls (bulk).
- ✓ Tire-derived-geo-cylinders, (TDGC).
- ✓ Steel belted rubber for rammed-earth encased walls.
- ✓ Tire treads (bulk).
- ✓ De-beaded passenger sidewalls (bulk).
- ✓ Passenger tire sidewalls' bead wire (bulk).
- ✓ Tire tread tree and landscape edging
- ✓ Tire tread fencing.

Figure 8.4 displays a close up on the required investment on the equipment necessary to supply these more accessible markets.

Based on this, a relevant difference still exists on the required investments on equipment necessary to process waste tires. It is also evident that some markets require the same equipment to produce tire derived products. For example to sell passenger tire sidewalls, treads, TDGC and steel belted rubber for rammed earth tire walls the investment is the same. The same happens with the equipment required to produce de-beaded sidewalls and bead wire, and yet again on the fencing and edging markets.

If we refer to **Attachment 30** of this report we can observe that the investment in these markets is the same because the equipment necessary is the same. The past statement means that with the same investment more than one market can be supplied.

Figure 8.3.
Required Investment on processing equipment for most expensive markets to access (US dollars)

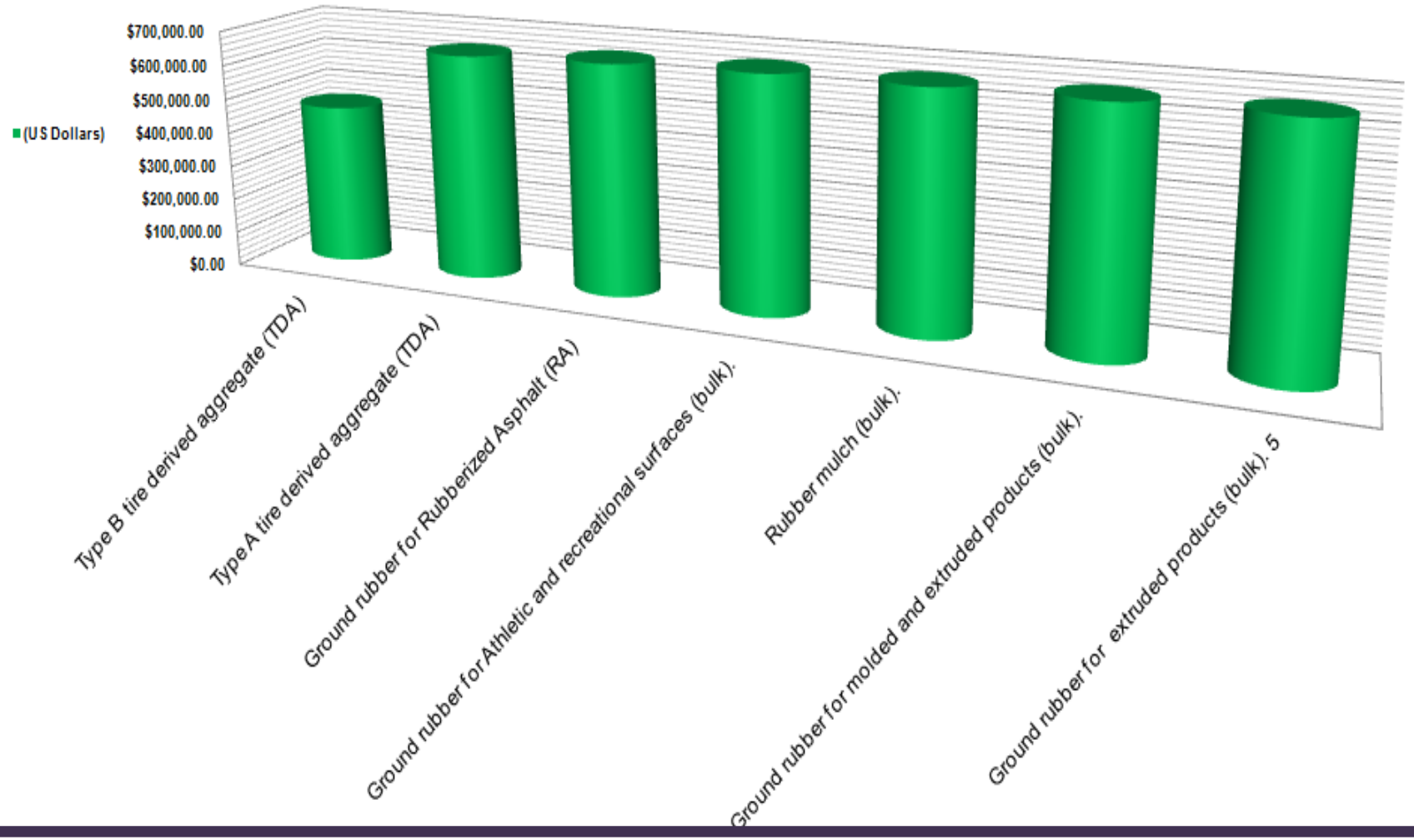
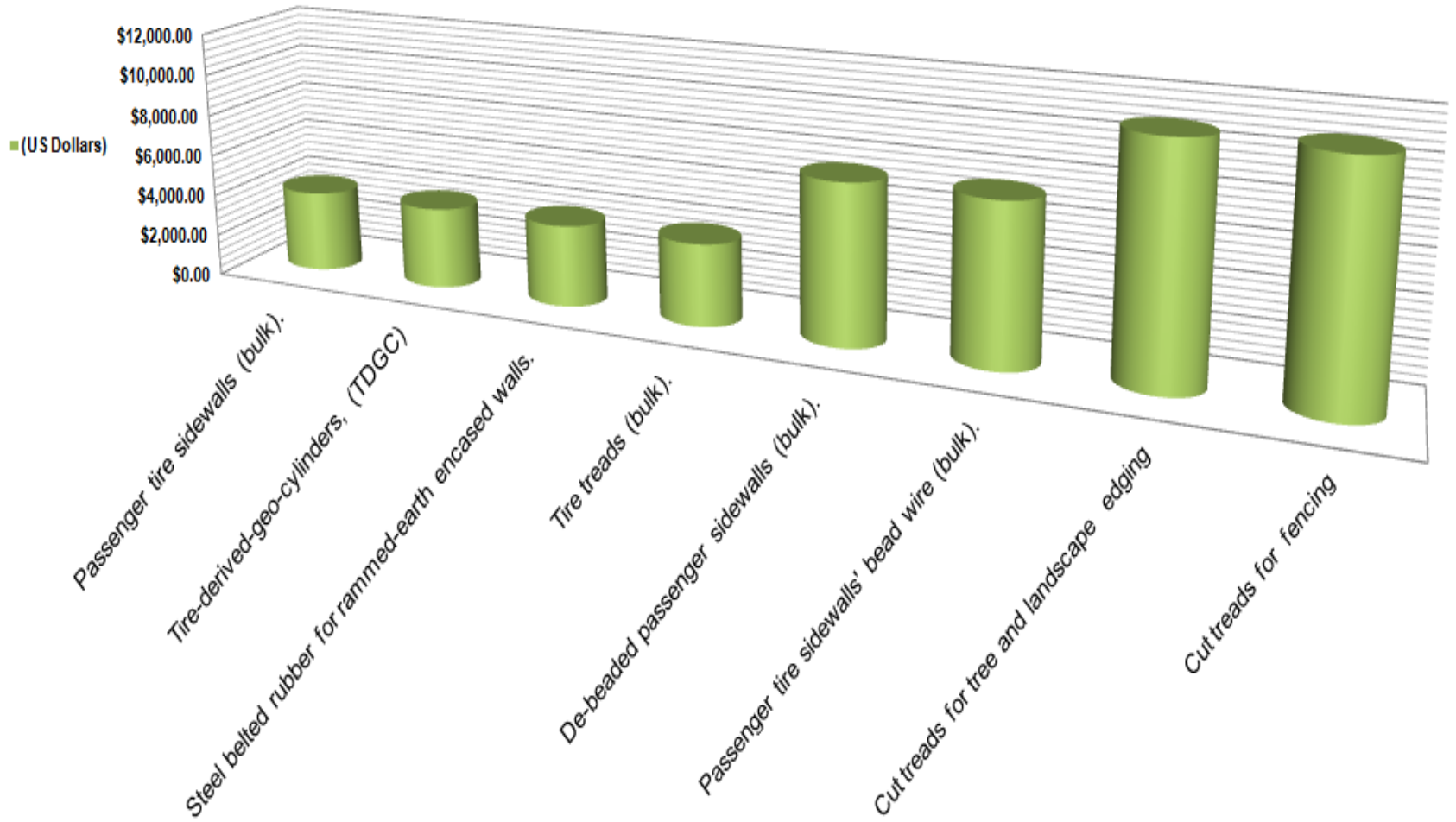


Figure 8.4.
Required Investment on processing equipment for more accessible markets (US dollars)



More accessible equipment investment range from $3,900 USD ($54,011 Mexican pesos)[18] in order to manufacture:

- ✓ Passenger tire sidewalls in bulk.
- ✓ Tire-derived-geo-cylinders, (TDGC).
- ✓ Steel belted rubber for rammed-earth encased walls.
- ✓ Tire treads (bulk).

These markets require only removing the sidewalls of waste tires. Equipment investment to remove passenger tire sidewalls can be lowered to $15.2 USD ($210.5 Mexican pesos)[19] for the purchase of a professional linoleum knife or even lower. Making the markets that only require removing one or both passenger tire sidewalls the most accessible based on required investment on equipment.

To a required equipment investment of $10,950 USD ($151,646.55 Mexican pesos) [20] in order to manufacture cut tire tread for fencing.

Equipment investment amounts are available on **Attachment 30** which also includes a matrix specifying equipment necessary for each market and its specific use. The sources consulted to obtain the prices of equipment are presented on **Attachment 31.**

4.3 Environmental evaluation

Performing environmental impact assessments on each application for each location in the Mexican scope area is not possible since many variables would be unknown. Such as: water bodies, biodiversity in the area, type of soil and its characteristics, climate, processes, etc.

Yet during fieldwork and deskwork activities IEMS identified environmental issues of concern which are presented as follows:

4.3.1 Environmental Issues of Concern (EIC)

Zinc Leaching

Tire rubber contains about 1.5 percent zinc as a vulcanization accelerator within the rubber polymer matrix. Water can gradually leach small amounts of zinc from the chip into the underlying soil.

[18] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).
[19] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).
[20] US dollar prices estimated based on the FIX Exchange value reported by the Bank of Mexico (BANXICO) on June 22, 2012 (13.8490 Mexican pesos/US dollars).

Traces of zinc serve as a micronutrient for many species, but excessive quantities can have a negative impact on some plants and grasses. Leaching is slow and controlled with water flowing through chips on the surface of beds, but it could be accelerated by continuous submersion in water or soil (Gray, 2010).

The following information was obtained from the document "Kanematsua, Masakazu et al. (2010) *Characterization and potential environmental risks of leachate from shredded rubber mulches"*. Davis: National Institutes of Health[21], and is presented textually to illustrate why Zinc leaching is an environmental issue of concern on some of the identified markets.

> *"In order to determine whether shredded rubber mulches (RM) posed water quality risks when used in stormwater best management practices (BMPs) such as bioretention basins, batch leaching tests were conducted to identify and quantify constituents in leachates from RM such as metal ions.*
>
> *The results indicate that aqueous extracts of RM contain high concentrations of zinc (Zn) compared with wood mulches (WM), and its concentration increased at lower pH and higher temperature.*
>
> .
>
> *Leaching of Zn from RM appears to be a potentially larger water quality issue for RM (Kanematsua, 2010)".*

Analysis of EIC

Some zinc concentrations on rubber mulch leachate are higher than 20 mg/L (Kanematsua, 2010), which is the maximum permissible monthly average limit established by Mexican Official Standard NOM-001-SEMARNAT-1996[22] for zinc concentrations in water discharges on national water bodies or soil. Although this regulation does not directly apply to mulch leachate it provides a reference value of how relevant these concentrations are.

In mediums with pH of 5 all rubber mulch leachates at any temperature, ranging from 10°C to 40°C, surpassed zinc concentrations of 10mg/L (Kanematsua, 2010) which is the maximum daily authorized average concentration of zinc in waste water discharges according to the standard.

Although the study of the NHS encompasses rubber mulch on a very conservative approach, since the following tire derived applications will be in direct contact with rain water and soil, it was considered relevant to consider this EIC also for them.

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[21] Published in final edited form as: Chemosphere. 2009 August ; 76(7): 952–958. doi:10.1016/j.chemosphere.2009.04.026.

[22] The federal standard NOM-001-SEMARNAT-1996 establishes the maximum permissible limits of pollutants in waste water discharges in waters or national goods such as soil.

Tire applications where relevant Zinc leaching may occur

- ✓ Tire derived geo cells (TDGC).
- ✓ Landscaping edging.
- ✓ Tire derived aggregates (TDA) (bulk).
- ✓ Ground rubber for rubberized asphalt (RA) (bulk).
- ✓ Ground rubber for athletic and recreational surfaces (bulk).
- ✓ Rubber mulch (bulk).

IEMS strongly suggests that the Environmental Impact Assessment (EIA) performed for the application of any of the markets mentioned above should consider the impact caused by zinc leaching from tire rubber when in contact with water. And propose mitigation alternatives to prevent contamination of soil and ground or surface water bodies.

4.3.2 Greenhouse gas emissions per PTE processed

The greenhouse emissions per PTE were estimated for each processing alternative in order to identify the cleanest options. As a rule of thumb the more energy required to process a product the more pollutant it is unless the energy is obtained from a clean source.

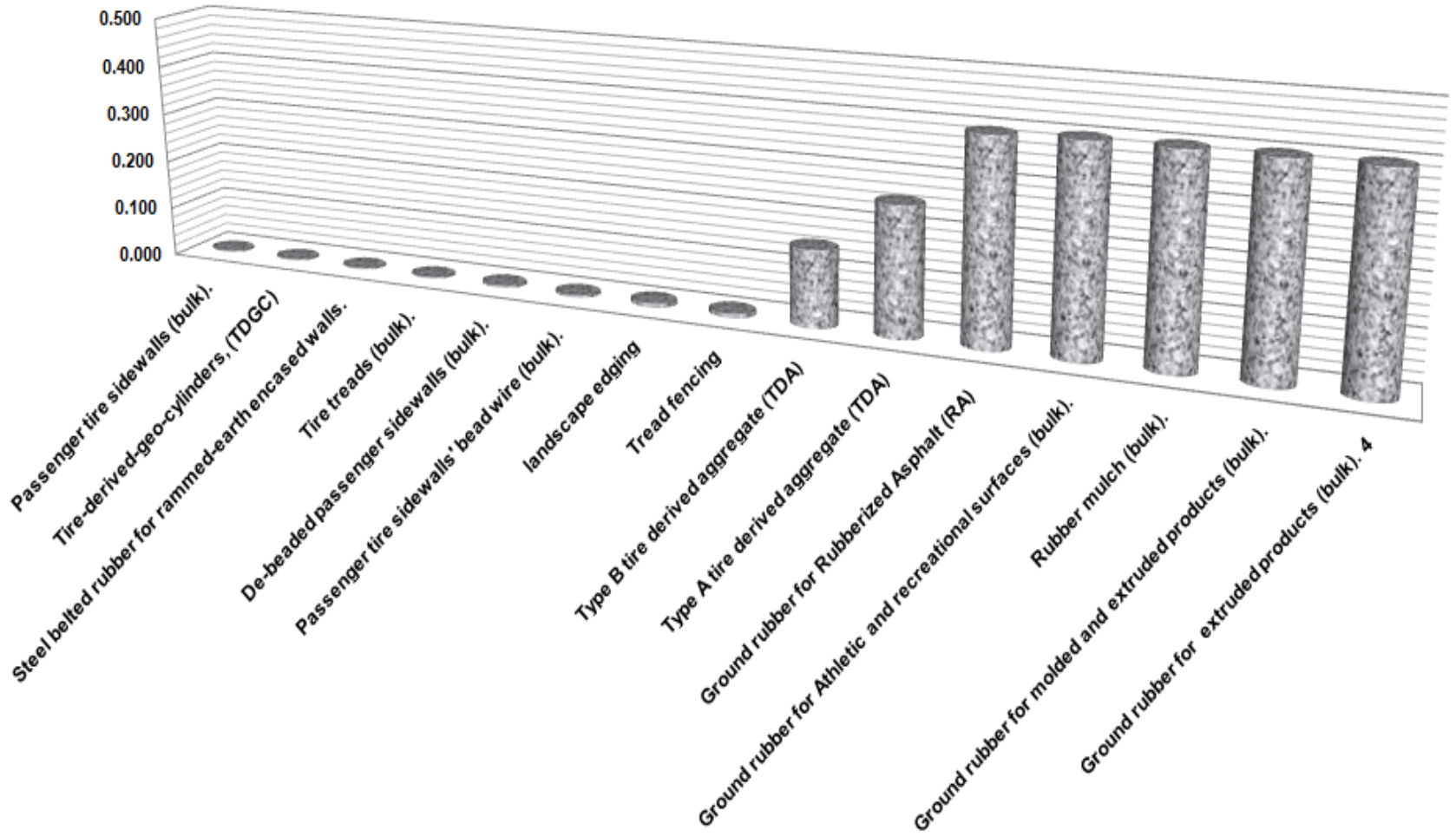
Attachment 41 presents a matrix table which estimates the emissions of equivalent CO_2 in kilograms based on the electrical energy requirements of the equipment required to process a passenger tire equivalent to manufacture each tire derived product. The following figure presents the results in a graphical way.[23]

It is relevant to note that (bulk) sidewalls and treads would be sold to be further grinded and processed so they eventually would present similar emissions to ground rubber products.

Emissions can be further reduced if instead of a sidewall removing machine a knife is employed to manually remove the tires' sidewalls.

[23] Emission factor obtained from the following source (Energetic application technicians and professionals association, ATPAE (Asociación de Técnicos y Profesionistas en Aplicación Energética), 2003)

Figure 8.5.
Greenhouse emissions to process a passenger tire equivalent (Kg of equivalent CO_2/ PTE)



Chapter 9. Waste Tires Appropriate Disposal Alternatives

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1 Methodology

1.1 Identification methodology

In order to identify the appropriate waste tire disposal alternatives in the Texas-Mexico Border Region it was necessary to define what "appropriate" means:

Appropriate disposal alternatives in this study are the ones which, as a base, comply with the legal regulations that apply where the disposal site is located.

1.1.1 Sources consulted

Waste tire disposal stakeholders in both sides of the border were interviewed to gather the required information for this Chapter.

Texas waste tire disposal stakeholders interviewed and information required:

- ✓ Texas Commission on Environmental Quality (TCEQ)
  - Full registry of the Texas authorized whole-used or scrap tire generators, transporters, transportation facilities, recyclers, energy recovery facilities, and other processors, storage and disposal sites. Indication if they have complied with reporting duties or not.[1]
- ✓ Local environmental authorities
  - How are waste tires handled on your city/county?
  - What's the adequate procedure to dispose of waste tires?
  - What proportion of waste tires generated is estimated to be handled in accordance to the proper disposal procedures?[2]
- ✓ Local landfill managers[3]
- ✓ Local waste tire land reclamation projects using tires.

Mexican waste tire disposal stakeholders interviewed and information required:

- ✓ Municipal environmental authorities
  - How are waste tires handled on your municipality?
  - What's the adequate procedure to dispose of waste tires? What proportion of waste tires is estimated to be handled in this way?[4]

[1] Question number 1 directed to the Texas Commission on Environmental Quality (TCEQ) presented on the attachment 3 of the report.
[2] Questions 2, 4 and 9 of the Environmental authorities' questionnaire guide presented on the attachment 3 of the report.
[3] Landfill managers proposed questionnaire is presented on attachment 3 of the report.

- ✓ Municipal local landfill representatives both public and private[5]
- ✓ Cement companies located in the Mexican states on the Texas-Mexico border.

1.2 Description of identified alternatives

The results of the search previously described are briefly described, emphasizing on what the disposal alternative consists and its legal status (legal or illegal) is defined. This in order to allow the reader to understand each alternative and to deem if it would be considered appropriate for the purposes of this study. When available, sites location is also presented.

At the summary of the description section the appropriate disposal alternatives are clearly defined for each scope border region.

Sources consulted for this section include the following:

- ✓ Fieldwork obtained data.
- ✓ Deskwork obtained data.
- ✓ United States Environmental Protection Agency
- ✓ Texas Commission on Environmental Quality
- ✓ Official Mexican Standard NOM-083-SEMARNAT-2003.
- ✓ Scrap Tires in Ciudad Juarez and El Paso: Ranking the Risks (Blackman & Palma, 2002).
- ✓ Handbook of solid waste management
- ✓ (Tchobanoglous & Kreith, 2002).
- ✓ California Integrated Waste Management Board.
- ✓ Kansas Department of Health and Environment.
- ✓ New Mexico Administrative Code
- ✓ Open pit mining and its environmental impacts (AECO-AT, 2001).
- ✓ Texas Department of Transportation
- ✓ World Coal Association
- ✓ Rubber Manufacturers Association
- ✓ Texas Natural Resource Conservation Commission.
- ✓ Railroad Commission of Texas
- ✓ Mexican Geologic Service
- ✓ Mexican Economy Ministry
- ✓ Coal mining and its geographical-economical impact in the mid west and northwest of Coahuila, Mexico (Sánchez Salazar, 1995).

[4] Questions 2 and 8 of the questionnaire for municipal ecology representatives (*Cuestionario detallado para autoridades municipales*) presented on attachment 2 of the report.
[5] The questionnaire applied to landfill representatives (Cuestionario detallado para representantes de sitios de disposición final) is presented on attachment 2 of the report.

1.3 Recommendations

Recommendations are the conclusions to which IEMS arrived after the evaluation of the appropriate disposal alternatives identified during research.

To provide recommendations regarding appropriate tire disposal alternatives in the Texas-Mexico border region as well as on the status of current levels and activities of sustainability of waste and used tires as it relates to the Texas-Mexico border region, IEMS analyzed the social, environmental and economic evaluations, providing conclusions based on data collected in from them.

1.4 Evaluation methodology

In order to make recommendations regarding appropriate tire disposal alternatives, the identified alternatives social, environmental and economic impacts were assessed and compared.

By analyzing each alternative under this triple bottom line approach (social-environmental-economic) IEMS intends to shed some light and make recommendations on the status of current levels and activities of sustainability of waste and used tires as it relates to the Texas-Mexico Border Region.

1.4.1 Alternatives evaluated

Texas' border region tire disposal alternatives evaluated:

Appropriate disposal sites in the Texas border area are:

- ✓ Land reclamation projects using tires (LRPUT).
- ✓ Landfills.

Mexico's border area evaluated alternatives:

Appropriate disposal sites in the Texas border area encompassed were:

- ✓ Landfills
- ✓ Tire derived fuel in cement kilns (TDF)

Although there is no kilns using TDF process located within the Texas-Mexico border area, kilns using this process located in border scope Mexican states were evaluated as an alternative for waste tire disposal in the Mexican side of the border.

1.4.2 Social and environmental evaluations methodology

A list of positive and negative social and environmental impacts is presented for each alternative. For every negative impact, mitigation recommendations are also presented.

Impact sources were obtained from:

- ✓ Previous publications and study's regarding the alternatives evaluated.
- ✓ IEMS professional experience and criteria.

1.4.2.1 Social evaluation description

A "Social Impact Assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative, of ***planned interventions*** *(policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment."* (Vanclay, 2003)

It is IEMS point of view that the ***planned intervention*** regarding this Task is the***:***

- ✓ The massive disposal of waste tires accumulated and generated in the Texas-Mexico border region.

Disposal meaning getting rid of waste tires without receiving an economical compensation.

Objective of the social evaluation

Assist the Texas-Mexico border area communities and other stakeholders in identifying waste tire disposal alternatives which ensure that positive outcomes are maximized, rather than only minimizing harm from negative impacts.

In other words; "by identifying impacts in advance:

1. Better decisions can be made about which interventions should proceed and how they should proceed; and
2. Mitigation measures can be implemented to minimize the harm and maximize the benefits from a specific planned intervention or related activity." (Vanclay, 2003)

Scope of the social evaluation

According to the social impact assessment international principles published by the *International Association for Impact Assessment,* (Vanclay, 2003); a convenient way of conceptualizing social impacts is as changes to one or more of the following:

- ✓ **People's way of life** – that is, how they live, work, play and interact with one another on a day-to-day basis;
- ✓ **Their culture** – that is, their shared beliefs, customs, values and language or dialect;
- ✓ **Their community** – its cohesion, stability, character, services and facilities;
- ✓ **Their political systems** – the extent to which people are able to participate in decisions that affect their lives, the level of democratization that is taking place, and the resources provided for this purpose;
- ✓ **Their environment** – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
- ✓ **Their health and wellbeing** – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;
- ✓ **Their personal and property rights** – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;
- ✓ **Their fears and aspirations** – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.

The purpose of presenting the scope and characteristics is to inform stakeholders on subjects that require identification prior to making a decision regarding waste tire disposal in the Texas-Mexico border region. No social evaluation is presented in this document.

1.4.2.2 Environmental evaluation description

In order to identify environmental impacts related to each identified disposal alternative previous studies and environmental impacts assessments publicly available were consulted. No conclusion is presented for each evaluation instead impacts and, when available on the sources, mitigation strategies are presented. The purpose of presenting in said way the impacts is to allow stakeholders arrive to their own conclusion on whether a disposal alternative is acceptable to him or not.

An *"Environmental Impact Assessment* can be defined as:

The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. (International Association for Impact Assessment, 1999)

Objectives of an environmental evaluation

The objective of the environmental evaluation in this study is to aid in the examination of the tire disposal alternatives in the Texas-Mexico border region in order for stakeholders to establish the preferred or most environmentally sound and benign option.

Additionally in compliance with the Principles of environmental impact assessment best practices (International Association for Impact Assessment, 1999), the general objectives are:

1. To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process regarding tire disposal alternatives in the Texas-Mexico border region.

2. To anticipate and avoid, minimize or offset the adverse significant biophysical, social and other relevant effects of recommended alternatives.

3. To protect the productivity and capacity of natural systems and the ecological processes which maintain their functions; and

4. To promote development that is sustainable and optimizes resource use and management opportunities.

1.4.3 Economic evaluation

Evaluating proper disposal alternatives for the Texas-Mexico border area as a whole represents a challenge due to the size of the area comprised. Economic variables depend greatly on the distance between the waste tire generation and/or accumulation site and the proper disposal site. The longer the transportation haul the more expensive it is to transport waste tires.

Another variable economically affecting disposal costs is the fee charged by disposal or processing facilities.

In summary the economic evaluation considers :

- ✓ Transportation costs
- ✓ disposal fees

1.4.3.1 Transportation costs

Common transportation options

In order to aid stakeholders in choosing and planning a transportation strategy a cost per tire per mile evaluation was made considering the following commonly used vehicles[6]:

- ✓ Pickup trucks.
- ✓ Pickup truck with trailer.
- ✓ Box truck.
- ✓ Tractor with 48 foot trailer.

The evaluation considers variables such as transporting whole tires and cut tires and compares the overall efficiency difference between each option and variable.

Transportation costs in Texas

Transportation costs in Texas were estimated based on the methodology employed in the following publication:

- ✓ Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (EPA, 2010)

Assumptions made in order to estimate transportation costs in Texas are:

1. Waste tires are accumulated in a collection point in a town or area and then hauled in larger vehicles to regional processing facilities or markets.

2. Regulations and roads connecting accumulation points and disposal sites allow the circulation of tractor trailers.

3. The vehicle is full during the trip.

4. Cut tires maximum load (cut tires per load) depends on the vehicle maximum payload rather than volume.

The only transportation alternative considered for Texas total disposal costs calculations was:

- ✓ 48 foot trailer.

Transportation costs per tire per mile, whole and cut, in Texas are presented in **Attachment 42** of this report.

[6] As reported in the Scrap Tires: Handbook on Recycling Applications and Management for U.S. and Mexico (EPA, 2010)

Note: transportation costs for a pickup truck, a pickup with a cage trailer and box truck are also presented on **Attachment 42** for illustrative and reference purposes.

Transportation costs in Mexico

Transportation costs in Mexico were obtained through quotations from trucking and rail companies. Equipment alternatives considered are:

- ✓ 53 foot trailers.
- ✓ 50 foot train wagons.
- ✓ 60 foot train wagons.

Quotations obtained correspond to routes connecting the scope's larger cities to nearby Mexican cities where cement kilns are located. Contrary to the Texas strategy of local disposal, the strategy for the Mexican side contemplates disposal in cities further south due to the lack of appropriate processing facilities or burial sites other than landfills.

For security reasons IEMS recommends employing routes considered safer by trucking companies with experience in each area.

Train transportation in Mexico

In Mexico rail transportation is limited by the number of companies providing the service as well as by installed routes. Only two rail companies provide transportation services in the Mexican side of the Texas-Mexico border.

The Mexican scope cities in the states of Coahuila and Chihuahua are exclusively served by the rail company *Ferrocarril mexicano S.A. de C.V.* (FERROMEX). The scope cities in the states of Nuevo Leon and Tamaulipas are only serviced by the rail company *Kansas City Southern de Mexico* (KCSM).

Quotations from these companies were obtained in order to identify potential rail routes from Mexican scope cities to appropriate disposal locations far from them and shed some light on their costs.

Using the wagons maximum payload the estimated number of whole and cut passenger tire equivalents (PTE) per trip and afterwards the disposal costs per tire were estimated.

1.4.3.2 Disposal fees

Disposal fees evaluated are the ones obtained from cement companies, public and private landfills and land reclamation projects using tires (LRPUT). Said prices were obtained either during fieldwork and desktop interviews or phone price requests. IEMS doesn't warranty the disposal fees reported will be valid through time since they are reported to change at discretion of the interviewed sites and companies.

Note: interview and pricing requests were continuously sent to the private disposal company Promotora Ambiental S.A. de C.V. (PASA) yet no response was obtained, reason for which disposal fees on PASA's landfills will be considered to be the same as the fees paid by Piedras Negras municipality for their waste tires disposal on a landfill managed by PASA and located on said municipality.

2 Identified disposal alternatives

Appropriate tire disposal alternatives identified in the Texas-Mexico border region and the ones developed by IEMS are the following:

1. Landfill, shred or cut waste tires.[7]
2. Burial of whole, shred or cut waste tires in Land Reclamation Projects Using Tires (LRPUT).
3. Burning, shred, cut or whole, waste tires as tire derived fuel in cement kilns.(TDF)
4. Reclamation of depleted open pit coal mines.

Options 1 and 2 are applied in the U.S. side of the border while only 1 and 3 are applied in the Mexican side of the border.

Option 4 was developed by IEMS' team of engineers and is not yet applied in any side of the border.

2.1 Landfill shred or cut waste tires

Landfills are engineered areas where waste is placed into the land. Landfills usually have liner systems and other safeguards to prevent polluting the groundwater. (U.S. Environmental protection agency, 2012)

[7] Land filling whole tires was not considered an appropriate disposal alternative since they tend to trap air and float towards the surface as was reported by Stephen Geiss, city of Laredo solid waste services manager, interviewed on August 30, 2011 who stated: "If a tire is not shredded it will float, pop out in the landfill" because air is trapped in the tire sidewalls.

Modern landfills are well-engineered facilities that are located, designed, operated, and monitored to ensure compliance with federal regulations. Solid waste landfills must be designed to protect the environment from contaminants which may be present in the solid waste stream. (U.S. Environmental Protection Agency, 2012)

Only split, quartered, or shredded tires may be disposed of in a landfill. Storage or processing activities must be specified in a landfill's permit and scrap management registration is required (Texas Commission on Environmental Quality, TCEQ, 2012)

According to Mexican remote interviews private landfills in Mexico also receive waste tires. They are previously shredded in order to prevent them from floating into the surface.

Image 9.1.
Hogzilla® shredder employed in the Brownsville Municipal Solid Waste Landfill to destroy waste tires

Image 9.2.
City of Laredo Sanitary Landfill

Landfills in the Texas side of the border area are classified, according to the type of waste they may receive, as follows: (TCEQ, 2011)

Type I landfills.- are authorized to accept municipal solid wastes.

Type IV landfills.- are normally more limited in that they may only accept brush, construction and demolition debris, and other waste that will not putrefy.

An additional designation "AE" in the landfill type indicates an "arid exempt" facility. AE landfills normally are limited in the amount of waste they are authorized to accept.

Waste tires are considered by Mexican legislation as a special handling waste. The federal standard NOM-083-SEMARNAT-2003 dictates the environmental protection specifications for the selection, design, construction, operation, monitoring, closure and complementary works of an urban solid waste and special handling waste disposal sites.

Said standard classifies final disposal sites (landfills) based on the amount of daily waste entering to them, in metric tons (tonnes), as the following table displays:

Table 9.1.
Final disposal sites categories

Type	Tonnes / Day
A	More than 100
B	From 50 to100
C	From 10 to less than 50
D	Less than10

Every final disposal site in Mexico must have a natural geologic barrier or an equivalent with a width of 1 meter (3.3 feet) and a hydraulic conductivity of at least $1X10^{-7}$ cm/ sec ($3.9\ X10^{-8}$ in/sec) over the area destined to the establishment of the final disposal cells; or also, to warranty it with an equivalent waterproofing system (NOM-083-SEMARNAT-2003).

2.1.1.1 Disposal of cut or shred tires in landfills.

Tires present unique and challenging disposal problems because of their size, shape, and physical and chemical properties. Landfill of whole tires consumes a large volume of landfill space because the tires are relatively incompressible and 75 percent of the space a tire occupies is empty. In addition, they tend to trap gases and rise to the top of landfills after being buried. As a result, laws in both Mexico and the United States prohibit landfill tires along with other types of waste (Blackman & Palma, 2002).

In the United States of America the tire management laws in most states do not ban disposal outright. In all, 38 states have bans, however, of those states with tire bans, some states allow disposal if the tires have been shredded, chipped, or halved. To keep track of who is collecting and transporting tires some states also have put permitting or registration requirements into legislation (Tchobanoglous & Kreith, Handbook of solid waste management, 2002). Along the Mexican boundary, solid waste disposal sites began accepting waste tires that had the sidewalls removed. There, the tires are buried in the landfill. Waste tires that have been shredded or cut into three pieces also are allowed to dispose in the landfills (California Integrated Waste Managment Board, 2009).

Private landfills in the Mexican side of the border, such as the Piedras Negras PASA facility, posses an exclusive cell for shredded of cut waste tire final disposal.[8]

In theory all sanitary landfills which comply with federal legislation in Mexico are able to receive cut or shred waste tires.

Cutting process description

Cutting the sidewalls out of waste passenger tires, and also making at least one cut across the tread for larger tires are the ways in which a tire must be processed prior to disposal at a landfill since these methods of processing reduce the volume of the tire by at least 50% and prevent the tire from retaining water (Kansas Department of Health and Environment, 2011).

Image 9.3.
Worker removing waste tires sidewalls

[8] Data provided by Piedras Negras , Coahuila, Mexico urban Image and Ecology authorities through a remote interview.

2.2 Land reclamation projects using tires (LRPUT)

LRPUTs are projects to fill, rehabilitate, improve, or restore already excavated, deteriorated, or disturbed land, using no more than 50 percent by volume of tire pieces along with inert fill materials, to restore the land to its approximate natural grade and to prepare or reclaim the land for reuse. In Texas all tires used to fill land must be split, quartered, or shredded. Whole tires cannot be placed belowground. Completed projects must be covered with 18 inches (0.46 meters) of clean soil. (Texas Commission on Environmental Quality, TCEQ, 2012)

Image 9.4.
Land Reclamation Project Using Tires in El Paso, Texas.

In the state of New Mexico, USA, land reclamation projects are not required to cut or shred waste tires in order to bury them as it is stated in the New Mexico Administrative Code (NMAC) 20.9.20 and specifically in 20.9.20.43.[9]

Mexican legislation doesn't contemplate the use of special handling wastes such as tires as filling material in abandoned open pit mines. The only allowed disposal alternative are sites which comply with standard NOM-083-SEMARNAT-2003.

[9] Operating requirements for civil engineering applications using scrap tires for land reclamation.

2.3 Tire derived fuel (TDF) in cement kilns

Calcinations of raw materials to manufacture clinker (a fundamental element in the production of cement) which takes place inside of kilns, is the core of the process within the cement plants; which requires a large amount of energy, supplied by fuel, which is injected into the kilns, and represents the bigger cost in the manufacture of cement. High temperatures in kilns and long residence times inherent to the cement manufacturing process, represent an high potential for the destruction of organic compounds, which enables the use of a wide variety of fuels, by-products of other industrial processes or derived from wastes, both solid (waste tires, wood, paper, cardboard, plastic, urban and industrial sludge, etc.) and liquids (solvents, used oils, distillation waste, etc.). This is why; cement plants meet the necessary conditions to carry out a clean burning of tires and taking advantage of its high caloric content instead of petroleum or coal.

Image 9.5.
Holcim Apasco cement kiln in the city of Ramos Arizpe, Coahuila, Mexico.

The company Ecoltec S.A. de C.V. supplies waste tires for TDF applications in this plant.

The chemical characteristics of any energy resource affect its technical and environmental performance. Tires are a hydrocarbon-based material derived from oil and natural gas. Tires have a heat content of 14,000 to 15,500 BTU/pound (7,800 to 8,600 kcal/ kg), depending on the type of tire and the amount of reinforcing wire that has been removed. By comparison, another solid fuel commonly displaced by use of tires as an energy resource is coal that typically contains 10,000 to 13,000 Btu/pound (5,550 to 7,200 kcal/kg) (EPA, 2010)

The technology for introducing and using whole and shredded tires in virtually all types of cement kilns has been proven over many years of operation in many facilities. Cement kilns have provided a constructive and inexpensive use for stockpiled tires in the United States, Canada, Mexico and many other countries. In fact, cement kilns are already using tires removed from stockpiles in the border areas of Mexico, such as Juarez during stockpile abatement. Also tires are shredded and transported to kilns in other cities.

No cement kilns are installed in the Texas side of the scope border area, only one kiln is located in the Mexican side of said border in the city of Ciudad Juarez, Chihuahua; which has no facilities for the use of tires as TDF. The General Law for the Prevention and Integral Management of Waste *(Ley General para la Prevencion y Gestion Integral de Residuos, LGPGIR)* promotes waste valorization, which encompasses the principle and group of associated actions whose objective is the recovery of the remaining value or caloric power of the materials which make up wastes, through their incorporation in productive processes, under shared responsibility criteria, integral management and environmental, technologic and economic efficiency.

Figure 9.1 and **Figure 9.2** present the location of cement kilns in Texas and Mexico.

Figure 9.1.
Cement kilns using tires in Texas location map

(EPA, 2010)

Figure 9.2.
Cement kilns in Mexico location map

(EPA, 2010)

2.4 Reclamation of depleted open pit coal mines.

Open pit mining is an industrial activity of high environmental, social and cultural impact. It is an inherently unsustainable industrial activity.

Technical innovations that have experienced mining from the second half of the XX century have radically changed the activity, so that it has gone from the exploitation of underground mines of high quality to exploitation in open pit mines of lower quality minerals in larger deposit areas. Open pit mining removes the surface layer or overload the soil to make accessible the extensive deposits and low quality ores. It is profitable because it is less expensive than an underground mine (AECO-AT, 2001).

Coal, like all other sources of energy, has a number of environmental impacts, from both coal mining and coal use. According to World Coal Association, coal mining raises a number of environmental challenges, including soil erosion, dust, noise and water pollution, and impacts on local biodiversity.

Image 9.6.
Active open pit coal mine in Coahuila, Mexico.

The coal ore (darker soil) is exploited after removing the soil overload (light colored soil)

Image 9.7.
Unrehabilitated inactive coal mine in Coahuila, Mexico.

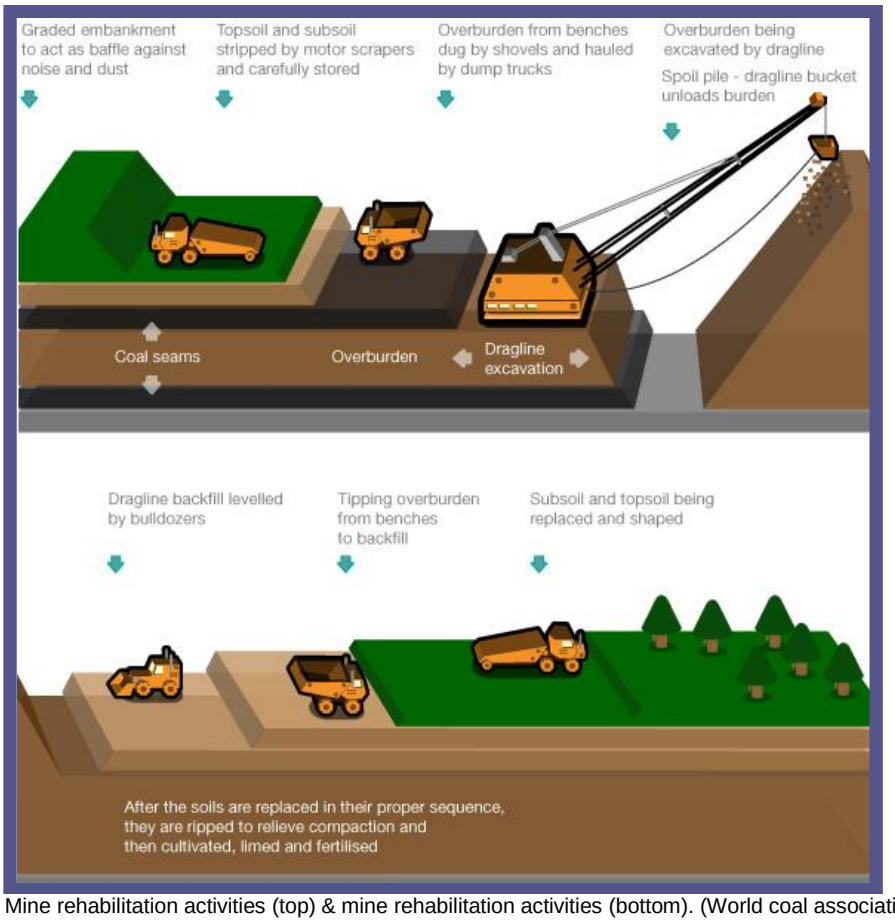
2.4.1 IEMS's Land reclamation proposal in open pit mines

In land reclamation projects using tires (LRPUT), tires are used as a fill material on land that has been mined or subjected to significant erosion and is in the process of being restored (reclaimed). Tires are used to level out the contour of the land before the land is covered with soil and reseeded. In 2007, about 70.8 thousand tons of scrap tires were used in reclamation projects in the United States. Reclamation projects were reported in four states: Arkansas, Nebraska, New Mexico and Texas, being the later one that has the more relative usage of scrap tires in land reclamation projects (87.8 %) (TCEQ & TxDOT, 2004).

Land reclamation is commonly used in the United States; the second largest use category for scrap tires in Texas is Land Reclamation Projects Using Tires (LRPUT). Shredded scrap tires have routinely been used as fill material in civil engineering and reclamation projects for a number of years (Rubber Manufacturers Association, 2009)

As a reference: in areas that have been strip mined or mined for sand and gravel, a 50:50 mixture of tire pieces and soil is usually used as fill material to reclaim the mined area (TCEQ & TxDOT, 2004).

Figure 9.3.
Diagram of surface coal mining operations and mine rehabilitation activities

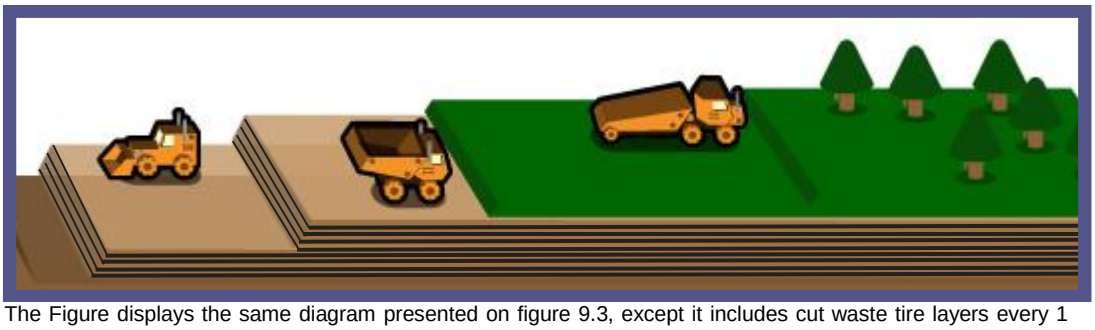


Mine rehabilitation activities (top) & mine rehabilitation activities (bottom). (World coal association)

The mine reclamation process proposed by IEMS consist in the use of a cut tires layer less than 1 meter thick followed by a soil layer with 1 meter thick and then repeated. Since the mineral coal extracted in Coahuila has 69-86% of carbon, it is feasible to refill open pit mines with waste tires, whose composition has 85% of total carbon approximately (TNRCC, 1999), practically replacing the coal extracted with a similar carbon source.

Since carbon mines are to be reclaimed at the end of their life, the reclamation equipment and machinery could very well be used for the burial of already cut or shredded tires. This assuming tires disposed by generators are cut or shredded before being sent for disposal. The **Figure 9.4** displays a diagram of the proposed reclamation technique using tires.

Figure 9.4.
Mine rehabilitation including cut waste tire layers



The Figure displays the same diagram presented on figure 9.3, except it includes cut waste tire layers every 1 meter (3.3 ft) inserted by IEMS.

To determinate layers thickness, IEMS proposes to apply the *Design Guidelines to Minimize Internal Heating of Tire Shred Fills* published by the EPA on the Scrap Tires: Handbook on Recycling Applications and Management for U.S. and Mexico (EPA, 2010) . According to this report, although there have been no projects with tire layers less than 4 meters (13.1 feet) that have experienced a catastrophic heating reaction, to be conservative, tire layers greater than 3 meters (9.8 feet) thick are not recommended. Additionally no design features are required to minimize heating of tires layer less than 1 meter thick.

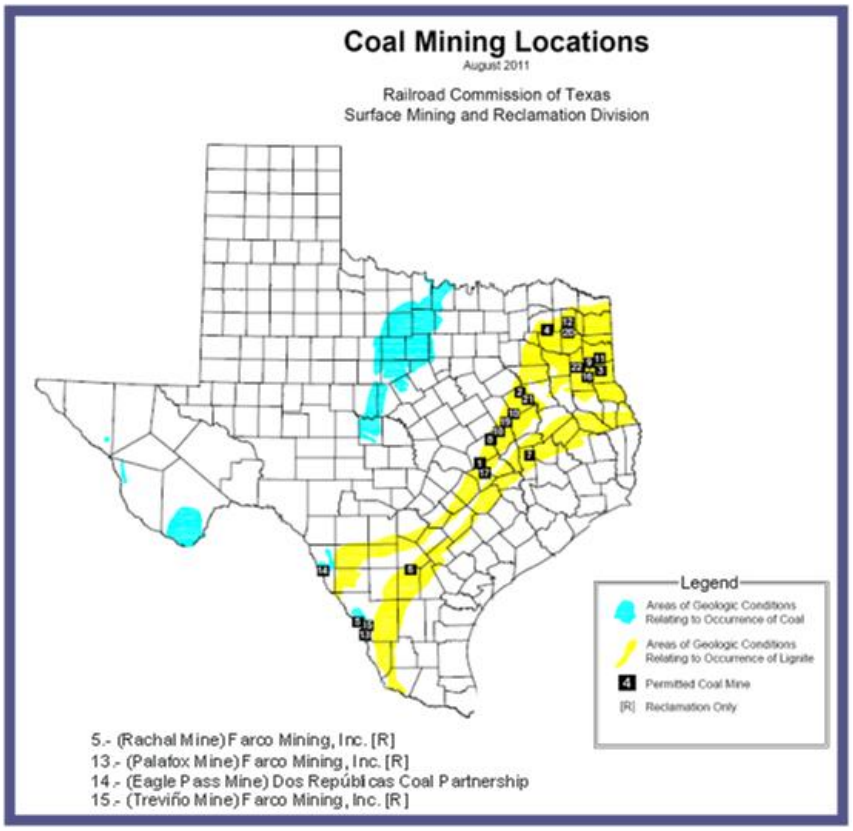
It also recommends that tires are contaminant-free such as oil, grease, gasoline, diesel fuel, etc., that could create a fire hazard or leachate. In any case the cut tires shall not contain the remains of tires that have been subjected to a fire because the heat of a fire may liberate liquid petroleum products from the tire that could create a fire hazard or leachate when the tires are placed in a fill.

For every cubic meter of volume to be reclaimed 28 passenger tires could be disposed of. Considering millions of cubic meters of coal are extracted from the mines, a large disposal volume potential is available. **Attachment 43** of this report presents estimated number of car tires to be buried per reclaimed cubic meter of mine space in a 50:50 mixture with soil.

2.4.1.1 Coal mining in the Texas border with Mexico

Currently four coal mines are located in the Texas side of the scope area. Three of them, located in Webb county, were still in reclamation process on August 2011 which presents a waste tire disposal opportunity for Texas border cities nearby. **Figure 9.5** displays the coal mining locations in Texas.

Figure 9.5.
Permitted coal mines in Texas.



Mines 5, 13 and 15 are currently on reclamation works. Mine 14 is active (Railroad Commission of Texas, 2011).

The currently active Eagle Pass mine could be an appropriate tire disposal site once it begins reclamation works for Del Rio and Eagle Pass cities which currently only posses a type 1 landfill for local waste tire disposal.

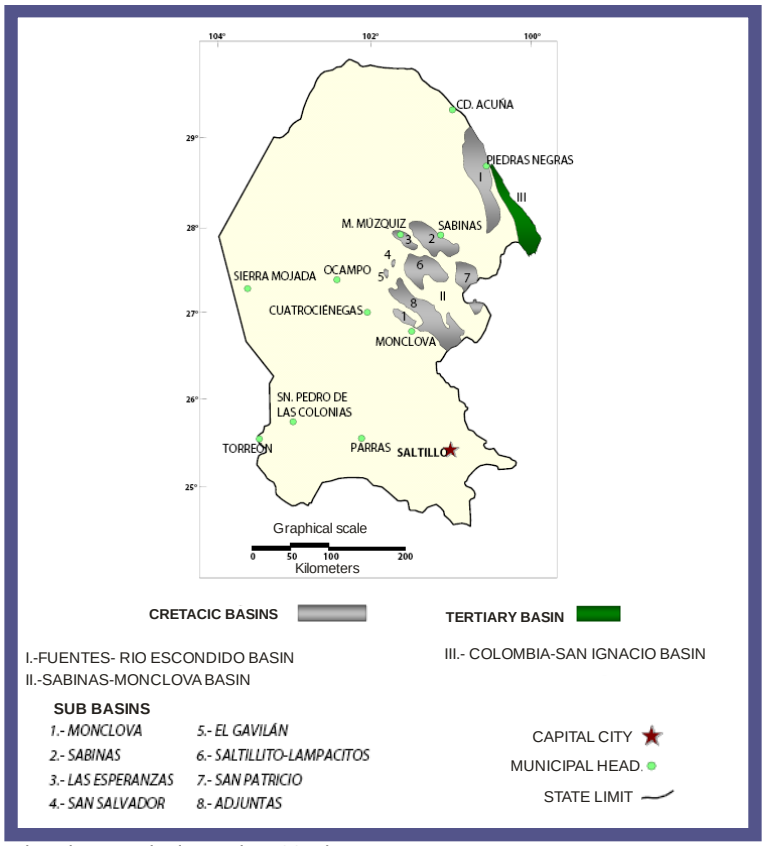
2.4.1.2 Coal mining in the State of Coahuila, Mexico

The coal mining industry and the variability of its activity have played a decisive role in the structuring and regional evolution of the central-eastern and northeastern areas of Coahuila state. The dependence of this region on mining exploitation in the absence of other economic activities that constitute real development alternatives, have made this region become vulnerable because of its geographical impact due to overexploitation of coal in open pit mines.

In 2010 State of Coahuila participated with 5.86% mining national production, occupying the first place in coal, iron and magnesium sulfate production. Coahuila is the Mexican state with more production of coal. (SGM & SE, 2011).

Mining in Coahuila started in 1828 by extracting coal in mines. The overexploitation of coal deposits in Coahuila began in the Sabinas basin to serve the steel industry of Piedras Negras, Monclova and Monterrey. Coal exploitation was subsequently extended to Fuentes-Río Escondido Basin as a result of the need to supply fuel to Río Escondido and Carbon II power plants.

Figure 9.6.
State of Coahuila, Mexico coal basins



(Mexican geologic service, 2011)

The coal extracted from Coahuila open pit mines is Bituminous and has a total carbon concentration range of 69-86% (Sánchez Salazar, 1995) as well as high sulfur and ashes content, so according to international standards, it is considered of poor quality, due to having a high polluting potential, before and after being extracted, as well as during its use.

As it was previously mentioned on the LRPUT description current Mexican legislation doesn't allow the final disposal of special handling wastes on sites unless they comply with the standard NOM-083-SEMARNAT-2003.

3 Recommendations

The Texas-Mexico border region being of great extent does not present a unique disposal alternative for all of its population. Each city should evaluate independently which alternative fits its economic and social needs based on the presented cost estimations and environmental impacts. Nevertheless all alternatives recommended theoretically comply with their local, state and federal regulations and are authorized by their corresponding environmental authorities.

By identifying social, environmental and economic impacts in advanced a stakeholder:

1. Can make better decisions about which appropriate tire disposal alternatives to select, how to proceed; and

2. Select what mitigation measures can be implemented to minimize the harm and maximize the social, environmental and economic benefits.

In IEMS' opinion each individual community should perform the following based on what it's presented in this document and other sources they consider appropriate:

- ✓ Decisions need to be deduced from principles, and principles need to be derived from core values. Only by first establishing the core values of the community of practice, then deriving the principles, and only then developing guidelines, can truly appropriate guidelines emerge.

- ✓ Guidelines and principles must be developed in participatory processes, include the people to whom the guidelines are directed. These are the people who ultimately need to develop 'ownership' of the guidelines if they are to be adopted and be utilized. (Vanclay, SIA principles, 2003)

3.1 Appropriate tire disposal alternatives

Texas international border area appropriate tire disposal alternatives currently available:

A. Land Reclamation Projects Using Tires (LRPUT)

B. Type 1 Sanitary Landfills.

LRPUT being an option which does not occupy landfill space and its used in rehabilitation process its more socially and environmentally desirable tire disposal alternative than landfills. Although both are considered appropriate by this study.

Texas Commission on Environmental Quality (TCEQ) authorized tire transporters and processors which finally dispose of waste tires in these alternatives or other TCEQ authorized alternatives located further north should also be considered appropriate. This study focus was specifically on final disposal alternatives, not including intermediaries.

Note: Type 1 and 4 landfills with Arid Exception (AE) could also receive cut or shred waste tires if authorized by the TCEQ and other corresponding authorities. During fieldwork and deskwork activities no landfill with AE was reported by generators as a disposal alternative.

The following Attachments present information regarding LRPUTs and type 1 landfills:

Attachment 44
List of appropriate tire disposal alternatives identified in the Texas side of the Texas-Mexico border area and disposal fees charged at the time this study was written.

Attachment 45
Display map of appropriate tire disposal alternatives identified in the Texas side of the Texas-Mexico border area.

Attachment 46
Environmental evaluation regarding the disposal of tires in land reclamation projects.

Attachment 47
Environmental evaluation regarding tire disposal in a sanitary landfill.

Attachment 48
Approximate driving distances from Texas scope cities to appropriate tire disposal sites in the Texas side of the Texas-Mexico border area.

Mexican side of the Texas-Mexico border:

A. Tire Derived Fuel in Cement Kilns

B. Sanitary Landfills complying with standard NOM-089-SEMARNAT-2003

The following Attachments present information regarding Mexican alternatives:

Attachment 49
List of appropriate sites in the Mexican side of the Texas-Mexico border area and disposal fees charged at the time this study was written.

Attachment 50

Environmental performance report of using tires as fuel in cement kilns both in Mexico and the U.S.A.

Attachment 51

Approximate driving distances from Mexican scope cities to appropriate tire disposal sites in the Mexican side of the Texas-Mexico border area.

Attachment 52

Transportations costs to cement kilns available to the Mexican side of the Texas-Mexico border area (per city per whole, cut or shredded tire).

Attachment 53

Display map of appropriate tire disposal alternatives identified in the Mexican side of the Texas-Mexico border area.

3.2 Tire management recommendations

Waste tires should be cut or shred by generators prior to their transportation. From these actions, transportation and disposal benefits can be obtained

3.2.1 Transportation benefits

The **Table 9.2** presents estimated savings obtained when transporting cut tires instead of whole tires. As displayed, important savings may be obtained when transporting cut tires instead of whole tires. These savings will be more relevant as the hauling distance increases. This savings are obtained because of the increase in the number of tires that can be transported. As an example a 48 foot trailer may transport approximately 60% more tires if the tires are cut[10].

Table 9.2.
Estimated savings when transporting cut tires instead of whole

Vehicle	Cost/tire/mile		Savings*
	whole	cut	
Pickup truck	$0.017	$0.010	**41%**
Pickup with trailer	$0.004	$0.003	**29%**
Box truck	$0.003	$0.002	**27%**
Tractor with 48 foot trailer	$0.002	$0.001	**38%**

*Increasing the gross weight at which a vehicle operates will increase its fuel consumption (Coyle, 2007) this increase is not considered when estimating the savings.

[10] Estimation performed considering a 48' trailer maximum load capacity of 1,400 whole tires against its maximum load capacity of 2,250 cut tires. Both capacities were estimated on **Attachment 42** of this report.

3.2.2 Disposal benefits

Additionally as reported on **Attachment 44** tire disposal fees are **75%** minor when disposing of cut or shred waste tires in appropriate disposal sites compared to whole tire disposal fees on the same sites. This occurs because sites no longer need to further process waste tires in order to landfill or bury them.

4 Alternatives economic evaluation

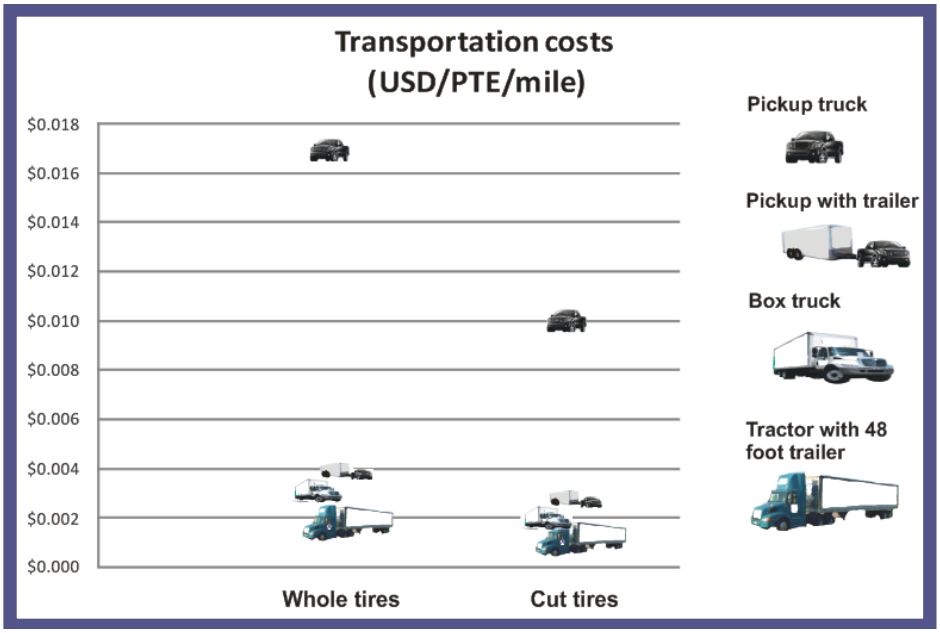
As was mentioned on Chapter 2 of this report two main variables affect the disposal cost per tire:

1. Transportation costs
2. Disposal fees

4.1 Common transportation options

The purpose of evaluating the different transporting options in this section is to aid the reader in choosing the one which better suits his/her needs. The **Figure 9.7** presents the cost per tire (whole and cut) per mile employing each type of equipment considered for Texas.

Figure 9.7.
Estimated transportation cost per tire per mile



The number of cut tires a vehicle may transport depends on payload capacity rather than volume. (Vehicle images and models are presented only for illustrative purposes). Numeric values are available on Attachment 42 (PTE= Passenger tire equivalent, weights 20 pounds)

Based on the results presented on **Figure 9.7** it is visible that tractors with trailers are the most cost efficient way to transport cut and whole tires, especially on large distances. Pickup trucks are the most inefficient in the same way.

As previously mentioned in **Table 9.2**, important savings may be obtained when transporting cut tires instead of whole tires. These savings will be more relevant as the hauling distance increases. This savings are obtained because of the increase in the number of tires that can be transported. This increase in the number of tires that can be transported per trip is summarized in **Table 9.3**.

Table 9.3.
Estimated increase in tires per load capacity when transporting cut tires instead of whole[11].

Vehicle	PTE / load		Load capacity estimated increase
	whole	cut	
Pickup truck	50	85	70%
Pickup with trailer	250	350	40%
Box truck	400	550	38%
Tractor with 48 foot trailer	1400	2250	61%

It is worth mentioning that cost efficiency when transporting shredded tires on the mentioned vehicles and equipment would not further increase since their maximum payload capacity is already reached when transporting cut tires. In other words the maximum tire capacity of a truck can be estimated by applying the following formula:

Formula 1.

$$\text{Vehicle maximum tire capacity (PTE / load)} = \frac{\text{Vehicle maximum payload (lb /load)}}{\text{PTE weight (20 lb /PTE)}}$$

This applies as long as volume is not the loading limiting factor, as is the case for the equipment and vehicles presented above.

[11] Estimation of load capacities presented on **Attachment 42** of this report.

4.2 Disposal fees per tire

Disposal costs per tire are presented separately for the Texas and Mexican sides of the border.

4.2.1 Texas side of the border

Attachment 44 presents a list of appropriate tire disposal alternatives identified in the Texas side of the Texas-Mexico border area and disposal fees charged at the time this study was written.

Since the tire disposal in reclamation of depleted open pit coal mines sites alternative is not currently being applied there is no available data regarding disposal fees that could be charged by the site owner. It could be presumed that fees would be similar to the ones charged on LRPUT currently working on the border area.

4.2.2 Mexico's side of the border

Attachment 49 presents a list of appropriate tire disposal alternatives identified in the Mexican side of the Texas-Mexico border area and disposal fees charged at the time this study was written.

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ATTACHMENT 1

- **Strategy re-adjustment petition with two attachments**
- **NADB strategy re-adjustment approval**

Monterrey, Nuevo Leon, Mexico

July 1, 2011

REF: Strategy re-adjustment petition for the Tire Flow Study, Texas-Mexico Border Region

MR. OSCAR CABRA

TECHNICAL SERVICES DIRECTOR

NORTH AMERICAN DEVELOPMENT BANK

IEMS is reaffirming its full commitment to complete the project "Tire Flow Study, Texas-Mexico Border Region" for the North American Development Bank (NADB). IEMS would like the NADB to reconsider the current approved strategy to gather the information necessary for the project given the escalating security issues along the US-Mexico border.

In light of the security risks of the Texas-Mexico border, four of our subcontractors have refused to conduct the field activites and the rest agreed to only work in selected "safer" areas along the Mexican border. This process of negotiating and finding adequate personnel has been very long and difficult. We have concluded that a change in the general field work strategy is necessary to satisfactorily complete the study.

IEMS can continue if the following modifications to the strategy are approved:

- A three-month extension. The due date will be February 29, 2012.

- A reduction in field exposure on the Mexican side. This would consist of:
  - Elimination of road reconnaissance trips (strategy number 7): Geographical information of legal and illegal dumps would be obtained from available sources (previous studies, interviews, and aerial photos) rather than from direct visit to the sites, as this is the highest risk activity.
  - Modification of interviews and surveys of stakeholders (strategies number 8 and 9): Some key stakeholders (authorities, custom officials, representatives of tire manufacturers, representatives of landfills) will be interviewed preferably remotely through telephone, teleconferencing or via email, unless the stakeholder is adamant on conducting a face-to-face interview. Personal interviews with the authorities through appointments lower the exposure of field personnel. Other key stakeholders that cannot be contacted remotely or with whom dedicated appointments cannot be

performed (small and medium tire dealers, tire dump employees, waste tire recyclers, waste tire transporters) will be excluded to avoid putting personnel in high-risk situations. A detailed list of the stakeholders to be interviewed in this way is included in Attachment 1, and a sample information request letter for each of the stakeholder types is found in Attachment 2.

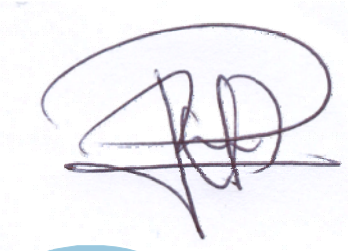
IEMS will request an official answer to the information request letter to properly document all information exchanges.

- Elimination of direct surveys of general population (strategy number 10): Surveys of general population expose the personnel to long hours in the streets, particularly in less secure areas. General population information will be conducted only in more secure areas with greater security measures including deployment of more people per group and reduced hours in field.

All desk-based strategies and field work conducted in Texas can be performed as described in the original strategy in Task 1.

Data obtained through this altered methodology would be sufficient to allow IEMS to analyze the mechanisms of flow of new and used tires through the Texas-Mexico border and produce a quality report with recommendations on policy, market and disposal alternatives in the region.

IEMS appreciates you taking into consideration what we have discussed in this petition and hope the NADB agrees with our approach to complete the study in a safe manner.



Ruben Villanueva Peon, M.Sc. , REPA

General Director

Integrated Environmental Management Services

Monterrey, Nuevo Leon, Mexico.

ATTACHMENT 1

Stakeholders to be contacted for remote interviews

Table 1. Mexican Remote Interview Contacts Database
Tire Flow Study Texas-Mexico Border Region

	City	Municipality	State	Government Rep.	Civil Guard Rep.	Customs Rep.	Landfill Rep
1	Cd. Juarez	Juarez	Chihuahua	Eliseo de la Fuente Chief of the Technical Assistance, Inspection and Surveillance Department	Guadalupe Sandoval Fire Department Commander	Daniel Marin Gomez Manager	Ricardo Lopez Promotora Ambiental S.A. Landfill Manager
2	Guadalupe	Juarez	Chihuahua				
3	Ojinaga	Manuel Ojinaga	Chihuahua	Carlos Hernandez Municipal Services Director	Abelardo Vaquera	Heidi Patricia Gonzalez Ibarra Manager	Carlos Hernandez Municipal Services Director
4	Cd. Acuña	Acuña	Coahuila	Edgar Villareal Vargas Ecology Director Eloy Rivera Assistant to the Director	Rodolfo Balderas Fremen Chief	NA	Ricardo Lopez Promotora Ambiental S.A. Landfill Manager
5	Piedras Negras	Piedras Negras	Coahuila	Alfredo Antonio Lucero Montemayor Ecology Director	Raul Roberto Zepeda Civil Guard Coordinator	Ernesto Alonso Gonzalez Hernanez Manager	Ricardo Lopez Promotora Ambiental S.A. Landfill Manager
6	Nava	Nava	Coahuila	Aroldo Villareal Fernandez Municipal President Jesus Miguel de la Garza Ecology Director	Manuel A. Bermea Dueñes	NA	Jesus Miguel de la Garza Ecology Director
7	Col. Venustiano Carranza	Nava	Coahuila				
8	Anahuac	Anahuac	Nuevo Leon	Jose Guadalupe Martinez Garcia Chief of Primary Services	Samuel Trejo Civil Guard Director	Alejandro Diaz Mundo Manager	Jose Guadalupe Martinez Garcia Chief of Primary Services
9	Nuevo Laredo	Nuevo Laredo	Tamaulipas	Roberto Gomez Zapata Ecology Director	Juan Ernesto Rivera Gomez Civil Guard Director	Carlos Hernando Ramirez Escoto Manager	NA

Table 1. Mexican Remote Interview Contacts Database Tire Flow Study Texas-Mexico Border Region							
	City	Municipality	State	Government Rep.	Civil Guard Rep.	Customs Rep.	Landfill Rep
10	Nueva Cd. Guerrero	Guerrero	Tamaulipas	Edgar Garcia Roel Public Works and Ecology Director	Edgar Garcia Roel Public Works and Ecology Director	NA	Edgar Garcia Roel Public Works and Ecology Director
11	Cd. Miguel Aleman	Miguel Aleman	Tamaulipas	Antonio Javier Sanchez Rios Ecology Director	Jorge Luis Longotia Silva Firemen and Civil Guard Chief	Jesus Aguilar Sub-manager	Antonio Javier Sanchez Rios Ecology Director
12	Cd. Camargo	Camargo	Tamaulipas	Luz Antonio Garcia Gonzalez Public Works and Ecology Director	Eduardo Raul Rodriguez Cuellar Civil Guard Director	NA	Luz Antonio Garcia Gonzalez Public Works and Ecology Director
13	Cd. Gustavo Diaz Ordaz	Gustavo Diaz Ordaz	Tamaulipas	Antonio Alvaro Gonzalez Cantu Ecology Director	NA	NA	NA
14	Reynosa	Reynosa	Tamaulipas	Angel Garza Ecology Director	Carlos Amadeo Leal Lopez Civil Guard Director	Jorge Fernando Boy Espinosa Manager	Ricardo Lopez Promotora Ambiental S.A. Landfill Manager
15	Cd. Rio Bravo	Rio Bravo	Tamaulipas	Gonzalo Chew Bajan Urban Development and Ecology Director	NA	NA	Gonzalo Chew Bajan Urban Development and Ecology Director
16	Nuevo Progreso	Rio Bravo	Tamaulipas				
17	Matamoros	Matamoros	Tamaulipas	Enrique Cerda Castillo Public Cleaning Director	Oscar Javier de la Cerda Maltos Civil Guard Director	Juan Huerta Leon Manager	Enrique Cerda Castillo Public Cleaning Director

NA: Not available at the close-up of this letter.

Table 2. Mexican Non-local Interview Contacts Database Tire Flow Study Texas-Mexico Border Region			
	Name	**Contact Person**	**Location**
1	Asociacion Nacional de Distribuidores de Llantas y Plantas Renovadoras A.C. (Andellac)	Ruben Lopez Albarran y Leal General Director	Mexico City
2	Camara Nacional de la Industria Hulera	Jose Francisco Martha H General Director	Mexico City
3	Asociacion Nacional de Representantes, Importadores y Distribuidores de Refacciones y Accesorios Para Automoviles A.C. (ARIDRA)	NA	Mexico City

ATTACHMENT 2

Information Request and Questionnaire per Stakeholder

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XX de XX del 2011

Solicitud de información

NOMBRE
CARGO, AUTORIDAD MUNICIPAL

PRESENTE.

Por medio de la presente nos permitimos informarle que nuestra empresa IEMS (Integrated Enviromental Management Services) está llevando a cabo un estudio de vital importancia para la frontera Texas-México, dicho estudio será elaborado para el Banco de Desarrollo de América del Norte (BDAN) y para la Agencia de Protección Ambiental de E.U. (EPA), este estudio se refiere principalmente a determinar el flujo de llantas entre la frontera Texas-México.

Como objetivo general tenemos determinar impactos económicos, sociales y ambientales del flujo transfronterizo de llantas nuevas y usadas desde Texas a los estados mexicanos con los cuales hace frontera.

Por lo anterior estamos solicitando su valiosa colaboración para la obtención de la siguiente información de los temas que a continuación se describen:

- Mecanismos legales e ilegales del paso de a través de la frontera.
- Situación actual e histórica del flujo transfronterizo de llantas nuevas y usadas.
- Manejo municipal de llantas de desecho.
- Situación del municipio en cuanto al problema de tiraderos legales e ilegales de llantas.
- Oportunidades en el municipio para el aprovechamiento de llantas de desecho.

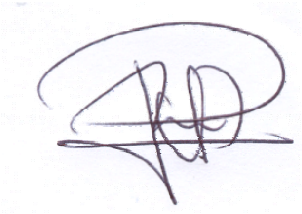
Anexo se encuentra un cuestionario detallado de la información y temas a tratarse durante la entrevista

Agradecemos de antemano su disposición para con el presente estudio. Debido a cuestiones de seguridad la política de este proyecto es realizar entrevistas vía remota; por teléfono o mediante videoconferencia en la fecha que a usted le parezca más conveniente. Si esto no fuera posible agradeceríamos tener contacto con usted vía correo electrónico o fax.

Para cumplir con el protocolo de calidad y documentación de este proyecto le solicitamos atentamente hacernos llegar por escrito vía correo electrónico o postal, su decisión en cuanto a la provisión de la información y su propuesta para la modalidad, fecha y día de la entrevista. Los datos de contacto se encuentran en el encabezado de la presente.

Nuevamente gracias y estaremos al pendiente de su respuesta.

Atentamente.



M. en C. Rubén Villanueva Peón

Director General

Integrated Environmental Management Services S.A. de C.V.

ANEXO: CUESTIONARIO DETALLADO PARA AUTORIDADES MUNICIPALES

1. ¿Quiénes tienen a su cargo el manejo de llantas de desecho en su municipio?
2. ¿Cómo se manejan las llantas de desecho dentro de su municipio?
3. Aproximadamente ¿cuántas llantas de desecho hay en el municipio?
4. ¿Cuántos vehículos se encuentran registrados en el municipio' (parque vehicular)
5. ¿Cuántos deshuesaderos (yonkes) existen en el municipio? ¿Cuál es su tamaño aproximado?
6. ¿De qué forma se usan las llantas de desecho en su municipio? (reuso, reciclaje, combustible, manufactura de productos, obra civil)
7. ¿Tiene conocimiento de algún proyecto que se haya dado en su municipio referente al reciclaje, uso como combustible, uso para obra civil? Si es afirmativo, ¿de quién fue iniciativa? ¿qué sucedió?
8. ¿Cuál es el procedimiento adecuado para disponer de las llantas de desecho? ¿Qué proporción de llantas se estima se manejan de esta manera?
9. ¿Existen o han existido, programas municipales específicos para el manejo de llantas? ¿Por qué o por qué no?
10. ¿Qué fracción del presupuesto municipal se destina al manejo de residuos sólidos urbanos o de manejo especial? ¿Qué fracción se destina a programas específicos de llantas?
11. ¿Cuánto le cuesta al municipio el manejo adecuado de las llantas?
12. ¿Existe algún cobro unitario (por llanta) para su disposición adecuada? Si es así, ¿a quién se le cobra y cuánto es?
13. ¿Existe algún sistema de seguimiento de llantas que son importadas legalmente desde la frontera de Texas?
14. ¿Dónde se localizan los sitios de disposición legal de llantas y dónde los ilegales? (Mapa)
15. Desde su perspectiva, ¿qué hace falta para que menos llantas vayan a los tiraderos?
16. ¿Qué proporción de la población de su municipio estima que sea consumidor de llantas nuevas traídas de Texas? ¿de llantas nuevas nacionales? ¿de llantas usadas de Texas? ¿de llantas usadas nacionales?
17. Además de la cercanía con Texas, ¿qué motiva que los ciudadanos consuman llantas de Texas en vez de las nacionales?
18. Desde su perspectiva, ¿quiénes son los beneficiados y los afectados por el flujo de llantas nuevas y usadas desde Texas a su municipio?
19. ¿Ha notado algunas tendencias de 2005 a la fecha respecto a la gravedad que los impactos de llantas de desecho ocasionan a su municipio?
20. ¿Qué herramientas le serían más útiles para manejar adecuadamente las llantas de desecho en su municipio?
21. En comparación a otros problemas ambientales con los que se enfrenta la población local, ¿qué tan importante es el problema de las llantas? ¿Cuáles son los problemas más graves? ¿Por qué?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

22. ¿Cuál es su rol en el manejo de llantas de desecho?
23. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
24. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
25. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas

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XX de XX del 2011

Solicitud de información

NOMBRE
CARGO, PROTECCIÓN CIVIL

PRESENTE.

Por medio de la presente nos permitimos informarle que nuestra empresa IEMS (Integrated Enviromental Management Services) está llevando a cabo un estudio de vital importancia para la frontera Texas-México, dicho estudio será elaborado para el Banco de Desarrollo de América del Norte (BDAN) y para la Agencia de Protección Ambiental de E.U. (EPA), este estudio se refiere principalmente a determinar el flujo de llantas entre la frontera Texas-México.

Como objetivo general tenemos determinar impactos económicos, sociales y ambientales del flujo transfronterizo de llantas nuevas y usadas desde Texas a los estados mexicanos con los cuales hace frontera.

Por lo anterior estamos solicitando su valiosa colaboración para la obtención de la siguiente información de los temas que a continuación se describen:

- Incidentes ocurridos debido al mal manejo de llantas de desecho.
- Situación actual e histórica del flujo transfronterizo de llantas nuevas y usadas.
- Localización de tiraderos ilegales de llantas.
- Frecuencia de incidentes (incendios, plagas, olas de enfermedades, inundaciones por bloqueo de cauces) ocasionados por llantas de desecho.
- Costo de abatimiento de incendios y limpieza de cauces.

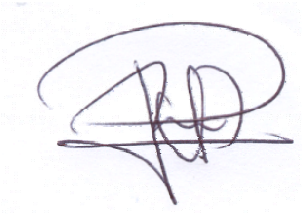
Anexo se encuentra un cuestionario detallado de la información y temas a tratarse durante la entrevista

Agradecemos de antemano su disposición para con el presente estudio. Debido a cuestiones de seguridad la política de este proyecto es realizar entrevistas vía remota; por teléfono o mediante videoconferencia en la fecha que a usted le parezca más conveniente. Si esto no fuera posible agradeceríamos tener contacto con usted vía correo electrónico o fax.

Para cumplir con el protocolo de calidad y documentación de este proyecto le solicitamos atentamente hacernos llegar por escrito vía correo electrónico o postal, su decisión en cuanto a la provisión de la información y su propuesta para la modalidad, fecha y día de la entrevista. Los datos de contacto se encuentran en el encabezado de la presente.

Nuevamente gracias y estaremos al pendiente de su respuesta.

Atentamente.



M. en C. Rubén Villanueva Peón

Director General

Integrated Environmental Management Services S.A. de C.V.

Monterrey, Nuevo León

ANEXO: CUESTIONARIO PARA PROTECCIÓN CIVIL DETALLADO

1. En su opinión, ¿existe un problema con llantas tiradas ilegalmente en el municipio? Si es así, ¿qué tan importante es con respecto a otros problemas?
2. ¿Podría identificar, en su municipio, los tiraderos ilegales de llantas?
3. ¿Cuáles son los riesgos a la población de un mal manejo de llantas usadas?
4. ¿Qué incidentes ha habido en la localidad que se relacionen con tiraderos de llantas? ¿Del 2005 a la fecha?
5. ¿Cuáles son los incidentes más frecuentes en relación a los tiraderos de llantas? (incendios, nido de fauna nociva, obstrucción de cauces de agua)
6. ¿Qué tipo de incidentes afectan a más personas?
7. De los incidentes mencionados, ¿cuántos atendieron? ¿Cuánto personal se requirió? ¿Cuánto tardaron en resolver el asunto?
8. ¿Cuál fue la pérdida material ocasionada por estos incidentes?
9. ¿Hubo fatalidades en alguno de ellos?
10. ¿Cuántos recursos han destinado al combate de incidentes de 2005 a la fecha?
11. ¿Cuántos recursos se han destinado a la prevención de incidentes de 2005 a la fecha?
12. ¿Qué tipo de incidente es el más sencillo y el más difícil de prevenir? ¿Por qué?
13. ¿Qué tipo de incidente es el más sencillo y el más difícil de combatir? ¿Por qué?
14. ¿Tienen ustedes campañas de prevención de incidentes por causa de llantas mal desechadas? ¿Por qué?
15. En su opinión, ¿cómo debería ser el manejo de llantas óptimo para minimizar los riesgos a la población?
16. En su situación actual, ¿qué hace falta con más urgencia para minimizar los riesgos a la población ocasionados por un mal manejo de llantas de desecho?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

17. ¿Cuál es su rol en el manejo de llantas de desecho?
18. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
19. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
20. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas

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XX de XX del 2011

Solicitud de información

NOMBRE
CARGO, ADUANA.

PRESENTE.

Por medio de la presente nos permitimos informarle que nuestra empresa IEMS (Integrated Enviromental Management Services) está llevando a cabo un estudio de vital importancia para la frontera Texas-México, dicho estudio será elaborado para el Banco de Desarrollo de América del Norte (BDAN) y para la Agencia de Protección Ambiental de E.U. (EPA), este estudio se refiere principalmente a determinar el flujo de llantas entre la frontera Texas-México.

Como objetivo general tenemos determinar impactos económicos, sociales y ambientales del flujo transfronterizo de llantas nuevas y usadas desde Texas a los estados mexicanos con los cuales hace frontera.

Por lo anterior estamos solicitando su valiosa colaboración para la obtención de la siguiente información de los temas que a continuación se describen:

- Mecanismos legales e ilegales del paso de a través de la frontera.
- Situación actual e histórica del flujo transfronterizo de llantas nuevas y usadas.
- Cuotas de importación vigentes y las aplicadas cada año a partir del 2005.

Anexo se encuentra un cuestionario detallado de la información y temas a tratarse durante la entrevista

Agradecemos de antemano su disposición para con el presente estudio. Debido a cuestiones de seguridad la política de este proyecto es realizar entrevistas vía remota; por teléfono o mediante videoconferencia en la fecha que a usted le parezca más conveniente. Si esto no fuera posible agradeceríamos tener contacto con usted vía correo electrónico o fax.

Para cumplir con el protocolo de calidad y documentación de este proyecto le solicitamos atentamente hacernos llegar por escrito vía correo electrónico o postal, su decisión en cuanto a la provisión de la información y su propuesta para la modalidad, fecha y día de la entrevista. Los datos de contacto se encuentran en el encabezado de la presente.

Nuevamente gracias y estaremos al pendiente de su respuesta.

Atentamente.

M. en C. Rubén Villanueva Peón

Director General

Integrated Environmental Management Services S.A. de C.V

ANEXO: CUESTIONARIO DETALLADO PARA ADUANAS

1. ¿Cuáles son los mecanismos legales de paso de llantas nuevas y usadas a través de la frontera? ¿Cómo es la pre-importación, los impuestos, la post-importación?
2. ¿Cuáles son los mecanismos ilegales de paso de llantas nuevas y usadas a través de la frontera?
3. ¿Cuál es la frecuencia de hallazgos de contrabando de llantas (mes/año)?
4. ¿Cuántas llantas incautan al año de 2005 a la fecha? ¿Cómo se manejan?
5. ¿Cuáles han sido la cuota de llantas nuevas y usadas (cantidad) de importación del año 2005 a la fecha?
6. ¿Cuál ha sido el impuesto de importación por llanta nueva y usada del año 2005 a la fecha?
7. ¿Se mantienen registros específicos para las llantas nuevas y usadas que cruzan por esta aduana?
8. ¿Cuál es el número de llantas que han cruzado por esta aduana del 2005-a la fecha?
9. ¿Han notado tendencias en el flujo de llantas nuevas y usadas? (10,5, 1 año)
10. ¿Existe alguna tendencia de flujo según época del año? (clima, por fechas especiales, por temporadas agrícolas)
11. ¿El flujo de llantas nuevas y usadas legales es constante o se da por lotes grandes esporádicos?
12. ¿El flujo de llantas usadas ilegales es constante o se da por lotes grandes esporádicos?
13. ¿Conoce el destino general de las llantas usadas que cruzan por esta aduana? (reventa, reciclaje, energía)
14. ¿Cuál es la proporción de llantas nuevas y usadas de automóviles, camiones, y agrícolas que cruzan la frontera?
15. ¿Quiénes cruzan las llantas? ¿Existen compañías o personas con grandes concesiones o no?
16. ¿Cuál es el tipo de vehículos que se usan para transportar las llantas? (Legal e ilegal) ¿Son vehículos viejos o nuevos?
17. Aproximadamente ¿cuántas llantas se transportan por tipo de vehículo?
18. La mayoría de los vehículos usados para el transporte ¿son americanos o mexicanos? ¿sus conductores?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

19. ¿Cuál es su rol en el manejo de llantas de desecho?
20. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
21. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
22. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

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XX de XX del 2011

Solicitud de información

NOMBRE
CARGO, REPRESENTANTES DE LA INDUSTRIA LLANTERA/HULERA

PRESENTE.

Por medio de la presente nos permitimos informarle que nuestra empresa IEMS (Integrated Enviromental Management Services) está llevando a cabo un estudio de vital importancia para la frontera Texas-México, dicho estudio será elaborado para el Banco de Desarrollo de América del Norte (BDAN) y para la Agencia de Protección Ambiental de E.U. (EPA), este estudio se refiere principalmente a determinar el flujo de llantas entre la frontera Texas-México.

Como objetivo general tenemos determinar impactos económicos, sociales y ambientales del flujo transfronterizo de llantas nuevas y usadas desde Texas a las comunidades fronterizas de los cuatro estados con que colinda.

Por lo anterior estamos solicitando su valiosa colaboración para la obtención de la siguiente información de los temas que a continuación se describen:

- Cifras de llantas nuevas y usadas importadas de Texas a México
- Situación actual e histórica del flujo transfronterizo de llantas nuevas y usadas.
- Oportunidades de mercado en la frontera para las llantas usadas nacionales o importadas.
- Valor de mercado del flujo transfronterizo de llantas

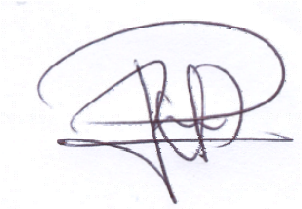
Anexo se encuentra un cuestionario detallado de la información y temas a tratarse durante la entrevista

Agradecemos de antemano su disposición para con el presente estudio. Debido a cuestiones de seguridad la política de este proyecto es realizar entrevistas vía remota s sus instalaciones se encuentran en la frontera Texas-Mexico; por teléfono o mediante videoconferencia en la fecha que a usted le parezca más conveniente. Si esto no fuera posible agradeceríamos tener contacto con usted vía correo electrónico o fax, o si sus instalaciones no se encuentran en esta franja, agradeceríamos la oportunidad de conducir una entrevista personal.

Para cumplir con el protocolo de calidad y documentación de este proyecto le solicitamos atentamente hacernos llegar por escrito vía correo electrónico o postal, su decisión en cuanto a la provisión de la información y su propuesta para la modalidad, fecha y día de la entrevista. Los datos de contacto se encuentran en el encabezado de la presente.

Nuevamente gracias y estaremos al pendiente de su respuesta.

Atentamente.



M. en C. Rubén Villanueva Peón

Director General

Integrated Environmental Management Services S.A. de C.V.

ANEXO: CUESTIONARIO DETALLADO PARA REPRESENTANTES DE LA INDUSTRIA LLANTERA/HULERA

1. ¿La oferta de llantas nacionales nuevas es suficiente para satisfacer la demanda?
2. ¿Qué calidades de llantas se manejan en México?
3. ¿Cuál es el mercado para cada nivel de calidad de llanta?
4. ¿Cuál es el mercado de mayor tamaño en número de llantas vendidas?
5. ¿Qué porcentaje del mercado es para llantas usadas y que porcentaje para llantas nuevas?
6. ¿Qué año, del 2005 a la fecha, fue el mejor en ventas de llantas nuevas?
7. ¿Qué año, del 2005 a la fecha, fue el peor en ventas de llantas nuevas?
8. ¿Cómo clasifican las llantas usadas? Según su tipo y calidad.
9. ¿Qué proporción de las llantas que venden son usadas?
10. ¿Cuál es el precio de venta de las llantas usadas? (Para auto, camioneta, camión y agrícola)
11. ¿Cuál es el precio de compra de las llantas usadas? (Para auto, camioneta, camión y agrícola)
12. ¿Cuál mercado de llantas usadas es el más lucrativo? Por tipo de llanta. (Para auto, camioneta, camión y agrícola)
13. ¿Cómo encuentran/contactan a los distribuidores de llantas usadas en EUA?
14. ¿Cuál es la diferencia de precios entre llantas usadas legales e ilegales?
15. ¿La oferta de llantas nacionales usadas es suficiente para satisfacer la demanda?
16. ¿Qué año, del 2005 a la fecha, fue el mejor en ventas de llantas usadas?
17. ¿Qué año, del 2005 a la fecha, fue el peor en ventas de llantas usadas?
18. ¿Cuántas llantas se vendieron cada año, del 2005 a la fecha?
19. Además del reuso como llanta en servicio, ¿cuál es el mercado para el reciclaje, combustible alterno, materia prima para otros productos y uso en obra civil de las llantas usadas?
20. Cantidad de llantas fueron fabricadas en Chihuahua, Coahuila, Nuevo León y Tamaulipas.
21. Cantidad y origen de llantas importadas.
22. Distribución del mercado que posee cada marca de llantas.
23. ¿Cuáles son los porcentajes que representa la venta de llantas por tipo? (autos, camionetas utilitarias, camión, agrícolas).
24. ¿Qué proporción de las llantas usadas que reciben es inservible?
25. ¿Cuál ha sido el costo de disposición final de una llanta, del 2005 a la fecha?

26. ¿Considera que en general el fenómeno de reúso de llantas es positivo o negativo para los habitantes?
27. En su opinión, ¿Cuáles son las soluciones para un buen manejo de llantas usadas en la frontera?
28. ¿Qué tendencias ha notado en el flujo transfronterizo de llantas nuevas y usadas del año 2005 a la fecha?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

29. ¿Cuál es su rol en el manejo de llantas de desecho?
30. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
31. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
32. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

Integrated Environmental Management Services
Matamoros 1443 Pte, Col. María Luisa
64040, Monterrey, Nuevo León
rubenv@iems-mex.com fernandar@iems-mex.com, estebani@iems-mex.com

XX de XX del 2011

Solicitud de información

NOMBRE
CARGO, REPRESENTANTES DE SITIOS DE DISPOSICIÓN FINAL

PRESENTE.

Por medio de la presente nos permitimos informarle que nuestra empresa IEMS (Integrated Enviromental Management Services) está llevando a cabo un estudio de vital importancia para la frontera Texas-México, dicho estudio será elaborado para el Banco de Desarrollo de América del Norte (BDAN) y para la Agencia de Protección Ambiental de E.U. (EPA), este estudio se refiere principalmente a determinar el flujo de llantas entre la frontera Texas-México.

Como objetivo general tenemos determinar impactos económicos, sociales y ambientales del flujo transfronterizo de llantas nuevas y usadas desde Texas a los estados mexicanos con los cuales hace frontera.

Por lo anterior estamos solicitando su valiosa colaboración para la obtención de la siguiente información de los temas que a continuación se describen:

- Cantidad de llantas almacenadas en su sitio de disposición final
- Manejo de llantas que llegan al relleno.
- Incidentes causados por las llantas de desecho.
- Tendencias en la forma de disposición, cantidad, y origen de las llantas en sus sitios.
- Mercados alternos para llantas usadas.

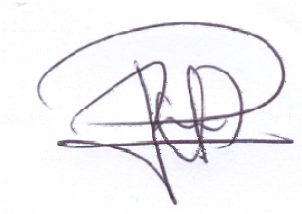
Anexo se encuentra un cuestionario detallado de la información y temas a tratarse durante la entrevista

Agradecemos de antemano su disposición para con el presente estudio. Debido a cuestiones de seguridad la política de este proyecto es realizar entrevistas vía remota; por teléfono o mediante videoconferencia en la fecha que a usted le parezca más conveniente. Si esto no fuera posible agradeceríamos tener contacto con usted vía correo electrónico o fax.

Para cumplir con el protocolo de calidad y documentación de este proyecto le solicitamos atentamente hacernos llegar por escrito vía correo electrónico o postal, su decisión en cuanto a la provisión de la información y su propuesta para la modalidad, fecha y día de la entrevista. Los datos de contacto se encuentran en el encabezado de la presente.

Nuevamente gracias y estaremos al pendiente de su respuesta.

Atentamente.



M. en C. Rubén Villanueva Peón

Director General

Integrated Environmental Management Services S.A. de C.V.

ANEXO: CUESTIONARIO DETALLADO PARA REPRESENTANTES DE SITIOS DE DISPOSICIÓN FINAL

1. ¿Reciben llantas? ¿Por qué si/no?
2. ¿Tiene un costo el desechar llantas en su relleno? ¿Cuál es? ¿En qué se aplica el dinero recibido?
3. ¿Qué porcentaje del total en masa, representan las llantas?
4. ¿Qué porcentaje del total en volumen, representan las llantas?
5. ¿Qué porcentaje del total en costo de disposición representan las llantas?
6. ¿Se procesa de alguna forma las llantas que ingresan?
7. ¿El acceso al sitio es controlado?
8. Si existen pepenadores; ¿Estos recolectan las llantas? ¿Por qué si o no?
9. ¿Existe un área especial para colocar llantas exclusivamente? ¿Por qué?
10. ¿Han tenido algún incidente que involucre llantas?
11. ¿Cómo se resolvió el incidente?
12. ¿Cuánto costó el incidente?
13. ¿Cuántas personas se ocuparon en resolverlo?
14. ¿Cuánto tiempo tomó resolverlo?
15. ¿Tiene conocimiento de incidentes que involucraran llantas en la zona, que hayan ocurrido en los 5 años pasados?
16. ¿Observa alguna tendencia en el número de llantas que ingresan legalmente?
17. ¿Observa alguna tendencia en el número de llantas colectadas?
18. ¿Observa alguna tendencia en el número de llantas que ingresan ilegalmente?
19. ¿Observa alguna tendencia en el número de llantas en general?
20. ¿Es posible identificar las llantas que provienen de Texas? ¿Cómo lo hacen?
21. ¿Cuál ha sido la cantidad de llantas almacenadas anualmente del 2005 a la fecha?
22. ¿Lleva un registro de la cantidad de llantas que ingresan? ¿Cómo? ¿Por qué? De manera ideal:
23. ¿Cómo mejoraría el manejo de las llantas en su relleno?
24. ¿Cómo evitaría que las llantas de desecho fueran abandonadas en sitios ilegales y fueran llevadas al relleno?
25. ¿Cómo piensa que se deberían de manejar las llantas de desecho a nivel regional?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

1. ¿Cuál es su rol en el manejo de llantas de desecho?
2. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
3. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
4. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

IEMS
INTEGRATED ENVIRONMENTAL MANAGEMENT SERVICES

North American Development Bank | Banco de Desarrollo de América del Norte

San Antonio, Texas, July 12, 2011
TSD-AI 0212-07/10

Ruben Villanueva Peon, M.Sc. , REPA
General Director
Integrated Environmental Management Services
Monterrey, Nuevo León, México

Ref.: Strategy re-adjustment petition for the Tire Flow Study, Texas-Mexico Border Region.

Mr. Villanueva:

The Bank finished reviewing your petition dated July 1st, 2011 and hereby approves the strategy re-adjustment to Task No. 1 "Methodology", to gather the information necessary for the Tire Flow Study in Texas-Mexico Border.

The modifications to the strategies for field work are the following:

- Elimination of road reconnaissance trips (strategy No. 7)
- Modification of interviews and surveys of stakeholders (strategies No. 8 and 9)
- Elimination of direct surveys of general population (strategy No. 10), and
- New due date of April 30th, 2011

Please find attached the addendum to the Contract No. 60611 for you to sign and return an original to my attention.

Please call me if you have any questions.

Sincerely,

Oscar Cabra, P.E.
Technical Services Director

Cc. Alejandro Jaramillo, NADB.
Arturo Ibarra, NADB
Martin Rodriguez, NADB

ATTACHMENT 2
Mexican authorities and stakeholders

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Table 1.
Local authorities and stakeholders

State	County / Municipality	City	Municipal Authority (Ecology)	Disposal Site Representative(s)	Civil protection Rep
Chihuahua	**Juarez**	**Cd Juarez**	Eliseo de la fuente Chief of the technical assistance, inspection and surveillance department Ing Raul de León Environmental compliance director	**Ricardo Lopez** **Landfill manager** **Promotora Ambiental S. A. de C. V.**	**Efren Matamoros Barraza** **Civil protection director**
Chihuahua	**Juarez**	**Guadalupe**		Ing Ricardo A Alarcon Pacheco General Sub director Municipal public services department	
Chihuahua	**Manuel Ojinaga**	**Ojinaga**	Carlos Hernandez Municipal services director	**Carlos Hernandez** **Municipal services director**	Abelardo Vaquera Carrasco Civil protection chief
Coahuila	**Acuña**	**Cd Acuña**	Caleb Rodriguez Ecology Director	**Ricardo Lopez** **Landfill manager** **Promotora Ambiental S. A. de C. V.**	Yassin Mendoza Civil protection officer
Coahuila	**Piedras Negras**	**Piedras Negras**	Alfredo Antonio Lucero Montemayor Urban Image and Ecology Director	**Ricardo Lopez** **Landfill manager** **Promotora Ambiental S. A. de C. V.**	Wrilbert Gandara Fireman in charge during the day shift
Coahuila	**Nava**	**Nava**	Jesus Miguel Flores de la Garza Ecology director	Jesus Miguel Flores de la Garza Ecology director	Martin Macias Perez Civil protection director
Coahuila	**Nava**	**Col Venustiano Carranza**			
Nuevo Leon	**Anahuac**	**Anahuac**	Martin Delgado Molina Ecology director	**Jose Guadalupe Martinez Garcia** **Chief of primary services**	Samuel Trejo Civil protection director
Tamaulipas	**Nuevo Laredo**	**Nuevo Laredo**	Roberto Gomez Zapata Ecology director	Marco Rosales Servicios de tecnologia ambiental S.A. de C.V. Landfill manager	Juan Ernesto Rivera Gomez Firemen and civil protection director

Table 1. Local authorities and stakeholders					
State	**County / Municipality**	**City**	**Municipal Authority (Ecology)**	**Disposal Site Representative(s)**	**Civil protection Rep**
Tamaulipas	**Guerrero**	**Nueva Cd Guerrero**	Edgar Garcia Roel Public works and ecology director	Edgar Garcia Roel Public works and ecology director	Edgar Garcia Roel Public works and ecology director
Tamaulipas	**Miguel Aleman**	**Cd Miguel Aleman**	Antonio Javier Sanchez Rios Ecology director	**Antonio Javier Sanchez Rios Ecology director**	**Jorge Luis Longoria Silva Firemen and Civil protection Chief**
Tamaulipas	**Camargo**	**Cd Camargo**	Luz Antonio Garcia Gonzalez Ecology and public works Director	Luz Antonio Garcia Gonzalez Ecology and public works Director	**Eduardo Raul Rodriguez Cuellar Civil protection director**
Tamaulipas	**Gustavo Diaz Ordaz**	**Cd Gustavo Diaz Ordaz**	Antonio Alvaro Gonzalez Cantu Ecology director	**Not available**	Julio Bermudez Recently retired civil protection director
Tamaulipas	**Reynosa**	**Reynosa**	Mauricio Chalons Salazar Environmental services chief	**Ricardo Lopez Landfill manager Promotora Ambiental S. A. de C. V.** Jesus Espinoza Operations Manager RECO de Reynosa S A de C V	**Carlos Amadeo Leal Lopez Civil protection director**
Tamaulipas	**Rio Bravo**	**Cd Rio Bravo**	Gonzalo Chew Bajan Urban development and ecology director	Gonzalo Chew Bajan Urban development and ecology director	Axel Gongora de Isla Firemen and civil protection chief
Tamaulipas	**Rio Bravo**	**Nuevo Progreso**			
Tamaulipas	**Matamoros**	**Matamoros**	Rusvelt Rocha Aguiñaga Public cleaning director	Rusvelt Rocha Aguiñaga Public cleaning director	**Oscar Javier de la Cerda Maltos Civil Protection Director**

Cells highlighted in red and black typography present stakeholders who denied the requested information.

Cells highlighted in yellow present stakeholders who provided the requested information but denied the signed confirmation letter.

Table 2. Non local authorities and stakeholders		
Location	**Organization**	**Contact person**
Mexico city	National association of tire distributors and renewal plants A.C. (Andellac)	Ruben Lopez Albarran y Leal General Director
Mexico city	Rubber industry national chamber (CNIH)	Jose Francisco Martha H. General Director
Mexico city	National ecology Institute (INE)	Veronica Garibay General research direction of urban and regional pollution (DGICUR)
Chihuahua, Chihuahua.	Economy ministry (SE) Chihuahua	Federal institute of access to public information (IFAIP)
Mexico city	Mario Molina center for strategic energy and environment studies.	Rodolfo Lacy

ATTACHMENT 3
Surveys designed to be applied on Texas fieldwork

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Texas Environmental Commission of Environmental Quality (TCEQ)

Registry

1. Full registry of the Texas authorized whole-used or scrap tire generators, transporters, transportation facilities, recyclers, energy recovery facilities and other processors, storage and disposal sites. Indication if they have complied with reporting duties or not.
2. Address and telephone of additional delivery destinations reported by processors.

Amounts

3. Annual amount (from 2005 to the present) of whole used and scrap tires reported by each registered:

a. Generator
b. Transporter
c. Storage area
d. Recycler
e. Energy recovery facility
f. Disposal site
g. Others

Information for all types of tires (light and heavy vehicles, agriculture) per number of tires and per weight.

4. Total storage capacity of whole used and scrap tires reported by all the above. (From 2005 to the present).
5. Maximum processing capacity of each registered:

a. Transporter
b. Recycler
c. Energy recovery facility
d. Other processors

From 2005 to present day.

6. Annual number of whole used or scrap tires stored, received and transferred in each storage site from 2005 to present day.
7. Estimated number of tires stored in illegal disposal sites from 2005 to this day.
8. Number of tires reportedly reused in Texas annually from 2005 to the present day.
9. Location and intended final destination of tires for reuse from 2005 to the present day.
10. Final destinations of used tires from 2005 to the present day in quantities and percentages (per type of destination).

Used tire-related emergencies

11. Used tire-related emergencies that have occurred each year from 2005 to this date.
12. Infrastructure, settlements (or number of people), and environmental features damaged by the registered emergencies.
13. Location of the emergency and estimated damage radius.
14. Frequency of used tire-related emergencies by type (i.e. fires, flash floods due to waterway obstruction, dengue fever episodes, rodent, poisonous snakes, or other noxious fauna plagues, etc.)
15. How were people affected in each of the emergencies? Which were the most damaging? Why?
16. Were there any legal actions taken by the affected population? What were the results?
17. What was the yearly budget allocated from 2005 to the present day for the type of emergencies related to improper used-tire disposal?
18. What was the yearly expenditure from 2005 to the present day for the actual used tire-related emergencies? How much per each type of emergency?

Impacts of emergencies

19. Environmental impacts caused by each contingency.
20. How was each impact mitigated?
21. Social impacts caused by each contingency (fatalities, displacements, loss of agricultural land, loss of residential area, etc.)
22. How was each impact mitigated?
23. Economical impacts caused by each contingency.
24. How was each impact mitigated?
25. What was the yearly expenditure from 2005 to the present day to **mitigate** the environmental, social and economical impacts caused by used tire-related emergencies? How much per type of impact and emergency?
26. What is the yearly expenditure from 2005 to the present day to **prevent** the environmental, social and economical impacts caused by used tire-related emergencies? How much per type of impact and emergency?

Management

27. Do you have any management programs for waste tires? Briefly describe.
28. What is the yearly budget allocated for waste tire management? Where does the money come from?

29. Personnel employed in the management and proper disposition of used tires each year from 2005 to this day.
30. What are the biggest challenges in the management of used tires?
31. What is the costliest aspect in the waste tire management? Why?
32. How would you rate the success of good waste tire management from 2005 to the present day? Has the situation in general improved or worsen? If it has improved in some areas but worsen in others, which ones?
33. What are the measures taken to prevent used-tire related emergencies?

Others

34. Is there additional study, report or information you would consider relevant regarding used tires?

Texas State Health Department

Conversation type interview which focused on the following subjects:

1. What are the diseases mosquitoes can spread?
2. How do these diseases develop and affect the Texas population.
3. Prevention and treatment methods.
4. History of cases and outbreaks of said diseases in Texas.
5. Trends.
6. Are tires a major cause for the spreading of the diseases.
7. Asking for any document or information regarding the diseases mentioned and their relation with mosquitoes and waste tires.

Council of governments

Conversation type interview which focused on the following subjects:

1. What's the role of the Council of governments regarding waste tire management?
2. Do you implement any programs regarding waste tires?
3. Do you have any records on what has been done and the number of tires handled?
4. How many resources do you spend in performing your role regarding waste tire management?
5. What's the source of the resources you spend?
6. What are the main problems you handle regarding waste tires?
7. Trends.

Environmental authorities' questionnaire guide

Management

1. Who is in charge of managing waste tires on your city/county?
2. How are waste tires handled on your city/county?
3. How are waste tires used on your city/county? (reuse, recycling, fuel, product manufacturing, civil works)
4. What's the adequate procedure to dispose of waste tires?
5. Did specific waste tire management programs exist or existed? Why or why not?
6. Do you keep track of used and/or waste tires sent into Mexico?
7. Do you know of any project implemented on your city/county referring to the recycling, use as fuel, civil works? If yes; whose initiative was it? What were the results?

Quantities and data

8. Approximately how many waste tires exist on your city/county? How has this amount changed from year 2005 to this date?
9. What proportion of the waste tires generated is estimated to be handled in accordance to the proper disposal procedures?
10. Where are the legal and illegal waste tires disposal sites located?
11. What proportion of the population purchases used tires instead of new ones?

Economic impacts

12. What fraction of the budget is destined to urban waste management?
13. How much money is spent on waste tire specific programs?
14. How much Money is spent on waste tires proper disposal?
15. Does the city charges for adequate waste tire disposal? To whom and how much?

Environmental impacts

16. From 2005 to this day; have you noticed any trends regarding the impacts caused by waste tires on your city/ county?
17. In comparison with other environmental problems affecting the local population, How big is the waste tire problem? What problems are bigger than the tire problem? Why?

On your opinion

18. What's necessary to avoid waste tires ending up on landfills and dumps?
19. What tools would be useful to you in order to adequately handle waste tires on your city/county?

General questions

20. ¿What's your role on waste management?
21. How does the war on drugs, people traffic, NAFTA, the new border wall and other current situations affect the flow of waste tires through the border?

Vector control proposed questionnaire

1. How many mosquito breeding locations have been reported annually since 2005?
2. How many of the annual mosquito breeding locations reported consisted of used or scrap tires from 2005 to this date?
3. Do you keep a record of the location of tires breeding mosquitoes?
4. What happens after a mosquito breeding location consisting of used tires has been identified? Please describe the process.
5. How much money does your department spend each year in the control of mosquito breeding locations?
6. Description of the costs and the percentage each one represents to the total, from 2005 to this day.
7. Source(s) of the money spent in the control of mosquito breeding locations.
8. Personnel employed in the control of mosquito breeding locations each year from 2005 to this day.
9. What benefits do employees receive?
10. Classify the percentage of employees in your department according to the country they live in. (i.e. 40% in Mexico, 60% USA-Texas)
11. Is there additional study, report or information you would consider relevant regarding used tires?

In case they collect the tires:

12. Does your department collect whole used or scrap tires?
13. How many tires has the department collected annually, from 2005 to this date?
14. Where has the department taken the collected tires?
15. Do you charge or pay for collecting used tires? How much?
16. Source of the money spent in used in the management and proper disposition of used tires each year from 2005 to this day.

Proposed questionnaire for code compliance (Illegal dumping)

1. How many Illegal dumping reports have you received annually from 2005 to this date?
2. How many of such reports involved whole used or scrap tires?
3. What is the location of each whole used or scrap tires illegal dumping site?
4. How many tires were involved in each incident?
5. What happens after a whole used or scrap tires illegal dumping site has been reported? Please describe the process.
6. How much money does your department spend each year in the control of illegal dumping sites?
7. How much money does your department spend each year in the control whole used or scrap tires illegal dumping sites?
8. Description of the costs and the percentage each one represents to the total, from 2005 to this day.
9. Source(s) of the money spent in the control of whole used or scrap tires illegal dumping site.
10. How much personnel has been employed in the control of whole used or scrap tires illegal dumping sites each year from 2005 to this day.
11. What benefits do employees receive?
12. Classify the percentage of employees in your department according to the country they live in. (i.e. 40% in Mexico, 60% USA-Texas)
13. Is there additional study, report or information you would consider relevant regarding whole used or scrap tires illegal dumping sites?

Proposed questionnaire for fire departments

1. To how many problems or emergencies have you attended each year from 2005 to this date?
2. What problems involving whole used or scrap tires do you attend to?
3. How many of each of the problems mentioned have occurred in your jurisdiction each year from 2005 to this date?
4. When and where did the events occur? (Date and Address.)
5. Approximately how many tires were involved in each incident?
6. What was the cause of each event?
7. How many human loses and injured did each event caused?
8. How many people had to be evacuated or were affected by each event, in any side of the border?
9. Which were the material damages or loses caused by each event?
10. How do you think each event could have been prevented?
11. How much time and money does your department spend each year in the control of whole used and scrap tire related events?
12. Description of the costs and the percentage each one represents to the total, from 2005 to this day.
13. Source(s) of the money spent in whole used and scrap tire related events.
14. How many people in your department deals with whole used and scrap tire related events?
15. What benefits do employees receive?
16. Classify the percentage of employees in your department according to the country they live in. (i.e. 40% in Mexico, 60% USA-Texas)

Proposed questionnaire for large Tire dealers

New tires

1. What type of tires do you sell? (light, heavy, agricultural vehicles)
2. How many new tires do you sell annually since 2005? (How many for light vehicles? How many for heavy vehicles? Agricultural?)
3. Do you keep a record of your clients and quantities of tires they buy?
4. Do you consider yourself one of the largest tire dealers in the area? Or medium?

Used tires

5. What do you do with the used tires that are left over from you client's tire replacement?
6. What fee do you charge to dispose of your client's used tires? Has this fee changed much since 2005?
7. How many used tires do you normally stock? How frequently do you have to haul them away?
8. Are you registered with the TCEQ as a tire generator? Why?
9. Are your employees allowed to take the used tires themselves? Why? Is this a formal or an informal policy?
10. Is your policy regarding the employees taking away the used tires obeyed?
11. Do you keep a record of the tires employees take away?
12. Do you allow or have knowledge of people external to the company taking away used tires without any record of it?
13. Do you consider that most people in the area buy new tires or used ones?
14. Would you consider that the sale of used tires is a big competition for your business?
15. Do you also sell used tires? Why?

If you sell used tires

16. How many used tires have you sold annually from 2005?
17. Who buys used tires? Why?
18. Do you keep a record of your clients and quantities of used tires they buy?
19. Do you only sell used tires derived from your own business or do you get additional used tires from someone else? Do you keep a registry of your used tire suppliers?
20. Do you sell used tires to someone who re-sells them across the border?
21. Do you know if most of the people who buy your used tires are locals or do they come from other locations, for example Mexico?

22. Do you have some standard on the used tires that you can sell? When do you decide that a used tire is no longer fit for driving?
23. What percentage of the used tires you get from client's replacement or otherwise can be reused for vehicles?
24. If you have used tires that can no longer be used in vehicles, can you sell them to other people? For what purposes?
25. Approximately what is the useful life of a used tire?

Others

26. Have there been any incidents or accidents regarding used tires from 2005 to this date? Elaborate please.
27. How do you keep attire related accidents or risky incidents from happening?
28. Do you keep a record of the used reusable tires you have in inventory? Why?
29. How many employees do you have?
30. How many people do you employ in this process?
31. Do your employees last for a long time or do you have a lot of rotation?

Used tire dealers proposed questionnaire

About the origin:

1. Where do they come from?

About the sales:

2. Do you sell wholesale, retail or both?
3. How do they sell more tires? (retail or wholesale)
4. Do you export?
5. How many tires they sell a month?
6. What time of the year they sell more.
7. How can I cross my tires?
8. Who buys in retail?
9. Who buys in wholesale?
10. What is the average price of a used car or light truck tire?
11. What is the average price of a used heavy truck tire?
12. Do your clients leave the scrap tires with you?
13. How much do you charge your clients for receiving their used tires?
14. In general which are the tire sizes that Mexican people look for?

About the tires:

15. Sizes available?
16. Is there a warranty?
17. How do they price them?

About legal compliment:

18. Are you registered in the TCEQ?
19. Where do you dispose of your scrap tires?
20. How much do you pay for disposal?

Social impact

21. How many people do you employ?

Ask him if he could sign a quotation letter.

Finally:

- Describe the store (take pictures).
- Ask for a business card.
- Ask who else sells used tires?

Tire haulers proposed questionnaire.

Management

1. What is your role as a used tire hauler?
2. What is the process of a used tire since it's picked up until it arrives to its final destination?
3. What has been the fee for the transport of used tires from 2005 to the present day? What are the main reasons for the change in the fee? (Gas prices, stringent waste management enforcement, etc.)
4. Do you only transport used tires? What other items do you transport? Do you transport mixed items in the same container?
5. Who are your used and scrap tire suppliers? Who generates the largest percentage?
6. Who are your used and scrap tire destinataries? Who accepts the largest percentage?
7. What kind of vehicles do you use in the transport of used and scrap tires? How many do you have?
8. How many tires fit in your vehicles?
9. How many tires do you typically haul in one ride?
10. In a single trip, do you transport tires from only a single generator or you go to several generators until you fill the vehicle?
11. Do you transport tires across the border into Mexico?
12. If you do, how frequently are you hired for the service?
13. Do you allow your workers or employees to take away used tires?
14. Do you have a formal or implicit policy regarding employees or taking away used tires? Is it obeyed?
15. Do you allow or have knowledge of people external to the company taking away used tires without any record of it?
16. What percentage of the tires you receive is considered reusable for vehicles? What percentage is just scrap?
17. Do you ever sell reusable tires to clients from across the border? Does your competition? How frequent would you say this is in general?
18. Would you say that hiring tire haulers for illegal dumping is a common practice in the area where you live? Where is it common?

Registration and legal requirements

19. Is your business registered in the TCEQ?
20. Do you know the environmental laws that regulate your operation as a tire hauler?
21. Do you comply with the environmental laws that regulate your operation as a tire hauler? How?

22. If you transport tires across the border to Mexico, what are the documents and legal requirements that apply?
23. What are the requirements that the final destinatary must have in order for you to deliver the used tires? Does this matter very much?
24. Do you keep a record of the number, origin and destiny of the used and scrap tires you transport?
25. Do you have a contract or other legal bindings with your used and scrap tires receivers? Why?

Recordkeeping and stock

26. Do you keep a record of the used tires received? Why?
27. Would you provide us with a list of your used and scrap tires receivers?
28. Do you keep a record of your used and scrap tire suppliers? Who are the largest and who the smallest?
29. What is the average stock of tires that you transport in a month? Is it constant or does it change throughout the year?
30. What tendencies in the number of used tires that you transport have you seen in the past 5 years (i.e. 2005 to the present day)?
31. Do you keep a record of the people from which you receive used reusable tires?
32. How many used reusable tires have you received annually from 2005 to this date?
33. Do you keep a record of the used reusable tires you have in inventory? Why?
34. How many used reusable tires did you have in storage at the end of each year from 2005 to this date?
35. Do you keep a record of tires employees take away?
36. Do you keep a record of the used reusable tires you transfer or sell? Why?
37. Do you keep a record of your clients and quantities of used reusable tires they buy?
38. How many used reusable tires have you transferred or sold annually from 2005 to this date?

Storage

39. Do you stock or accumulate used and/or scrap tires? ¿Why? ¿How many in average?
40. Where do you stock or accumulate used and/or scrap tires?
41. What are the conditions of your storage facilities?
42. Do you store used tires you would consider to be reusable?
43. Do you charge to store used and scrap tires? How much?
44. How much has the storage of one tire cost from 2005 till today?

Other

45. Do you have a contract or other legal bindings with your used and scrap tires suppliers? Why?
46. Do you know the applications the used and scrap tires will have after you deliver them? Which ones?
47. Is the transport of used and scrap tires your main business? If not, which is?
48. How many people do you employ?
49. How many days of the year do you operate?
50. What benefits do the employees receive?

Proposed questionnaire for collection stations

1. ¿Are you registered in the TCEQ ?
2. How are you registered? Generator, transporter, processor, storage facility or disposal facility?
3. Do you ever receive used tires you would consider to be reusable?
4. Do you keep a record of the used reusable tires received? Why?
5. Is there a period of the year when the entrance of used reusable tires increases or diminishes? Do you know or have a theory of why this happens?
6. Do you keep a record of the people from which you receive used reusable tires?
7. How many used reusable tires have you received annually from 2005 to this date?
8. Do you store used tires you would consider to be reusable?
9. Do you keep a record of the used reusable tires you have in inventory? Why?
10. How many used reusable tires did you have in storage at the end of each year from 2005 to this date?
11. Do you allow your workers or employees to take away used tires?
12. Do you have a formal or implicit policy regarding employees taking away used tires? Is it obeyed?
13. Do you keep a record of the tires employees take away?
14. Do you allow or have knowledge of external people taking away used tires without any record of it?
15. Do you charge or pay for receiving used and scrap tires? How much?
16. Do you charge or pay for receiving used reusable tires? How much?
17. Do you charge or pay for transferring used and scrap tires? How much?
18. Do you charge or pay for transferring used reusable tires? How much?

Proposed questionnaire for storage facilities

1. Are you registered with TCEQ as a scrap tire generator?
2. Have there been any incidents or accidents regarding used tires from 2005 to this date? Elaborate please.
3. How do you keep accidents or risky incidents from happening?
4. Do you transport used tires?
5. What kind of vehicle do you use to transport used tires?
6. Do you ever receive used tires you would consider to be reusable?
7. Do you keep a record of the used reusable tires received? Why?
8. Is there a period of the year when the entrance of used reusable tires increases or diminishes? Do you know or have a theory of why this happens?
9. Do you keep a record of the people from which you receive used reusable tires?
10. How many used reusable tires have you received annually from 2005 to this date?
11. Do you store used tires you would consider to be reusable?
12. Do you keep a record of the used reusable tires you have in inventory? Why?
13. How many used reusable tires did you have in storage at the end of each year from 2005 to this date?
14. Do you allow your workers or employees to take away used tires?
15. Do you have a formal or implicit policy regarding employees or taking away used tires? Is it obeyed?
16. Do you keep a record of tires employees take away?
17. Do you allow or have knowledge of people external to the company taking away used tires without any record of it?
18. Do you export used tires? To where?
19. Do you ever transfer or sell used reusable tires?
20. Do you attend people interested in obtaining exclusively tires considered reusable?
21. Do you keep a record of the used reusable tires you transfer or sell? Why?
22. Do you keep a record of your clients and quantities of used reusable tires they buy?
23. How many used reusable tires have you transferred or sold annually from 2005 to this date?
24. Are there any conditions a person has to comply in order for you to sell or transfer to him reusable tires?
25. How much time passes before a client returns to buy again used reusable tires?

26. How do you distinguish between a reusable and a non-reusable tire?
27. What percentage of the tires you receive is considered reusable?
28. Do you charge or pay for receiving used and scrap tires? How much?
29. Do you charge or pay for receiving used reusable tires? How much?
30. Do you charge or pay for transferring used and scrap tires? How much?
31. Do you charge or pay for transferring used reusable tires? How much?
32. Which has been the approximate cost of storing one tire from 2005 to this date?
33. Would you provide us with an estimate of the inputs and the percentage each input represents in the cost of storage of one tire?
34. Would you please describe the storage process, from meeting the source of tires, receiving them to handling and disposal or transfer of them?
35. How many people do you employ in this process?
36. What benefits do the employees receive?
37. Classify the percentage of employees in your recycling facilities according to the country they live in. (i.e. 40% in Mexico, 60% USA-Texas)

Landfill managers proposed questionnaire

General

1. Do your operations include the land filling of used and scrap tires?
2. Please describe the typical process of how your facility manages used and scrap tires from collection point and method to yearly reports to the authorities of tires disposed of.
3. Is your landfill registered with the TCEQ? What is the registry number?
4. Are there any other registered landfills within 30 miles that also handle used and scrap tires?
5. What is the capacity of your landfill? When was it built? When will the capacity be reached?

Recordkeeping

6. How many tires have you processed/disposed of yearly from 2005 to the current date?
7. How do you keep an account of the tires you process or dispose of?
8. Do you keep any other records concerning the processing or disposal of used or scrap tires? (i.e. how many you shredded vs. how many were land filled as a whole, how many tires are shredded and used for other purposes or sold, how many come from specific sources such as collection points vs. how many are picked up in the streets, etc.)
9. Have you ever had an accident regarding used or scrap tires? (i.e. fires). If so, do you have a procedure to document it and save it in your records?
10. What has been the operative cost of disposal per tire from 2005 to this day?
11. What do you charge the end user for disposal per tire from 2005 to this day?

Used tire management

12. Do you commercialize or transfer used tires in good condition? Why?
13. Is it legally possible for you to commercialize or transfer used tires in good condition? What would be the procedure? Would it be profitable?
14. If a used tire in relatively good condition arrives, are employees allowed to take it with them to reuse?
15. In your view, is this policy obeyed?
16. Do you allow or have knowledge of people external to the company taking away used tires without any record of it?
17. How do you distinguish used tires in “good condition” to be reused in vehicles?
18. What percentage of the tires you handle would you consider reusable?

19. Do you landfill used tires directly without processing them (i.e. shredding, chipping, etc.)
20. Are you registered as a scrap tire facility in the TCEQ? Why?
21. Do you transport the tires from the collection point until your landfill? If yes, are you registered as a transporter before the TCEQ?
22. Do you use separate vehicles to transport tires than the rest of the waste you collect? Why?
23. Do you landfill tires in the same cells than the rest of the waste? Why?
24. Do you have or know of any plans to recycle the tires you receive? (i.e. chip them to manufacture other products, or use the whole tires as support walls for the landfill, etc?)

Others

25. How do used and scrap tires compare to the other waste you handle? For example in terms of space costs, handling, pre-processing costs, etc?
26. Would you say that land filling used and scrap tires is a profitable business? Why or why not?
27. In your view, what would be the most sensible way of dealing with used and scrap tires? Why?
28. What is necessary to achieve that solution?
29. How many people do you employ? Are any of them used exclusively for tire management?
30. Do any of your employees live in Mexico?
31. Have you seen any trends in the number of tires you have managed from 2005 to this day? What do you think are the reasons behind?
32. How do you keep tire related accidents or risky incidents from happening?
33. Do you know of any illegal tire dumps in your area?
34. Is there a legal way to transfer used tires to Mexico to be disposed of? Which one is it?
35. How profitable would it be to dispose of the tires in Mexico? Why?

Information request

MR. MICHAEL BLUMENTHAL
US/MEXICO BORDER REGION SCRAP TIRE COMMITTEE,
RUBBER MANUFACTURERS ASSOCIATION

By this mean of contact we allow ourselves to inform you that our company IEMS (Integrated Environmental Management Services) is performing a study of vital relevance for the Texas-México border, the study will be elaborated for the North American Development Bank (NADB) and for the United States Environmental Protection Agency (EPA), it is mainly about determining the tire flow through the Texas-Mexico border.

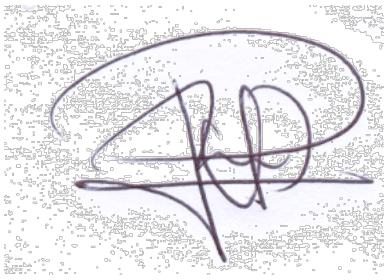
As a general objective; the intention is to determine the environmental, social and economic impacts of the flow through the border of new and used tires from the state of Texas to the Mexican states with which it shares a border.

This is why we request your valuable collaboration to obtain the information regarding the topics described below:

- Amount of tires manufactured and sold in Texas from 2005 to this date (best if the information can be provided on a yearly basis).
- Amount of tires imported from other states or countries and sold in Texas from 2005 to this date.
- Amount of used tires (from Texas manufacturing plants, from other U.S. States or from other countries) sold in Texas from 2005 to this date, and the general state of this market.
- Amount of tires recycled, used as alternative fuel for cogeneration or disposed of in Texas from 2005 to this date.
- Amount of new and used tires exported from Texas to Mexico from 2005 to this date.
- Legal and illegal mechanisms to cross tires through the Texas-Mexico border.
- Costs involved in the export of new and used tires from Texas to Mexico.
- Retail and wholesale price of used and new tires in the state of Texas.
- The disposal alternatives for used tires along with your organization's policy on the recommended methods.

We wish to thank you in advance for your cooperation in providing information on these topics whether via e-mail or telephone conference.

Kindest regards,



Ruben Villanueva Peon, M.Sc.

General Manager

Integrated Environmental Management Services S.A. de C.V.

Monterrey, Nuevo León, Mexico.

ATTACHMENT 4
Surveys designed to be applied on Mexico's remote interviews

Printed on 100% recycled fiber paper using solid ink

Anexo: cuestionario Secretaria de Economía (A través de IFAI)

Se solicita información del año 2005 a la fecha. (Información desglosada por año, o por mes, como esté disponible).

Llantas nuevas

1. Número de llantas nuevas importadas a través de cada cruce fronterizo entre México y Texas (2005- ahora) por tipo de llanta (vehículos ligeros, camiones, agrícolas, motocicletas, etc.)
2. ¿Cuál ha sido el número máximo de llantas nuevas que han cruzado la frontera entre México y Texas del 2005 a la fecha?
3. Destino final (reportado en los pedimentos) de las llantas nuevas importadas a través de cada cruce fronterizo entre México y Texas (2005 – ahora).
4. Destino de los recursos económicos captados por los aranceles aplicados a la importación de llantas nuevas en cada cruce fronterizo entre México y Texas (2005- ahora).
5. Padrón de importadores de llantas nuevas a través de los cruces fronterizos entre México y Texas (2005- ahora).

Llantas usadas

1. Cupo de importación de llantas usadas a México (2005- ahora) para cada cruce fronterizo entre México y E.U.
2. Número de llantas usadas importadas a través de cada cruce fronterizo entre México y E.U. (2005- ahora) por tipo de llanta (vehículos ligeros, camiones, agrícolas, motocicletas, etc.).
3. ¿Cuál ha sido el número máximo de llantas usadas que han cruzado la frontera entre México y Texas del 2005 a la fecha?
4. Destino final (reportado en los pedimentos) de las llantas usadas importadas a través de cada cruce fronterizo entre México y Texas (2005-ahora).
5. Destino de los recursos económicos captados por los aranceles aplicados a la importación de llantas usadas en cada cruce fronterizo entre México y Texas (2005- ahora).
6. Padrón de importadores de llantas usadas a través de los cruces fronterizos entre México y Texas (2005- ahora).
7. Cupos asignados a cada importador de llantas usadas a través de los cruces fronterizos entre México y Texas (2005- ahora).
8. Registros de llantas nuevas y usadas que cruzaron la frontera entre Texas y México (de 2005 a la fecha).
9. ¿México exporta llantas usadas? ¿Cuántas? ¿A dónde?

General

10. ¿Por qué se permite la importación de llantas usadas de E.U. a México?
11. ¿Cuáles son los requisitos solicitados para convertirse en un importador de llantas usadas?
12. Vigencia de los cupos asignados a los importadores.

13. ¿Cuáles son los criterios para la asignación de cupos de importación de llantas usadas? ¿Cómo se deciden los cupos anuales? ¿Cómo se decide a qué importador asignarle determinado cupo?

14. ¿Cuál es la proporción de llantas nuevas y usadas de automóviles, camiones, y agrícolas que cruzan la frontera?

15. ¿Cuáles son los cruces fronterizos donde encuentran más importación ilegal de llantas? ¿Tiene algunas estadísticas?

16. ¿México exporta llantas usadas? ¿Cuántas? ¿A dónde?

17. Número de vehículos importados a través de la frontera Texas-México para su desmantelación (2005-fecha).

18. ¿Cuál es el criterio utilizado para decidir si una llanta usada se puede importar a México o no? (para reúso, reciclaje, combustible alterno).

19. ¿Cuál es la política mexicana en cuanto a permitir el paso de llantas usadas desde E.U. que solo se desecharán?

Cuestionario enviado al delgado René Chavira, Secretaria de Economia delegación Chihuahua.

- ¿Cuales fueron los cupos de importación de llanta usada autorizados para Ciudad Juárez? en los años:

2005
2006
2007
2008
2009
2010
2011

- Y/o si existe alguna ley, acuerdo o publicación donde se puedan consultar dichos cupos.

Anexo: Cuestionario Administración Central de Contabilidad y Glosa parte del Sistema de Administración Tributaria (a través de IFAI)

Se solicita información del año 2005 a la fecha. (Información desglosada por año, o por mes, como esté disponible).

Llantas nuevas

1. Número de llantas nuevas importadas a través de cada cruce fronterizo entre México y Texas (2005- ahora) por tipo de llanta (vehículos ligeros, camiones, agrícolas, motocicletas, etc.)
2. ¿Cuál ha sido el número máximo de llantas nuevas que han cruzado la frontera entre México y Texas del 2005 a la fecha?
3. Destino final (reportado en los pedimentos) de las llantas nuevas importadas a través de cada cruce fronterizo entre México y Texas (2005 – ahora).
4. Arancel aplicado a la importación de llantas nuevas provenientes de E.U. de 2005 a la fecha.
5. Cantidad recaudada por los aranceles aplicados a la importación de llantas nuevas en cada cruce fronterizo entre México y Texas (2005- ahora).
6. Destino de los recursos económicos captados por los aranceles aplicados a la importación de llantas nuevas en cada cruce fronterizo entre México y Texas (2005- ahora).
7. Padrón de importadores de llantas nuevas a través de los cruces fronterizos entre México y Texas (2005- ahora).
8. Origen de llantas nuevas importadas a través de los cruces fronterizos entre México y Texas (2005- ahora).
9. Origen de llantas nuevas importadas en México.

Llantas usadas

1. Cupo de importación de llantas usadas a México (2005- ahora).
2. Número de llantas usadas importadas a través de cada cruce fronterizo entre México y E.U. (2005- ahora) por tipo de llanta (vehículos ligeros, camiones, agrícolas, motocicletas, etc.).
3. ¿Cuál ha sido el número máximo de llantas usadas que han cruzado la frontera entre México y Texas del 2005 a la fecha?
4. Destino final (reportado en los pedimentos) de las llantas usadas importadas a través de cada cruce fronterizo entre México y Texas (2005-ahora).
5. Arancel aplicado a la importación de llantas usadas provenientes de E.U. de 2005 a la fecha.
6. Cantidad recaudada por los aranceles aplicados a la importación de llantas usadas en cada cruce fronterizo entre México y Texas (2005- ahora).
7. Destino de los recursos económicos captados por los aranceles aplicados a la importación de llantas usadas en cada cruce fronterizo entre México y Texas (2005- ahora).
8. Padrón de importadores de llantas usadas a través de los cruces fronterizos entre México y Texas (2005- ahora).
9. Cupos asignados a cada importador de llantas usadas a través de los cruces fronterizos entre México y Texas (2005- ahora).

10. Origen de llantas usadas importadas a través de los cruces fronterizos entre México y Texas (2005- ahora).
11. Número de llantas usadas ilegales decomisadas en los cruces fronterizos entre México y E.U. (2005- ahora).
12. Frecuencia de hallazgos de contrabando de llantas usadas.
13. ¿Qué destino y manejo se le da a las llantas incautadas?
14. Registros de llantas nuevas y usadas que cruzaron la frontera entre Texas y México? (de 2005 a la fecha).
15. ¿México exporta llantas usadas? ¿Cuántas? ¿A dónde?

General

17. ¿Existe algún representante del sector llantero en la administración general de aduanas? ¿Cuál es su contacto?
18. ¿Cuál es la proporción de llantas nuevas y usadas de automóviles, camiones, y agrícolas que cruzan la frontera?
19. ¿Cuáles son los cruces fronterizos donde encuentran más importación ilegal de llantas? ¿Tiene algunas estadísticas?
20. ¿México exporta llantas usadas? ¿Cuántas? ¿A dónde?
21. Número de vehículos importados a través de la frontera Texas-México para su desmantelación (2005-fecha).

Anexo: solicitud de información a secretario Ing. Fernando Gutiérrez Moreno, Secretaría de Desarrollo Sustentable del Estado de Nuevo León

1. Listado de los rellenos sanitarios, basureros y tiraderos localizados por la Secretaría en el estado de Nuevo León.

(Si es posible, su localización o datos para localizar cada uno, ya sea por medio de su dirección, coordenadas geográficas o cercanía con alguna población)

2. Cualquier estudio o información que incluya a sitios de disposición, manejo, venta, transporte o importación de llantas usadas con que cuente la Secretaría. (Incluyendo el estudio base para la realización de su manual de gestión integral de residuos “proyecto de limpieza de tiraderos a cielo abierto en 22 municipios de Nuevo león 2008-2009”)

3. Datos de contacto de sus homólogos involucrados en el seguimiento a la problemática generada por las llantas usadas en los estados de Tamaulipas, Coahuila y Chihuahua.

Anexo: cuestionario para aduanas detallado

1. ¿Cuáles son los mecanismos legales de paso de llantas nuevas y usadas a través de la frontera? ¿Cómo es la pre-importación, los impuestos, la post-importación?
2. ¿Cuáles son los mecanismos ilegales de paso de llantas nuevas y usadas a través de la frontera?
3. ¿Cuál es la frecuencia de hallazgos de contrabando de llantas (mes/año)?
4. ¿Cuántas llantas incautan al año de 2005 a la fecha? ¿Cómo se manejan?
5. ¿Cuáles han sido la cuota de llantas nuevas y usadas (cantidad) de importación del año 2005 a la fecha?
6. ¿Cuál ha sido el impuesto de importación por llanta nueva y usada del año 2005 a la fecha?
7. ¿Se mantienen registros específicos para las llantas nuevas y usadas que cruzan por esta aduana?
8. ¿Cuál es el número de llantas que han cruzado por esta aduana del 2005-a la fecha?
9. ¿Han notado tendencias en el flujo de llantas nuevas y usadas? (10,5, 1 año)
10. ¿Existe alguna tendencia de flujo según época del año? (clima, por fechas especiales, por temporadas agrícolas)
11. ¿El flujo de llantas nuevas y usadas legales es constante o se da por lotes grandes esporádicos?
12. ¿El flujo de llantas usadas ilegales es constante o se da por lotes grandes esporádicos?
13. ¿Conoce el destino general de las llantas usadas que cruzan por esta aduana? (reventa, reciclaje, energía)
14. ¿Cuál es la proporción de llantas nuevas y usadas de automóviles, camiones, y agrícolas que cruzan la frontera?
15. ¿Quiénes cruzan las llantas? ¿Existen compañías o personas con grandes concesiones o no?
16. ¿Cuál es el tipo de vehículos que se usan para transportar las llantas? (Legal e ilegal) ¿Son vehículos viejos o nuevos?
17. Aproximadamente ¿cuántas llantas se transportan por tipo de vehículo?
18. La mayoría de los vehículos usados para el transporte ¿son americanos o mexicanos? ¿sus conductores?

Nota las siguientes preguntas se realizarán en las entrevistas a todos los actores.

19. ¿Cuál es su rol en el manejo de llantas de desecho?
20. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
21. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
22. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

Anexo: cuestionario detallado para autoridades ambientales municipales (ecología)

Manejo

1. ¿Quiénes tienen a su cargo el manejo de llantas de desecho en su municipio?
2. ¿Cómo se manejan las llantas de desecho dentro de su municipio?
3. ¿De qué forma se usan las llantas de desecho en su municipio? (reúso, reciclaje, combustible, manufactura de productos, obra civil.)
4. ¿Cuál es el procedimiento adecuado para disponer de las llantas de desecho?
5. ¿Existen o han existido, programas municipales específicos para el manejo de llantas? ¿Por qué o por qué no?
6. ¿Existe algún sistema de seguimiento de llantas que son importadas legalmente desde la frontera de Texas?
7. ¿Tiene conocimiento de algún proyecto que se haya dado en su municipio referente al reciclaje, uso como combustible, uso para obra civil? Si es afirmativo, ¿de quién fue iniciativa? ¿qué sucedió?

Datos y cantidades.

8. Aproximadamente ¿cuántas llantas de desecho hay en el municipio? ¿Cómo ha cambiado esta cantidad del año 2005 a la fecha?
9. ¿Cuántos vehículos se encuentran registrados en el municipio' (parque vehicular)
10. ¿Cuántos deshuesaderos (yonkes) existen en el municipio? ¿Cuál es su tamaño aproximado?
11. ¿Qué proporción de llantas se estima se manejan de acuerdo al procedimiento adecuado para disponer de ellas?
12. ¿Dónde se localizan los sitios de disposición legal de llantas y dónde los ilegales? (Mapa)
13. ¿Qué proporción de la población de su municipio estima que sea consumidor de llantas nuevas traídas de Texas? ¿de llantas nuevas nacionales? ¿de llantas usadas de Texas? ¿de llantas usadas nacionales?

Impactos económicos

14. ¿Qué fracción del presupuesto municipal se destina al manejo de residuos sólidos urbanos o de manejo especial?
15. ¿Qué fracción se destina a programas específicos de llantas?
16. ¿Cuánto le cuesta al municipio el manejo adecuado de las llantas?
17. ¿Existe algún cobro unitario (por llanta) para su disposición adecuada? Si es así, ¿a quién se le cobra y cuánto es?

Impactos ambientales

18. ¿Ha notado algunas tendencias de 2005 a la fecha respecto a la gravedad que los impactos de llantas de desecho ocasionan a su municipio?
19. En comparación a otros problemas ambientales con los que se enfrenta la población local, ¿qué tan importante es el problema de las llantas? ¿Cuáles son los problemas más graves? ¿Por qué?

Su opinión experta

20. Desde su perspectiva, ¿qué hace falta para que menos llantas vayan a los tiraderos?
21. Además de la cercanía con Texas, ¿qué motiva que los ciudadanos consuman llantas de Texas en vez de las nacionales?
22. Desde su perspectiva, ¿quiénes son los beneficiados y los afectados por el flujo de llantas nuevas y usadas desde Texas a su municipio?
23. ¿Qué herramientas le serían más útiles para manejar adecuadamente las llantas de desecho en su municipio?

Nota: las siguientes preguntas se realizarán en las entrevistas a todos los actores.

24. ¿Cuál es su rol en el manejo de llantas de desecho?
25. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
26. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
27. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

Anexo: cuestionario para protección civil detallado

Incidentes relacionados a llantas usadas

1. ¿Qué incidentes ha habido en la localidad que se relacionen con tiraderos de llantas? ¿Del 2005 a la fecha?
2. De los incidentes mencionados, ¿cuántos atendieron? ¿Cuánto personal se requirió? ¿Cuánto tardaron en resolver el asunto?
3. ¿Hubo fatalidades en alguno de ellos?
4. ¿Cuál fue la pérdida material ocasionada por estos incidentes?
5. ¿Cuáles son los incidentes más frecuentes en relación a los tiraderos de llantas?
6. ¿Qué tipo de incidente es el más sencillo y el más difícil de prevenir? ¿Por qué?
7. ¿Qué tipo de incidente es el más sencillo y el más difícil de combatir? ¿Por qué?

Daños a la población relacionados a llantas usadas

8. ¿Qué tipo de incidentes afectan a más personas?
9. ¿Tienen ustedes campañas de prevención de incidentes por causa de llantas mal desechadas? ¿Por qué?
10. ¿Podría identificar, en su municipio, los tiraderos ilegales de llantas? (mapa).
11. ¿Cuáles son los riesgos a la población de un mal manejo de llantas usadas?

Gastos relacionados a llantas usadas

12. ¿Cuántos recursos han destinado al combate de incidentes de 2005 a la fecha?
13. ¿Cuántos recursos se han destinado a la prevención de incidentes de 2005 a la fecha?
14. En su situación actual, ¿qué hace falta con más urgencia para minimizar los riesgos a la población ocasionados por un mal manejo de llantas de desecho?

Su opinión experta

15. En su opinión, ¿existe un problema con llantas tiradas ilegalmente en el municipio? Si es así, ¿qué tan importante es con respecto a otros problemas?

En su opinión, ¿cómo debería ser el manejo de llantas óptimo para minimizar los riesgos a la población?

Nota: las siguientes preguntas se realizarán en las entrevistas a todos los actores.

16. ¿Cuál es su rol en el manejo de llantas de desecho?
17. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
18. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?

¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

Anexo: cuestionario detallado para representantes de sitios de disposición final y tabla de características de sitio.

Sobre el sitio:

1. Direcciones para su fácil localización.
2. ¿Volumen de basura que recibe diariamente (m^3/día)?
3. ¿Número de llantas acumuladas de manera separada?
4. ¿Tiempo de operación? (años)
5. ¿Vida útil? (años)
6. ¿Número de celdas en uso, cerradas y por utilizarse?
7. ¿Área de cada celda (m^2)?
8. Profundidad bajo el nivel del suelo de cada celda. (m)
9. Altura sobre el suelo para cada celda.
10. ¿El acceso al sitio es controlado?
11. ¿Lleva un registro de la cantidad de llantas que ingresan? ¿Cómo? ¿Por qué?
12. ¿Existe un área especial para colocar llantas exclusivamente? ¿Por qué?
13. Si existen pepenadores; ¿Estos recolectan las llantas? ¿Por qué si o no?

Tabla de características del sitio:

Número de celdas en uso.	**Número de celda en uso.**	Área de cada celda. (m^2)	Profundidad bajo el nivel del suelo de cada celda. (m)	Altura sobre el suelo planeada para cada celda. (m)

Número de celdas cerradas o por cerrarse en menos de un año.	**Número de celda cerrada o por cerrarse en menos de un año.**	Área de cada celda. (m^2)	Profundidad bajo el nivel del suelo de cada celda. (m)	Altura sobre el suelo planeada para cada celda. (m)

Número de celdas por usarse.	**Celdas por usarse.**	Área de cada celda. (m^2)	Profundidad bajo el nivel del suelo de cada celda. (m)	Altura sobre el suelo planeada para cada celda. (m)

Sobre llantas de desecho:

23. ¿Reciben llantas? ¿Por qué si/no?
24. ¿Cuál ha sido la cantidad de llantas almacenadas anualmente del 2005 a la fecha?
25. ¿Qué porcentaje del total en masa, representan las llantas?
26. ¿Qué porcentaje del total en volumen, representan las llantas?
27. ¿Se procesa de alguna forma las llantas que ingresan?
28. ¿Observa alguna tendencia en el número de llantas que ingresan legalmente?
29. ¿Observa alguna tendencia en el número de llantas colectadas?
30. ¿Observa alguna tendencia en el número de llantas que ingresan ilegalmente?
31. ¿Observa alguna tendencia en el número de llantas en general?
32. ¿Es posible identificar las llantas que provienen de Texas? ¿Cómo lo hacen?

Sobre impactos económicos:

33. ¿Tiene un costo el desechar llantas en su relleno? ¿Cuál es? ¿En qué se aplica el dinero recibido?
34. ¿Qué porcentaje del total del costo de disposición representan las llantas?

Incidentes que involucren llantas:

35. ¿Han tenido algún incidente que involucre llantas?
36. ¿Cómo se resolvió el incidente?
37. ¿Cuánto costó el incidente?
38. ¿Cuántas personas se ocuparon en resolverlo?
39. ¿Cuánto tiempo tomó resolverlo?
40. ¿Tiene conocimiento de incidentes que involucraran llantas en la zona, que hayan ocurrido en los 5 años pasados?

De manera ideal:

41. ¿Cómo mejoraría el manejo de las llantas en su relleno?
42. ¿Cómo evitaría que las llantas de desecho fueran abandonadas en sitios ilegales y fueran llevadas al relleno?
43. ¿Cómo piensa que se deberían de manejar las llantas de desecho a nivel regional?

Nota: las siguientes preguntas se realizarán en las entrevistas a todos los actores.

44. ¿Cuál es su rol en el manejo de llantas de desecho?
45. ¿Cómo afecta la seguridad debido al narcotráfico y trata de personas, el TLC, el nuevo muro fronterizo y otros acontecimientos actuales al flujo de bienes a través de la frontera, específicamente llantas?
46. ¿Cuáles son los problemas más grandes del flujo transfronterizo de llantas nuevas y usadas?
47. ¿Cuáles son las oportunidades más grandes del flujo transfronterizo de llantas nuevas y usadas?

Anexo: cuestionario para recicladores de llanta muerta y potenciales recicladores de llanta muerta

Datos generales

1. Nombre de la empresa:
2. Dirección:
3. Persona otorgando la entrevista:
4. Puesto:
5. Giro industrial:
6. Productos que generan:

Llantas procesadas

7. ¿Utilizan llantas usadas como insumo?

Si No

8. ¿Qué beneficios obtienen a partir del aprovechamiento de llantas de desecho?

9. ¿Cuánta es la máxima cantidad de llantas que pueden consumir en un año?

10. ¿Cuántas llantas procesaron en los años?

2005

2006

2007

2008

2009

2010

2011

11. ¿Pueden recibir llantas enteras?

Si No ¿Qué tamaños?_____

12. ¿Pueden recibir llantas molidas?

Si No ¿Qué tamaños de partícula?_____

13. ¿Pueden recibir llantas cortadas en 3 partes? (es decir a las cuales se les cortaron las paredes)

Si No ¿Porqué?

_____

_____

_____

_____

14. ¿Las llantas que reciben deben cumplir con características específicas?

Si No

¿Cuáles?_____

_____

_____

Modificaciones a su proceso

15. ¿En qué parte de su proceso utilizan llantas como insumo?

16. ¿Fue necesario modificar su planta para poder recibir llantas?

Si No

El cambio consistió en:

_____

_____

_____

_____

17. ¿De cuánto fue la inversión para poder recibir llantas?

18. ¿Cuánto tiempo tomó hacer las modificaciones?

Abastecimiento

19. ¿De dónde provienen las llantas de desecho que consumen?

20. Para recibir llantas:

Cobran Pagan ¿Cuánto?_____

21. ¿Existen requisitos para ser su proveedor de llantas de desecho?

22. ¿Mantienen un inventario al aire libre para asegurar el abasto de llanta de desecho?

No Si ¿De cuántas llantas aprox?_____

Reúso de llantas

23. Del total de llantas que manejan ¿Qué porcentaje es revendido como llanta usada?

24. Del total de llantas usadas revendidas (**Si aplica**); que porcentaje se clasifica como:

Tipo	**Porcentaje**
➢ Seminuevas	
➢ Tipo 1 (40-60% Vida útil restante)	
➢ Tipo 2 (20-40% Vida útil restante)	
➢ Tipo 3 (hasta 20% de vida útil restante)	
	100%

Anexo: cuestionario detallado ingeniero Rodolfo Lacy centro Mario Molina, delegación Cuajimalpa, México Distrito Federal.

Les solicito encarecidamente información sobre el estudio que se menciona en su página de internet, específicamente sobre los siguientes datos:

"se realizó un estudio de caso en Ciudad Juárez, Chihuahua, por ser una entidad con elevados problemas de contaminación atmosférica con un parque vehicular de aproximadamente 450 mil unidades, donde el 90% son autos usados provenientes de Estados Unidos." [1]

Sobre la cuantificación de vehículos:

1. ¿Año en que se realizó el conteo de vehículos?
2. ¿Ha habido actualizaciones?
3. ¿Cuentan con cifras históricas del incremento de vehículos del 2005 a la fecha?
4. ¿Cuentan con estudios ó cifras similares para otras ciudades de la frontera norte?
5. ¿Sería posible obtener una copia del estudio o sus reportes?

En su opinión como experto en la materia:

6. ¿Considera que el número de automóviles por habitante de Ciudad Juárez y su porcentaje de origen americano es extrapolable a las demás ciudades en la frontera de México con Texas?
7. ¿La quema y/o incendio de llantas tiene o ha tenido algún impacto relevante en la calidad del aire en las ciudades fronterizas? (Corto, mediano y largo plazo.

[1] Centro Mario Molina (2007) Campaña de Medición de Emisiones Vehiculares de Ciudad Juárez. Extraído el 20 de Octubre del 2011 desde http://www.centromariomolina.org/calidad-del-aire/juarez/

Solicitud de información a SAT a través de IFAI

Necesito saber ¿Cuáles fueron las cuotas de importación de llantas usadas autorizadas por la Secretaría de Economía para Cd. Juárez Chihuahua? Para los años 2005,2006,2007, 2008, 2009, 2010, 2011, 2012.

ATTACHMENT 5
Texas fieldwork itinerary

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
1	8/29/2011	Esteban Ibarra	Webb	Laredo	New & used tires dealer	Not available.
2	8/29/2011	Esteban Ibarra	Webb	Laredo	New & used tires dealer	Not available.
3	8/29/2011	Esteban Ibarra	Webb	Laredo	New & used tires dealer	Not available.
4	8/29/2011	Esteban Ibarra	Webb	Laredo	Used tires dealer	Not available.
5	8/30/2011	Esteban Ibarra	Webb	Laredo	City officials	Environmental Services Department Director/ City of Laredo
6	8/30/2011	Esteban Ibarra	Webb	Laredo	City officials	Solid Waste Services Manager/ City of Laredo
7	8/30/2011	Esteban Ibarra	Webb	Laredo	City and County official	Health Department Environmental Health Services Sanitarian III/ City of Laredo
8	8/30/2011	Esteban Ibarra	Webb	Laredo	City officials	Fire Prevention Div. Fire Inspector/City of Laredo Fire Department
9	8/30/2011	Esteban Ibarra	Webb	Laredo	City officials	Building Development Services Environmental Engineer/City of Laredo
10	8/30/2011	Esteban Ibarra	Webb	Laredo	New tires dealer	Not available.
11	8/30/2011	Esteban Ibarra	Webb	Laredo	Hauler/Processor	Not available.
12	8/30/2011	Esteban Ibarra	Webb	Laredo	Used tires dealer	Not available.
13	8/31/2011	Esteban Ibarra	Webb	Laredo	County official	Chief investigator, Assistant County Attorney/ Office of the Webb County Attorney
14	8/31/2011	Esteban Ibarra	Webb	Laredo	New tires dealer	Not available.
15	8/31/2011	Esteban Ibarra	Webb	Laredo	New tires dealer	Not available.

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
16	8/31/2011	Esteban Ibarra	Webb	Laredo	Used tires dealer	Not available.
17	8/31/2011	Esteban Ibarra	Webb	Laredo	Used tires dealer	Not available.
18	8/31/2011	Esteban Ibarra	Webb	Laredo	Used tires dealer	Not available.
19	9/1/2011	Esteban Ibarra	Cameron	Brownsville	City officials	Fire Marshal/Brownsville Fire Department.
20	9/1/2011	Esteban Ibarra	Cameron	Brownsville	City officials	Department of public health Ordinance Enforcement Officer II/City of Brownsville
21	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
22	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
23	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
24	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
25	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
26	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
27	9/1/2011	Esteban Ibarra	Cameron	Brownsville	New & used tires dealer	Not available.
28	9/1/2011	Esteban Ibarra	Cameron	Brownsville	Used tires dealer	Not available.
29	9/2/2011	Esteban Ibarra	Cameron	Brownsville	City officials	Public Works Department Assistant Director/City of Brownsville
30	9/2/2011	Esteban Ibarra	Cameron	Brownsville	City officials	Public Works Department Landfill Staff/ City of Brownsville

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
31	9/2/2011	Esteban Ibarra	Cameron	Brownsville	City officials	Public Works Department / City of Brownsville
32	9/6/2011	Esteban Ibarra	El Paso	El Paso	City officials	Code Compliance Supervisor, Environmental Services Department/ The City of El Paso
33	9/6/2011	Esteban Ibarra	El Paso	El Paso	City officials	Sustainability Manager/ The City of El Paso
34	9/6/2011	Esteban Ibarra	El Paso	El Paso	City officials	Environmental Services Department Director/ The City of El Paso
35	9/6/2011	Esteban Ibarra	El Paso	El Paso	City officials	Solid Waste Operations Manager, Environmental Services / The City of El Paso
36	9/6/2011	Esteban Ibarra	El Paso	El Paso	City officials	Senior Environmental Scientist, Environmental Services Ordinance & Policy Coordinator/ The City of El Paso
37	9/6/2011	Esteban Ibarra	El Paso	El Paso	Texas Commission on Environmental Quality (TCEQ)	Lead Border Team Coordinator, Intergovernmental Relations, Border Affairs Division/ Texas Commission on Environmental Quality (TCEQ).
38	9/7/2011	Esteban Ibarra	El Paso	El Paso	Texas Commission on Environmental Quality (TCEQ)	Environmental investigator, Office of Compliance and Enforcement/ Texas Commission on Environmental Quality (TCEQ).
39	9/7/2011	Esteban Ibarra	El Paso	El Paso	Texas Commission on Environmental Quality (TCEQ)	Compliance Assistance Specialist, Small business and local government assistance/ Texas Commission on Environmental Quality (TCEQ).
40	9/7/2011	Esteban Ibarra	El Paso	El Paso	Hauler/Processor	Not available.
41	9/7/2011	Esteban Ibarra	El Paso	El Paso	Used tires dealer	Not available.
42	9/7/2011	Esteban Ibarra	El Paso	El Paso	Used tires dealer	Not available.
43	9/7/2011	Esteban Ibarra	El Paso	El Paso	Used tires dealer	Not available.

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
44	9/8/2011	Esteban Ibarra	El Paso, Presidio, Hudspeth, Jeff Davis, Doña Ana, Culberson, Brewster.	El Paso	Council Of Governments officials	Environmental Services Coordinator/ Rio Grande Council Of Governments
45	9/8/2011	Esteban Ibarra	El Paso	El Paso	New tires dealer	Not available.
46	9/8/2011	Esteban Ibarra	El Paso	El Paso	New tires dealer	Not available.
47	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	City officials	Public works assistant director/City of Pharr Public Works Department
48	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	New & used tires dealer	Not available.
49	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	New tires dealer	Not available.
50	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	Used tires dealer/ hauler	Not available.
51	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	Used tires dealer	Not available.
52	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	Used tires dealer	Not available.
53	9/12/2011	Esteban Ibarra	Hidalgo	Pharr	Used tires dealer	Not available.
54	9/13/2011	Esteban Ibarra	Cameron, Hidalgo, Willacy	Hidalgo	Council Of Governments officials	Regional Planning & Services/ Lower Rio Grande Valley Development Council
55	9/13/2011	Esteban Ibarra	Hidalgo	Hidalgo	County official	Health & human services department executive assistant / The County of Hidalgo, Texas
56	9/13/2011	Esteban Ibarra	Hidalgo	Hidalgo	County official	Health & human services department Division Manager/The County of Hidalgo, Texas
57	9/13/2011	Esteban Ibarra	Hidalgo	Pharr	City officials	Health coordinator/ City of Pharr
58	9/13/2011	Esteban Ibarra	Hidalgo	Pharr	City officials	Assistant Fire Marshal/ City of Pharr Fire Rescue

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
59	9/13/2011	Esteban Ibarra	Hidalgo	Pharr	City officials	Community planning and development assistant director/ City of Pharr
60	9/13/2011	Esteban Ibarra	Hidalgo	Pharr	Private solid waste management company	Not available.
61	9/15/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Mc Allen	City officials	Fire Marshal/ City of McAllen Fire Department
62	9/15/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Mc Allen	City officials	Director of environmental & health/ City of McAllen Code Compliance
63	9/15/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Mc Allen	City officials	Stormwater & Environmental Education Manager / City of McAllen Public Works
64	9/16/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Progreso	Used tires dealer	Not available.
65	9/16/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Progreso	Used tires dealer	Not available.
66	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Planning director/ City of Rio Grande
67	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Planner & code enforcement officer/ City of Rio Grande
68	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Vector Control/ City of Rio Grande
69	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Computer operator/Landfill transfer station
70	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Fire chief/Rio Grande City Fire Department
71	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	City officials	Public works director/City of Rio Grande
72	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	New & used tires dealer	Not available.
73	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	Used tires dealer	Not available.

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
74	9/19/2011	Fernanda Rivas, Esteban Ibarra	Starr	Rio Grande City	Used tires dealer	Not available.
75	9/20/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Mc Allen	Used tires dealer	Not available.
76	9/20/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Pharr	New & used tires dealer	Not available.
77	9/20/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	Pharr	New & used tires dealer	Not available.
78	9/21/2011	Fernanda Rivas, Esteban Ibarra	Hidalgo	La Joya	Used tires dealer	Not available.
79	9/21/2011	Fernanda Rivas, Esteban Ibarra	Starr	Roma	City officials	Public Works Director/ City of Roma
80	9/21/2011	Fernanda Rivas, Esteban Ibarra	Starr	Roma	City officials	Landfill secretary/ City of Roma
81	9/21/2011	Fernanda Rivas, Esteban Ibarra	Starr	Roma	New & used tires dealer	Not available.
82	9/21/2011	Fernanda Rivas, Esteban Ibarra	Starr	Roma	New tires dealer	Not available.
83	9/22/2011	Esteban Ibarra	Hidalgo	Mc Allen	New & used tires dealer	Not available.
84	9/23/2011	Esteban Ibarra	Hidalgo	Linn	Hauler/Processor	Not available.
85	9/27/2011	Esteban Ibarra	Harris	Baytown	Hauler/Processor	Not available.
86	9/27/2011	Esteban Ibarra	Harris	Houston	Hauler/Processor	Not available.
87	9/28/2011	Esteban Ibarra	Travis	Austin	Texas Commission on Environmental Quality (TCEQ)	Scrap Tire Program Support/ Texas Commission on Environmental Quality
88	9/29/2011	Esteban Ibarra	Valverde	Del Rio	new & used tires dealer / hauler	Not available.
89	9/29/2011	Esteban Ibarra	Valverde	Del Rio	City officials	Code Compliance, Health Inspector / City of Del Rio

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
90	9/29/2011	Esteban Ibarra	Valverde	Del Rio	City officials	Assistant Chief /City of Del Rio Fire & Rescue Department
91	9/29/2011	Esteban Ibarra	Valverde	Del Rio	City officials	workers/ Del Rio Recycling Center
92	9/30/2011	Esteban Ibarra	Valverde	Del Rio	City officials	Landfill Coordinator, Refuse Department/ City of Del Rio
93	9/30/2011	Esteban Ibarra	Maverick	Eagle Pass	City officials	Recycling Supervisor / City of Eagle Pass Recycling Center
94	9/30/2011	Esteban Ibarra	Maverick	Eagle Pass	City officials	Code compliance officer/ City of Eagle Pass
95	9/30/2011	Esteban Ibarra	Maverick	Eagle Pass	City officials	Public Works & Vector control chief/ City of Eagle Pass
96	9/30/2011	Esteban Ibarra	Valverde, Kinney, Maverick, Dimmit, La Salle, Zavala, Uvalde, Real, Edwards.	Carrizo Springs	Council Of Governments officials	Solid Waste Coordinator/ Middle Rio Grande Development Council
97	10/3/2011	Esteban Ibarra	Valverde	Del Rio	New & used tires dealer	Not available.
98	10/3/2011	Esteban Ibarra	Valverde	Del Rio	New & used tires dealer	Not available.
99	10/3/2011	Esteban Ibarra	Valverde	Del Rio	New & used tires dealer	Not available.
100	10/3/2011	Esteban Ibarra	Valverde	Del Rio	New & used tires dealer	Not available.
101	10/3/2011	Esteban Ibarra	Valverde	Del Rio	Used tires dealer	Not available.
102	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	City officials	Training Officer/ Eagle Pass Fire Department
103	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	Used tires dealer	Not available.
104	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	new & used tires dealer / hauler	Not available.
105	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	New tires dealer	Not available.

Table 1. Tire Flow Study Texas Fieldwork Itinerary Report						
No.	**Date**	**Interviewer(s)**	**County**	**City**	**Type of stakeholder interviewed**	**Position / Public Institution**
106	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	new & used tires dealer	Not available.
107	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	Used tires dealer	Not available.
108	10/3/2011	Esteban Ibarra	Maverick	Eagle Pass	Used tires dealer	Not available.
109	10/5/2011	Esteban Ibarra	Presidio	Presidio	Texas Department of State Health Services	Nurse II/ Team Leader Family and Community Health Services HSR 9&10 / Texas Department of State Health
110	10/5/2011	Esteban Ibarra	Presidio	Presidio	City officials	Code enforcement officer / City of Presidio
111	10/5/2011	Esteban Ibarra	Presidio	Presidio	City officials	City Administrator/ City of Presidio
112	10/5/2011	Esteban Ibarra	Presidio	Presidio	City officials	NREMT-P, CCEMT-P, LP Director of Emergency Services/ City of Presidio
113	10/5/2011	Esteban Ibarra	Presidio	Presidio	New & used tires dealer	Not available.
114	10/5/2011	Esteban Ibarra	Presidio	Presidio	Used tires dealer	Not available.
115	10/6/2011	Esteban Ibarra	El Paso	El Paso	Generator/ Storage facility/former processor	Not available.
116	10/6/2011	Esteban Ibarra	El Paso	El Paso	new & used tires dealer	Not available.
117	10/6/2011	Esteban Ibarra	El Paso	El Paso	new & used tires dealer	Not available.
118	10/6/2011	Esteban Ibarra	El Paso	El Paso	new & used tires dealer	Not available.
119	10/6/2011	Esteban Ibarra	El Paso	El Paso	new & used tires dealer	Not available.
120	10/6/2011	Esteban Ibarra	El Paso	fabens	new & used tires dealer	Not available.
121	10/6/2011	Esteban Ibarra	El Paso	Socorro	Used tires dealer	Not available.
122	10/7/2011	Esteban Ibarra	El Paso	Canutillo	Hauler/Processor	Not available.
123	10/7/2011	Esteban Ibarra	El Paso	El Paso	Texas Department of State Health Services	Regional veterinarian Zoonosis Control HSR 9-10 / Texas Department of State Health Services

ATTACHMENT 6
NADB cooperation request letter
(Spanish and English versions)

North American Development Bank

Banco de Desarrollo de América del Norte

San Antonio, Texas a 15 de Septiembre del 2011

A quien corresponda:

El Banco de Desarrollo de América del Norte (BDAN), creado bajo los auspicios del Tratado de Libre Comercio, es una institución financiera establecida y capitalizada en partes iguales por los gobiernos de México y los Estados Unidos, con el propósito de financiar proyectos de infraestructura ambiental a lo largo de su frontera común. Como institución pionera en su campo, el Banco está trabajando para desarrollar proyectos integrales, sustentables y fiscalmente responsables, con amplio apoyo comunitario, en un marco de colaboración y coordinación estrechas entre México y los Estados Unidos.

Actualmente el BDAN se encuentra llevando a cabo una importante investigación acerca del movimiento y la disposición de llantas a lo largo de la frontera entre México y los Estados Unidos. El objetivo de este estudio es establecer los impactos económicos, sociales y ambientales causados por el movimiento y disposición de las llantas a lo largo de la frontera de Texas y los estados Mexicanos colindantes.

El BDAN ha contratado a la empresa Integrated Environmental Management Services S.A de C.V. (IEMS) para que nos apoye en esta investigación. Esperamos que usted le extienda a IEMS su cooperación y apoyo en sus solicitudes de información durante esta investigación.

Su apoyo y cooperación ayudará hacer que este esfuerzo sea valioso y apoyará los esfuerzos del BDAN para mejorar la calidad de vida y ambiental a lo largo de la frontera entre México y los Estados Unidos.

Atentamente:

Ing. Oscar Cabra Gavito
Director de Servicios Técnicos
Banco de Desarrollo de América del Norte

203 South St. Mary's, Suite 300 • San Antonio, Texas 78205 • 210-231-8000 • Fax: 210-231-6232

North American Development Bank

Banco de Desarrollo de América del Norte

San Antonio, Texas, September 15, 2011

To whom it may concern:

The North American Development Bank (NADB) is a financial institution established and capitalized in equal parts by the United States and Mexico for the purpose of financing environmental infrastructure projects along their common border. As a pioneer institution in its field, the Bank is working to develop integrated, sustainable and fiscally responsible projects with broad community support in a framework of close cooperation and coordination between Mexico and the United States.

The NADB is currently conducting an important investigation on the movement and disposal of tires along the US-Mexican Border. The objective of this study is to establish the economic, social and environmental impacts caused by the movement and disposal of these tires along between Texas and the bordering Mexican states.

The NADB has hired the company Integrated Environmental Management Services S.A. de C.V. (IEMS) to support the NADB in this investigation. We hope that you will extend your cooperation and support to IEMS in their request for information during this study.

Your support and cooperation will help make this a valuable endeavor and support our efforts to improving the quality of life and the environment along the US-Mexican border.

Sincerely,

Oscar Cabra Gavito Jr, P.E.
Technical Services Director
North American Development Bank

203 South St. Mary's, Suite 300 ● San Antonio, Texas 78205 ● 210-231-8000 ● Fax: 210-231-6232

ATTACHMENT 7
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico

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Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
1	Matamoros	Tamaulipas	**2,250,000**	"Ejido of Guadalupe". Road to Reynosa Km 11.5 (7.15 miles)	14	642436	2866898	33	10
2	Rio Bravo	Tamaulipas	**32,000**	Taking federal highway 2 (Reynosa-Matamoros) turn right 4.17 km (2.59 miles) after "Camioneta Tahoe" road. Cross a ditch and continue 3.45km (2.14 miles), turn right and continue 400m (0.25 miles)	14	598665	2868165	89	27
3	Reynosa	Tamaulipas	**200,000**	Open air dump "Las Anacuas". Taking the Reynosa-San Fernando road, turn right on "Beatriz Velazco" (or "Puerto Escondido"), then turn left on "Prolongacion Boulevard Loma Bonita", continue 1.42Km (0.89 miles), the road will turn right, continue 1.17Km (0.72 miles) and the disposal site is located on the right side of the road.	14	568689	2876212	194	59
4	Reynosa*	Tamaulipas*	**50,000***	Open air dump "Las Calabazas"*	14*	Unknown*	Unknown*	Unknown*	Unknown*
5	Reynosa*	Tamaulipas*	**50,000***	Open air dump "Corrales"* UTM coordinates point an approximate location.	14*	575974.53*	2882372.51*	0*	0*

Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
6	Reynosa*	Tamaulipas*	**50,000***	Open air dump "Cumbres"*	14*	Unknown*	Unknown*	Unknown*	Unknown*
7	Reynosa*	Tamaulipas*	**50,000***	"Las Colmenas" Landfill*	14*	Unknown*	Unknown*	Unknown*	Unknown*
8	Reynosa*	Tamaulipas*	**50,000***	"Alto Bonito" Landfill*	14*	Unknown*	Unknown*	Unknown*	Unknown*
9	Reynosa	Tamaulipas	**200**	Km 187.5 (116.5 miles) Monterrey-Reynosa road. UTM coordinates point an approximate location.	14	558979	2880564	263	80
10	Gustavo Dias Ordaz	Tamaulipas	**Unknown**	4Km (2.48 miles) taking the road to Monterrey from Gustavo Diaz Ordaz city.	14	541240	2897625	125	38
11	Camargo	Tamaulipas	**800**	"Las Flores" colony municipal yards. Entering Camargo city from Reynosa turn right on "Acceso No. 4" Drive 750 meters (0.465 miles) then turn left. Continue one block to arrive to the municipal grounds. UTM coordinates point an approximate location.	14	518635	2910553	164	50
12	Miguel Aleman	Tamaulipas	**3,000**	Located on the "5 de Junio" overpass in "Rodriguez" colony. UTM coordinates point an approximate location.	14	496410	2920211	0	0

Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
13	Guerrero	Tamaulipas	**200**	"General Lazaro Cardenaz" street corner with "Adrian Gonzalez Gonzalez". Take "Avenida Hermanos Gutierrez de Lara" towards the city center, turn left on "sexta", and continue 3 blocks west. Behind the city's cemetery.	14	475931	2938002	325	99
14	Nuevo Laredo	Tamaulipas	**Unknown, site was remediated on year 2012**	Integral center for the handling of waste tires. Located on Km 18 (11.2 miles) of national highway Mexico 85. Take Nuevo Laredo-Sabinas Hidalgo road (Mexico 85) continue 11.88km (7.38 miles) starting from the corner with "Luis Donaldo Colosio" boulevard, then turn left and continue 1.5 km (0.96 miles) towards east.	14	443827	3022773	446	136
15	Anahuac	Nuevo Leon	**13,000**	6.5 Km (4 miles) from the city center on the Anahuac-Nuevo Laredo road, on the left side.	14	392412.45	3016770	686	209
16	Cerralvo*	Nuevo Leon*	**200***	Not available*	14*	445886*	2888049*	Unknown*	Unknown*
17	Cerralvo*	Nuevo Leon*	**Unknown***	Not available*	14*	442743*	2888198*	Unknown*	Unknown*

Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
18	Cerralvo*	Nuevo Leon*	Unknown*	Not available*	14*	442709*	2888207*	Unknown*	Unknown*
19	Cerralvo*	Nuevo Leon*	1,500*	Not available*	14*	442706*	2888060*	Unknown*	Unknown*
20	Sabinas Hidalgo*	Nuevo Leon*	8,000*	Not available*	14*	384468*	2926343*	Unknown*	Unknown*
21	Los Aldamas*	Nuevo Leon*	230*	Not available*	14*	480135*	2881301*	Unknown*	Unknown*
22	Los Aldamas*	Nuevo Leon*	Unknown*	Not available*	14*	480115*	2881384*	Unknown*	Unknown*
23	Los Aldamas*	Nuevo Leon*	Unknown*	Not available*	14*	480099*	2881301*	Unknown*	Unknown*
24	General Bravo*	Nuevo Leon*	450*	Not available*	14*	481032*	2846332*	Unknown*	Unknown*
25	General Bravo*	Nuevo Leon*	Unknown*	Not available*	14*	480653*	2846462*	Unknown*	Unknown*
26	General Bravo*	Nuevo Leon*	Unknown*	Not available*	14*	481099*	2846526*	Unknown*	Unknown*
27	General Bravo*	Nuevo Leon*	Unknown*	Not available*	14*	480626*	2846671*	Unknown*	Unknown*
28	Vallecillo*	Nuevo Leon*	65*	Not available*	14*	402210*	2948724*	Unknown*	Unknown*
29	Vallecillo*	Nuevo Leon*	Unknown*	Not available*	14*	402182*	2948764*	Unknown*	Unknown*

Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
30	Vallecillo*	Nuevo Leon*	**Unknown***	Not available*	14*	402393*	2948827*	Unknown*	Unknown*
31	Acuña	Coahuila	**200,000**	Acuña-Santa Eulalia road 7.18km (4.46miles) from the "Emilio Mendoza Cisneros" overpass.	14	299864	3245347	1085	330
32	Piedras Negras	Coahuila	**115,500**	Taking the Piedras Negras-Acuña road (Federal 2), turn right 7.5km (4.64miles) after the "Manuel Perez Trevino" overpass and drive north 800m (0.5miles).	14	345497	3182226	833	254
33	Nava	Coahuila	**1,000**	Progreso street, 2km (1.24 miles) west of downtown Nava.	14	328493	3143850	1049	321
34	Ojinaga	Chihuahua	**50,000**	Taking the Chihuahua freeway turn right 8.4km (5.23 miles) after crossing the overpass with the road to Camargo (Avenida de la Juventud). The site is located 100meters (328 feet) from the freeway.	13	548717	3269389	2684	818

Table 1.
Ultimate disposal locations of waste tires that are being transported from Texas into Mexico on the Texas-Mexico border area

General Data			Accumulated waste tires (tires)	Directions to the site	site's coordinates (UTM, Datum WGS84)			Elevation	
Id #	Municipality	State			Zone	X	Y	(FASL)	(MASL)
35	Juarez	Chihuahua	**2,500,000**	Located at km 27.5 (17 miles) of the Panamerican freeway (Mexico 45). Taking Mexico 45 towards the south turn right 6Km (3.72 miles) after crossing Federal 2 freeway, finally continue 1.5 km (0.93 miles) towards the west.	13	358959	3492229	4065	1239
36	Matamoros	Tamaulipas	**400,000**	Federal Freeway number 101, Km. 21 (75.2 miles) without number, turn right and follow the road 1.54Km (0.96 miles)	14	641485	2843741	23	7

*** Means data was not confirmed with a key stakeholder, it is presented as it was obtained from previous tire pile inventories mentioned on Chapter 3 and public Geographical Information Systems.**

Tire sites 16 to 30 are not located within the study's selected search area but are located within 100km from the Texas-Mexico border.

MASL = meters above sea level. **FASL = feet above sea level**

ATTACHMENT 8
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
1	Matamoros	Tamaulipas	**2,250,000**	Municipal government	Municipal Waste Tires Collection Center	All waste tires collected in the cleaning of drainage ditches, junk collection programs, incidentally collected by garbage trucks, disposed by factories, among other sources used to be taken to this collection and storage center by the municipal authorities. Site is currently not receiving waste tires, they are being sent to the landfill waste tire storage center.	Tires are sent to a cement kiln to be used as Tire Derived Fuel (TDF) in the city of Monterrey, state of Nuevo Leon, Mexico. 32,000 waste tires were sent on the year 2011.	Active
2	Rio Bravo	Tamaulipas	**32,000**	Municipal government	Municipal Landfill and waste tires storage center	Waste tires are collected by the municipal government employees from people's homes and taken to the storage center.	Non	Active
3	Reynosa	Tamaulipas	**200,000**	Municipal government	City open-air dump.	Municipal employees collect the waste tires throughout the city and leave them in the open air dump.	On 2010 nearly 800,000 waste tires were burned in a fire.	Active

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
4	Reynosa *	Tamaulipas*	**50,000***	Unknown*	Open air dump "Las Calabazas"*	Unknown*	Unknown*	Active*
5	Reynosa *	Tamaulipas*	**50,000***	Unknown*	Open air dump "Corrales"*	Unknown*	Unknown*	Active*
6	Reynosa *	Tamaulipas*	**50,000***	Unknown*	Open air dump "Cumbres"*	Unknown*	Unknown*	Active*
7	Reynosa *	Tamaulipas*	**50,000***	Unknown*	"Las Colmenas" Landfill*	Unknown*	Unknown*	Active*
8	Reynosa *	Tamaulipas*	**50,000***	Unknown*	"Alto Bonito" Landfill*	Unknown*	Unknown*	Active*
9	Reynosa	Tamaulipas	**200**	Private company: RECO de Reynosa S.A. de C.V.	Private landfill.	Waste tires generated by their own vehicles or accidentally introduced into garbage collecting trucks.	Waste tires are used within the landfill to delineate roads, to create planters and when 100 waste tires are accumulated they are used as daily cell base.	Inactive
10	Gustavo Dias Ordaz	Tamaulipas	**Unknown**	Municipal government	Open air dump.	Waste tires are taken and dumped into the municipal open air dump.	Waste tires are burned as they arrive to the municipal open air dump.	Active

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
11	Camargo	Tamaulipas	**800**	Municipal government	Municipal Waste Tires Collection Center	Tires are collected and stored were the municipal junk yard was located waiting to be processed.	Non	Active
12	Miguel Aleman	Tamaulipas	**3,000**	Municipal government	Provisional Municipal Waste Tires Collection Center	Tires are collected and stored on the municipal fair grounds.	During a period of time waste tires were sent to Nuevo Laredo for their handling. Actually they are stored waiting for disposal due to a lack of budget.	Active
13	Guerrero	Tamaulipas	**200**	Municipal government	Municipal open-air dump	Tires are collected and sent to the open air municipal dump.	The Mexican armed forces use them as barricades. Also 400 waste tires were lost during a fire.	Active
14	Nuevo Laredo	Tamaulipas	**Unknown, during year 2012 site was remediated**	Municipal government	Storage center	Waste tires are collected on 5 mobile collection centers by the environmental municipal authority, taken to the storage center where they are counted.	Waste tires are shredded and sent to the city of Ramos Arizpe in the state of Coahuila, Mexico to be used as Tire Derived Fuel (TDF) in a cement kiln. 300,000 waste tires were burned during a fire in August 2011.	Active

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
15	Anahuac	Nuevo Leon	**13,000**	Municipal government	Municipal Landfill	Tires are collected by the municipal authorities from tire repair shop and stored in a storage center adjacent to the city landfill. Also the inhabitants dispose of their waste tires on said location.	Waste tires are sent to the city of Monterrey in the state of Nuevo Leon, Mexico were they are shredded and used as Tire Derived Fuel (TDF) in cement Kilns or sent to a state managed landfill.	Active
16	Cerralvo*	Nuevo Leon*	**200***	Not available*	Unknown*	Unknown*	Unknown*	Inactive*
17	Cerralvo*	Nuevo Leon*	**Unknown***	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
18	Cerralvo*	Nuevo Leon*	**Unknown***	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
19	Cerralvo*	Nuevo Leon*	**1,500***	Not available*	Unknown*	Unknown*	Unknown*	Inactive*
20	Sabinas Hidalgo*	Nuevo Leon*	**8,000***	Not available*	Unknown*	Unknown*	Unknown*	Active*
21	Los Aldamas*	Nuevo Leon*	**230***	Not available*	Unknown*	Unknown*	Unknown*	Inactive*
22	Los Aldamas*	Nuevo Leon*	**Unknown***	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
23	Los Aldamas*	Nuevo Leon*	**Unknown***	Not available*	Unknown*	Unknown*	Unknown*	Unknown*

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
24	Gral. Bravo*	Nuevo Leon*	450*	Not available*	Unknown*	Unknown*	Unknown*	Active*
25	Gral. Bravo*	Nuevo Leon*	Unknown*	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
26	Gral. Bravo*	Nuevo Leon*	Unknown*	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
27	Gral. Bravo*	Nuevo Leon*	Unknown*	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
28	Vallecillo*	Nuevo Leon*	65*	Not available*	Unknown*	Unknown*	Unknown*	Inactive*
29	Vallecillo*	Nuevo Leon*	Unknown*	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
30	Vallecillo*	Nuevo Leon*	Unknown*	Not available*	Unknown*	Unknown*	Unknown*	Unknown*
31	Acuña	Coahuila	200,000	Municipal government	Municipal Landfill	Waste tires are taken to collection centers by tire repair shops personnel and by regular people motivated by different education campaigns. Then taken to a storage center by the Ecology municipal authorities.	Non	Active

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
32	Piedras Negras	Coahuila	**115,500**	Promotora Ambiental S.A. De C.V.	Private landfill.	The municipal Ecology and Urban Image department picks up the tires throughout the city and takes them to the private company landfill.	Tires are shredded and buried in an exclusive cell. Also waste tires were transported, by train, to the city of Torreon, state of Coahuila, Mexico for their handling.	Active
33	Nava	Coahuila	**1,000**	Municipal government	Storage center	Tires are collected from tire repair shops by municipal workers and accumulated in a storage center adjacent to the municipal landfill waiting for an adequate disposal. Inhabitants also take there their waste tires.	Non	Active
34	Ojinaga	Chihuahua	**50,000**	Municipal government	Storage center	Tires are collected from tire repair shops by municipal public services workers and accumulated in a storage center adjacent to the municipal landfill waiting for an adequate disposal.	Non	Active

Table 1.
Operation and management procedures of each waste tires accumulation site of the Mexican side of the Texas-Mexico border area

General Data			Number of waste tires accumulated	Operation and management procedures				
Id #	Municipality	State		Responsible of the site's management	Type of site	Waste tires inflow source	Waste tires outflow destiny	Status
35	Juarez	Chihuahua	**2,500,000**	Municipal government	Storage center	Tires are accumulated in a storage center adjacent to the municipal landfill.	Tires are sent to a cement kiln to be used as Tire Derived Fuel (TDF).	Active
36	Matamoros	Tamaulipas	**400,000**	Municipal government	Municipal landfill waste tire storage center	Waste tires collected in the cleaning of drainage ditches, junk collection programs, incidentally collected by garbage trucks, disposed by factories, among other sources are taken to the collection and storage center by the municipal authorities.	Tires are cut in four pieces by a machine. Then the pieces are accumulated.	Active

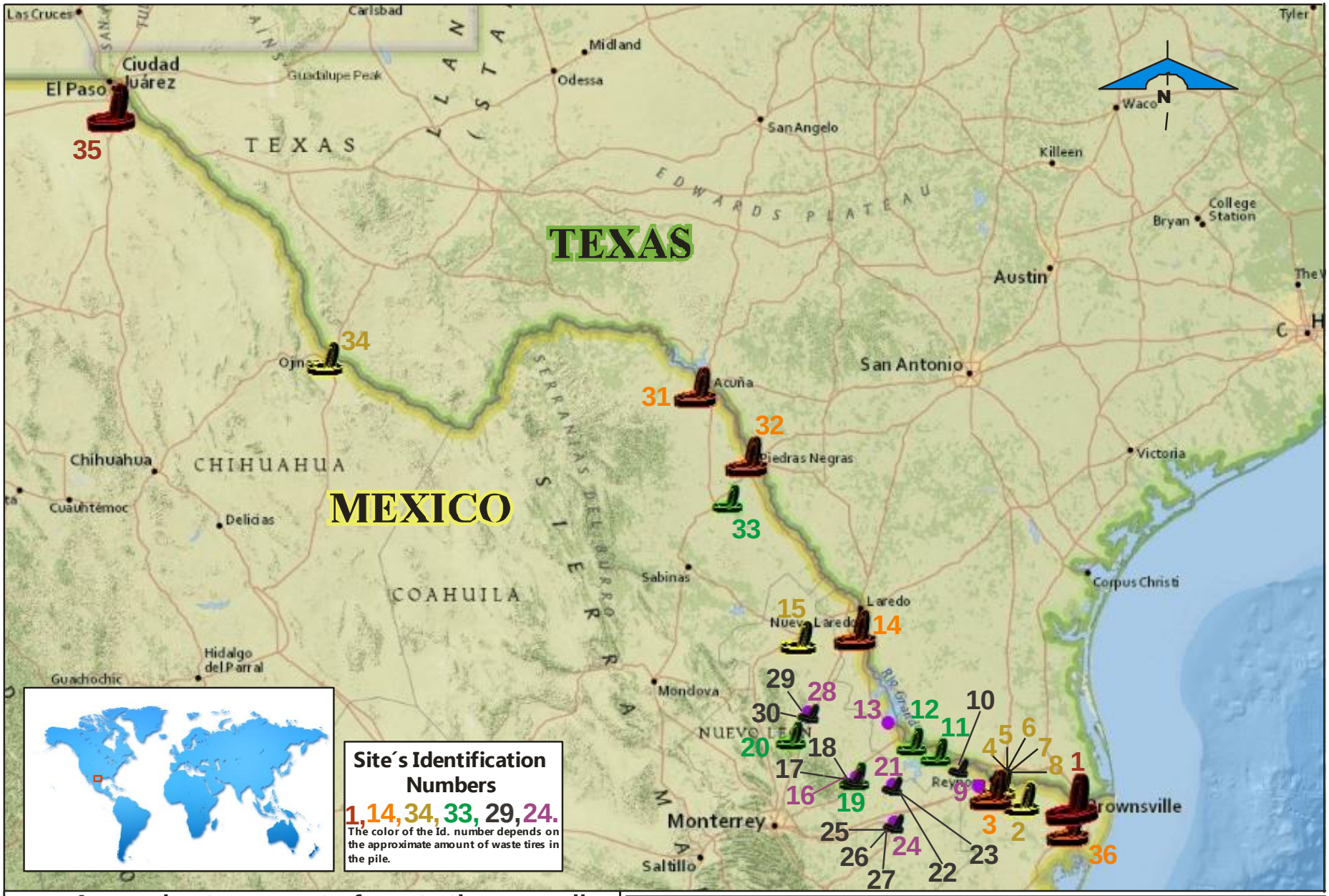
*** Means data was not confirmed with a key stakeholder, it is presented as it was obtained from previous tire pile inventories mentioned on section 2.0.1 of the Chapter 3.**

Tire sites 16 to 30 are not located within the study's selected search area but are located within 100km from the Texas-Mexico border.

The information presented on this attachment was obtained through remote interviews with the key stakeholders mentioned on Attachment 1.

ATTACHMENT 9
Ultimate disposal locations map of waste tires being transported from Texas into Mexico

Printed on 100% recycled fiber paper using solid ink



Site´s Identification Numbers

1,14,34,33, 29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

Approximate amount of waste tires per pile:

- >1´000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I·E·M·S	TITLE: Ultimate disposal locations	PROJECT: 432.01	DATE: 1 / 02 / 2012	SCALE: 1:5'900,000
	CLIENT: NADB	LOCATION: Texas-Mexico Border Region	DRAWN BY: Esteban Ibarra	CHECK: MK AUTH.: RV

ATTACHMENT 10
Geo referenced potential waste tire generators location list

Printed on 100% recycled fiber paper using solid ink

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
1	Juarez	Chihuahua	13	363187.97	3499995.48
2	Juarez	Chihuahua	13	368348.88	3503551.81
3	Juarez	Chihuahua	13	361693.84	3509923.47
4	Juarez	Chihuahua	13	363271.43	3500107.5
5	Juarez	Chihuahua	13	363680.81	3500508.57
6	Juarez	Chihuahua	13	364146.16	3502558.98
7	Juarez	Chihuahua	13	357295.85	3513128.46
8	Juarez	Chihuahua	13	357342.36	3513159.67
9	Juarez	Chihuahua	13	357127.06	3513108.33
10	Juarez	Chihuahua	13	357015.3	3513084.66
11	Juarez	Chihuahua	13	356913.85	3512905.39
12	Juarez	Chihuahua	13	356624.73	3513307.63
13	Juarez	Chihuahua	13	355283.77	3513366.02
14	Juarez	Chihuahua	13	355128	3511714
15	Juarez	Chihuahua	13	354954.14	3511593.48
16	Juarez	Chihuahua	13	361242.56	3500045.74
17	Juarez	Chihuahua	13	361209.11	3500010.49
18	Juarez	Chihuahua	13	361127.84	3499915.5
19	Juarez	Chihuahua	13	361071.54	3499732.41
20	Juarez	Chihuahua	13	361136.84	3499616.15
21	Juarez	Chihuahua	13	360813.99	3499227.44
22	Juarez	Chihuahua	13	362753.59	3498727.33
23	Juarez	Chihuahua	13	368936.31	3507037.75
24	Juarez	Chihuahua	13	368894.12	3506991.66
25	Juarez	Chihuahua	13	361383.53	3511007.72
26	Juarez	Chihuahua	13	360949.25	3512724.77
27	Juarez	Chihuahua	13	369198.87	3503572.01
28	Juarez	Chihuahua	13	369018.06	3503327.04
29	Juarez	Chihuahua	13	369099.17	3503393.02
30	Juarez	Chihuahua	13	369179.78	3503368.62
31	Juarez	Chihuahua	13	369242.64	3503419.03
32	Juarez	Chihuahua	13	369245.88	3503355.1
33	Juarez	Chihuahua	13	369388.3	3503395.13
34	Juarez	Chihuahua	13	369522.74	3503327.88

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
35	Juarez	Chihuahua	13	369541.73	3503303.31
36	Juarez	Chihuahua	13	369666.18	3503139.89
37	Juarez	Chihuahua	13	369853.9	3503011.92
38	Juarez	Chihuahua	13	369995.59	3502981.17
39	Juarez	Chihuahua	13	370013.59	3502946.9
40	Juarez	Chihuahua	13	370065.59	3502955.36
41	Juarez	Chihuahua	13	370110.49	3502942.38
42	Juarez	Chihuahua	13	370273.35	3502916.4
43	Juarez	Chihuahua	13	370479.03	3502937.83
44	Juarez	Chihuahua	13	370451.52	3502986.33
45	Juarez	Chihuahua	13	370354.39	3503013.03
46	Juarez	Chihuahua	13	368919.17	3503473.6
47	Juarez	Chihuahua	13	368467.46	3503377.01
48	Juarez	Chihuahua	13	368404.51	3503397.46
49	Juarez	Chihuahua	13	368347.5	3503395.23
50	Juarez	Chihuahua	13	368430.3	3503543.32
51	Juarez	Chihuahua	13	354807.77	3516163.9
52	Juarez	Chihuahua	13	354912.74	3516122.16
53	Juarez	Chihuahua	13	354932.35	3516313.89
54	Juarez	Chihuahua	13	354985.33	3516309.07
55	Juarez	Chihuahua	13	355033.36	3516300.53
56	Juarez	Chihuahua	13	355053.24	3516296.05
57	Juarez	Chihuahua	13	354992.66	3516217.57
58	Juarez	Chihuahua	13	355051.98	3516204.95
59	Juarez	Chihuahua	13	355078.81	3516213.11
60	Juarez	Chihuahua	13	355762.06	3515500.8
61	Juarez	Chihuahua	13	354837.06	3515021.61
62	Juarez	Chihuahua	13	354854.72	3515017.91
63	Juarez	Chihuahua	13	355249.53	3515570.66
64	Juarez	Chihuahua	13	355439.44	3515191.78
65	Juarez	Chihuahua	13	363253.94	3503987.31
66	Juarez	Chihuahua	13	363208.41	3503729.15
67	Juarez	Chihuahua	13	365129.95	3504373.04
68	Juarez	Chihuahua	13	364864.3	3504664.61

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
69	Juarez	Chihuahua	13	363314.86	3505139.94
70	Juarez	Chihuahua	13	359653.66	3513273.92
71	Juarez	Chihuahua	13	359545.67	3510896.24
72	Juarez	Chihuahua	13	364029.04	3509256.55
73	Juarez	Chihuahua	13	363311.89	3507976.68
74	Juarez	Chihuahua	13	363399.99	3507540.32
75	Juarez	Chihuahua	13	361673.07	3496458.05
76	Juarez	Chihuahua	13	361596.99	3496622.39
77	Juarez	Chihuahua	13	361551.42	3496659.6
78	Juarez	Chihuahua	13	361525.56	3496679.58
79	Juarez	Chihuahua	13	361464.23	3496831.4
80	Juarez	Chihuahua	13	361464.92	3496796.62
81	Juarez	Chihuahua	13	361534.45	3496871.09
82	Juarez	Chihuahua	13	361764.46	3496350.59
83	Juarez	Chihuahua	13	361760.15	3496439.79
84	Juarez	Chihuahua	13	361838.48	3496552.01
85	Juarez	Chihuahua	13	361988	3496611
86	Juarez	Chihuahua	13	363158.87	3499861.24
87	Juarez	Chihuahua	13	363213.56	3499979.52
88	Juarez	Chihuahua	13	363263.66	3500079.62
89	Juarez	Chihuahua	13	363286.09	3500132.5
90	Juarez	Chihuahua	13	363288.4	3500167.23
91	Juarez	Chihuahua	13	363175.23	3500155.36
92	Juarez	Chihuahua	13	363388.17	3500420.24
93	Juarez	Chihuahua	13	363298.27	3500509.35
94	Juarez	Chihuahua	13	363578.52	3500491.97
95	Juarez	Chihuahua	13	363091.42	3502873.49
96	Juarez	Chihuahua	13	363061.61	3502799.2
97	Juarez	Chihuahua	13	363059.52	3503138.61
98	Juarez	Chihuahua	13	361158	3495291
99	Juarez	Chihuahua	13	361618	3496357
100	Juarez	Chihuahua	13	352898	3498484
101	Juarez	Chihuahua	13	353460	3498567
102	Juarez	Chihuahua	13	353575	3498580

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
103	Juarez	Chihuahua	13	354125	3498708
104	Juarez	Chihuahua	13	354530	3498521
105	Juarez	Chihuahua	13	354570	3498553
106	Juarez	Chihuahua	13	354682	3498575
107	Juarez	Chihuahua	13	354840	3498751
108	Juarez	Chihuahua	13	354827	3498531
109	Juarez	Chihuahua	13	354921	3498817
110	Juarez	Chihuahua	13	354937	3498708
111	Juarez	Chihuahua	13	355017	3498691
112	Juarez	Chihuahua	13	355475	3499413
113	Juarez	Chihuahua	13	356101	3498711
114	Juarez	Chihuahua	13	356243	3498652
115	Juarez	Chihuahua	13	356736	3498340
116	Juarez	Chihuahua	13	357231	3498105
117	Juarez	Chihuahua	13	357568	3497915
118	Juarez	Chihuahua	13	357976	3497864
119	Juarez	Chihuahua	13	358636	3497699
120	Juarez	Chihuahua	13	359117	3497772
121	Juarez	Chihuahua	13	359312	3497701
122	Juarez	Chihuahua	13	359343	3497792
123	Juarez	Chihuahua	13	359396	3497809
124	Juarez	Chihuahua	13	360004	3497713
125	Juarez	Chihuahua	13	360176	3497618
126	Juarez	Chihuahua	13	359802	3498147
127	Juarez	Chihuahua	13	360285	3498046
128	Juarez	Chihuahua	13	360447	3498163
129	Juarez	Chihuahua	13	360340	3497982
130	Juarez	Chihuahua	13	360251	3497971
131	Juarez	Chihuahua	13	360267	3497935
132	Juarez	Chihuahua	13	360755	3497789
133	Juarez	Chihuahua	13	360664	3497984
134	Juarez	Chihuahua	13	360849	3497909
135	Juarez	Chihuahua	13	360972	3498005
136	Juarez	Chihuahua	13	361118	3497972

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
137	Juarez	Chihuahua	13	361284	3497882
138	Juarez	Chihuahua	13	362632	3497685
139	Juarez	Chihuahua	13	362591	3497852
140	Juarez	Chihuahua	13	362181	3498063
141	Juarez	Chihuahua	13	362246	3498379
142	Juarez	Chihuahua	13	360595	3492948
143	Juarez	Chihuahua	13	372345	3500726
144	Juarez	Chihuahua	13	372296	3501205
145	Juarez	Chihuahua	13	372279	3501288
146	Juarez	Chihuahua	13	372061	3501316
147	Juarez	Chihuahua	13	372280	3501361
148	Juarez	Chihuahua	13	360831	3494314
149	Juarez	Chihuahua	13	361663	3495882
150	Juarez	Chihuahua	13	361831	3496114
151	Juarez	Chihuahua	13	361885	3496008
152	Juarez	Chihuahua	13	361780	3496691
153	Juarez	Chihuahua	13	361757	3496848
154	Juarez	Chihuahua	13	362043	3496665
155	Juarez	Chihuahua	13	361517	3497081
156	Juarez	Chihuahua	13	376046	3496427
157	Juarez	Chihuahua	13	375459	3497745
158	Juarez	Chihuahua	13	375430	3497835
159	Juarez	Chihuahua	13	375364	3497924
160	Juarez	Chihuahua	13	374077	3499598
161	Juarez	Chihuahua	13	373732	3499684
162	Juarez	Chihuahua	13	373255	3500913
163	Juarez	Chihuahua	13	373012	3501057
164	Juarez	Chihuahua	13	371566	3504452
165	Juarez	Chihuahua	13	372525	3504628
166	Juarez	Chihuahua	13	354317	3498350
167	Juarez	Chihuahua	13	354389	3498339
168	Juarez	Chihuahua	13	351994	3497288
169	Juarez	Chihuahua	13	356414	3515331
170	Juarez	Chihuahua	13	356570	3515315

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
171	Juarez	Chihuahua	13	355716	3512457
172	Juarez	Chihuahua	13	355711	3512517
173	Juarez	Chihuahua	13	355625	3512578
174	Juarez	Chihuahua	13	355655	3512593
175	Juarez	Chihuahua	13	355504	3515231
176	Juarez	Chihuahua	13	355099	3516288
177	Juarez	Chihuahua	13	355101	3512478
178	Juarez	Chihuahua	13	355254	3512427
179	Juarez	Chihuahua	13	355308	3512407
180	Juarez	Chihuahua	13	355164	3512238
181	Juarez	Chihuahua	13	354171	3513049
182	Juarez	Chihuahua	13	354220	3513079
183	Juarez	Chihuahua	13	353906	3511327
184	Juarez	Chihuahua	13	354099	3513416
185	Juarez	Chihuahua	13	358074	3512251
186	Juarez	Chihuahua	13	357802	3510001
187	Juarez	Chihuahua	13	357778	3509785
188	Juarez	Chihuahua	13	357719	3509594
189	Juarez	Chihuahua	13	357420	3509275
190	Juarez	Chihuahua	13	357337	3509257
191	Juarez	Chihuahua	13	357343	3509320
192	Juarez	Chihuahua	13	357265	3509213
193	Juarez	Chihuahua	13	357442	3508926
194	Juarez	Chihuahua	13	358301	3510654
195	Juarez	Chihuahua	13	358484	3509904
196	Juarez	Chihuahua	13	358616	3510225
197	Juarez	Chihuahua	13	359027	3510290
198	Juarez	Chihuahua	13	359401	3508701
199	Juarez	Chihuahua	13	358802	3507893
200	Juarez	Chihuahua	13	358774	3506922
201	Juarez	Chihuahua	13	359677	3508150
202	Juarez	Chihuahua	13	359790	3508345
203	Juarez	Chihuahua	13	359986	3508516
204	Juarez	Chihuahua	13	359852	3508086

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
205	Juarez	Chihuahua	13	359746	3508056
206	Juarez	Chihuahua	13	359729	3507758
207	Juarez	Chihuahua	13	359410	3507574
208	Juarez	Chihuahua	13	358763	3506053
209	Juarez	Chihuahua	13	359321	3506907
210	Juarez	Chihuahua	13	360273	3508320
211	Juarez	Chihuahua	13	360942	3508749
212	Juarez	Chihuahua	13	360899	3508634
213	Juarez	Chihuahua	13	360577	3508271
214	Juarez	Chihuahua	13	360407	3508262
215	Juarez	Chihuahua	13	360201	3508088
216	Juarez	Chihuahua	13	359992	3507832
217	Juarez	Chihuahua	13	360112	3507724
218	Juarez	Chihuahua	13	360157	3507694
219	Juarez	Chihuahua	13	360237	3507686
220	Juarez	Chihuahua	13	360251	3507719
221	Juarez	Chihuahua	13	360296	3507804
222	Juarez	Chihuahua	13	360577	3507714
223	Juarez	Chihuahua	13	360753	3507721
224	Juarez	Chihuahua	13	361777	3508457
225	Juarez	Chihuahua	13	361720	3508419
226	Juarez	Chihuahua	13	361666	3508333
227	Juarez	Chihuahua	13	361398	3508306
228	Juarez	Chihuahua	13	361366	3508284
229	Juarez	Chihuahua	13	361444	3508210
230	Juarez	Chihuahua	13	361337	3508142
231	Juarez	Chihuahua	13	361267	3508098
232	Juarez	Chihuahua	13	361301	3508006
233	Juarez	Chihuahua	13	361251	3507916
234	Juarez	Chihuahua	13	361136	3507902
235	Juarez	Chihuahua	13	361082	3507877
236	Juarez	Chihuahua	13	361022	3507840
237	Juarez	Chihuahua	13	360953	3507858
238	Juarez	Chihuahua	13	361063	3507751

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
239	Juarez	Chihuahua	13	361038	3507733
240	Juarez	Chihuahua	13	360923	3507773
241	Juarez	Chihuahua	13	360896	3507756
242	Juarez	Chihuahua	13	360812	3507711
243	Juarez	Chihuahua	13	360753	3507589
244	Juarez	Chihuahua	13	360720	3507611
245	Juarez	Chihuahua	13	360731	3507567
246	Juarez	Chihuahua	13	360669	3507617
247	Juarez	Chihuahua	13	360747	3507547
248	Juarez	Chihuahua	13	360578	3507540
249	Juarez	Chihuahua	13	360716	3507237
250	Juarez	Chihuahua	13	360555	3507557
251	Juarez	Chihuahua	13	360503	3507613
252	Juarez	Chihuahua	13	360509	3507508
253	Juarez	Chihuahua	13	360415	3507363
254	Juarez	Chihuahua	13	360425	3507414
255	Juarez	Chihuahua	13	360602	3507370
256	Juarez	Chihuahua	13	360673	3507270
257	Juarez	Chihuahua	13	360806	3507330
258	Juarez	Chihuahua	13	360766	3507431
259	Juarez	Chihuahua	13	360834	3507460
260	Juarez	Chihuahua	13	360924	3507422
261	Juarez	Chihuahua	13	360989	3507490
262	Juarez	Chihuahua	13	360997	3507463
263	Juarez	Chihuahua	13	361073	3507457
264	Juarez	Chihuahua	13	359839	3506830
265	Juarez	Chihuahua	13	359834	3506768
266	Juarez	Chihuahua	13	359917	3506576
267	Juarez	Chihuahua	13	359954	3506638
268	Juarez	Chihuahua	13	360061	3506927
269	Juarez	Chihuahua	13	360024	3506950
270	Juarez	Chihuahua	13	360245	3507084
271	Juarez	Chihuahua	13	360280	3507057
272	Juarez	Chihuahua	13	360130	3507147

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
273	Juarez	Chihuahua	13	360081	3507357
274	Juarez	Chihuahua	13	360090	3507398
275	Juarez	Chihuahua	13	360203	3507418
276	Juarez	Chihuahua	13	360131	3507625
277	Juarez	Chihuahua	13	360078	3507698
278	Juarez	Chihuahua	13	360334	3504669
279	Juarez	Chihuahua	13	360271	3504951
280	Juarez	Chihuahua	13	360058	3505249
281	Juarez	Chihuahua	13	359961	3506078
282	Juarez	Chihuahua	13	359776	3506539
283	Juarez	Chihuahua	13	359693	3506878
284	Juarez	Chihuahua	13	359658	3506930
285	Juarez	Chihuahua	13	359563	3506841
286	Juarez	Chihuahua	13	359615	3507244
287	Juarez	Chihuahua	13	359618	3507183
288	Juarez	Chihuahua	13	359613	3507202
289	Juarez	Chihuahua	13	359643	3507640
290	Juarez	Chihuahua	13	359958	3507684
291	Juarez	Chihuahua	13	359897	3507680
292	Juarez	Chihuahua	13	359839	3507675
293	Juarez	Chihuahua	13	359558	3506513
294	Juarez	Chihuahua	13	359613	3506207
295	Juarez	Chihuahua	13	359761	3505655
296	Juarez	Chihuahua	13	359879	3505488
297	Juarez	Chihuahua	13	360015	3505156
298	Juarez	Chihuahua	13	359978	3504805
299	Juarez	Chihuahua	13	361385	3507762
300	Juarez	Chihuahua	13	360336	3506933
301	Juarez	Chihuahua	13	361858	3508405
302	Juarez	Chihuahua	13	361929	3508448
303	Juarez	Chihuahua	13	361549	3508576
304	Juarez	Chihuahua	13	360277	3507145
305	Juarez	Chihuahua	13	360807	3508009
306	Juarez	Chihuahua	13	360805	3508036

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
307	Juarez	Chihuahua	13	360778	3508077
308	Juarez	Chihuahua	13	360833	3508013
309	Juarez	Chihuahua	13	361136	3508703
310	Juarez	Chihuahua	13	359537	3508037
311	Juarez	Chihuahua	13	359576	3508059
312	Juarez	Chihuahua	13	361455	3505383
313	Juarez	Chihuahua	13	360641	3505473
314	Juarez	Chihuahua	13	360819	3505479
315	Juarez	Chihuahua	13	361112	3505334
316	Juarez	Chihuahua	13	362922	3504898
317	Juarez	Chihuahua	13	362396	3504985
318	Juarez	Chihuahua	13	361661	3505044
319	Juarez	Chihuahua	13	360560	3505057
320	Juarez	Chihuahua	13	360338	3505033
321	Juarez	Chihuahua	13	360264	3505060
322	Juarez	Chihuahua	13	360116	3505121
323	Juarez	Chihuahua	13	360702	3504804
324	Juarez	Chihuahua	13	360782	3504838
325	Juarez	Chihuahua	13	360909	3504912
326	Juarez	Chihuahua	13	360888	3504833
327	Juarez	Chihuahua	13	360853	3504728
328	Juarez	Chihuahua	13	360445	3504704
329	Juarez	Chihuahua	13	361475	3504454
330	Juarez	Chihuahua	13	361447	3504443
331	Juarez	Chihuahua	13	360794	3504486
332	Juarez	Chihuahua	13	360804	3504469
333	Juarez	Chihuahua	13	360489	3504513
334	Juarez	Chihuahua	13	360593	3504460
335	Juarez	Chihuahua	13	362048	3506080
336	Juarez	Chihuahua	13	362221	3506606
337	Juarez	Chihuahua	13	361686	3506758
338	Juarez	Chihuahua	13	360202	3506634
339	Juarez	Chihuahua	13	360419	3506917
340	Juarez	Chihuahua	13	362247	3507756

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
341	Juarez	Chihuahua	13	363220	3503777
342	Juarez	Chihuahua	13	363667	3505590
343	Juarez	Chihuahua	13	363710	3505739
344	Juarez	Chihuahua	13	363728	3505867
345	Juarez	Chihuahua	13	363427	3506883
346	Juarez	Chihuahua	13	363374	3502973
347	Juarez	Chihuahua	13	363630	3502886
348	Juarez	Chihuahua	13	364009	3502585
349	Juarez	Chihuahua	13	364318	3502588
350	Juarez	Chihuahua	13	364349	3502659
351	Juarez	Chihuahua	13	364179	3502318
352	Juarez	Chihuahua	13	364666	3503468
353	Juarez	Chihuahua	13	364614	3503541
354	Juarez	Chihuahua	13	365146	3505730
355	Juarez	Chihuahua	13	365132	3506058
356	Juarez	Chihuahua	13	365307	3502617
357	Juarez	Chihuahua	13	365739	3503388
358	Juarez	Chihuahua	13	366025	3504242
359	Juarez	Chihuahua	13	366660	3504309
360	Juarez	Chihuahua	13	366874	3504423
361	Juarez	Chihuahua	13	366718	3502835
362	Juarez	Chihuahua	13	366691	3502828
363	Juarez	Chihuahua	13	366695	3502889
364	Juarez	Chihuahua	13	370600	3502435
365	Juarez	Chihuahua	13	370397	3502120
366	Juarez	Chihuahua	13	370360	3502089
367	Juarez	Chihuahua	13	367903	3501598
368	Juarez	Chihuahua	13	366867	3501226
369	Juarez	Chihuahua	13	367200	3501055
370	Juarez	Chihuahua	13	366863	3501177
371	Juarez	Chihuahua	13	366791	3501745
372	Juarez	Chihuahua	13	366537	3502245
373	Juarez	Chihuahua	13	366622	3502296
374	Juarez	Chihuahua	13	366497	3502375

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
375	Juarez	Chihuahua	13	366982	3503300
376	Juarez	Chihuahua	13	366205	3502810
377	Juarez	Chihuahua	13	366107	3502873
378	Juarez	Chihuahua	13	366105	3502808
379	Juarez	Chihuahua	13	366209	3503325
380	Juarez	Chihuahua	13	366425	3503887
381	Juarez	Chihuahua	13	366298	3504101
382	Juarez	Chihuahua	13	366490	3503846
383	Juarez	Chihuahua	13	366531	3503789
384	Juarez	Chihuahua	13	366522	3503385
385	Juarez	Chihuahua	13	366383	3502714
386	Juarez	Chihuahua	13	366627	3502579
387	Juarez	Chihuahua	13	366689	3502593
388	Juarez	Chihuahua	13	366617	3503195
389	Juarez	Chihuahua	13	366680	3503190
390	Juarez	Chihuahua	13	366699	3503648
391	Juarez	Chihuahua	13	366713	3504109
392	Juarez	Chihuahua	13	366916	3503824
393	Juarez	Chihuahua	13	367115	3503271
394	Juarez	Chihuahua	13	367076	3502910
395	Juarez	Chihuahua	13	367107	3503529
396	Juarez	Chihuahua	13	367084	3503916
397	Juarez	Chihuahua	13	367173	3504031
398	Juarez	Chihuahua	13	366983	3504127
399	Juarez	Chihuahua	13	359454	3511374
400	Juarez	Chihuahua	13	359841	3510397
401	Juarez	Chihuahua	13	360180	3509818
402	Juarez	Chihuahua	13	362094	3508372
403	Juarez	Chihuahua	13	360250	3510067
404	Juarez	Chihuahua	13	362348	3510168
405	Juarez	Chihuahua	13	362415	3510202
406	Juarez	Chihuahua	13	362430	3510448
407	Juarez	Chihuahua	13	362190	3510329
408	Juarez	Chihuahua	13	362032	3510497

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
409	Juarez	Chihuahua	13	361567	3510102
410	Juarez	Chihuahua	13	360273	3511972
411	Juarez	Chihuahua	13	361504	3510510
412	Juarez	Chihuahua	13	359910	3512632
413	Juarez	Chihuahua	13	361543	3511531
414	Juarez	Chihuahua	13	361522	3511405
415	Juarez	Chihuahua	13	363387	3507806
416	Juarez	Chihuahua	13	360750	3512067
417	Juarez	Chihuahua	13	365293	3508287
418	Juarez	Chihuahua	13	363863	3509592
419	Juarez	Chihuahua	13	364934	3508872
420	Juarez	Chihuahua	13	364094	3509726
421	Juarez	Chihuahua	13	365119	3509501
422	Juarez	Chihuahua	13	368492	3505795
423	Juarez	Chihuahua	13	369441	3506896
424	Juarez	Chihuahua	13	371656	3504862
425	Juarez	Chihuahua	13	369812	3506429
426	Juarez	Chihuahua	13	369396	3506677
427	Juarez	Chihuahua	13	369746	3506018
428	Juarez	Chihuahua	13	370829	3503251
429	Juarez	Chihuahua	13	370325	3502880
430	Juarez	Chihuahua	13	360390	3512965
431	Juarez	Chihuahua	13	360621	3513082
432	Juarez	Chihuahua	13	360901	3513115
433	Juarez	Chihuahua	13	366498	3509156
434	Juarez	Chihuahua	13	365322	3512693
435	Juarez	Chihuahua	13	361272	3512761
436	Juarez	Chihuahua	13	363549	3513021
437	Juarez	Chihuahua	13	363878	3512855
438	Juarez	Chihuahua	13	372124	3501375
439	Juarez	Chihuahua	13	371049	3497907
440	Juarez	Chihuahua	13	367003	3495946
441	Juarez	Chihuahua	13	359760	3504971
442	Juarez	Chihuahua	13	359517	3502814

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
443	Juarez	Chihuahua	13	359498	3502992
444	Juarez	Chihuahua	13	359170	3503079
445	Juarez	Chihuahua	13	359017	3502918
446	Juarez	Chihuahua	13	359039	3502978
447	Juarez	Chihuahua	13	358927	3502934
448	Juarez	Chihuahua	13	358955	3503059
449	Juarez	Chihuahua	13	358840	3503404
450	Juarez	Chihuahua	13	358989	3503044
451	Juarez	Chihuahua	13	362159	3498172
452	Juarez	Chihuahua	13	362504	3501501
453	Juarez	Chihuahua	13	362170	3501467
454	Juarez	Chihuahua	13	363518	3502512
455	Juarez	Chihuahua	13	363565	3502483
456	Juarez	Chihuahua	13	363760	3502522
457	Juarez	Chihuahua	13	363387	3502636
458	Juarez	Chihuahua	13	363282	3502602
459	Juarez	Chihuahua	13	363312	3502763
460	Juarez	Chihuahua	13	362906	3502825
461	Juarez	Chihuahua	13	361997	3503331
462	Juarez	Chihuahua	13	360523	3504179
463	Juarez	Chihuahua	13	360409	3504251
464	Juarez	Chihuahua	13	360014	3504340
465	Juarez	Chihuahua	13	360527	3504445
466	Juarez	Chihuahua	13	360640	3504206
467	Juarez	Chihuahua	13	361153	3504080
468	Juarez	Chihuahua	13	362593	3503791
469	Juarez	Chihuahua	13	360334	3504085
470	Juarez	Chihuahua	13	361098	3497169
471	Juarez	Chihuahua	13	360973	3497358
472	Juarez	Chihuahua	13	361601.64	3495455.6
473	Juarez	Chihuahua	13	363367.75	3511240.82
474	Juarez	Chihuahua	13	363136.35	3499810.88
475	Juarez	Chihuahua	13	361602.62	3511931.5
476	Juarez	Chihuahua	13	359888.4	3505970.69

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
477	Juarez	Chihuahua	13	359718.52	3506850.51
478	Juarez	Chihuahua	13	362798.57	3510223.93
479	Juarez	Chihuahua	13	357949.85	3514266.41
480	Juarez	Chihuahua	13	362971.35	3504592.95
481	Juarez	Chihuahua	13	357171.01	3513186.92
482	Juarez	Chihuahua	13	371489.58	3503430.56
483	Juarez	Chihuahua	13	364570.82	3503848.05
484	Juarez	Chihuahua	13	361896.93	3508180.03
485	Ojinaga	Chihuahua	13	555975	3265530
486	Ojinaga	Chihuahua	13	555952	3267084
487	Ojinaga	Chihuahua	13	555607	3268614
488	Ojinaga	Chihuahua	13	555785	3269365
489	Ojinaga	Chihuahua	13	554299	3268246
490	Ojinaga	Chihuahua	13	554929	3268702
491	Ojinaga	Chihuahua	13	555344	3267453
492	Ojinaga	Chihuahua	13	554973	3267648
493	Ojinaga	Chihuahua	13	554246	3267911
494	Ojinaga	Chihuahua	13	556705	3267112
495	Ojinaga	Chihuahua	13	558667	3268275
496	Ojinaga	Chihuahua	13	558017	3268824
497	Ojinaga	Chihuahua	13	555991	3268250
498	Ojinaga	Chihuahua	13	557781	3269228
499	Ojinaga	Chihuahua	13	557824	3270104
500	Ojinaga	Chihuahua	13	556004	3269559
501	Ojinaga	Chihuahua	13	554707	3268839
502	Acuña	Coahuila	14	309125.51	3246423.84
503	Acuña	Coahuila	14	304989.74	3246888.05
504	Acuña	Coahuila	14	305664.27	3247018.18
505	Acuña	Coahuila	14	308374.85	3245458.68
506	Acuña	Coahuila	14	309658.64	3245400.69
507	Acuña	Coahuila	14	309057.71	3245594.18
508	Acuña	Coahuila	14	308754.86	3245940.87
509	Acuña	Coahuila	14	308323.71	3245822.03
510	Acuña	Coahuila	14	307973.2	3245751.81

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
511	Acuña	Coahuila	14	314858	3241657
512	Acuña	Coahuila	14	312656	3244566
513	Acuña	Coahuila	14	310062	3246429
514	Acuña	Coahuila	14	314112	3239863
515	Acuña	Coahuila	14	314225	3240939
516	Acuña	Coahuila	14	311603	3243322
517	Acuña	Coahuila	14	310949	3243480
518	Acuña	Coahuila	14	310849	3243546
519	Acuña	Coahuila	14	309902	3243733
520	Acuña	Coahuila	14	310365	3244594
521	Acuña	Coahuila	14	311041	3246371
522	Acuña	Coahuila	14	308272	3245679
523	Acuña	Coahuila	14	308015	3245707
524	Acuña	Coahuila	14	307390	3244916
525	Acuña	Coahuila	14	308019	3246538
526	Acuña	Coahuila	14	306307	3246002
527	Anahuac	Nuevo Leon	14	386286	3012261
528	Anahuac	Nuevo Leon	14	385708	3011458
529	Anahuac	Nuevo Leon	14	385616	3011604
530	Anahuac	Nuevo Leon	14	386146	3012714
531	Anahuac	Nuevo Leon	14	388368	3014430
532	Anahuac	Nuevo Leon	14	387001	3013825
533	Camargo	Tamaulipas	14	520694	2908654
534	Camargo	Tamaulipas	14	515565	2912120
535	Guerrero	Tamaulipas	14	476679	2937342
536	Guerrero	Tamaulipas	14	476208	2937733
537	Guerrero	Tamaulipas	14	477897	2937796
538	Gustavo Diaz Ordaz	Tamaulipas	14	540291	2899917
539	Gustavo Diaz Ordaz	Tamaulipas	14	540675	2899167
540	Gustavo Diaz Ordaz	Tamaulipas	14	540480	2900083
541	Gustavo Diaz Ordaz	Tamaulipas	14	539361	2901204

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
542	Gustavo Diaz Ordaz	Tamaulipas	14	540508	2900850
543	Gustavo Diaz Ordaz	Tamaulipas	14	540579	2900179
544	Matamoros	Tamaulipas	14	646234	2865330
545	Matamoros	Tamaulipas	14	646404	2865155
546	Matamoros	Tamaulipas	14	646424	2865041
547	Matamoros	Tamaulipas	14	647051	2864629
548	Matamoros	Tamaulipas	14	647229	2864467
549	Matamoros	Tamaulipas	14	647175	2864400
550	Matamoros	Tamaulipas	14	647514	2864144
551	Matamoros	Tamaulipas	14	640301	2860880
552	Matamoros	Tamaulipas	14	635639	2859995
553	Matamoros	Tamaulipas	14	647119	2852460
554	Matamoros	Tamaulipas	14	647824	2853765
555	Matamoros	Tamaulipas	14	647844	2854151
556	Matamoros	Tamaulipas	14	648235	2855036
557	Matamoros	Tamaulipas	14	648735	2857026
558	Matamoros	Tamaulipas	14	648797	2856958
559	Matamoros	Tamaulipas	14	649270	2855730
560	Matamoros	Tamaulipas	14	649566	2855976
561	Matamoros	Tamaulipas	14	650258	2857213
562	Matamoros	Tamaulipas	14	650221	2857370
563	Matamoros	Tamaulipas	14	650205	2857849
564	Matamoros	Tamaulipas	14	650244	2857935
565	Matamoros	Tamaulipas	14	650655	2858387
566	Matamoros	Tamaulipas	14	650655	2858484
567	Matamoros	Tamaulipas	14	650553	2858556
568	Matamoros	Tamaulipas	14	647906	2855612
569	Matamoros	Tamaulipas	14	647541	2855636
570	Matamoros	Tamaulipas	14	647205	2855446
571	Matamoros	Tamaulipas	14	647047	2855588
572	Matamoros	Tamaulipas	14	646786	2855576
573	Matamoros	Tamaulipas	14	643817	2866815

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
574	Matamoros	Tamaulipas	14	644031	2866916
575	Matamoros	Tamaulipas	14	644249	2866744
576	Matamoros	Tamaulipas	14	644355	2866686
577	Matamoros	Tamaulipas	14	644542	2866610
578	Matamoros	Tamaulipas	14	646712	2857422
579	Matamoros	Tamaulipas	14	646321	2857360
580	Matamoros	Tamaulipas	14	645974	2857779
581	Matamoros	Tamaulipas	14	648299	2856984
582	Matamoros	Tamaulipas	14	646862	2858176
583	Matamoros	Tamaulipas	14	646897	2858418
584	Matamoros	Tamaulipas	14	645968	2850811
585	Matamoros	Tamaulipas	14	651994	2860998
586	Matamoros	Tamaulipas	14	641200	2868358
587	Matamoros	Tamaulipas	14	653209	2860886
588	Matamoros	Tamaulipas	14	610182	2868222
589	Matamoros	Tamaulipas	14	610182	2868222
590	Matamoros	Tamaulipas	14	612715	2867397
591	Matamoros	Tamaulipas	14	612715	2867397
592	Matamoros	Tamaulipas	14	618108	2864471
593	Matamoros	Tamaulipas	14	618108	2864471
594	Matamoros	Tamaulipas	14	622279	2868913
595	Matamoros	Tamaulipas	14	622279	2868913
596	Matamoros	Tamaulipas	14	622441	2869105
597	Matamoros	Tamaulipas	14	622441	2869105
598	Matamoros	Tamaulipas	14	624774	2874339
599	Matamoros	Tamaulipas	14	624774	2874339
600	Matamoros	Tamaulipas	14	659664	2858366
601	Matamoros	Tamaulipas	14	659664	2858366
602	Matamoros	Tamaulipas	14	654883	2861320
603	Matamoros	Tamaulipas	14	654883	2861320
604	Matamoros	Tamaulipas	14	658581	2858066
605	Matamoros	Tamaulipas	14	658581	2858066
606	Matamoros	Tamaulipas	14	651385	2862382
607	Matamoros	Tamaulipas	14	651385	2862382

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
608	Matamoros	Tamaulipas	14	652618	2859881
609	Matamoros	Tamaulipas	14	652618	2859881
610	Matamoros	Tamaulipas	14	651754	2861229
611	Matamoros	Tamaulipas	14	651754	2861229
612	Matamoros	Tamaulipas	14	654282	2857272
613	Matamoros	Tamaulipas	14	654282	2857272
614	Matamoros	Tamaulipas	14	653373	2858319
615	Matamoros	Tamaulipas	14	653373	2858319
616	Matamoros	Tamaulipas	14	652462	2858555
617	Matamoros	Tamaulipas	14	652462	2858555
618	Matamoros	Tamaulipas	14	651540	2859656
619	Matamoros	Tamaulipas	14	651540	2859656
620	Matamoros	Tamaulipas	14	651411	2859635
621	Matamoros	Tamaulipas	14	651411	2859635
622	Matamoros	Tamaulipas	14	651573	2860251
623	Matamoros	Tamaulipas	14	651573	2860251
624	Matamoros	Tamaulipas	14	651049	2859034
625	Matamoros	Tamaulipas	14	651049	2859034
626	Matamoros	Tamaulipas	14	651256	2858571
627	Matamoros	Tamaulipas	14	651256	2858571
628	Matamoros	Tamaulipas	14	650193	2858811
629	Matamoros	Tamaulipas	14	650193	2858811
630	Matamoros	Tamaulipas	14	649488	2853813
631	Matamoros	Tamaulipas	14	649488	2853813
632	Matamoros	Tamaulipas	14	649491	2852706
633	Matamoros	Tamaulipas	14	649491	2852706
634	Matamoros	Tamaulipas	14	648046	2853696
635	Matamoros	Tamaulipas	14	648046	2853696
636	Matamoros	Tamaulipas	14	647763	2853656
637	Matamoros	Tamaulipas	14	647763	2853656
638	Matamoros	Tamaulipas	14	647518	2853267
639	Matamoros	Tamaulipas	14	647518	2853267
640	Matamoros	Tamaulipas	14	646997	2853936
641	Matamoros	Tamaulipas	14	646997	2853936

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
642	Matamoros	Tamaulipas	14	649840	2854467
643	Matamoros	Tamaulipas	14	649840	2854467
644	Matamoros	Tamaulipas	14	649422	2854304
645	Matamoros	Tamaulipas	14	649422	2854304
646	Matamoros	Tamaulipas	14	648112	2854820
647	Matamoros	Tamaulipas	14	648112	2854820
648	Matamoros	Tamaulipas	14	648120	2855049
649	Matamoros	Tamaulipas	14	648120	2855049
650	Matamoros	Tamaulipas	14	648393	2855374
651	Matamoros	Tamaulipas	14	648393	2855374
652	Matamoros	Tamaulipas	14	648164	2855298
653	Matamoros	Tamaulipas	14	648164	2855298
654	Matamoros	Tamaulipas	14	649312	2855658
655	Matamoros	Tamaulipas	14	649312	2855658
656	Matamoros	Tamaulipas	14	647502	2855553
657	Matamoros	Tamaulipas	14	647502	2855553
658	Matamoros	Tamaulipas	14	648942	2855487
659	Matamoros	Tamaulipas	14	646990	2855572
660	Matamoros	Tamaulipas	14	646853	2855359
661	Matamoros	Tamaulipas	14	648514	2855871
662	Matamoros	Tamaulipas	14	650575	2856639
663	Matamoros	Tamaulipas	14	650202	2857134
664	Matamoros	Tamaulipas	14	650245	2857123
665	Matamoros	Tamaulipas	14	646381	2857608
666	Matamoros	Tamaulipas	14	646270	2857597
667	Matamoros	Tamaulipas	14	649583	2858221
668	Matamoros	Tamaulipas	14	649969	2858295
669	Matamoros	Tamaulipas	14	650142	2858832
670	Matamoros	Tamaulipas	14	645904	2857624
671	Matamoros	Tamaulipas	14	645073	2857890
672	Matamoros	Tamaulipas	14	647144	2860380
673	Matamoros	Tamaulipas	14	645490	2861933
674	Matamoros	Tamaulipas	14	645434	2861796
675	Matamoros	Tamaulipas	14	647572	2863206

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
676	Matamoros	Tamaulipas	14	647474	2863138
677	Matamoros	Tamaulipas	14	644888	2862058
678	Matamoros	Tamaulipas	14	641150	2861092
679	Miguel Aleman	Tamaulipas	14	489472	2919669
680	Miguel Aleman	Tamaulipas	14	490981	2918872
681	Miguel Aleman	Tamaulipas	14	491723	2918951
682	Miguel Aleman	Tamaulipas	14	491792	2918914
683	Miguel Aleman	Tamaulipas	14	491683	2918829
684	Miguel Aleman	Tamaulipas	14	491581	2919121
685	Miguel Aleman	Tamaulipas	14	492436	2919306
686	Miguel Aleman	Tamaulipas	14	493089	2919335
687	Miguel Aleman	Tamaulipas	14	493295	2919214
688	Miguel Aleman	Tamaulipas	14	494399	2919529
689	Miguel Aleman	Tamaulipas	14	494444	2919507
690	Miguel Aleman	Tamaulipas	14	494464	2919596
691	Miguel Aleman	Tamaulipas	14	494695	2919440
692	Miguel Aleman	Tamaulipas	14	502442	2917890
693	Miguel Aleman	Tamaulipas	14	497542	2918757
694	Miguel Aleman	Tamaulipas	14	497228	2918814
695	Miguel Aleman	Tamaulipas	14	494901	2919446
696	Miguel Aleman	Tamaulipas	14	495028	2918712
697	Miguel Aleman	Tamaulipas	14	491297	2918290
698	Miguel Aleman	Tamaulipas	14	490982	2919077
699	Miguel Aleman	Tamaulipas	14	493465	2919255
700	Miguel Aleman	Tamaulipas	14	495523	2917294
701	Miguel Aleman	Tamaulipas	14	495287	2917418
702	Miguel Aleman	Tamaulipas	14	495871	2916816
703	Miguel Aleman	Tamaulipas	14	496086	2917004
704	Miguel Aleman	Tamaulipas	14	495874	2917088
705	Miguel Aleman	Tamaulipas	14	496251	2920234
706	Miguel Aleman	Tamaulipas	14	496191	2919771
707	Miguel Aleman	Tamaulipas	14	496576	2917250
708	Miguel Aleman	Tamaulipas	14	496594	2917085
709	Miguel Aleman	Tamaulipas	14	496607	2917190

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
710	Miguel Aleman	Tamaulipas	14	496492	2916904
711	Miguel Aleman	Tamaulipas	14	496523	2916759
712	Miguel Aleman	Tamaulipas	14	497116	2917332
713	Nava	Coahuila	14	327641.05	3145112.36
714	Nava	Coahuila	14	328536	3147815
715	Nava	Coahuila	14	328298	3147624
716	Nava	Coahuila	14	328235	3147582
717	Nava	Coahuila	14	328878	3144244
718	Nuevo Laredo	Tamaulipas	14	446531.21	3039323.19
719	Nuevo Laredo	Tamaulipas	14	446550.81	3039374.9
720	Nuevo Laredo	Tamaulipas	14	446471.2	3039319.96
721	Nuevo Laredo	Tamaulipas	14	446553.18	3039423.51
722	Nuevo Laredo	Tamaulipas	14	446563.23	3039534.24
723	Nuevo Laredo	Tamaulipas	14	446711.55	3039528.77
724	Nuevo Laredo	Tamaulipas	14	446755.51	3039505.9
725	Nuevo Laredo	Tamaulipas	14	444218.41	3038419.32
726	Nuevo Laredo	Tamaulipas	14	444237.5	3038775.08
727	Nuevo Laredo	Tamaulipas	14	444051.25	3039025.18
728	Nuevo Laredo	Tamaulipas	14	444052.63	3039530.38
729	Nuevo Laredo	Tamaulipas	14	443733.2	3040382.04
730	Nuevo Laredo	Tamaulipas	14	443913.71	3040405.83
731	Nuevo Laredo	Tamaulipas	14	444158.51	3040602.31
732	Nuevo Laredo	Tamaulipas	14	442759.41	3040139.64
733	Nuevo Laredo	Tamaulipas	14	442677.65	3040195.08
734	Nuevo Laredo	Tamaulipas	14	442856.83	3040143.28
735	Nuevo Laredo	Tamaulipas	14	443862.07	3041300.67
736	Nuevo Laredo	Tamaulipas	14	443869.25	3041260.66
737	Nuevo Laredo	Tamaulipas	14	443864.21	3041225.93
738	Nuevo Laredo	Tamaulipas	14	443867.89	3041185.59
739	Nuevo Laredo	Tamaulipas	14	443863.51	3041157.73
740	Nuevo Laredo	Tamaulipas	14	443877.37	3041127.43
741	Nuevo Laredo	Tamaulipas	14	444018.83	3042042.84
742	Nuevo Laredo	Tamaulipas	14	444009.72	3042097.21
743	Nuevo Laredo	Tamaulipas	14	444025.1	3042127.72

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
744	Nuevo Laredo	Tamaulipas	14	444352.2	3043092.73
745	Nuevo Laredo	Tamaulipas	14	444567.83	3043599.87
746	Nuevo Laredo	Tamaulipas	14	447625.37	3029442.48
747	Nuevo Laredo	Tamaulipas	14	448793.18	3034515.94
748	Nuevo Laredo	Tamaulipas	14	449229.45	3039611.32
749	Nuevo Laredo	Tamaulipas	14	445272.76	3041998.25
750	Nuevo Laredo	Tamaulipas	14	445827.27	3041362.1
751	Nuevo Laredo	Tamaulipas	14	445870.9	3041353.92
752	Nuevo Laredo	Tamaulipas	14	445892.4	3041311.35
753	Nuevo Laredo	Tamaulipas	14	442796	3022473
754	Nuevo Laredo	Tamaulipas	14	443702	3022791
755	Nuevo Laredo	Tamaulipas	14	442440	3023173
756	Nuevo Laredo	Tamaulipas	14	443441	3025629
757	Nuevo Laredo	Tamaulipas	14	443484	3025661
758	Nuevo Laredo	Tamaulipas	14	443509	3025706
759	Nuevo Laredo	Tamaulipas	14	443505	3025789
760	Nuevo Laredo	Tamaulipas	14	443543	3025852
761	Nuevo Laredo	Tamaulipas	14	443903	3026502
762	Nuevo Laredo	Tamaulipas	14	443943	3026577
763	Nuevo Laredo	Tamaulipas	14	443981	3026633
764	Nuevo Laredo	Tamaulipas	14	443977	3026718
765	Nuevo Laredo	Tamaulipas	14	443981	3026767
766	Nuevo Laredo	Tamaulipas	14	444074	3026851
767	Nuevo Laredo	Tamaulipas	14	444120	3026918
768	Nuevo Laredo	Tamaulipas	14	444208	3026875
769	Nuevo Laredo	Tamaulipas	14	443965	3027122
770	Nuevo Laredo	Tamaulipas	14	444084	3027035
771	Nuevo Laredo	Tamaulipas	14	444323	3027089
772	Nuevo Laredo	Tamaulipas	14	444452	3027342
773	Nuevo Laredo	Tamaulipas	14	444455	3027383
774	Nuevo Laredo	Tamaulipas	14	445474	3028738
775	Nuevo Laredo	Tamaulipas	14	445593	3028774
776	Nuevo Laredo	Tamaulipas	14	445072	3028894
777	Nuevo Laredo	Tamaulipas	14	445490	3029999

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
778	Nuevo Laredo	Tamaulipas	14	445599	3030004
779	Nuevo Laredo	Tamaulipas	14	445712	3029991
780	Nuevo Laredo	Tamaulipas	14	445773	3030002
781	Nuevo Laredo	Tamaulipas	14	445836	3030238
782	Nuevo Laredo	Tamaulipas	14	446525	3030452
783	Nuevo Laredo	Tamaulipas	14	445541	3031048
784	Nuevo Laredo	Tamaulipas	14	446413	3031277
785	Nuevo Laredo	Tamaulipas	14	446335	3031290
786	Nuevo Laredo	Tamaulipas	14	446793	3032072
787	Nuevo Laredo	Tamaulipas	14	446843	3032226
788	Nuevo Laredo	Tamaulipas	14	447983	3034574
789	Nuevo Laredo	Tamaulipas	14	446515	3031021
790	Nuevo Laredo	Tamaulipas	14	442493	3036959
791	Nuevo Laredo	Tamaulipas	14	447953	3036386
792	Nuevo Laredo	Tamaulipas	14	448322	3036581
793	Nuevo Laredo	Tamaulipas	14	444269	3037820
794	Nuevo Laredo	Tamaulipas	14	444130	3037735
795	Nuevo Laredo	Tamaulipas	14	444127	3037679
796	Nuevo Laredo	Tamaulipas	14	444024	3037505
797	Nuevo Laredo	Tamaulipas	14	444352	3037868
798	Nuevo Laredo	Tamaulipas	14	443949	3037844
799	Nuevo Laredo	Tamaulipas	14	443796	3037814
800	Nuevo Laredo	Tamaulipas	14	443693	3037824
801	Nuevo Laredo	Tamaulipas	14	444144	3038335
802	Nuevo Laredo	Tamaulipas	14	447575	3037202
803	Nuevo Laredo	Tamaulipas	14	444738	3038900
804	Nuevo Laredo	Tamaulipas	14	442823	3040037
805	Nuevo Laredo	Tamaulipas	14	441834	3040703
806	Nuevo Laredo	Tamaulipas	14	448896	3037213
807	Nuevo Laredo	Tamaulipas	14	447909	3038096
808	Nuevo Laredo	Tamaulipas	14	445675	3039106
809	Nuevo Laredo	Tamaulipas	14	445626	3039104
810	Nuevo Laredo	Tamaulipas	14	445592	3039031
811	Nuevo Laredo	Tamaulipas	14	445578	3039112

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
812	Nuevo Laredo	Tamaulipas	14	443899	3040212
813	Nuevo Laredo	Tamaulipas	14	443737	3040259
814	Nuevo Laredo	Tamaulipas	14	443670	3040470
815	Nuevo Laredo	Tamaulipas	14	441368	3042007
816	Nuevo Laredo	Tamaulipas	14	445387	3039636
817	Nuevo Laredo	Tamaulipas	14	448942	3037882
818	Nuevo Laredo	Tamaulipas	14	449261	3037629
819	Nuevo Laredo	Tamaulipas	14	448990	3039007
820	Nuevo Laredo	Tamaulipas	14	450543	3038503
821	Nuevo Laredo	Tamaulipas	14	450540	3038642
822	Nuevo Laredo	Tamaulipas	14	444593	3040639
823	Nuevo Laredo	Tamaulipas	14	448684	3040278
824	Nuevo Laredo	Tamaulipas	14	443520	3040758
825	Nuevo Laredo	Tamaulipas	14	444546	3041380
826	Nuevo Laredo	Tamaulipas	14	442547	3045356
827	Nuevo Laredo	Tamaulipas	14	442495	3044072
828	Nuevo Laredo	Tamaulipas	14	442687	3044490
829	Nuevo Laredo	Tamaulipas	14	442573	3045380
830	Nuevo Laredo	Tamaulipas	14	444053	3042261
831	Nuevo Laredo	Tamaulipas	14	445500	3043046
832	Nuevo Laredo	Tamaulipas	14	446228	3030559
833	Nuevo Laredo	Tamaulipas	14	449675.15	3040597.71
834	Piedras Negras	Coahuila	14	346166	3179291
835	Piedras Negras	Coahuila	14	346315	3179366
836	Piedras Negras	Coahuila	14	346312	3179003
837	Piedras Negras	Coahuila	14	346209	3179000
838	Piedras Negras	Coahuila	14	346297	3178820
839	Piedras Negras	Coahuila	14	346239	3178885
840	Piedras Negras	Coahuila	14	340782	3160370
841	Piedras Negras	Coahuila	14	341342	3160952
842	Piedras Negras	Coahuila	14	346852	3167637
843	Piedras Negras	Coahuila	14	346829	3167600
844	Piedras Negras	Coahuila	14	346823	3167518
845	Piedras Negras	Coahuila	14	347187	3167795

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
846	Piedras Negras	Coahuila	14	347231	3167860
847	Piedras Negras	Coahuila	14	347126	3167896
848	Piedras Negras	Coahuila	14	347103	3167854
849	Piedras Negras	Coahuila	14	347040	3168050
850	Piedras Negras	Coahuila	14	346987	3168291
851	Piedras Negras	Coahuila	14	347391	3170666
852	Piedras Negras	Coahuila	14	347450	3170885
853	Piedras Negras	Coahuila	14	347123	3170835
854	Piedras Negras	Coahuila	14	347269	3170966
855	Piedras Negras	Coahuila	14	347220	3170864
856	Piedras Negras	Coahuila	14	347419	3171090
857	Piedras Negras	Coahuila	14	349928	3171904
858	Piedras Negras	Coahuila	14	349868	3175909
859	Piedras Negras	Coahuila	14	348967	3178439
860	Piedras Negras	Coahuila	14	348804	3175843
861	Piedras Negras	Coahuila	14	349524	3174388
862	Piedras Negras	Coahuila	14	348796	3175035
863	Piedras Negras	Coahuila	14	347413	3178076
864	Piedras Negras	Coahuila	14	348536	3170626
865	Piedras Negras	Coahuila	14	348139	3172510
866	Piedras Negras	Coahuila	14	346535	3179250
867	Piedras Negras	Coahuila	14	345117	3181275
868	Piedras Negras	Coahuila	14	347677	3172831
869	Piedras Negras	Coahuila	14	348706	3169290
870	Piedras Negras	Coahuila	14	346858	3172227
871	Piedras Negras	Coahuila	14	346809	3173317
872	Reynosa	Tamaulipas	14	572481.99	2877835.55
873	Reynosa	Tamaulipas	14	569454	2880069
874	Reynosa	Tamaulipas	14	569212.7	2880882.55
875	Reynosa	Tamaulipas	14	569368.77	2880869.44
876	Reynosa	Tamaulipas	14	569060.65	2880907.96
877	Reynosa	Tamaulipas	14	566581.9	2881463.58
878	Reynosa	Tamaulipas	14	566657.47	2882221.39
879	Reynosa	Tamaulipas	14	566520.98	2882433.26

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
880	Reynosa	Tamaulipas	14	540847	2872382
881	Reynosa	Tamaulipas	14	550787	2876263
882	Reynosa	Tamaulipas	14	552440	2877351
883	Reynosa	Tamaulipas	14	556348	2879215
884	Reynosa	Tamaulipas	14	561817	2879717
885	Reynosa	Tamaulipas	14	561549	2881055
886	Reynosa	Tamaulipas	14	561589	2881398
887	Reynosa	Tamaulipas	14	561826	2881129
888	Reynosa	Tamaulipas	14	561874	2881502
889	Reynosa	Tamaulipas	14	561258	2888937
890	Reynosa	Tamaulipas	14	562591	2881629
891	Reynosa	Tamaulipas	14	562505	2881788
892	Reynosa	Tamaulipas	14	562570	2881799
893	Reynosa	Tamaulipas	14	562605	2881849
894	Reynosa	Tamaulipas	14	562373	2881729
895	Reynosa	Tamaulipas	14	562598	2882004
896	Reynosa	Tamaulipas	14	562150	2881608
897	Reynosa	Tamaulipas	14	561362	2881441
898	Reynosa	Tamaulipas	14	561364	2881784
899	Reynosa	Tamaulipas	14	561520	2881904
900	Reynosa	Tamaulipas	14	562922	2892710
901	Reynosa	Tamaulipas	14	563079	2885305
902	Reynosa	Tamaulipas	14	563978	2882261
903	Reynosa	Tamaulipas	14	565172	2892157
904	Reynosa	Tamaulipas	14	564308	2882454
905	Reynosa	Tamaulipas	14	564488	2882532
906	Reynosa	Tamaulipas	14	564518	2882547
907	Reynosa	Tamaulipas	14	565671	2891448
908	Reynosa	Tamaulipas	14	566164	2883735
909	Reynosa	Tamaulipas	14	566329	2883797
910	Reynosa	Tamaulipas	14	561898	2881522
911	Reynosa	Tamaulipas	14	564677	2882584
912	Reynosa	Tamaulipas	14	566238	2883588
913	Reynosa	Tamaulipas	14	564703	2882600

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
914	Reynosa	Tamaulipas	14	564723	2882617
915	Reynosa	Tamaulipas	14	564798	2882669
916	Reynosa	Tamaulipas	14	565532	2882840
917	Reynosa	Tamaulipas	14	569054	2884481
918	Reynosa	Tamaulipas	14	568642	2886786
919	Reynosa	Tamaulipas	14	570472	2885853
920	Reynosa	Tamaulipas	14	579178	2880287
921	Reynosa	Tamaulipas	14	572205	2876752
922	Reynosa	Tamaulipas	14	572402	2877895
923	Reynosa	Tamaulipas	14	571941	2876716
924	Reynosa	Tamaulipas	14	572188	2879787
925	Reynosa	Tamaulipas	14	572276	2879746
926	Reynosa	Tamaulipas	14	572349	2879865
927	Reynosa	Tamaulipas	14	572188	2879906
928	Reynosa	Tamaulipas	14	572303	2880117
929	Reynosa	Tamaulipas	14	571908	2880330
930	Reynosa	Tamaulipas	14	571598	2880224
931	Reynosa	Tamaulipas	14	571309	2880626
932	Reynosa	Tamaulipas	14	571227	2880684
933	Reynosa	Tamaulipas	14	570867	2881458
934	Reynosa	Tamaulipas	14	570963	2881782
935	Reynosa	Tamaulipas	14	570986	2881563
936	Reynosa	Tamaulipas	14	570629	2882454
937	Reynosa	Tamaulipas	14	569088	2884516
938	Reynosa	Tamaulipas	14	573547	2881520
939	Reynosa	Tamaulipas	14	580227	2879275
940	Reynosa	Tamaulipas	14	579947	2880144
941	Reynosa	Tamaulipas	14	579019	2877949
942	Reynosa	Tamaulipas	14	577544	2878521
943	Reynosa	Tamaulipas	14	578569	2876900
944	Reynosa	Tamaulipas	14	577183	2879005
945	Reynosa	Tamaulipas	14	577172	2878937
946	Reynosa	Tamaulipas	14	576775	2879674
947	Reynosa	Tamaulipas	14	576130	2879857

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
948	Reynosa	Tamaulipas	14	576173	2876227
949	Reynosa	Tamaulipas	14	575519	2878903
950	Reynosa	Tamaulipas	14	574456	2878027
951	Reynosa	Tamaulipas	14	573987	2882461
952	Reynosa	Tamaulipas	14	573830	2882320
953	Reynosa	Tamaulipas	14	573607	2879469
954	Reynosa	Tamaulipas	14	573734	2879089
955	Reynosa	Tamaulipas	14	573402	2879571
956	Reynosa	Tamaulipas	14	572680	2878992
957	Reynosa	Tamaulipas	14	572712	2878978
958	Reynosa	Tamaulipas	14	572678	2879008
959	Reynosa	Tamaulipas	14	572691	2879316
960	Reynosa	Tamaulipas	14	572676	2879883
961	Reynosa	Tamaulipas	14	572631	2879921
962	Reynosa	Tamaulipas	14	572346	2883115
963	Reynosa	Tamaulipas	14	572079	2879100
964	Reynosa	Tamaulipas	14	571715	2885585
965	Reynosa	Tamaulipas	14	571843	2877062
966	Reynosa	Tamaulipas	14	571539	2884942
967	Reynosa	Tamaulipas	14	570876	2886366
968	Reynosa	Tamaulipas	14	570847	2883906
969	Reynosa	Tamaulipas	14	570737	2880690
970	Reynosa	Tamaulipas	14	570642	2880557
971	Reynosa	Tamaulipas	14	570609	2880501
972	Reynosa	Tamaulipas	14	570404	2880426
973	Reynosa	Tamaulipas	14	570184	2880618
974	Reynosa	Tamaulipas	14	570790	2879795
975	Reynosa	Tamaulipas	14	570817	2879328
976	Reynosa	Tamaulipas	14	570885	2879348
977	Reynosa	Tamaulipas	14	570833	2879390
978	Reynosa	Tamaulipas	14	570913	2879118
979	Reynosa	Tamaulipas	14	570486	2880160
980	Reynosa	Tamaulipas	14	570289	2879999
981	Reynosa	Tamaulipas	14	570327	2879987

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
982	Reynosa	Tamaulipas	14	570372	2879960
983	Reynosa	Tamaulipas	14	570340	2879803
984	Reynosa	Tamaulipas	14	570577	2879333
985	Reynosa	Tamaulipas	14	570523	2879598
986	Reynosa	Tamaulipas	14	570120	2879855
987	Reynosa	Tamaulipas	14	570218	2881743
988	Reynosa	Tamaulipas	14	570121	2882076
989	Reynosa	Tamaulipas	14	570089	2882782
990	Reynosa	Tamaulipas	14	569609	2886766
991	Reynosa	Tamaulipas	14	569619	2886221
992	Reynosa	Tamaulipas	14	569764	2882628
993	Reynosa	Tamaulipas	14	569700	2881772
994	Reynosa	Tamaulipas	14	569363	2880449
995	Reynosa	Tamaulipas	14	569015	2881247
996	Reynosa	Tamaulipas	14	569056	2881712
997	Reynosa	Tamaulipas	14	569047	2880971
998	Reynosa	Tamaulipas	14	569585	2879804
999	Reynosa	Tamaulipas	14	569654	2877708
1000	Reynosa	Tamaulipas	14	568528	2885454
1001	Reynosa	Tamaulipas	14	568545	2882074
1002	Reynosa	Tamaulipas	14	568115	2880847
1003	Reynosa	Tamaulipas	14	568184	2884372
1004	Reynosa	Tamaulipas	14	568453	2886480
1005	Reynosa	Tamaulipas	14	568361	2886382
1006	Reynosa	Tamaulipas	14	568055	2886617
1007	Reynosa	Tamaulipas	14	568055	2886617
1008	Reynosa	Tamaulipas	14	568102	2885090
1009	Reynosa	Tamaulipas	14	568102	2885090
1010	Reynosa	Tamaulipas	14	567732	2881177
1011	Reynosa	Tamaulipas	14	567732	2881177
1012	Reynosa	Tamaulipas	14	567868	2886959
1013	Reynosa	Tamaulipas	14	567868	2886959
1014	Reynosa	Tamaulipas	14	567526	2884540
1015	Reynosa	Tamaulipas	14	567526	2884540

Table 1. Potential waste tire generators from the vehicle importation tire flow generated through a GIS visual search					
Name-Number	Municipality	State	UTM coordinates (Datum WGS84)		
			Zone	X	Y
1016	Reynosa	Tamaulipas	14	567314	2881346
1017	Reynosa	Tamaulipas	14	567314	2881346
1018	Reynosa	Tamaulipas	14	567212	2881313
1019	Reynosa	Tamaulipas	14	567212	2881313
1020	Reynosa	Tamaulipas	14	566991	2881467
1021	Reynosa	Tamaulipas	14	566991	2881467
1022	Reynosa	Tamaulipas	14	566977	2881557
1023	Reynosa	Tamaulipas	14	566977	2881557
1024	Rio Bravo	Tamaulipas	14	587098	2875861
1025	Rio Bravo	Tamaulipas	14	587039	2875609
1026	Rio Bravo	Tamaulipas	14	587874	2873917
1027	Rio Bravo	Tamaulipas	14	587990	2870775
1028	Rio Bravo	Tamaulipas	14	588163	2870177
1029	Rio Bravo	Tamaulipas	14	588143	2869697
1030	Rio Bravo	Tamaulipas	14	588150	2873867
1031	Rio Bravo	Tamaulipas	14	588150	2873867
1032	Rio Bravo	Tamaulipas	14	588628	2874981
1033	Rio Bravo	Tamaulipas	14	588794	2874879
1034	Rio Bravo	Tamaulipas	14	588934	2874925
1035	Rio Bravo	Tamaulipas	14	591683	2876757
1036	Rio Bravo	Tamaulipas	14	593140	2875008
1037	Rio Bravo	Tamaulipas	14	593279	2875052
1038	Rio Bravo	Tamaulipas	14	593179	2873596
1039	Rio Bravo	Tamaulipas	14	594016	2875045
1040	Rio Bravo	Tamaulipas	14	594086	2874944
1041	Rio Bravo	Tamaulipas	14	594494	2873191
1042	Rio Bravo	Tamaulipas	14	594646	2873068
1043	Rio Bravo	Tamaulipas	14	594320	2875257
1044	Rio Bravo	Tamaulipas	14	595716	2872939
1045	Rio Bravo	Tamaulipas	14	591998	2873991
1046	Rio Bravo	Tamaulipas	14	587485	2874915
1047	Rio Bravo	Tamaulipas	14	587402	2874655
1048	Rio Bravo	Tamaulipas	14	595100	2873010

Matamoros, Tamaulipas, Mexico.		
Part of the city	**Date**	**Source**
N-E-W	05/27/2010	Image ©2012 GeoEye
S-E-C	10/22/2010	Image ©2012 GeoEye
S	8/28/2009	Image ©2012 Digital Globe
N-E	12/31/2008	Image Texas General Land Office
C	01/30/2009	U.S. Geological Survey
C	01/30/2009	Image Texas General Land Office
C	12/19/2007	Image ©2012 Digital Globe
E-W	1/19/2008	Image ©2012 Digital Globe
E	1/30/2009	Image ©2012 Digital Globe
W	12/05/2009	Image ©2012 GeoEye

Rio Bravo, Tamaulipas, Mexico.		
Part of the city	**Date**	**Source**
N-W	2/27/2009	U.S. Geological Survey
N-W-C	1/30/2009	Image Texas General Land Office
W	6/29/2006	Image ©2012 Digital Globe
E	1/29/2004	Image ©2012 Digital Globe
S	12/23/2003	Image ©2012 Digital Globe
C	10/30/2008	U.S. Geological Survey
C	6/29/2006	U.S. Geological Survey

Reynosa, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
N-E	12/25/2010	U.S. Geological Survey
E-W-C	2/27/2009	U.S. Geological Survey
N-E-W	1/30/2009	Image Texas General Land Office
S-C	07/04/2009	Image ©2012 GeoEye
S	05/27/2007	Image ©2012 Digital Globe

Gustavo Diaz Ordaz, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	1/30/2009	Image Texas General Land Office
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program

Camargo, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program
N-S-E-W-C	10/21/2005	U.S. Geological Survey

Miguel Aleman, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
E	10/30/2008	Texas Orthoimagery Program
E	10/21/2005	U.S. Geological Survey
S-N-W-C	9/30/2010	Image ©2012 GeoEye
S-N-W-C	10/30/2008	Texas Orthoimagery Program

Miguel Aleman, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program
N-S-E-W-C	10/18/2007	Image ©2012 Digital Globe

Nuevo Laredo, Tamaulipas, Mexico.		
Part of the city	**Date of image**	**Source**
S	10/30/2008	Texas Orthoimagery Program
S	10/21/2005	Image ©2012 Digital Globe
W-S-O-C	09/14/2010	Image ©2012 GeoEye
W-S-O-C	11/27/2010	Image ©2012 GeoEye
N	11/27/2010	Image ©2012 GeoEye
N	08/12/2010	Image ©2012 GeoEye

Anahuac, Nuevo Leon, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	9/27/2006	Image ©2012 GeoEye

Piedras Negras, Coahuila, Mexico.		
Part of the city	**Date of image**	**Source**
S	06/11/2006	Image ©2012 Digital Globe
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program
S-E	10/21/2005	U.S. Geological Survey
C	10/21/2005	USDA Farm Service Agency

Nava, Coahuila, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	7/17/2006	Image ©2012 Digital Globe

Acuña, Coahuila, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program
E	09/08/2007	USDA Farm Service Agency
N-S-C	10/21/2005	USDA Farm Service Agency
W-C	12/14/2010	Image ©2012 GeoEye
S-C	10/21/2005	U.S. Geological Survey

Ojinaga, Chihuahua, Mexico.		
Part of the city	**Date of image**	**Source**
N-S-E-W-C	07/02/2009	Image ©2012 GeoEye
N-S-E-W-C	10/30/2008	Texas Orthoimagery Program

Ciudad Juarez, Chihuahua, Mexico.		
Part of the city	**Date of image**	**Source**
S-W	03/01/2011	Image ©2012 GeoEye
S-W-C	08/14/2007	Image ©2012 Digital Globe
S-W	12/10/2006	Image ©2012 Digital Globe
N-S-E-C	08/19/2007	Image ©2012 Digital Globe
N-S-E-W-C	05/23/2008	Image ©2012 Digital Globe
N	10/30/2008	Texas Orthoimagery Program
N	08/14/2009	USDA Farm Service Agency
N-E-W-C	03/31/2008	Texas Orthoimagery Program
N	04/14/2007	Image ©2012 Digital Globe
E	2/25/2007	Image ©2012 Digital Globe

ATTACHMENT 11
Geo referenced potential illegal waste tire piles location list

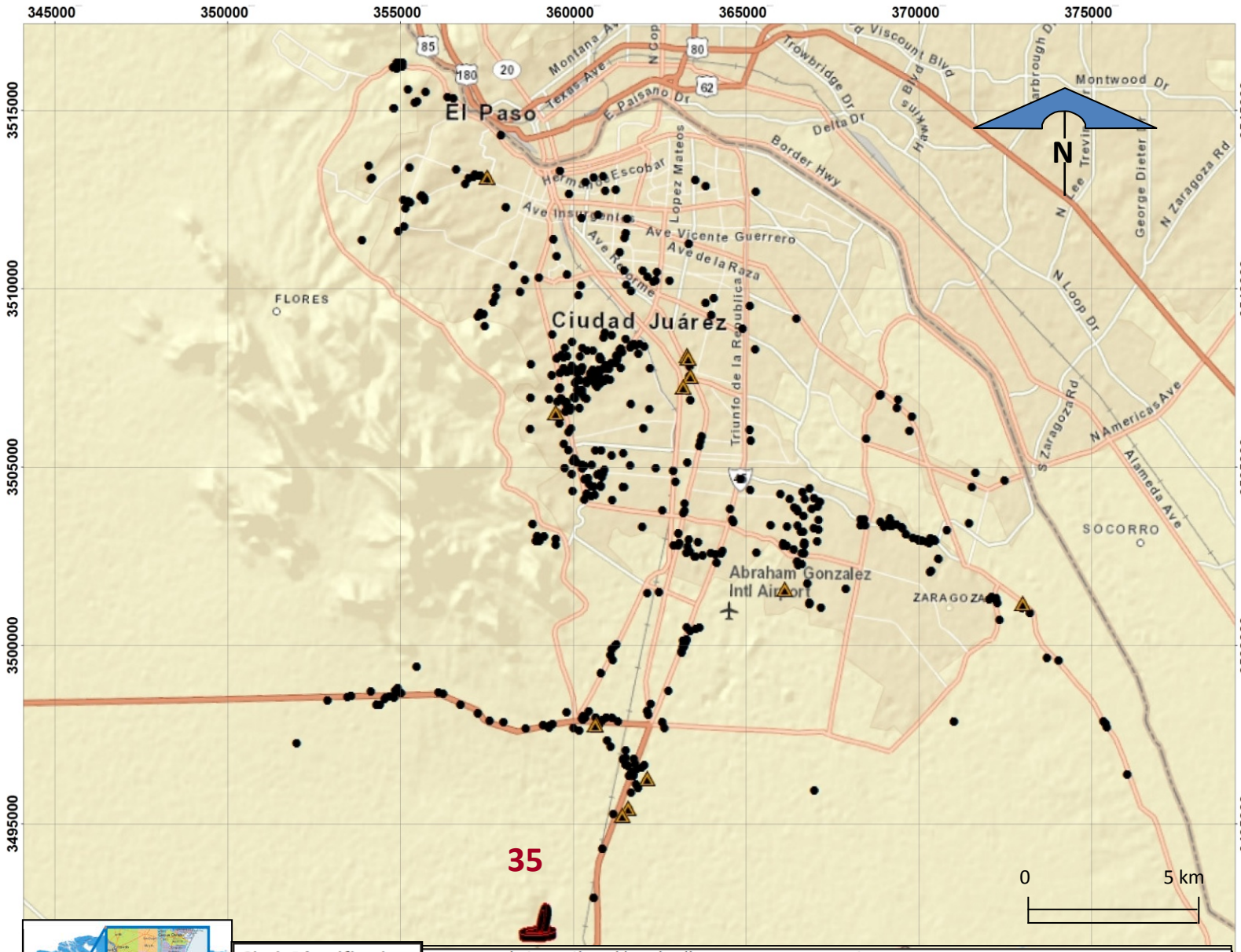
Printed on 100% recycled fiber paper using solid ink

Table 1.
Possible illegal tire pile sites identified during GIS visual search.

Id. Name	zone	UTM coordinates		Municipality	State	Date of satellite image	Source
		x	y				
R1	14	561049.00	2889376.00	Reynosa	Tamaulipas	2/27/2009	U.S. Geological Survey, Google™Earth
J1	13	363334.02	3508112.13	Juarez	Chihuahua	5/23/2008	Google™Earth
J2	13	363350.06	3508053.10	Juarez	Chihuahua	5/23/2008	Google™Earth
J3	13	363424.03	3507532.97	Juarez	Chihuahua	5/23/2008	Google™Earth
J4	13	361429.00	3495273.00	Juarez	Chihuahua	8/14/2007	©2012 Digital globe, Google™Earth
J5	13	366147.00	3501599.00	Juarez	Chihuahua	5/23/2008	Google™Earth
J6	13	364146.16	3502558.98	Juarez	Chihuahua	5/23/2008	Google™Earth

GIS= Geographical Information Systems

ATTACHMENT 12
Waste tire sites display map per Mexican city



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

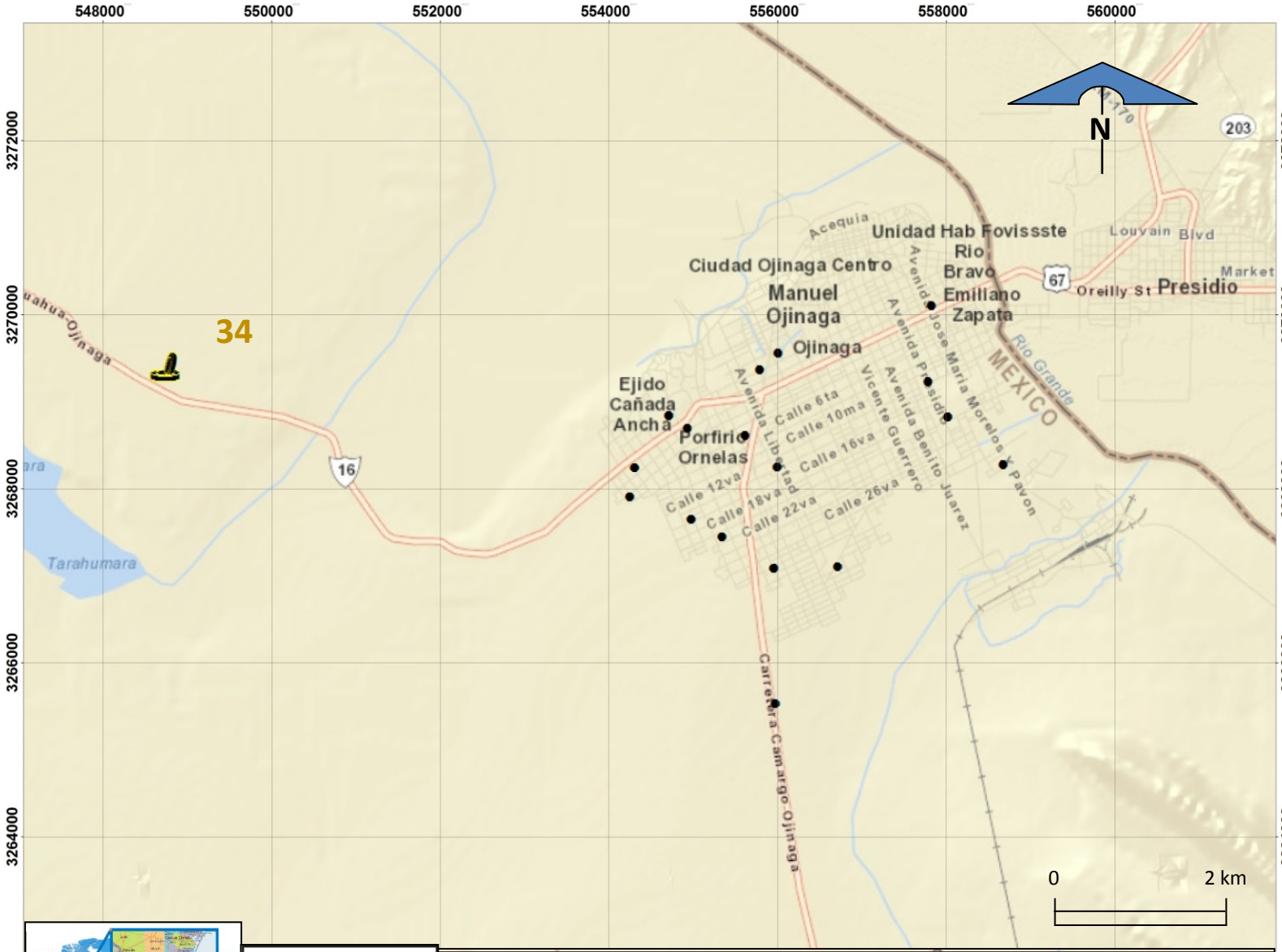
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE: Ciudad Juarez sites display map.	PROJECT: 432.01	DATE: 23/08/2012	SCALE: Graphic
CUENT.: N A D B	LOCATION.: Ciudad Juarez Chihuahua, Mexico.	DRAWN BY.: Marcel Lopez	CHECK.: EI / APRP: RV



Site´s Identification Numbers

1,14,34, 33, 29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

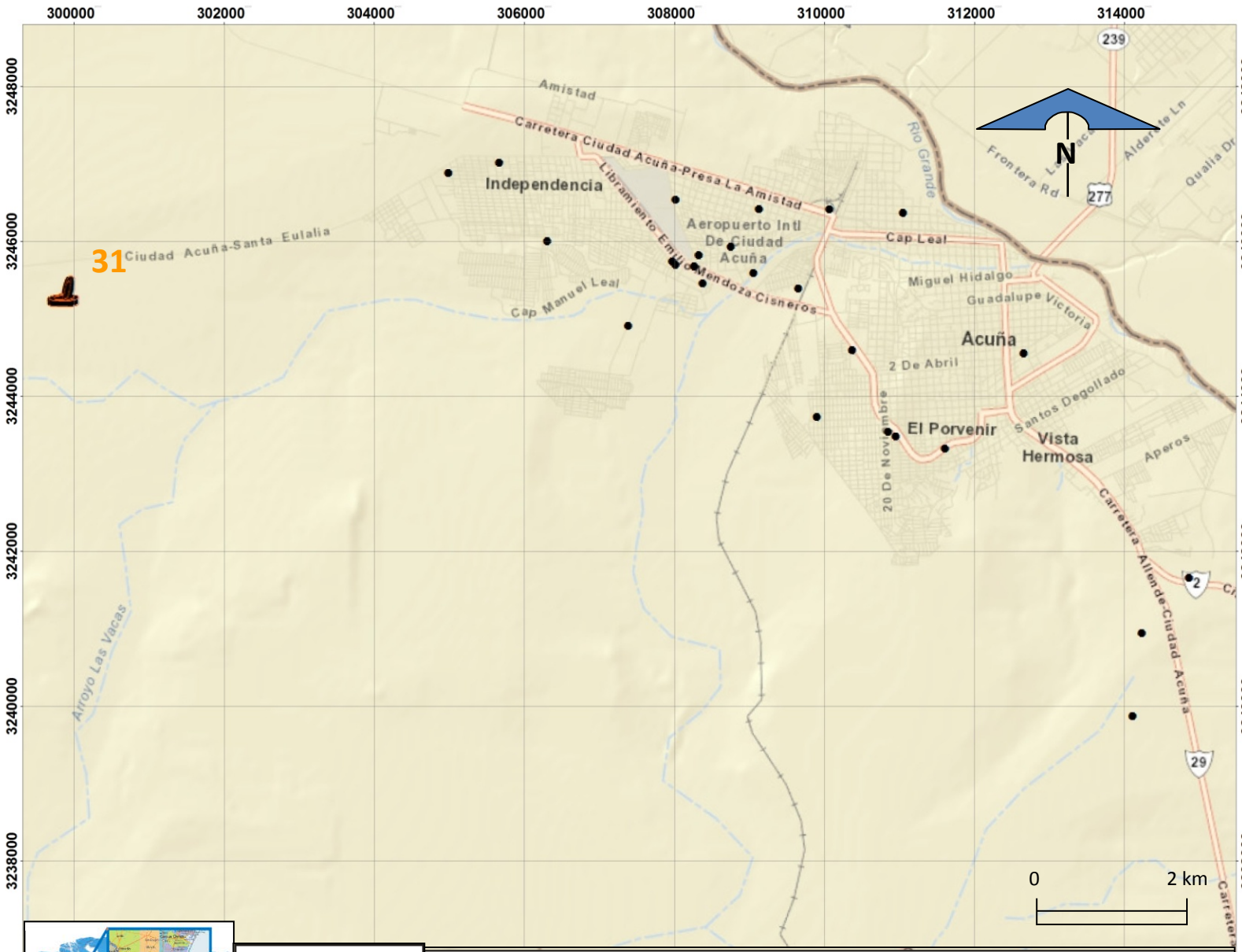
Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE	PROJECT	DATE	SCALE.
Ojinaga sites display map.	432.01	23/08/2012	Graphic

CUENT.	LOCATION.	DRAWN BY.	CHECK.	EI
N A D B	Ojinaga Chihuahua, Mexico.	Marcel Lopez	APRP	RV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306000
308000
310000
312000
314000
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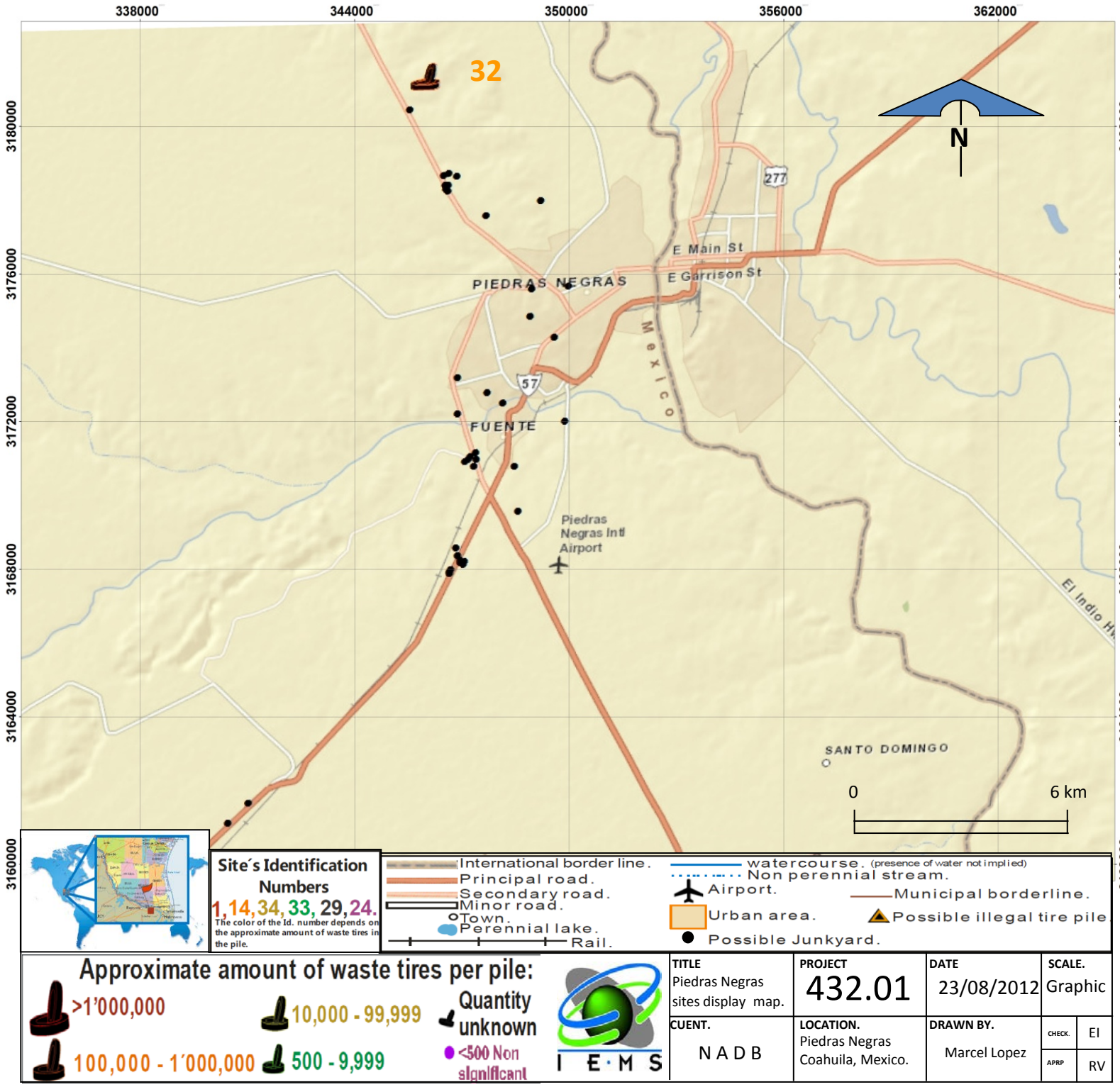
3246000
3244000
3242000
3240000
3238000
N
239
277
29
2
Amistad
Carretera Ciudad Acuña-Presa La Amistad
Independencia
Libramiento Emilio Mendoza Cisneros
Aeropuerto Intl De Ciudad Acuña
Cap Leal
Miguel Hidalgo
Guadalupe Victoria
Acuña
2 De Abril
El Porvenir
Vista Hermosa
Santos Degollado
Aperos
20 De Noviembre
Río Grande
Frontera Rd
Alderete Ln
Quails Dr
31
Ciudad Acuña-Santa Eulalia
Cap Manuel Leal
Arroyo Las Vacas
Carretera Allende-Ciudad Acuña
0
2 km
Site´s Identification Numbers
1,14,34,33,29,24.
The color of the Id. number depends on the approximate amount of waste tires in the pile.
International border line.
Principal road.
Secondary road.
Minor road.
Town.
Perennial lake.
Rail.
watercourse. (presence of water not implied)
Non perennial stream.
Airport.
Municipal borderline.
Urban area.
Possible illegal tire pile
Possible Junkyard.
Approximate amount of waste tires per pile:
>1'000,000
10,000 - 99,999
Quantity unknown
100,000 - 1´000,000
500 - 9,999
<500 Non significant
I E·M S
TITLE
Acuña sites display map.
PROJECT
432.01
DATE
23/08/2012
SCALE.
Graphic
CUENT.
N A D B
LOCATION.
Acuña Coahuila, Mexico.
DRAWN BY.
Marcel Lopez
CHECK.
EI
APRP
RV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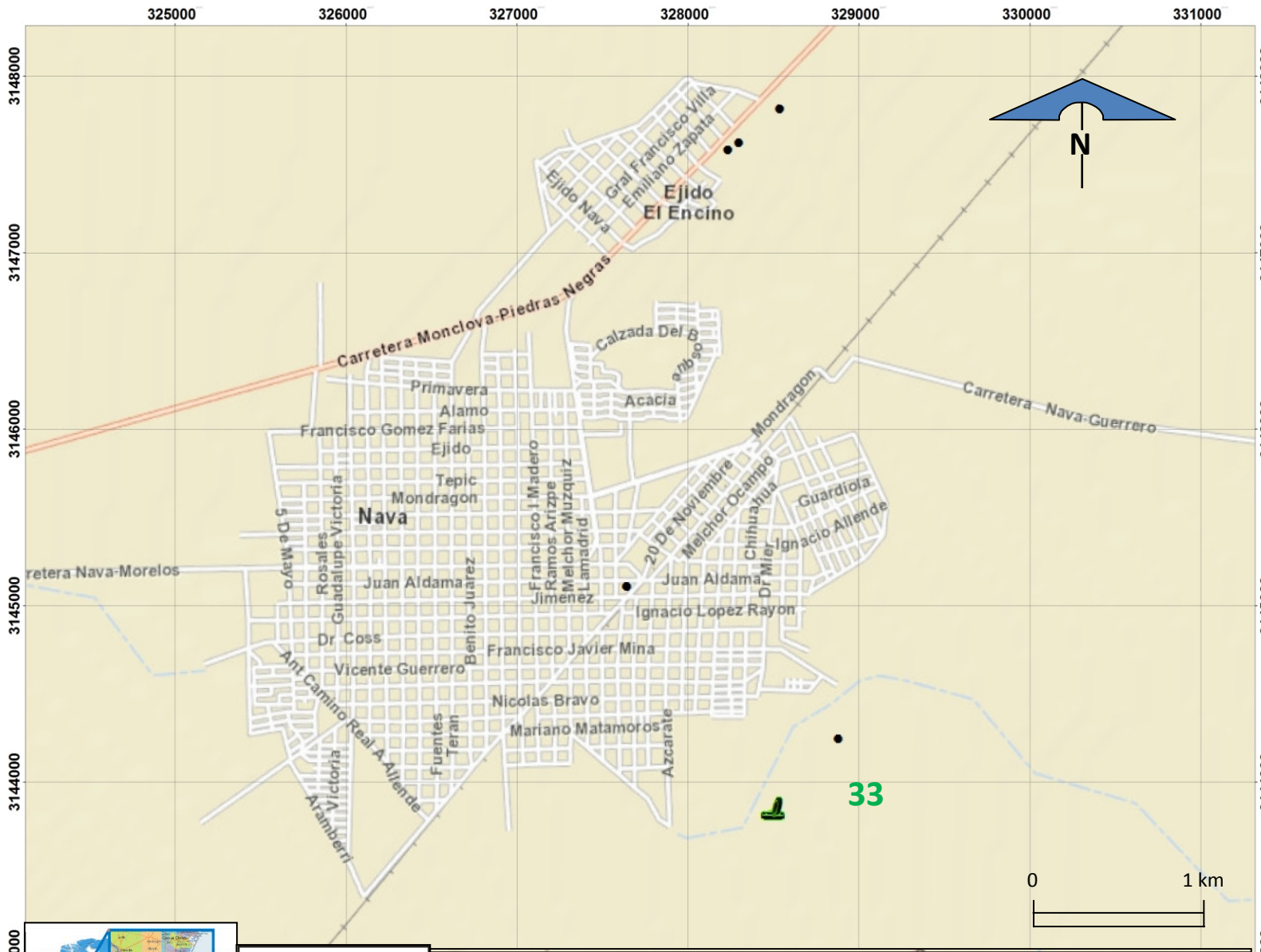
350000
356000
362000
3180000
3176000
3172000
3168000
3164000
3160000
32
N
277
E Main St
E Garrison St
PIEDRAS NEGRAS
Mexico
57
FUENTE
Piedras Negras Intl Airport
El Indio Hy
SANTO DOMINGO
0
6 km
Site´s Identification Numbers
1,14,34,33,29,24.
The color of the Id. number depends on the approximate amount of waste tires in the pile.
International border line.
Principal road.
Secondary road.
Minor road.
Town.
Perennial lake.
Rail.
watercourse. (presence of water not implied)
Non perennial stream.
Airport.
Municipal borderline.
Urban area.
Possible illegal tire pile
Possible Junkyard.
Approximate amount of waste tires per pile:
>1'000,000
10,000 - 99,999
Quantity unknown
100,000 - 1´000,000
500 - 9,999
<500 Non significant
I E·M S
TITLE
Piedras Negras sites display map.
PROJECT
432.01
DATE
23/08/2012
SCALE.
Graphic
CUENT.
N A D B
LOCATION.
Piedras Negras Coahuila, Mexico.
DRAWN BY.
Marcel Lopez
CHECK.
EI
APRP
RV



Site´s Identification Numbers

1,14,34, 33, 29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

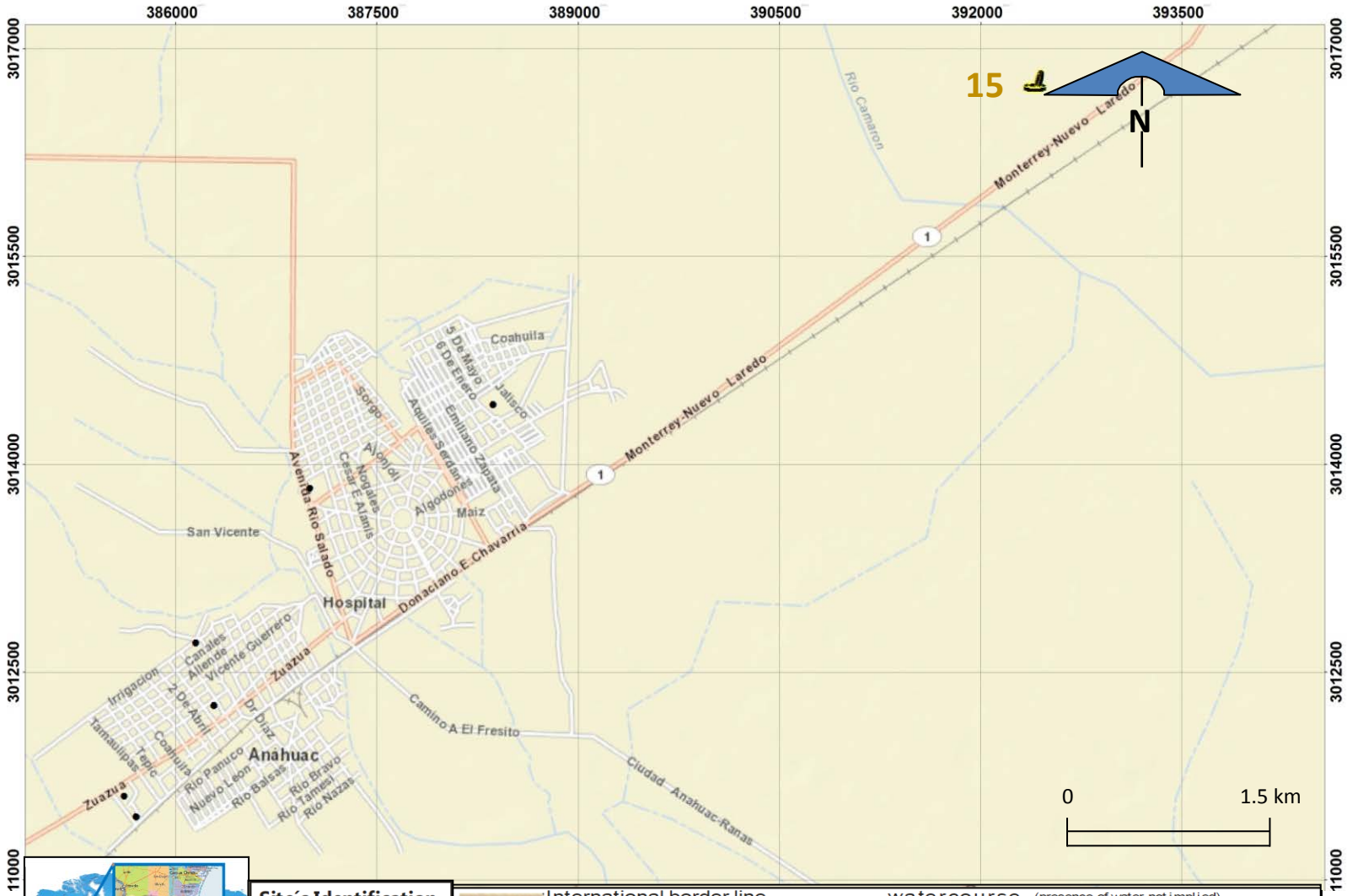
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Nava sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CUENT. N A D B	**LOCATION.** Nava Coahuila, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV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392000
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3017000
3015500
3014000
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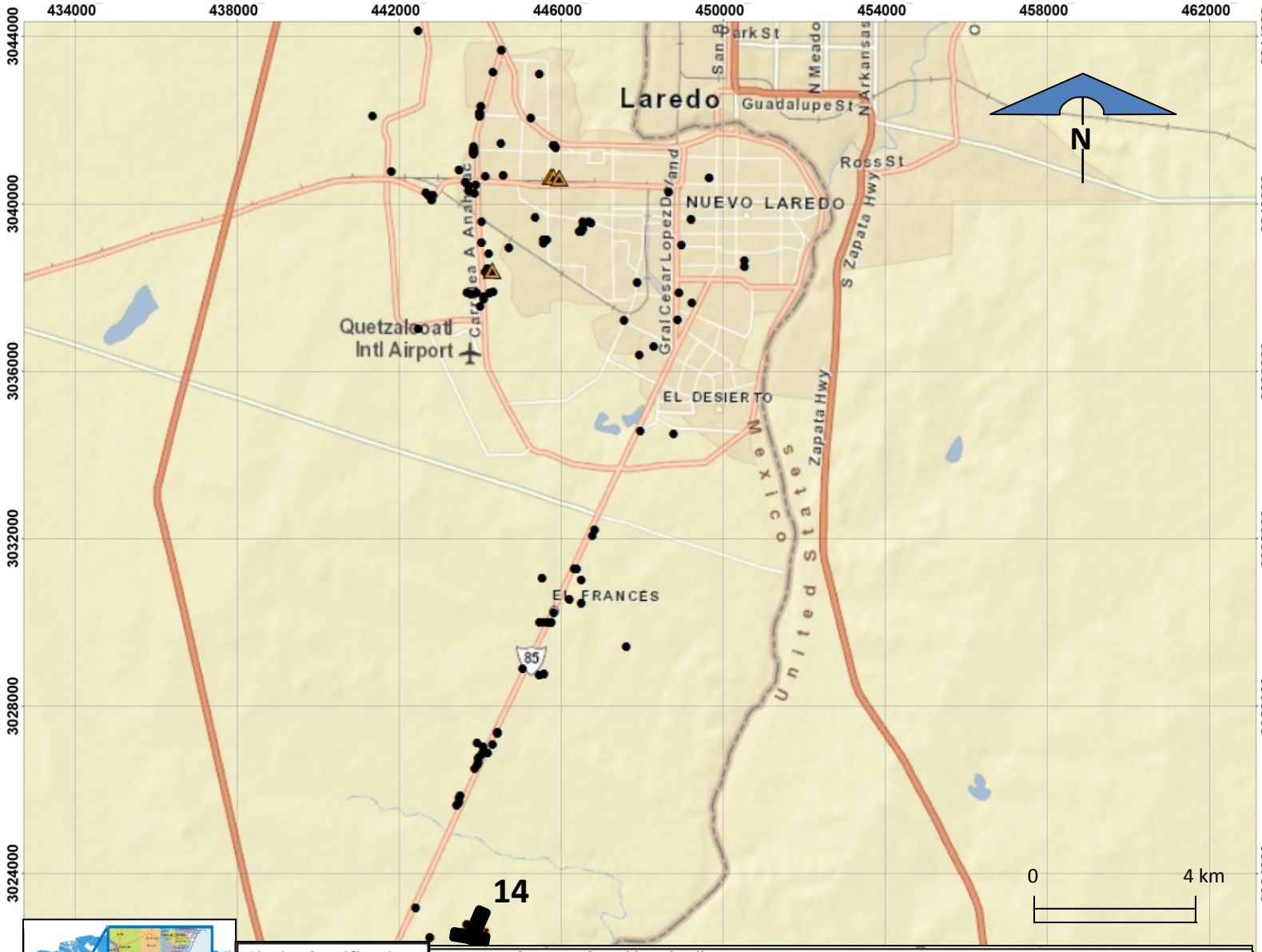
11000
15
N
Monterrey-Nuevo Laredo
Rio Camaron
Coahuila
5 De Mayo
6 De Enero
Jalisco
Sorgo
Aquiles Serdan
Emiliano Zapata
Algodones
Maiz
Avenida Rio Salado
San Vicente
Hospital
Donaciano E Chavarria
Irrigacion
Canales
Allende
Vicente Guerrero
Zuazua
2 De Abril
Dr Diaz
Tamaulipas
Tepic
Rio Panuco
Nuevo Leon
Rio Balsas
Rio Bravo
Rio Tamesi
Rio Nazas
Anahuac
Camino A El Fresito
Ciudad Anahuac-Ranas
0
1.5 km
Site´s Identification Numbers
1,14,34,33,29,24.
The color of the Id. number depends on the approximate amount of waste tires in the pile.
International border line.
Principal road.
Secondary road.
Minor road.
Town.
Perennial lake.
Rail.
watercourse. (presence of water not implied)
Non perennial stream.
Airport.
Municipal borderline.
Urban area.
Possible illegal tire pile
Possible Junkyard.
Approximate amount of waste tires per pile:
>1'000,000
10,000 - 99,999
Quantity unknown
100,000 - 1´000,000
500 - 9,999
<500 Non significant
I E·M S
TITLE
Anahuac sites display map.
PROJECT
432.01
DATE
23/08/2012
SCALE.
Graphic
CUENT.
N A D B
LOCATION.
Anahuac Nuevo Leon, Mexico.
DRAWN BY.
Marcel Lopez
CHECK.
EI
APRP
RV



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Nuevo Laredo sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CUENT. N A D B	**LOCATION.** Nuevo Laredo Tamaulipas, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV

Site´s Identification Numbers

1,14,34,33, 29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

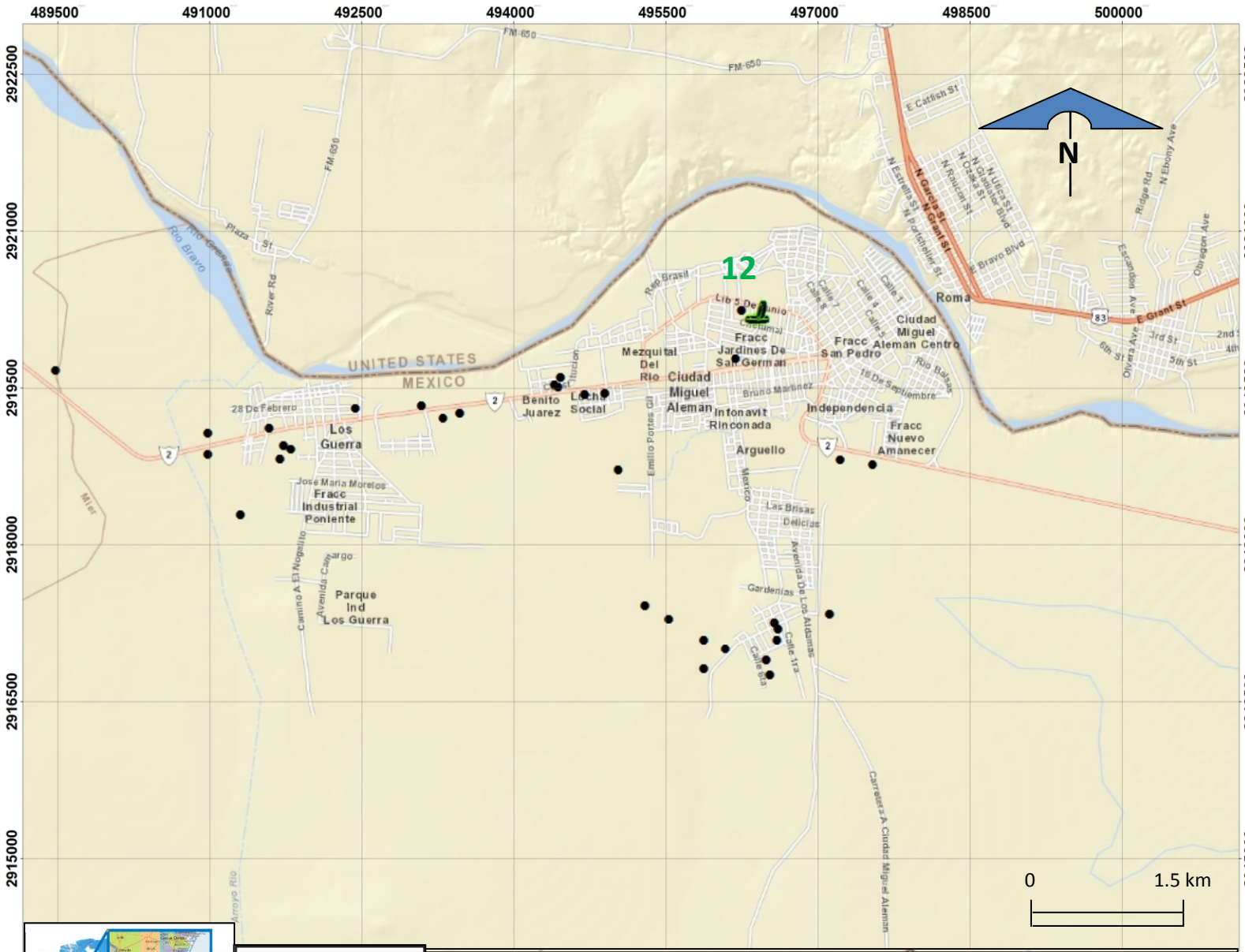
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Nueva Cd. Guerrero sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CLIENT. N A D B	**LOCATION.** Nueva Cd. Guerrero Tamaulipas, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

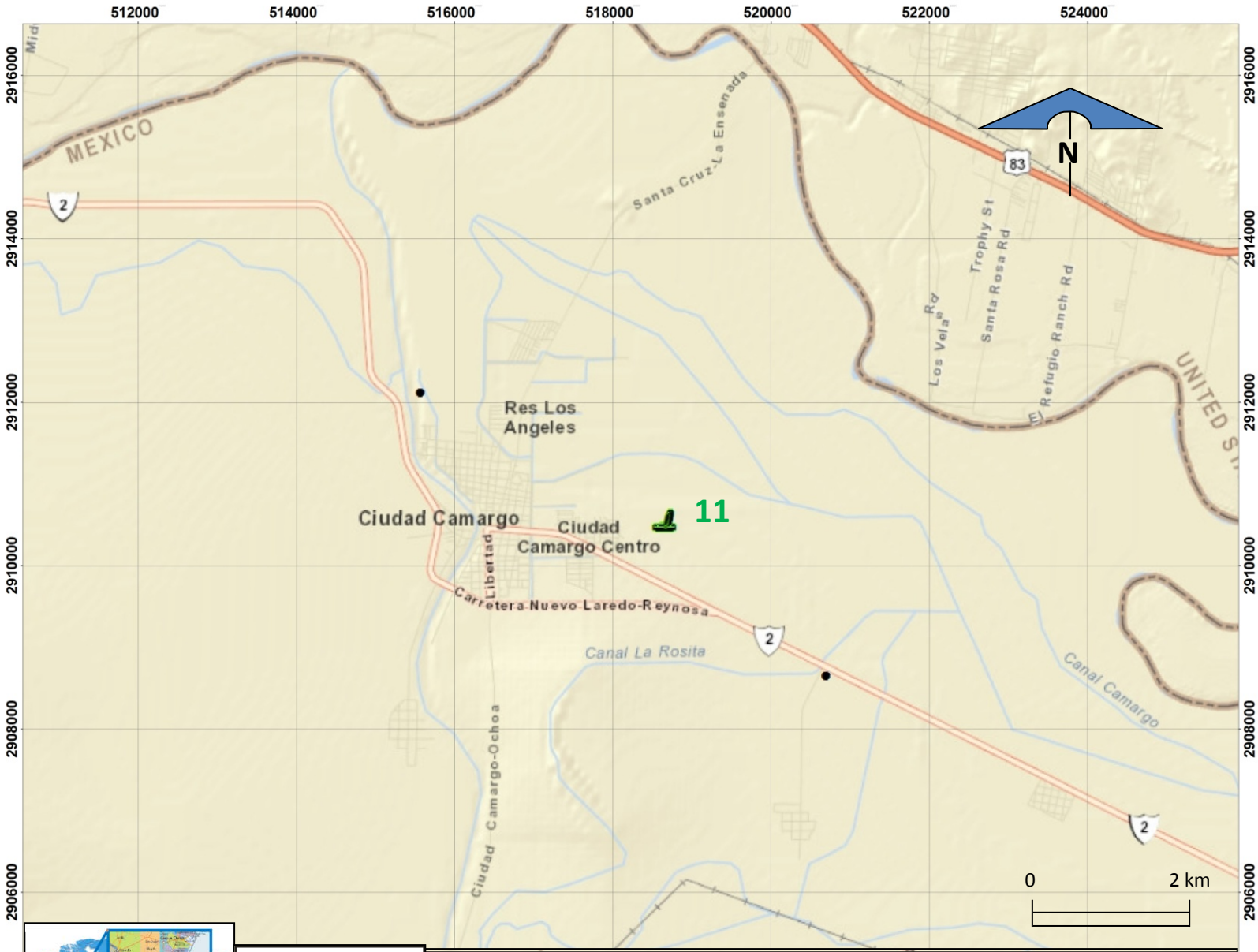
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile.
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Miguel Aleman sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CUENT. N A D B	**LOCATION.** Miguel Aleman Tamaulipas, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

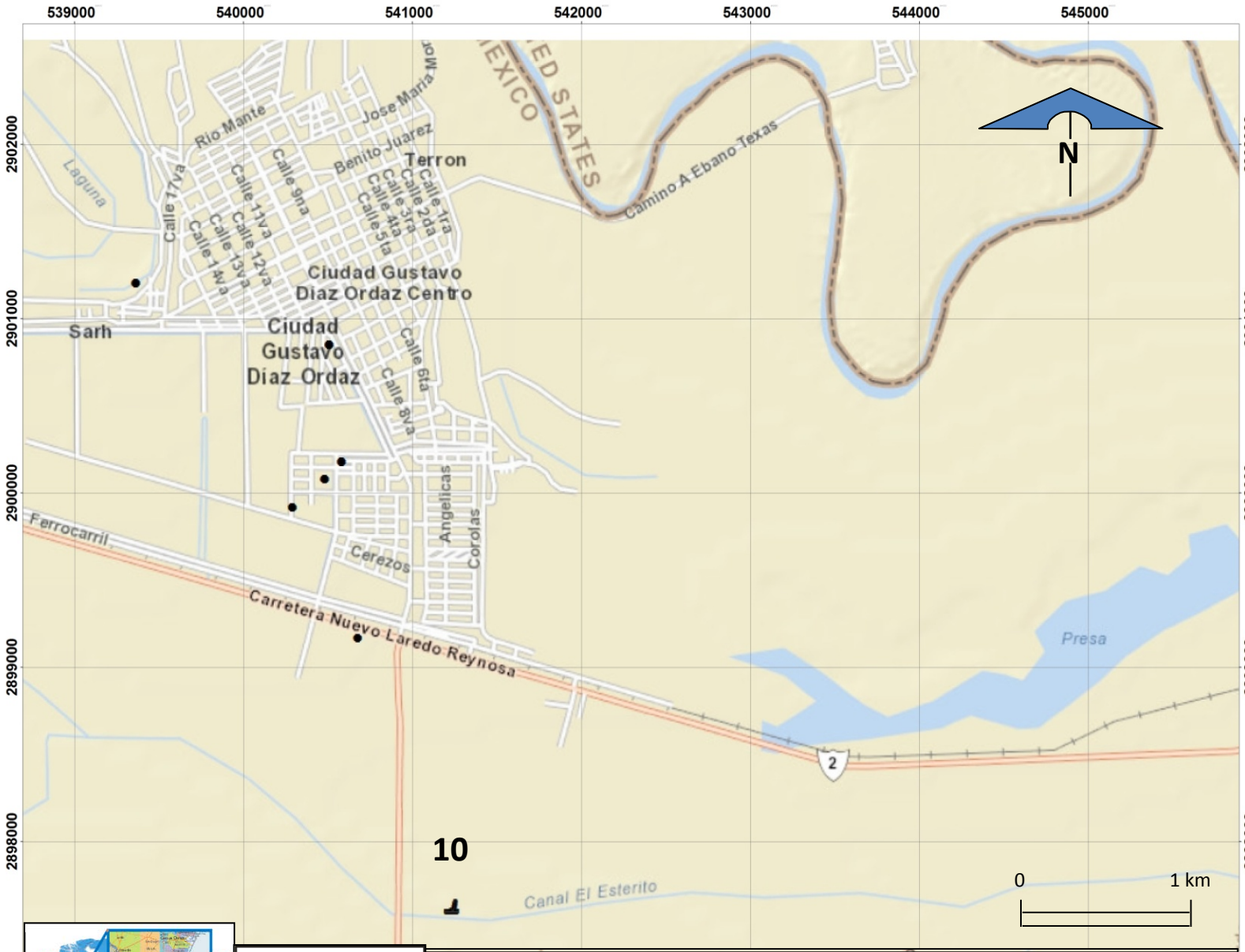
Approximate amount of waste tires per pile:

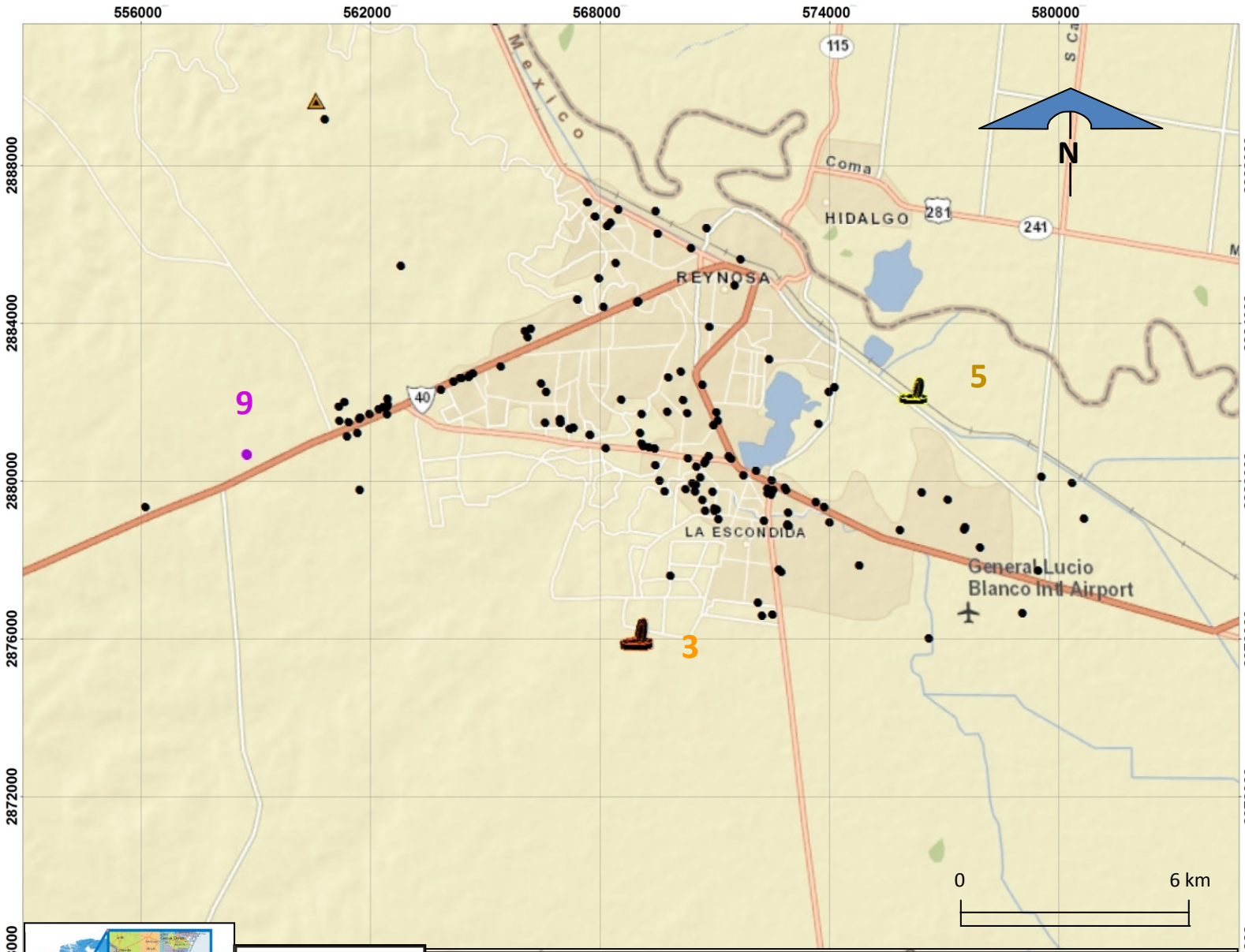
- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE	PROJECT	DATE	SCALE.
Camargo sites display map.	432.01	23/08/2012	Graphic

CUENT.	LOCATION.	DRAWN BY.	CHECK.	EI
N A D B	Camargo Tamaulipas, Mexico.	Marcel Lopez	APRP	RV


539000
540000
541000
542000
543000
544000
545000
2902000
2901000
2900000
2899000
2898000
N
Laguna
Rio Mante
Calle 17va
Calle 14va
Calle 13va
Calle 12va
Calle 11va
Calle 9na
Jose Maria Mor
Benito Juarez
Calle 5ta
Calle 4ta
Calle 3ra
Calle 2da
Calle 1ra
Terron
Camino A Ebano Texas
Ciudad Gustavo Diaz Ordaz Centro
Sarh
Ciudad Gustavo Diaz Ordaz
Calle 6ta
Calle 8va
Angelicas
Corolas
Cerezos
Ferrocarril
Carretera Nuevo Laredo Reynosa
Presa
2
10
Canal El Esterito
0
1 km
Site´s Identification Numbers
1,14,34,33,29,24.
The color of the Id. number depends on the approximate amount of waste tires in the pile.
International border line.
Principal road.
Secondary road.
Minor road.
Town.
Perennial lake.
Rail.
watercourse. (presence of water not implied)
Non perennial stream.
Airport.
Municipal borderline.
Urban area.
Possible illegal tire pile
Possible Junkyard.
Approximate amount of waste tires per pile:
>1'000,000
10,000 - 99,999
Quantity unknown
100,000 - 1´000,000
500 - 9,999
<500 Non significant
I E·M S
TITLE
Gustavo Diaz Ordaz sites display map.
PROJECT
432.01
DATE
23/08/2012
SCALE.
Graphic
CUENT.
N A D B
LOCATION.
Gustavo Diaz Ordaz Tamaulipas, Mexico.
DRAWN BY.
Marcel Lopez
CHECK.
EI
APRP
RV



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

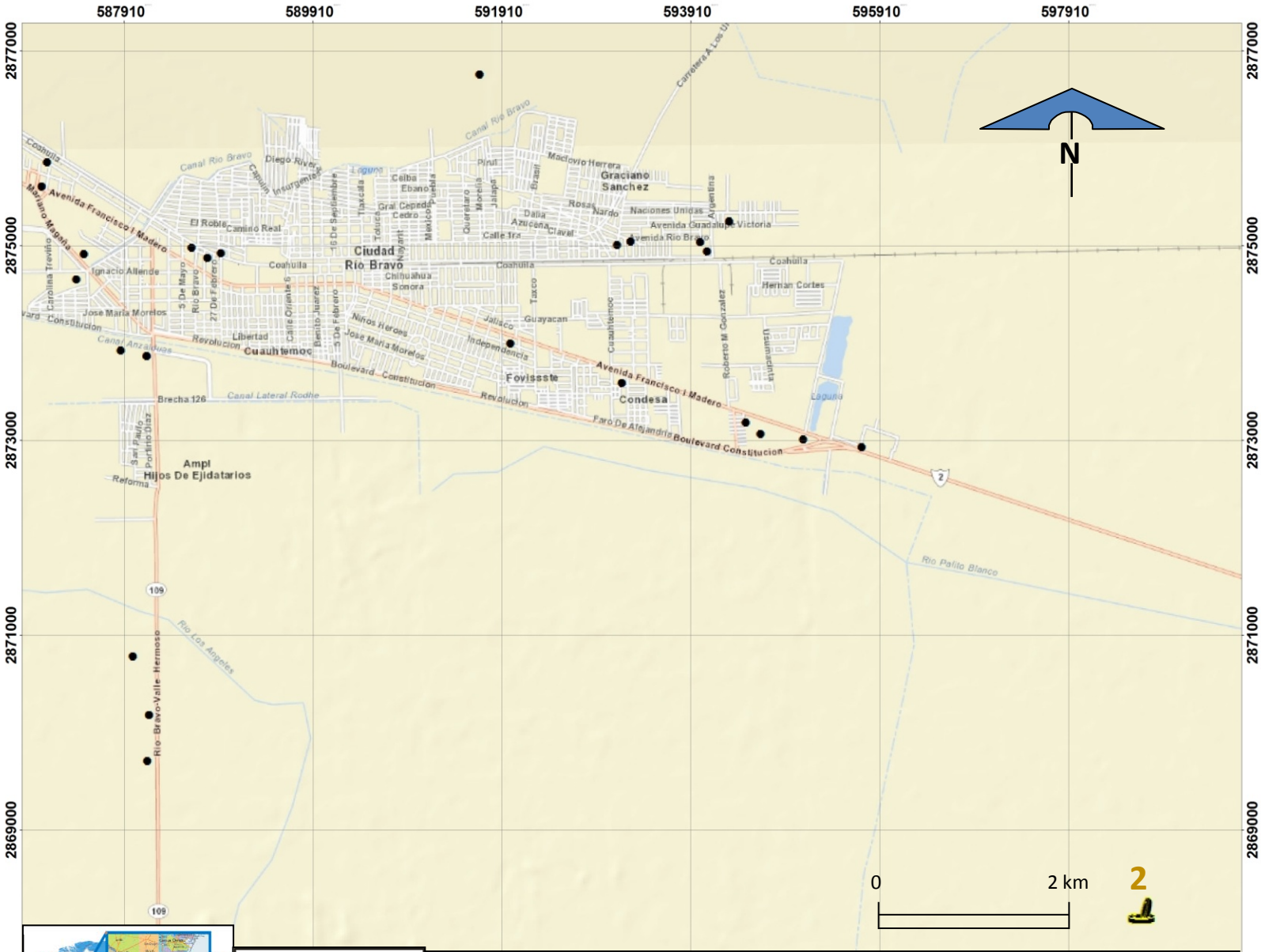
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Reynosa sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CUENT. N A D B	**LOCATION.** Reynosa Tamaulipas, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV



Site´s Identification Numbers

1,14,34,33,29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

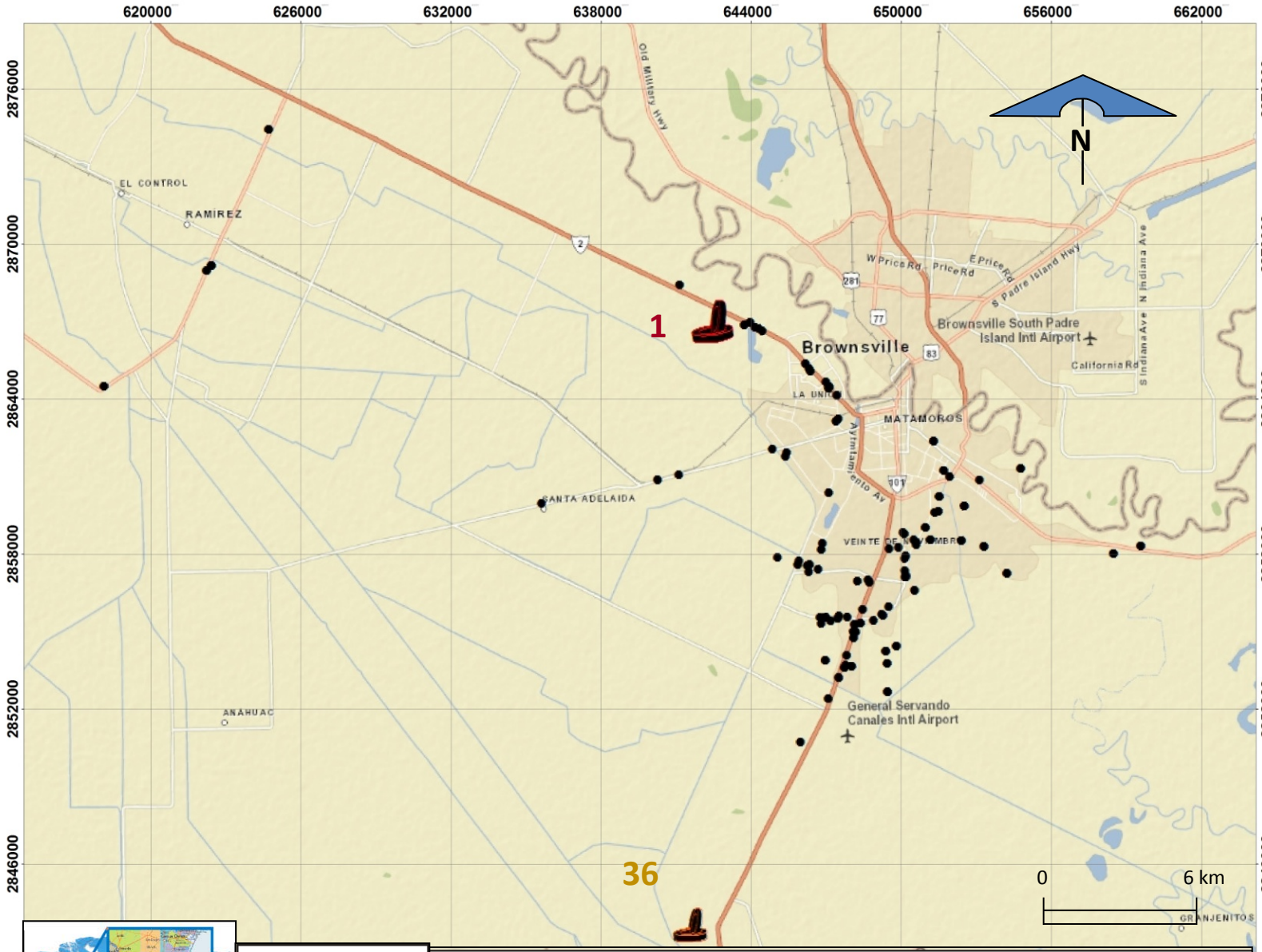
- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE Rio Bravo sites display map.	**PROJECT** 432.01	**DATE** 23/08/2012	**SCALE.** Graphic
CUENT. N A D B	**LOCATION.** Rio Bravo Tamaulipas, Mexico.	**DRAWN BY.** Marcel Lopez	CHECK. EI / APRP RV



Site´s Identification Numbers

1,14,34,33, 29,24.

The color of the Id. number depends on the approximate amount of waste tires in the pile.

- International border line.
- Principal road.
- Secondary road.
- Minor road.
- Town.
- Perennial lake.
- Rail.
- watercourse. (presence of water not implied)
- Non perennial stream.
- Airport.
- Municipal borderline.
- Urban area.
- Possible illegal tire pile
- Possible Junkyard.

Approximate amount of waste tires per pile:

- >1'000,000
- 100,000 - 1´000,000
- 10,000 - 99,999
- 500 - 9,999
- Quantity unknown
- <500 Non significant

I E·M S

TITLE	PROJECT	DATE	SCALE.
Matamoros sites display map.	432.01	23/08/2012	Graphic

CUENT.	LOCATION.	DRAWN BY.	CHECK.	EI
N A D B	Matamoros Tamaulipas, Mexico.	Marcel Lopez	APRP	RV

ATTACHMENT 13
Quotation questions applied to used tire dealers in representative Mexican scope cities (Spanish)

Printed on 100% recycled fiber paper using solid ink

Cuestionario para vendedores de llantas usadas

1.- ¿Cuál es el precio de las siguientes llantas usadas?

	Rin 13		Rin 14		Rin 15		Rin 16		Rin 17	
Huella restante	**Gallito solo para ciudad (Clase 3)**	**Que aguante carretera (Clase 2)**	**Gallito solo para ciudad (Clase 3)**	**Que aguante carretera (Clase 2)**	**Gallito solo para ciudad (Clase 3)**	**Que aguante carretera (Clase 2)**	**Gallito solo para ciudad (Clase 3)**	**Que aguante carretera (Clase 2)**	**Gallito solo para ciudad (Clase 3)**	**Que aguante carretera (Clase 2)**
Precio por una llanta (pesos mexicanos)										

2.-¿El precio de la llanta ha subido en los últimos 7 años?

Si No **¿Cuánto?**_____

3.- ¿Qué tamaño de llanta es el que más se vende?

R13 R14 R15 R16 R17 ó mayores

4.- ¿De qué ciudad o proveedor surten sus llantas usadas?

Nombre del negocio_____

Dirección_____

Persona que te atendió_____

ATTACHMENT 14
Tire piles fire risk estimations according to Mexican Official Standard NOM-002-STPS-2010

Printed on 100% recycled fiber paper using solid ink

Table 1.
Significant Tire Piles Fire Risk Classification

General Data				Number of waste tires	Approximated weight (Kilograms)[1]	Fire risk[3]
Id #	Municipality	State	Type of site			
1	Matamoros	Tamaulipas	Municipal Waste Tires Collection Center	2,250,000	20,411,640	High
2	Rio Bravo	Tamaulipas	Municipal Landfill and waste tires storage center	32,000	290,299	High
3	Reynosa	Tamaulipas	"Las Anacuas" City open-air dump.	550,000	4,989,512	High
4	Reynosa	Tamaulipas	Open air dump "Las Calabazas"	50,000	453,592	High
7	Reynosa	Tamaulipas	"Las Colmenas" Landfill	1,000	9,072	Ordinary
8	Reynosa	Tamaulipas	"Alto Bonito" Landfill	100,000	907,184	High
11	Camargo	Tamaulipas	Municipal Waste Tires Collection Center	800	7,257	Ordinary
12	Miguel Aleman	Tamaulipas	Provisional Municipal Waste Tires Collection Center	3,000	27,216	High
13	Guerrero	Tamaulipas	Municipal open-air dump	200	1,814	Ordinary
14	Nuevo Laredo	Tamaulipas	Storage center	Cleaned up[2]	NA	High
15	Anahuac	Nuevo Leon	Municipal Landfill	13,000	117,934	High
19	Cerralvo*	Nuevo Leon*	Unknown*	1,500	13,608	Ordinary
20	Sabinas Hidalgo*	Nuevo Leon*	Unknown*	8,000	72,575	High
31	Acuña	Coahuila	Municipal Landfill	200,000	1,814,368	High
32	Piedras negras	Coahuila	Private landfill.	115,500	1,047,798	High
33	Nava	Coahuila	Storage center	1,000	9,072	Ordinary
34	Ojinaga	Chihuahua	Storage center	50,000	453,592	High
35	Juarez	Chihuahua	Storage center	2,500,000	22,679,600	High
36	Matamoros	Tamaulipas	Municipal landfill waste tire storage center	400,000	3,628,736	High

"Significant Tire Pile" and "Dump Sites" are defined as any tire pile or dump site with more than 500 tires.

Numbers colored in red signal sites which accumulated less than 500 tires, but since they continue active the number will be eventually reached if no output is employed.

[1] Estimation based on the weight of a Passenger Tire Equivalent (PTE) mass of 20 pounds (9.07 Kg) per tire.

[2] Nuevo Laredo tire pile was cleaned up during the write-up of this Task Report according to the remote interview applied to the municipal Environment and Climate Change Coordinator on April 20, 2012 (signed confirmation pending).

[3] Fire Risk based on the Official Mexican Standard NOM-002-STPS-2010 which states that any workplace accumulating 15,000 Kg or more of combustible solid materials are classified as High Fire Risk.

ATTACHMENT 15
Rim 13 and 15 inches manual cutting of waste tire's sidewalls time and volume diminishing field measurements

IEMS performed a simple field test with the assistance of 3 tire repair shop workers-owners. The test was performed in the city of Queretaro, Mexico. Due to security reasons fieldwork testing in the Mexican Texas-Mexico border area weren't performed.

Objectives

To obtain real life data regarding the following matters:

1. When sidewalls area separated from their tread; what percentage of the original whole tire volume is occupied by the tread when compacted? (Not considering the resulting sidewall rings).
2. When placing a sidewall ring, without tread, over another; what is their vertical width?
3. How much time does it take to manually remove a passenger tire sidewall using a knife?
4. What kind of knife is the most comfortable when manually removing waste tires sidewalls?

Background

During fieldwork activities in the Texas side of the Texas-Mexico border several used tire dealers and a processor highlighted the volume reduction and facilitation of the logistics regarding waste tire management by simply removing the sidewalls in order to reduce the waste tires volume. IEMS decided to perform this field test to assess how beneficial the reduction really is.

Materials

Materials used in the field test:

- ✓ 2 waste tires rim size of 15 inches
- ✓ 1 waste tire rim size 13 inches
- ✓ 1 Chronometer
- ✓ 1 Flexometer.

✓ 1 Linoleum knife

Image 1.
Linoleum knife

Brand: Truper
Handle material: wood
Blade: carbon steel 1060 with double thermal treatment.
Model: NI-8

✓ 1 Retractable knife 6'

Image 2.
Retractable knife 6'

Brand: Pretul
Handle material: injected plastic
Blade: steel (no more data available)
Model: Not available (NA)

✓ 1 Plastic cutter knife

Image 3.
Plastic cutter knife

Brand: Truper
Handle material: plastic
Blade: SK4-0.4
Model: Not available (NA)

✓ 1 Hacksaw

Image 4.
Hacksaw

Brand: Pretul
Handle material: resistant plastic with anti skid design
Blade: 24dpp 12'
Model: NA

Procedure

1. IEMS proceeded to a roadside tire repair shop.

2. IEMS asked the owner-worker if he could help us in performing a test to measure the volume of a whole tire against the volume of a tire whose sidewalls had been removed and measure the time it takes to remove a sidewall using diverse tools.

3. The owner-worker selected a waste tire.

4. IEMS measured and registered the whole tire rim size, diameter and sidewall height.

5. IEMS asked the shop owner-worker to select a tool and to start cutting a sidewall.

6. IEMS measured and registered the time it took to cut one sidewall of the waste tire.

7. IEMS asked the shop owner-worker to select a second tool and to cut the remaining sidewall of the waste tire.

8. IEMS measured and registered the time it took to cut the second sidewall of the waste tire.

9. One IEMS personnel stood over the resulting waste tire tread in order to compact or fold it.

10. IEMS measured and registered its width when compacted (measuring on the folding area which was the place with the highest width).

11. IEMS measured and registered the tread's length when compacted-folded.

12. IEMS placed one sidewall ring over the other and measured the resulting width and radius.

13. IEMS ask the owner-worker which tool was the most comfortable to use and registered the answer received.

Calculations

Fieldwork volume reduction

Formula 1.
Cylinder volume (m^3) = π x radius (m) x height (m)

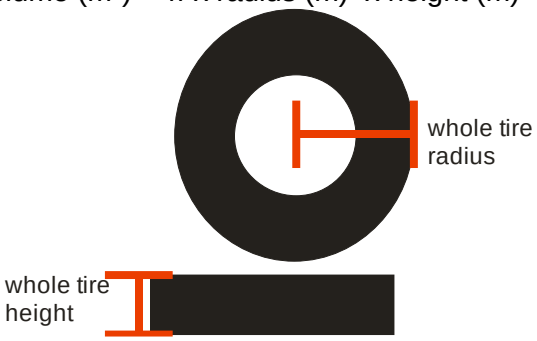


Table 1. Whole tire volume estimation					
No. of Test	**1**	**2**	**3**		
Data	**Amount**	**Amount**	**Amount**	**Units**	**Source**
rim size	13	15	15	in	Waste tire sidewall
radius (r)	0.28	0.39	0.27	m	measured during fieldwork
height (h)	0.18	0.23	0.18	m	measured during fieldwork
pi	3.1415927	3.1415927	3.1415927	-	-
Volume (V)	**0.0443**	**0.1099**	**0.0412**	**m^3**	estimated with **Formula 1**

Formula 2.

Hexahedron volume = length (m) x width (m) x height(m)

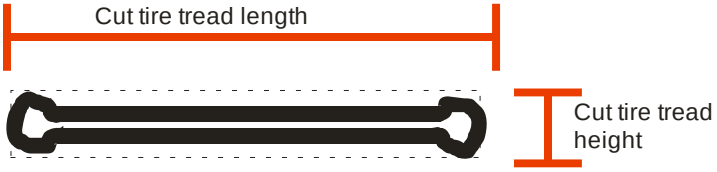


Table 2. Volume of cut tire tread without sidewalls estimation					
Data	**Amount**	**Amount**	**Amount**	**Units**	**Source**
rim size	13	15	15	in	Waste tire sidewall
length	0.83	0.96	0.84	m	measured during fieldwork
width	0.09	0.2	0.18	m	measured during fieldwork
height	0.05	0.06	0.05	m	measured during fieldwork
Volume	**0.003735**	**0.01152**	**0.00756**	**m^3**	estimated with **Formula 2**

Formula 3.

$$\text{Volume reduction if sidewalls are not considered} = \frac{\text{Volume of tire tread without sidewalls}}{\text{Whole tire volume}} \times 100\%$$

Table 3. Volume reduction estimation (not considering the tire walls pieces volume)					
Data	**Amount**	**Amount**	**Amount**	**Units**	**Source**
Rim Size	13	15	15	in	Waste tire sidewall
Volume reduction if sidewalls are not considered*	**92%**	**90%**	**82%**	**percentage**	estimated with **Formula 3**

*Sidewall rings volume wasn't considered in this fieldwork estimation.

Formula 4.

$$\text{Mean volume reduction not considering the tire walls pieces (percentage)} = \left(\prod_{i=1}^{n} \text{Volume reduction not considering the tire walls (percentage)} \right) \wedge 1/n$$

n= number of tests

Table 4. Mean volume reduction (not considering the tire walls pieces volume)			
Data	**Amount**	**Units**	**Source**
Mean volume reduction if sidewalls are not considered	**87%**	**percentage**	estimated with **Formula 4**

Sidewall's diameter and stacking width

Sidewall rings diameter

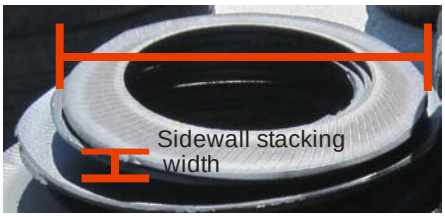


Table 5. Sidewall stacking width			
Test No.	**Amount**	**Units**	**Source**
1	NA	m	NA
2	0.05	m	measured during fieldwork
3	0.03	m	measured during fieldwork

Time for manual cutting of sidewalls

Formula 5.

$$\text{Mean time for manual removing of sidewalls} = \left(\prod_{i=1}^{n} \text{Time to manually remove a tire sidewall using specific types of knives (seconds / sidewall)} \right) \wedge 1/n$$

n= number of tests

Table 6. Time to manually remove a tire sidewall using different types of knives (seconds/ sidewall)		
Test No.	**Linoleum knife**	**Retractable knife 6'**
1	120	84
2	41	34
3	54	107
Mean time for manual removing of sidewalls	**64**	**67**

Most comfortable and reliable tool for manually cutting tire sidewalls:

Tools compared:

1. Cutter knife
2. Hacksaw
3. Linoleum knife
4. Retractable knife 6'

Note: Hacksaw and plastic cutter knife were immediately discarded on the first test and no testing was continued using them

Table 7. Most comfortable tool reports		
Test No.	**Linoleum knife**	**Retractable knife 6'**
1	*	-
2	*	-
3	NA	NA
Total	2	0

NA = Not Applicable. The owner-worker of the tire repair shop answered that if only the retractable knife had a longer blade and the locking mechanism worked properly when firmly griping the tool with the fist it would be the most comfortable.

Results

Fieldwork volume reduction

Table 4. Mean volume reduction (not considering the tire walls pieces volume)			
Data	**Amount**	**Units**	**Source**
Mean volume reduction if sidewalls are not considered	**87%**	**percentage**	estimated with **Formula 4**

Sidewall's stacking width

Table 5. Sidewall stacking width			
Test No.	**Amount**	**Units**	**Source**
1	NA	m	NA
2	0.05	m	measured during fieldwork
3	0.03	m	measured during fieldwork

Time to manually remove a sidewall

Table 6. Time to manually remove a tire sidewall using different types of knives (seconds/ sidewall)		
Test No.	**Linoleum knife**	**Retractable knife 6'**
1	120	84
2	41	34
3	54	107
Mean time for manual removing of sidewalls	**64**	**67**

Most comfortable tool for manually cutting tire sidewalls:

- Cutter knife was ruled out since the blade kept breaking on its division lines endangering the user.
- Hacksaw was ruled out on the first attempt since it couldn't cut through the tire sidewall in order to reach the tread-sidewall radius in order to remove the sidewall.
- The linoleum knife was reported as the most comfortable by 2 out of 3.
- The retractable knife was reported as potentially the most comfortable by 1 out of 3 if only it could have a longer blade and the locking mechanism worked properly when firmly griping the tool with the fist.

Conclusions

1. If rim 13 and 15 inches tires' sidewalls are separated from their tread, the compacted tread approximately occupies 13% of the original whole tire volume, not considering the resulting sidewall rings.
2. Sidewall stacking width for rim 15 tires ranged from 3 to 5 centimeters.
3. On rim 13 and 15 in tires; it takes an average time of 64 seconds to remove a tire sidewall using a linoleum knife and about 67 seconds by using a retractable knife.
4. Linoleum knives are more comfortable for users when being employed in the removal of waste tires sidewalls.

Data analysis

Data obtained is only representative for rim 13 and 15 waste tires. Conclusions of this test should only be employed to illustrate on the benefits of using linoleum knives versus other kinds of knives when using them to manually remove waste tires sidewalls. Other data obtained was calculated in order to possess real life measurements with which estimate approximated costs and calibrate dimensions reduction estimations.

ATTACHMENT 16
Tires' volume reduction theoretical estimation if sidewalls are removed

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IEMS developed a simple formula that estimated the volume reduction of a waste tire when the sidewalls are removed from it, it is based on the commercial sizing codes placed in all commercial passenger tires sold in the United States and Mexico.

Tires' code names (width, rim diameter and Aspect radio) displayed on their sidewalls provide a significant amount of information regarding the tire's dimensions, as it is explained on figure 1 as follows:

Figure 1.
Visual explanation of tire size information (Goodyear).

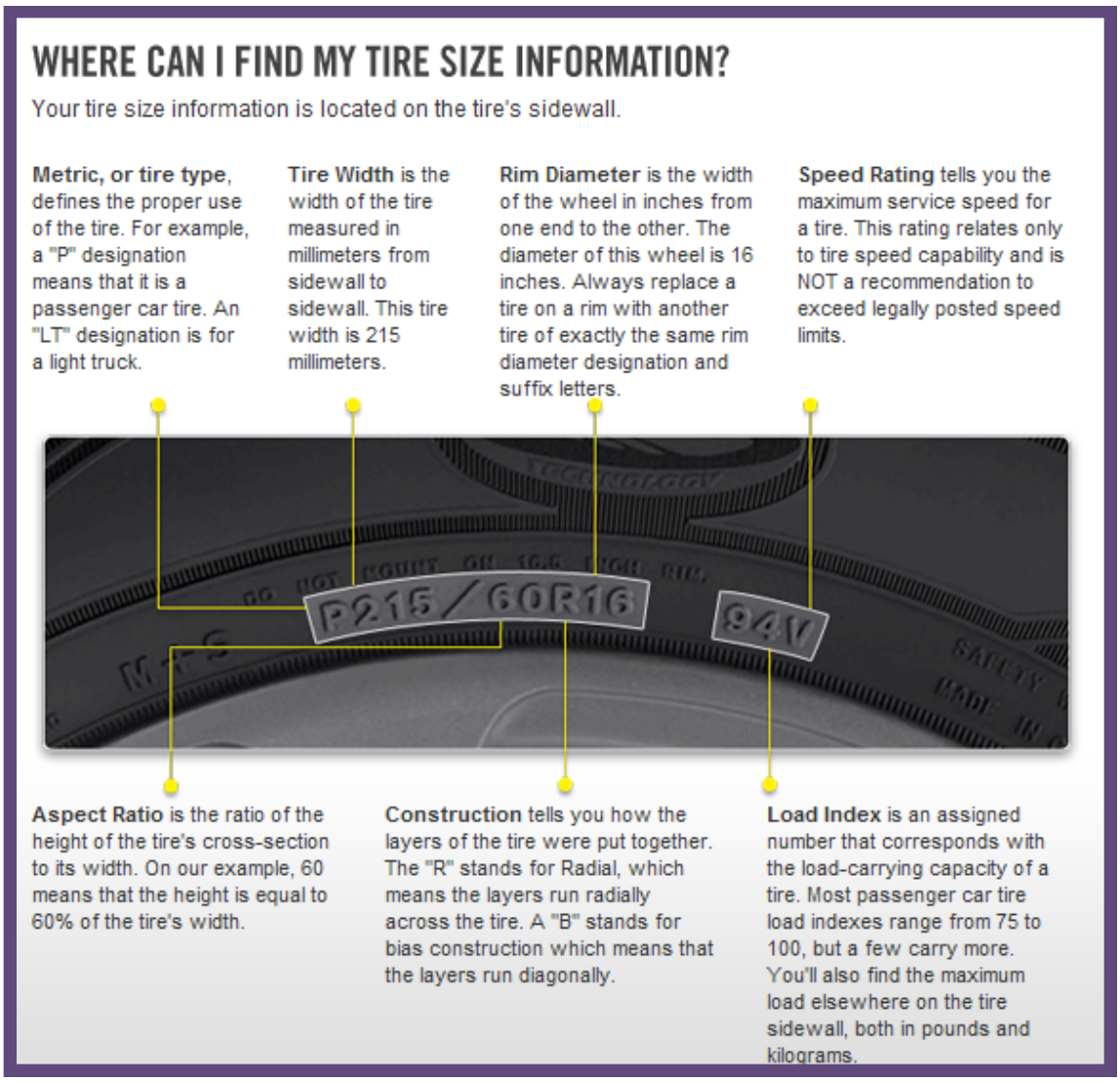
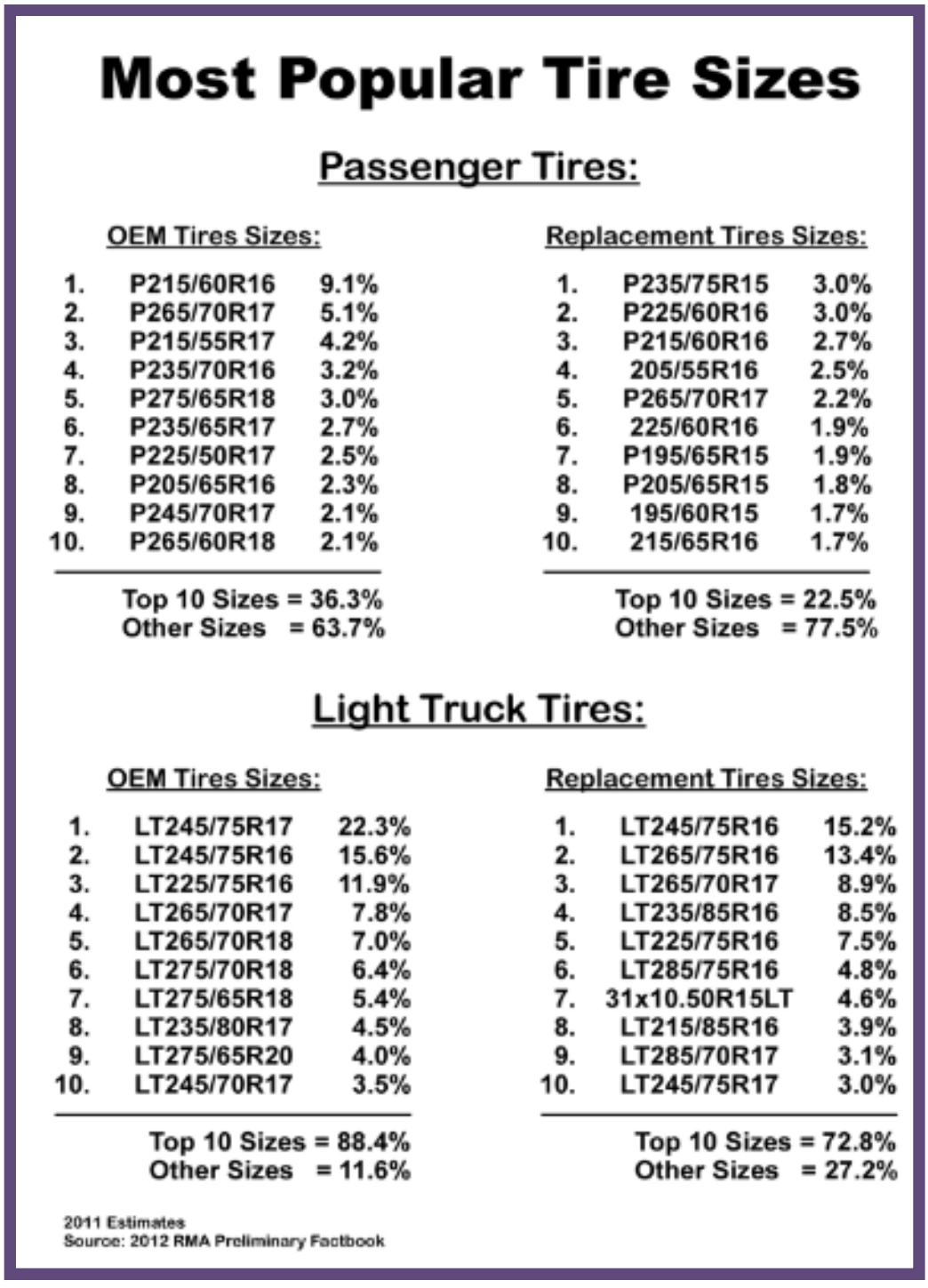


Figure 2.
Most popular tire sizes in the United States during year 2011.



Most Popular Tire Sizes

Passenger Tires:

OEM Tires Sizes:

1.	P215/60R16	9.1%
2.	P265/70R17	5.1%
3.	P215/55R17	4.2%
4.	P235/70R16	3.2%
5.	P275/65R18	3.0%
6.	P235/65R17	2.7%
7.	P225/50R17	2.5%
8.	P205/65R16	2.3%
9.	P245/70R17	2.1%
10.	P265/60R18	2.1%

Top 10 Sizes = 36.3%
Other Sizes = 63.7%

Replacement Tires Sizes:

1.	P235/75R15	3.0%
2.	P225/60R16	3.0%
3.	P215/60R16	2.7%
4.	205/55R16	2.5%
5.	P265/70R17	2.2%
6.	225/60R16	1.9%
7.	P195/65R15	1.9%
8.	P205/65R15	1.8%
9.	195/60R15	1.7%
10.	215/65R16	1.7%

Top 10 Sizes = 22.5%
Other Sizes = 77.5%

Light Truck Tires:

OEM Tires Sizes:

1.	LT245/75R17	22.3%
2.	LT245/75R16	15.6%
3.	LT225/75R16	11.9%
4.	LT265/70R17	7.8%
5.	LT265/70R18	7.0%
6.	LT275/70R18	6.4%
7.	LT275/65R18	5.4%
8.	LT235/80R17	4.5%
9.	LT275/65R20	4.0%
10.	LT245/70R17	3.5%

Top 10 Sizes = 88.4%
Other Sizes = 11.6%

Replacement Tires Sizes:

1.	LT245/75R16	15.2%
2.	LT265/75R16	13.4%
3.	LT265/70R17	8.9%
4.	LT235/85R16	8.5%
5.	LT225/75R16	7.5%
6.	LT285/75R16	4.8%
7.	31x10.50R15LT	4.6%
8.	LT215/85R16	3.9%
9.	LT285/70R17	3.1%
10.	LT245/75R17	3.0%

Top 10 Sizes = 72.8%
Other Sizes = 27.2%

2011 Estimates
Source: 2012 RMA Preliminary Factbook

Figure 3.
Mexican's specific rim size preference when buying used tires from retailers whose used tires come from USA (percentage) Error margin of 3%

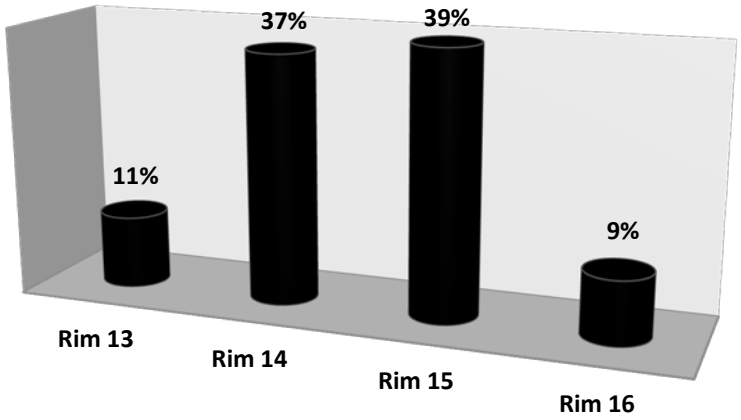


Table 1.
USA-Mexico most popular tire sizes theoretical reduced volume when sidewalls are removed and resulting pieces tightly packed or when sidewalls are not considered.

Section width (milimeters, mm)	Sidewall aspect ratio (percentage, %)	Tire and wheel diameter (inches, in)	Whole tire volume (cubic meters, m^3)	Cut or packed tread without sidewalls volume (m^3)	Cut in half and/or packed sidewall rings theoretical volume (m^3)	Approximate volume reduction (m^3)	Volume reduction if sidewall rings are not considered (m^3)
155	80	13	0.041	0.004	0.009	68%	90%
165	80	13	0.046	0.005	0.010	69%	90%
175	70	13	0.045	0.005	0.009	70%	90%
185	70	13	0.050	0.005	0.009	71%	90%
175	70	14	0.050	0.005	0.009	71%	90%
185	70	14	0.055	0.005	0.010	72%	90%
195	70	14	0.061	0.006	0.011	73%	90%
205	70	14	0.066	0.006	0.011	74%	91%
195	65	15	0.062	0.006	0.010	74%	91%
195	60	15	0.058	0.006	0.009	74%	90%
205	65	15	0.068	0.006	0.011	75%	91%
235	75	15	0.099	0.008	0.015	76%	92%
205	65	16	0.073	0.007	0.011	76%	91%
205	55	16	0.064	0.006	0.009	76%	91%
215	60	16	0.075	0.007	0.011	76%	91%
215	60	16	0.075	0.007	0.011	76%	91%
215	65	16	0.079	0.007	0.012	76%	91%
215	85	16	0.101	0.008	0.017	75%	92%
225	60	16	0.081	0.007	0.011	77%	91%
225	60	16	0.081	0.007	0.011	77%	91%
225	75	16	0.098	0.008	0.015	76%	92%
225	75	16	0.098	0.008	0.015	76%	92%
235	70	16	0.100	0.008	0.015	77%	92%
235	85	16	0.120	0.009	0.019	77%	93%
245	75	16	0.115	0.009	0.017	77%	92%
245	75	16	0.115	0.009	0.017	77%	92%
265	75	16	0.135	0.010	0.019	78%	93%
285	75	16	0.156	0.011	0.021	79%	93%
215	55	17	0.075	0.007	0.010	77%	91%
225	50	17	0.076	0.007	0.010	78%	91%
235	65	17	0.100	0.008	0.014	78%	92%
235	80	17	0.120	0.009	0.018	77%	93%
245	70	17	0.116	0.009	0.016	78%	92%
245	75	17	0.123	0.009	0.018	78%	92%

Table 1. USA-Mexico most popular tire sizes theoretical reduced volume when sidewalls are removed and resulting pieces tightly packed or when sidewalls are not considered.							
Section width (milimeters, mm)	Sidewall aspect ratio (percentage, %)	Tire and wheel diameter (inches, in)	Whole tire volume (cubic meters, m^3)	Cut or packed tread without sidewalls volume (m^3)	Cut in half and/or packed sidewall rings theoretical volume (m^3)	Approximate volume reduction (m^3)	Volume reduction if sidewall rings are not considered (m^3)
245	70	17	0.116	0.009	0.016	78%	92%
245	75	17	0.123	0.009	0.018	78%	92%
265	70	17	0.134	0.010	0.018	79%	93%
265	70	17	0.134	0.010	0.018	79%	93%
265	70	17	0.134	0.010	0.018	79%	93%
265	70	17	0.134	0.010	0.018	79%	93%
285	70	17	0.154	0.011	0.020	80%	93%
265	60	18	0.125	0.010	0.015	80%	92%
265	70	18	0.143	0.010	0.019	80%	93%
275	65	18	0.143	0.011	0.018	80%	93%
275	70	18	0.153	0.011	0.020	80%	93%
275	65	18	0.143	0.011	0.018	80%	93%
275	65	20	0.162	0.011	0.019	81%	93%
Geometric mean of volume reduction in most popular tire sizes						**77%**	**92%**
Source of USA most common tire sizes: 2011 Estimates, 2012 RMA Preliminary Factbook							
Mexico's most common tire sizes are 13, 14 and 15 inches reason for which 4 different models for each of these sizes were considered for this estimation.							
Note: tire size 31x10.50R15LT wasn't included in the estimation							

Table 2. Estimated tire volume reduction when sidewalls are removed and resulting pieces packed	
Tire and wheel diameter (inches, in)	Mean volume reduction (%)
13	70%
14	73%
15	72%
16	74%
17	76%
18	78%
20	79%

Figure 5.
Estimated volume reduction of a whole tire when its sidewalls are removed and the three resulting pieces are tightly packed of cut.

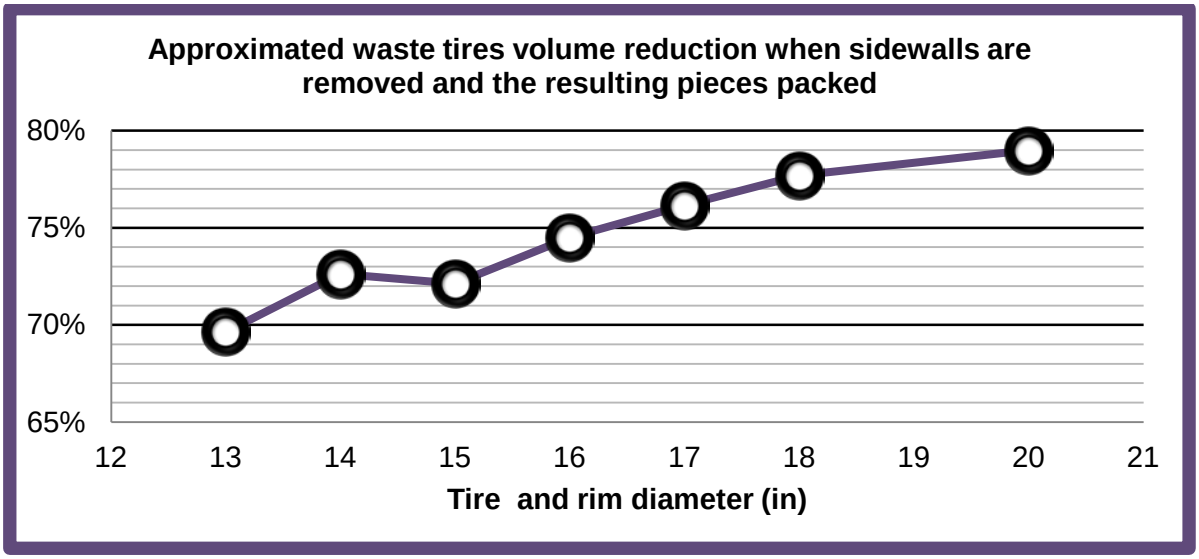


Table 3. Estimated tire volume reduction when sidewalls removed are not considered	
Tire and wheel diameter (inches, in)	**Approximated volume reduction (%)**
13	90%
14	90%
15	91%
16	92%
17	92%
18	93%
20	93%

Formula 1.

$$\text{Whole tire theoretical radius (meters)} = \left(\frac{\text{Section width (millimeters, mm)} \times \frac{\text{Sidewall aspect ratio (percentage, \%)}}{100}}{1000 \text{ (mm/meter)}} \right) + \left(\frac{\text{Tire and wheel diameter (inches, in)} \times \frac{0.0254}{\text{(meters / in)}}}{2} \right)$$

Formula 2.

$$\text{Whole tire theoretical height (meters)} = \frac{\text{Section width (millimeters, mm)}}{\frac{1000}{\text{(mm/ meters)}}}$$

Formula 3.

$$\text{Whole tire theoretical volume } (m^3) = \pi \times \text{Whole tire theoretical radius (meters)}^{\wedge 2} \times \text{Whole tire theoretical height (meters)}$$

Figure 4.
Cut tire tread height diagram.

Formula 4.

$$\text{Cut or packed tread without sidewalls volume } (m^3) = 2 \times \pi \times \text{Whole tire theoretical radius (meters)} \times \text{Cut tire tread height (meters)} \times \frac{\text{Section width (milimeters, mm)}}{\text{1000 (mm/ meters)}}$$

Cut tire tread height will be considered a constant of 3cm = 0.03 meters obtained on fieldwork tests explained on Attachment 15

Formula 5.

$$\text{Cut in half and/or packed sidewall rings theoretical volume } (m^3) = \left(\pi \times \text{Whole tire theoretical radius (meters)}^{\wedge 2} \times \text{Sidewall stacking width (meters)} \right) - \left(\pi \times \left(\frac{\text{Tire and wheel diameter (inches, in)} \times 0.0254 \text{ (meters / in)}}{2} \right)^{\wedge 2} \times \text{Sidewall stacking width (meters)} \right)$$

ATTACHMENT 17
Tread cutting, sidewall remover and sidewall debeader machines technical brochure and quotations for delivery in Juarez, Mexico and delivery in the U.S.

BIOS

Thomas Dom
- Founder/President
- Mechanical Engineer (ASU)

Alex Dom
- Mechanical Engineer (NYIT)

Matthew Dom
- Welding Degree (EVIT)
- 11 MIG and TIG certifications
- Fabricator

EECO'S BUSINESS ETHICS

At *EECO* we believe in manufacturing equipment using **3 simple** ideas:

- *Use ingenuity and creativeness to create simple operating machines*
- *Implement modern technology and efficient manufacturing methods*
- *Incorporate standard/common parts and hardware*

These **simple** rules result in **affordable**, dependable and **easily repairable** machines for anyone looking to improve their tire recycling business or to start their own.

ENGINEERING & EQUIPMENT CO.

FUN FACTS

- Founded in 1991
- ***3*** U.S. Patents
- Sold over ***380*** machines to ***11*** different countries

Because we are family owned and operated we focus our personal attention to suit any of your custom tire recycling needs.

6869 E. Vernon Ave.
Scottsdale, Az 85257
USA

Shop 480-264-8780
Office 480-990-2037
Fax 480-990-2037
www.eaeco.com

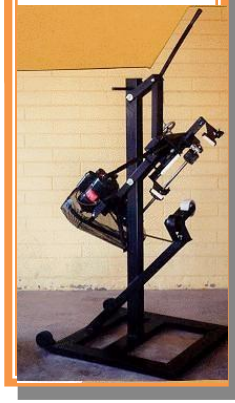
This brochure was designed to use less ink

EECO

www.eaeco.com

PRODUCTS

Sidewall Cutter



Production Rate:
180 sidewalls per hour (average)

Cutters:
Standard heavy duty utility knife blades

Price:
$3900 w/ **Free** shipping

Tread Cutter

Production Rate:
180 sidewalls per hour (average)

Cutters:
Hardened steel cutting disc

Price:
$3400 w/ **Free** shipping

DeBeader

Production Rate:
360 sidewalls per hour (average)

Cutters:
Standard heavy duty utility knife blades

Price:
$3650 w/ **Free** shipping

BACKGROUND

Engineering and Equipment Co. manufactures tire recycling equipment; our Sidewall and Tread Cutter as well as our Bead Remover use **simple**, **standard** and **easily accessible** parts. All machines are mobile and ***easy*** to ***operate***.

We also offer engineering design and analysis of any custom machine built to fit ***your*** needs.

- 3D Modeling with PRO/E and SolidWorks (drawings and stress analysis)
- Certified TIG, MIG and Arc Welding
- CNC Machining and CNC Plasma Cutting

Ever since the first version of our Sidewall Cutter we continue to improve our machines every step of the way.

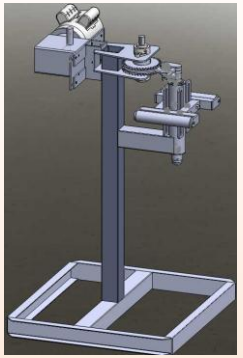
We perform ***Research and Development to develop better tire recycling machines*** as well as other innovative ideas. Check out our website to see our current projects.

www.eaeco.com

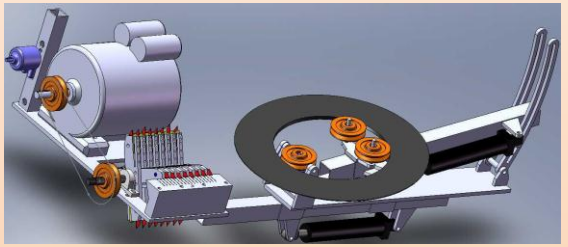
WHAT'S NEW

Research and Development is being conducted for **3 new machines** that will hit our product line by the end of 2011!

- Our Semi-Truck Sidewall Cutter will remove Semi-Truck Sidewalls at equal rates as our competitors, but at **half the cost!**

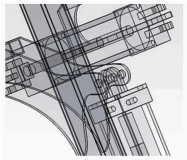


- Our up and coming Sidewall Chipper will produce a **chip size of ½"x ½"** from car and light truck tire sidewalls.



- We are in the midst of testing our Bead Stripping Machine that essentially peels away the rubber left on beads cut from car and light truck tires from our DeBeader Machine; leaving the clean high quality steel ring to be recycled!

Engineering & Equipment Co.
6869 E. Vernon Ave.
Scottsdale, Az USA 85257
www.eaeco.com
email eaeco@hotmail.com
tel 480-264-8780
fax 480-990-2037



SALES QUOTE

quote # SQ-000010
date 4/20/2012

billing address **Integrated Environmental Management Services**

shipping address **Integrated Environmental Management Services**
Warez
Mexico

contact Esteban Ibarra
phone 305-407-9964

sales rep
Alex Dom

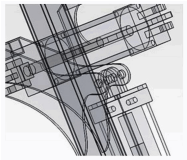
payment terms
Payment Due Before Shipment

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	DISCOUNT	SUB-TOTAL
DeBeader	Removes bead from sidewall	3	$3,650.00	5 %	$10,402.50
Sidewall Cutter	Removes Sidewalls	3	$3,900.00	5 %	$11,115.00
Truck Tire Sidewall Cutter	Removes sidewalls from truck tires and super singles	3	$7,000.00	5 %	$19,950.00
TT Tread Cutter	Cuts Treads of Truck Tires	3	$4,400.00	5 %	$12,540.00
Tread Cutter	Tire Cutting Machine and manual - 1 Crate - 480 Lbs, 65"L x 37"W x 39"H	3	$3,400.00	5 %	$9,690.00

SUB-TOTAL	$63,697.50
FREIGHT	$1,950.00
TOTAL	$65,647.50

Make all checks payable to EECO
We Appreciate Your Purchase And Promise to Continue Our Service For As Long As You Own Our Equipment.

Engineering & Equipment Co.
6869 E. Vernon Ave.
Scottsdale, Az USA 85257
www.eaeco.com
email eaeco@hotmail.com
tel 480-264-8780
fax 480-990-2037



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SUB-TOTAL $63,697.50

TOTAL $63,697.50

Make all checks payable to EECO
We Appreciate Your Purchase And Promise to Continue Our Service For As Long As You Own Our Equipment.

ATTACHMENT 18
34 target compounds (weighted based on toxicity and expected ambient air concentrations) that should be considered for air monitoring during a tire fire
(Environmental Protection Agency, 1997)

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TABLE 12. TARGET COMPOUNDS BY CRITERIA

Target Compound	Criteria			
	CA	TLV	Subchronic RfC	Chronic RfC
Acenaphthene	X			
Acenaphthylene	X			
Arsenic	X			
Barium				X
Benz(a)anthracene	X			
Benzene	X			
Benzo(a)pyrene	X			
Benzo(b)fluoranthene	X			
Benzylchloride	X			
Butadiene	X			
Carbon monoxide		X		
Carbon tetrachloride	X			
Chloroform	X			
Chromium	X			
Chrysene	X			
Coal tar pitch volatiles	X	X		
Cumene			X	X
1,2-Dichloropropane	X		X	X
Dibenz(a,h)anthracene	X			
Ethylene dichloride	X			
Hexachloroethane	X			
Hexane			X	X
Lead	X			
Methylene chloride	X			
Nickel	X			
Phenol	X			
Styrene	X			X
Sulfur dioxide		X		
Sulfuric acid		X		X
Toluene			X	X
1,1,2-Trichloroethane	X			
Trichloroethylene	X			
Vanadium		X		
o-Xylene		X		

CA = Suspected or Confirmed Human Carcinogen.
TLV = Reported Value is 33% of Threshold Limit Value.
RfC = Inhalation Reference Concentration.

ATTACHMENT 19
Disposal cost per tire in Texas

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Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
Brownsville	City's solid waste dumpsters	NA	$0.25	NA	$3.24	Fieldwork reported the common practice for used tire dealers is to manually cut the sidewalls of their waste tires and dispose of the pieces in the 2 cubic yards (1.53 cubic meters) dumpster the city takes away once a week with a cost of 60 dollars ($765 pesos) each month. No specific disposal fee for waste tires is paid. The price per tire varies depending on the number of waste tires disposed of in a month. In theory a dumpster can be filled with 59 cut tires[2] tightly packed. During a four week month; 236 cut tires can be disposed of. The disposal fee per cut tire reported in this row is based on this number. Said practice is authorized by the city's landfill authorities because cut tires are authorized to be landfilled.
Brownsville	City landfill	$0.91	$0.33	$11.60	$4.21	The city landfill charges $36 dollars ($459 pesos) per ton of cut tires and $100 dollars ($1,275 pesos) per ton of whole tires. Considering a Passenger Tire Equivalent of 20 pounds (9.07Kilograms) (United States Environmental Protection Agency, 2006) the disposal cost per equivalent tire is $0.33 dollars (4.2 pesos) per cut tire and $0.91 dollars ($11.6 pesos) per whole tire. Whole tires are shredded of bailed and then landfilled.
Progreso	City dump	$0.00	$0.00	$0.00	$0.00	Due to the low generation volume generators dispose of their waste tires with no charge in adjacent city's dumps. (Which city dump wasn't specified)
Pharr	LIBERTY TIRE RECYCLING LLC	$1.25	NA	$15.94	NA	TCEQ ID:6025071
Pharr	Donna recycling center	NA	0.35 - 0.5	NA	$4.46 - $6.38	Dealers cut their tires and dispose of them in this location paying the fee mentioned.
Pharr	Public works	-$0.50	NA	-$6.38	NA	A pilot program was applied where the city paid $0.5 dollars ($$6.38 pesos) per tire. This way the city saved money in collection personnel and liability.

Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
Pharr	UTW TIRE COLLECTION SERVICES	NA	NA	NA	NA	TCEQ ID:6027055
Pharr	JUAN SALINAS	$1.50	NA	$19.13	NA	No additional information was provided. No transporter or processor under this name is registered on the TCEQ database.
Pharr	Recycling center of Pharr	$1.50	NA	$19.13	NA	Residents may dispose up to 5 tires every six months with no charge. Water bill and drivers license must be presented to prove residency in Pharr. The city public works department absorbs the disposal costs. Fees to dispose of tires may apply after said amount at $1.5 dollars ($19.13 pesos) thereafter. It is forbidden to dispose of waste tires with the regular trash. Illegal dumping fines start at $1,000 dollars ($12,750 pesos).
Mc Allen	City recycling center	$0.00	NA	$0.00	NA	McAllen residents may dispose up to 5 tires per month free of charge, the city absorbs the disposal costs on Edinburg landfill or with a private company.
Mc Allen	DLD	NA	$1.25-$1.5	NA	$15.94 - $19.13	Tire hauler reported by interviewees to be on 401 Border Road, Alamo, Texas. No registry under this name or similar was found on the TCEQ database.
Mc Allen	Edinburg landfill	$5.00	NA	$63.75	NA	The city of McAllen has no landfill of it's own.
La Joya	Edinburg collection center	$0.00	$0.00	$0.00	$0.00	No additional information was provided.
Rio Grande City	Transfer station	$1.00	$0.00	$12.75	$0.00	For the disposal of a passenger tire charges $1 dollar ($12.75 pesos) , for a commercial truck tire $5 dollars ($63.5 pesos) and for an agricultural tire $20 dollars ($255 pesos).

Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
Roma	CAMERON LAND AND CATTLE INC	1.75-$18	NA	$22.3-$229.5	NA	This company based in San Antonio charges the city for picking up tires in Roma as follows: $1.75 dollars ($22.3 pesos) per passenger tire, $8 dollars ($102 pesos) per truck tire and $18 dollars ($229.5 pesos) per tractor tire. If tires are delivered directly to the in San Antonio, Texas they charge as follows: $1.25 dollars ($15.94 pesos) per passenger tire, $7.25 dollars ($92.4pesos) per truck tire and $16 dollars ($204 pesos) per tractor tire. Tires with rim are charged extra. TCEQ ID:26992
Laredo	City landfill	$0.00	NA	$0.00	NA	Residents may dispose of 4 tires each month showing their water bill. They shreds them and then landfill. When the tires overstock or are oversized they are sent to a private company's Land Reclamation Project (UTW TIRE COLLECTION SERVICES) in Laredo.
Laredo	Environmental Services Department	-$0.50	NA	-$6.38	NA	3 times a year the department buys waste tires paying $0.5dollars ($6.38 pesos) per tire. The location of the collection area changes. The explanation for this is that it is cheaper to have residents and non profit organizations bringing waste tires than to have collection crews throughout the city picking up tires.
Laredo	LIBERTY TIRE RECYCLING LLC	NA	NA	NA	NA	TCEQ ID:6025071
Laredo	A TO Z TIRE & BATTERY	NA	NA	NA	NA	TCEQ ID:6200163
Laredo	UTW TIRE COLLECTION SERVICES	$1.00	NA	$12.75	NA	Charges 25 USD /ton or $1 dollar ($12.8 pesos) per passenger tire and $5 to $6 dollars ($63.5 to $76.5 pesos) per truck tire. TCEQ ID:6027055
Eagle Pass	J & M TRUCK TIRE SHOP INC	NA	NA	NA	NA	TCEQ ID:25033
Eagle Pass	GUTIERREZ USED TIRES	$0.85	NA	$10.84	NA	Gutierrez tire shop disposes of the waste tires in a private company in San Antonio, Texas. TCEQ ID:8739

Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
Eagle Pass	City Recycling Center	$1.50	NA	$19.13	NA	The city recycling center charges $1.5 dollars ($19.3 pesos) for each passenger tire, $6 dollars ($76.5 pesos) per truck tire and a bigger amount for bigger waste tires. The tires are loaded into a private hauling company trailer and the disposal paid to said company.
Del Rio	City landfill	$2-$5	NA	$38.3-$76.5	NA	landfill authorities charge $2 dollars ($25.5 pesos) for the disposal of each passenger tire and $5 dollars ($63.75 pesos) for each tire larger than rim size 16. The city uses a Laredo private disposal company to dispose of the tires. Waste tires left by residents are loaded into a trailer and when it's full the company picks it up and leaves an empty one. For this service the city pays $1,500 dollars ($19,125 pesos) per trailer.
Del Rio	City solid waste management	$3.00	NA	$38.25	NA	The city picks up waste tires from generators and charges them for this service.
Del Rio	SOUTHWEST TIRE	$1.50	NA	$19.13	NA	Private company which charges $1.5 dollars (19.3 pesos) for each passenger tire, $5 dollars ($63.75 pesos) for 18thwheeler tires and $10 to $15 dollars ($127.5 to $191.25 pesos) for each agricultural tire. TCEQ ID:6200637
Del Rio	LIBERTY TIRE RECYCLING LLC	$1.00	NA	$12.75	NA	TCEQ ID:6025071
Presidio	-	NA	NA	NA	NA	There is not an appropriate location to dispose of waste tires in the city of Presidio. Waste tires are stored in a warehouse next to the city landfill. In the past through a grant of the Border Environment Cooperation Commission (BECC) on the Border 2012 program they spent 12,000 dollars ($153,000 pesos) to dispose of 3,000 waste tires. As a condition to obtain said grant they had to collect the waste tires dumped in the city's outskirts.

Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
Fabens	El Paso, TX	NA	NA	NA	NA	Fabens generators dispose in the options available in the city of El Paso, Texas.
El Paso	City landfill	$3 -$10	NA	$38.3-$127.5	NA	The landfill authorities charge $3 dollars($38.3 pesos) for the disposal of each passenger tire with rim size lower than 19.5 inches, larger tires must pay $10 dollars ($127.5 pesos) per tire. Waste tires are not landfilled; once received are loaded into a trailer and send to a Land Reclamation Project owned by a private company in New Mexico, for this the city is charged $80 dollars ($1,020 pesos) per ton of tires, plus the costs of transportation and unloading of the tires from the trailer.
El Paso	Citizen Collection Stations	$0.00	NA	$0.00	NA	Residents may dispose of 8 tires (without rims) each year free of charge presenting their water bill. City's collection stations are located throughout the city open 5 days a week all year long.
El Paso	CHAPARRAL SAND & GRAVEL	$0.73-$0.9	NA	$9.31-$11.48	NA	$80 to $99 dollars ($1,020 to $1,262.3 pesos) per ton. Considering a Passenger Tire Equivalent of 20 pounds (9.07Kilograms) (United States Environmental Protection Agency, 2006) the cost per equivalent tire is $0.73 to $0.9 USD ($9.31 to $11.48 pesos) per tire. The cost of transportation to New Mexico is not included. Waste tires are buried in a Land Reclamation Project (LRP) without being cut or shredded because, contrary to Texas, in New Mexico it is legal to bury whole tires. TCEQ ID:27034
El Paso	ROAD MASTERS	$0.75-$1.5	NA	$9.56-$19.3	NA	The price varies depending on the number of tires that will be disposed of. The lower price is for generators of 6,000 waste tires or more. Reusable tires are separated from waste tires. Waste tires are shredded and disposed in a local landfill. TCEQ ID:26828

Table 1. Disposal cost per tire in Texas						
City	Waste tires proper disposal alternatives reported by generators and city authorities	Disposal fee per tire				Additional information
		Whole tires (US dollars, dollars)	Cut tires (dollars)	Whole tires (Mexican pesos, pesos[1])	Cut tires (pesos)	
El Paso	TRES PESETAS INC	$1.5-$3	$0.75	$19.3-$38.25	$9.56	Depending on commercial agreements generators are charged from $1.5 to $3 dollars ($19.3 to $38.25 pesos) for each whole tire, for each cut tire $0.75 dollars ($9.56 pesos) are charged for its disposal. Reusable tires are resold to used tire dealers. Waste tires are shredded and the resulting pieces are used in a Land Reclamation Project (LRP) or sent to a cement kiln in Mexico. TCEQ ID:26869

[1] All pesos values in this table were estimated based on an exchange value of $12.75 Mexican pesos / US dollar for March 2012. (Bank of Mexico (BANXICO), 2012)

[2] Estimation based on the geometric mean volume for most common tires sizes in USA.

Private companies presented, in CAPITAL LETTERS, in this table are the ones currently being used by generators interviewed in the scope's area. Haulers who collect tires in more than one city may be presented more than once. Other private companies are likely to operate in the area as well, for a whole list of authorized active private transporters and processors registered in Texas please refer to the TCEQ Scrap Tire program web page were active scrap tire generators, transporters, processors, recyclers, storages, scrap tire facilities, energy recovery, Land Reclamation Project Using Tires (LRPUT) and transportation facilities are displayed on a data base. (http://www5.tceq.state.tx.us/TireQuery/) Searches can be based on TCEQ ID or registration number, company name, city, zip code, county, region and type of registration.

NA= Not available

TCEQ= Texas Commission on Environmental Quality

TCEQ ID= or registration number, is a unique code assigned to every scrap tire TCEQ registered generator, transporter, processor, recycler, storage, scrap tire facility, energy recovery, Land Reclamation Project Using Tires (LRPUT) and transportation facilities.

ATTACHMENT 20
Disposal cost per tire in the Mexican side of the Texas-Mexico Border Region

Table 1. Disposal cost per tire in the Mexican side of the Texas-Mexico Border Region					
State	**Municipality**	**Waste tires disposal site alternatives made available by municipal authorities to generators**	**Disposal fee charged to generators per waste tire**		**Additional information**
			Mexican pesos (pesos)	**US dollars1 (dollars)**	
Chihuahua	Ciudad Juarez	Municipal landfill's waste tire storage center	$6.00	$ 0.47	Price for disposing of a tire with size up to rim 17. Medium and large tires, up to rim 24.5, must pay $20.8 pesos ($1.63 dollars) per tire. Also used tire generators must pay $273 pesos ($21.41 dollars) to renovate a distinctive eco sticker.
Chihuahua	Ojinaga	Municipal landfill's waste tire storage center	$0.00	$ -	The municipality absorbs the cost of $2.13 pesos ($0.17 dollars) per tire, this includes collection, transport, storage and disposal, general population and generators aren't charged for the disposal of their tires. Used tire repair shops are charged a monthly fee of $60 pesos ($4.71 dollars) for the transportation of their waste tires to the disposal site.
Coahuila de Zaragoza	Nava	municipal open air dump' strorage center	$0.00	$ -	The municipality spends $10,000 pesos ($784.31 dollars) in the collection and transport of waste tires to their storage center in the municipal dump; they don't know the average amount of tires collected each month. There is no disposal fee charged by the municipal dump.
Coahuila de Zaragoza	Piedras Negras	Private landfill	$0.00	$ -	The municipality absorbs the cost of waste tires collection, processing and landfilling charged by a private company (Promotora Ambiental S.A. de C.V., PASA) who is concessionary of the municipal waste tires collection and disposal service. PASA charges $800 pesos ($62.75 dollars) per ton of waste tires, which are shredded and landfilled in an exclusive cell in their own private landfill. Considering a Passenger Tire Equivalent of 20 pounds (9.07Kilograms) (United States Environmental Protection Agency, 2006) the cost per equivalent tire is $7.26 pesos (0.57 dollars) which is absorbed by the municipality.

Table 1. Disposal cost per tire in the Mexican side of the Texas-Mexico Border Region					
State	**Municipality**	**Waste tires disposal site alternatives made available by municipal authorities to generators**	**Disposal fee charged to generators per waste tire**		**Additional information**
			Mexican pesos (pesos)	**US dollars1 (dollars)**	
Coahuila de Zaragoza	Acuña	Municipal landfill's waste tire storage center	$0.00	$ -	The municipality absorbs the cost of waste tires disposal and storage in the municipal landfill´s waste tire storage center. They used to charge from $10 to $30 pesos to dispose of a tire.
Nuevo Leon	Anahuac	Municipal dump's waste tire storage center	$0.00	$ -	The municipality absorbs the cost of waste tires disposal and storage in the municipal dump's waste tire storage center.
Tamaulipas	Nuevo Laredo	Municipal waste tire storage center	$0.00	$ -	The municipality absorbs the cost of waste tires disposal and storage in the municipal waste tire storage center. Before 2007 for tires with rim sizes 15 and 16 the municipality used to charge $6 pesos ($0.47 dollars) and for rim 17 and bigger waste tires $20 pesos (1.57 dollars) per tire.
Tamaulipas	Guerrero	Municipal open-air dump	$0.00	$ -	The municipality absorbs the disposal costs in the municipal open air dump. No fee is charged for disposal.
Tamaulipas	Miguel Aleman	Provisional Municipal Waste Tires Collection Center	$0.00	$ -	The municipality absorbs the disposal costs in the municipal provisional waste tires collection center. No fee is charged for disposal.
Tamaulipas	Camargo	Municipal Waste Tires Collection Center	$0.00	$ -	The municipality absorbs the disposal costs in the municipal waste tires collection center. No fee is charged for disposal.
Tamaulipas	Gustavo Diaz Ordaz	Open air dump.	$0.00	$ -	People take their waste tires to the municipal open air dump. No fee has ever been charged for disposal.
Tamaulipas	Reynosa	"Las Anacuas", open air dumps	$0.00	$ -	The municipality absorbs the disposal costs in the municipal open air dumps. No fee is charged for disposal.

Table 1. Disposal cost per tire in the Mexican side of the Texas-Mexico Border Region					
State	**Municipality**	**Waste tires disposal site alternatives made available by municipal authorities to generators**	**Disposal fee charged to generators per waste tire**		**Additional information**
			Mexican pesos (pesos)	**US dollars1 (dollars)**	
Tamaulipas	Rio bravo	Municipal dump's waste tires storage center	$0.00	$ -	The municipality absorbs the disposal costs in the municipal dump's waste tires collection center. They used to charge, before January 2011, from $5 to $20 pesos ($0.39 to $1.57 dollars) per waste tire, depending on its size, for the collection and disposal of waste tires.
Tamaulipas	Matamoros	Municipal Waste Tires Collection Center and Municipal landfill's waste tire storage center	$0.00	$ -	The municipality absorbs the disposal costs in the municipal waste tires collection center and in the municipal landfill's waste tire storage center. They used to charge for the collection and disposal of waste tires.

[1] All dollar values in this table were estimated based on an exchange value of $12.75 Mexican pesos / US dollar for March 2012. (Bank of Mexico (BANXICO), 2012)

ATTACHMENT 21
Harmonized system tariff schedule

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Heading/ Subheading	Stat. Suf-fix	Article Description	Unit of Quantity	Rates of Duty 1 General	Rates of Duty 1 Special	Rates of Duty 2
4012		Retreaded or used pneumatic tires of rubber; solid or cushion tires, tire treads and tire flaps, of rubber:				
		Retreaded tires:				
4012.11		Of a kind used on motor cars (including station wagons and racing cars):				
4012.11.40	00	Radial	No..	4%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%
4012.11.80	00	Other	No..	3.4%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%
4012.12		Of a kind used on buses or trucks:				
4012.12.40		Radial		4%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%
		On-the-highway truck and bus tires:				
	15	Light truck	No.			
	25	Other	No.			
	35	Other	No.			
4012.12.80		Other		3.4%	Free (A*,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%
		On-the-highway truck and bus tires:				
	19	Light truck	No.			
	29	Other	No.			
	50	Other	No.			
4012.13.00		Of a kind used on aircraft		Free		30%
	10	For use in civil aircraft	No.			
	50	Other	No.			
4012.19		Other:				
4012.19.20	00	Designed for tractors provided for in subheading 8701.90.10 or for agricultural or horticultural machinery or implements provided for in chapter 84 or in subheading 8716.80.10	No..	Free		Free
		Other:				
4012.19.40	00	Radial	No..	4%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%
4012.19.80	00	Other	No..	3.4%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	10%

Heading/ Subheading	Stat. Suf- fix	Article Description	Unit of Quantity	Rates of Duty 1 General	1 Special	2
4012 (con.)		Retreaded or used pneumatic tires of rubber; solid or cushion tires, tire treads and tire flaps, of rubber(con.):				
4012.20		Used pneumatic tires:				
4012.20.10		Aircraft		Free		30%
	10	For use in civil aircraft	No.			
	50	Other	No.			
		Designed for tractors provided for in subheading 8701.90.10 or for agricultural or horticultural machinery or implements provided for in chapter 84 or in subheading 8716.80.10:				
4012.20.15	00	Of a kind used on vehicles, including tractors, for the on-highway transport of passengers or goods	No.	Free		Free
4012.20.45	00	Other	No.	Free		Free
		Other:				
4012.20.60	00	Of a kind used on vehicles, including tractors, for the on-highway transport of passengers or goods, or on vehicles of heading 8705	No.	Free		10%
4012.20.80	00	Other	No.	Free		10%

Heading/ Subheading	Stat. Suf-fix	Article Description	Unit of Quantity	Rates of Duty 1 General	1 Special	2
4012 (con.)		Retreaded or used pneumatic tires of rubber; solid or cushion tires, tire treads and tire flaps, of rubber (con.):				
4012.90		Other:				
4012.90.10	00	Solid or cushion tires	No.	Free		25%
		Other:				
		Of natural rubber:				
4012.90.30	00	Bicycle rim strips	kg. / No.	Free		35%
4012.90.45	00	Other	kg. / No.	4.2%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	35%
		Other:				
4012.90.70	00	Bicycle rim strips	kg. / No.	Free		80%
4012.90.90	00	Other	kg. / No.	2.7%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	80%
4013		Inner tubes, of rubber:				
4013.10.00		Of a kind used on motor cars (including station wagons and racing cars), buses or trucks		3.7%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	25%
	10	Motor car	No.			
	20	Truck and bus	No.			
4013.20.00	00	Of a kind used on bicycles	No.	Free		30%
4013.90		Other:				
4013.90.10	00	Designed for tires provided for in subheadings 4011.61.00, 4011.92.00, 4012.19.20, 4012.20.15 and 4012.20.45	No.	Free		Free
4013.90.50		Other		3.7%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	25%
	10	Motorcycle (including moped)	No.			
	50	Other	No.			
4014		Hygienic or pharmaceutical articles (including nursing nipples), of vulcanized rubber other than hard rubber, with or without fittings of hard rubber:				
4014.10.00	00	Sheath contraceptives	X	Free		25%
4014.90		Other:				
4014.90.10	00	Nursing nipples	gross	Free		25%
4014.90.50	00	Other	X	4.2%	Free (A,AU,BH, CA,CL,E,IL, J,JO,KR,MA, MX,OM,P, PE,SG)	25%

ATTACHMENT 22
Waste Tire Management Regulatory Framework

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1 International treaties

1.1 NAFTA

CHAPTER NINE: Standards-Related Measures
Article 913: Committee on Standards-Related Measures
5. Further to paragraph 4, the Committee shall establish:
(a) The following subcommittees
(i) Land Transportation Standards Subcommittee, in accordance with Annex 913.5.a-1.

1.2 North American Agreement on Environmental Cooperation

Article 5. Government enforcement action
With the aim of achieving high levels of environmental protection and compliance with its environmental laws and regulations through appropriate governmental action, subject to Article 37, such as:

a. Appointing and training inspectors
b. monitoring compliance and investigating suspected violations, including through on-site inspections;
c. seeking assurances of voluntary compliance and compliance agreements;
d. publicly releasing non-compliance information;
e. issuing bulletins or other periodic statements on enforcement procedures;
f. promoting environmental audits;
g. requiring record keeping and reporting;
h. providing or encouraging mediation and arbitration services;
i. using licenses, permits or authorizations;
j. initiating, in a timely manner, judicial, quasi-judicial or administrative proceedings to seek appropriate sanctions or remedies for violations of its environmental laws and regulations;
k. providing for search, seizure or detention; or
l. issuing administrative orders, including orders of a preventative, curative or emergency nature.

Each party shall ensure that judicial, quasi-judicial or administrative enforcement proceedings are available under its law to sanction or remedy violations of its environmental laws and regulations.
Sanctions and remedies provided for a violation of a Party's environmental laws and regulations shall, as appropriate:

a) take into consideration the nature and gravity of the violation, any economic benefit derived from the violation by the violator, the economic condition of the violator, and other relevant factors; and
b) include compliance agreements, fines, imprisonment, injunctions, the closure of facilities, and the cost of containing or cleaning up pollution.

Article 10. Council Functions
2 The Council may consider, and develop recommendations regarding:
(m) the environmental implications of goods throughout their life cycles;

Article 37. Enforcement principle

Nothing in this Agreement shall be construed to empower a party's authorities to undertake environmental law enforcement activities in the territory of another party.

1.3 Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area

Article 8. Each Party designates a national coordinator whose principal functions will be to coordinate and monitor implementation of this Agreement, make recommendations to the Parties, and organize the annual meetings referred to in Article 10, and the meetings of the experts referred to in Article 11. Additional responsibilities of the national coordinators may be agreed to in an annex to this Agreement. In the case of Mexico the national coordinator shall be the Secretaria de Desarrollo Urbano y Ecologia, through the Subsecretaria de Ecologia, and in the case of the United States of America it shall be the Environmental Protection Agency.

1.4 Basel Convention about Control of Transboundary Movements of Hazardous Waste and their Disposal

Article 4

1. General Obligations

(a) Parties exercising their right to prohibit the import of hazardous waste or other waste for disposal shall inform the other Parties of their decision pursuant to Article 13.

(b) Parties shall prohibit or shall not permit the export of hazardous waste and other waste to the Parties which have prohibited the import of such waste, when notified pursuant to subparagraph (a) above.

(c) Parties shall prohibit or shall not permit the export of hazardous waste and other waste if the State of import does not consent in writing to the specific import, in the case where that State of import has not prohibited the import of such waste.

2. Each Party shall take the appropriate measures to:

(d) Ensure that the transboundary movement of hazardous waste and other waste is reduced to the minimum consistent with the environmentally sound and efficient management of such waste, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

(f) Require that information about a proposed transboundary movement of hazardous waste and other waste be provided to the States concerned, according to Annex V A, to state clearly the effects of the proposed movement on human health and the environment;

(g) Prevent the import of hazardous waste and other waste if it has reason to believe that the waste in question will not be managed in an environmentally sound manner;

(h) Co-operate in activities with other Parties and interested organizations, directly and through the Secretariat, including the dissemination of information on the transboundary movement of hazardous waste and other waste, in order to improve the environmentally sound management of such waste and to achieve the prevention of illegal traffic.

3. The Parties consider that illegal traffic in hazardous waste or other waste is criminal.

4. Each Party shall take appropriate legal, administrative and other measures to implement and enforce the provisions of this Convention, including measures to prevent and punish conduct in contravention of the Convention.

7. Furthermore, each Party shall:

(a) Prohibit all persons under its national jurisdiction from transporting or disposing of hazardous waste or other waste unless such persons are authorized or allowed to perform such types of operations;

(b) Require that hazardous waste and other waste that are to be the subject of a transboundary movement be packaged, labeled, and transported in conformity with generally accepted and recognized international rules and standards in the field of packaging, labeling, and transport, and that due account is taken of relevant internationally recognized practices;

(c) Require that hazardous waste and other waste be accompanied by a movement document from the point at which a transboundary movement commences to the point of disposal.

9. Parties shall take the appropriate measures to ensure that the trans-boundary movement of hazardous waste and other waste only be allowed if:

(a) The State of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the waste in question in an environmentally sound and efficient manner; or

(b) The waste in question are required as a raw material for recycling or recovery industries in the State of import; or (c) The transboundary movement in question is in accordance with other criteria to be decided by the Parties, provided those criteria do not differ from the objectives of this Convention.

10. The obligation under this Convention of States in which hazardous waste and other waste are generated to require that those waste are managed in an environmentally sound manner may not under any circumstances be transferred to the States of import or transit.

13. Parties shall undertake to review periodically the possibilities for the reduction of the amount and/or the pollution potential of hazardous waste and other waste which are exported to other States, in particular to developing countries.

Article 5. Designation of competent authorities and focal point

To facilitate the implementation of this Convention, the Parties shall: 1. Designate or establish one or more competent authorities and one focal point. One competent authority shall be designated to receive the notification in case of a State of transit. 2. Inform the Secretariat, within three months of the date of the entry into force of this Convention for them, which agencies they have designated

as their focal point and their competent authorities. 3. Inform the Secretariat, within one month of the date of decision, of any changes regarding the designation made by them under paragraph 2 above.

Article 10. International co-operation

1. The Parties shall co-operate with each other in order to improve and achieve environmentally sound management of hazardous waste and other waste.

2. To this end, the Parties shall:

(a) Upon request, make available information, whether on a bilateral or multilateral basis, with a view to promoting the environmentally sound management of hazardous waste and other waste, including harmonization of technical standards and practices for the adequate management of hazardous waste and other waste;

(b) Co-operate in monitoring the effects of the management of hazardous waste on human health and the environment;

(c) Co-operate, subject to their national laws, regulations and policies, in the development and implementation of new environmentally sound low-waste technologies and the improvement of existing technologies with a view to eliminating, as far as practicable, the generation of hazardous waste and other waste and achieving more effective and efficient methods of ensuring their management in an environmentally sound manner, including the study of the economic, social and environmental effects of the adoption of such new or improved technologies;

(d) Co-operate actively, subject to their national laws, regulations and policies, in the transfer of technology and management systems related to the environmentally sound management of hazardous waste and other waste. They shall also co-operate in developing the technical capacity among Parties, especially those which may need and request technical assistance in this field;

(e) Co-operate in developing appropriate technical guidelines and/ or codes of practice.

3. The Parties shall employ appropriate means to co-operate in order to assist developing countries in the implementation of subparagraphs a, b, c and d of paragraph 2 of Article 4.

4. Taking into account the needs of developing countries, co-operation between Parties and the competent international organizations is encouraged to promote, inter alia, public awareness, the development of sound management of hazardous waste and other waste and the adoption of new low-waste technologies.

1.5 Customs Convention for the Temporary Importation of Private Road Vehicles.

Article 26. Customs authorities shall not have the right to require from the guaranteeing association payment of import duties and import taxes on vehicles or component parts temporarily imported when the non discharge of the temporary importation papers has not been notified to the guaranteeing association within a year of the date of expiry of the validity of those papers.

Article 27.

1. The guaranteeing associations shall have a period of one year from the date of notification of the non-discharge of temporary importation papers in which to furnish proof of the re-exportation of the vehicles or component parts in question under the conditions laid down in this Convention.

2. If such proof is not furnished within the time allowed, the guaranteeing association shall forthwith deposit or pay provisionally the import duties and import taxes payable. This deposit or payment shall become final after a period of one year from the date of the deposit or provisional payment. During the latter period, the guaranteeing association may still avail itself of the facilities provided by the preceding paragraph with a view to repayment of the sums deposited or paid.

3. For countries whose regulations do not provide for the deposit or provisional payment of import duties, payments made in conformity with the provisions of the preceding paragraph will be regarded as final, it being understood that the sums paid may be refunded when the conditions laid down in this article are fulfilled.

4. In the case of the non-discharge of temporary importation papers, the guaranteeing association shall not be required to pay a sum greater than the total of the import duties and import taxes applicable to the vehicles or component parts not reexported, together with interest if applicable.

1.6 Convention on Combating Bribery of Foreign Public Officials in International Business Transactions

Article 1. The Offence of Bribery of Foreign Public Officials

1. Each Party shall take such measures as may be necessary to establish that it is a criminal offence under its law for any person intentionally to offer, promise or give any undue pecuniary or other advantage, whether directly or through intermediaries, to a foreign public official, for that official or for a third party, in order that the official act or refrain from acting in relation to the performance of official duties, in order to obtain or retain business or other improper advantage in the conduct of international business.

2. Each Party shall take any measures necessary to establish that complicity in, including incitement, aiding and abetting, or authorization of an act of bribery of a foreign public official shall be a criminal offence. Attempt and conspiracy to bribe a foreign public official shall be criminal offences to the same extent as attempt and conspiracy to bribe a public official of that Party.

3. The offences set out in paragraphs 1 and 2 above are hereinafter referred to as “bribery of a foreign public official”.

4. For the purpose of this Convention:

“foreign public official” means any person holding a legislative, administrative or judicial office of a foreign country, whether appointed or elected; any person exercising a public function for a foreign country, including for a public agency or public enterprise; and any official or agent of a public international organization;

"foreign country" includes all levels and subdivisions of government, from national to local;

"act or refrain from acting in relation to the performance of official duties" includes any use of the public official's position, whether or not within the official's authorized competence.

Article 3. Sanctions

1. The bribery of a foreign public official shall be punishable by effective, proportionate and dissuasive criminal penalties. The range of penalties shall be comparable to that applicable to the bribery of the Party's own public officials and shall, in the case of natural persons, include deprivation of liberty sufficient to enable effective mutual legal assistance and extradition.

2. In the event that, under the legal system of a Party, criminal responsibility is not applicable to legal persons, that Party shall ensure that legal persons shall be subject to effective, proportionate and dissuasive non-criminal sanctions, including monetary sanctions, for bribery of foreign public officials.

3. Each Party shall take such measures as may be necessary to provide that the bribe and the proceeds of the bribery of a foreign public official, or property the value of which corresponds to that of such proceeds, are subject to seizure and confiscation or that monetary sanctions of comparable effect are applicable.

4. Each Party shall consider the imposition of additional civil or administrative sanctions upon a person subject to sanctions for the bribery of a foreign public official

1.7 World Health Regulations

ANNEX 1 – B. Core Capacity Requirements for Designated Airports, Ports and Ground Crossings

1. At all times

The capacities:

(e) to provide as far as practicable a programmed and trained personnel for the control of vectors and reservoirs in and near points of entry.

ANNEX 5 – Specific Measures for Vector-Borne Diseases

1. WHO shall publish, on a regular basis, a list of areas where disinfection or other vector control measures are recommended for conveyances arriving from these areas. Determination of such areas shall be made pursuant to the procedures regarding temporary or standing recommendations, as appropriate.

2. Every conveyance leaving a point of entry situated in an area where vector control is recommended should be disinfected and kept free of vectors. When there are methods and materials advised by the Organization for these procedures, these should be employed. The presence of vectors on board conveyances and the control measures used to eradicate them shall be included:

(a) in the case of aircraft, in the Health Part of the Aircraft General Declaration, unless this part of the Declaration is waived by the competent authority at the airport of arrival;

(b) in the case of ships, on the Ship Sanitation Control Certificates; and

(c) in the case of other conveyances, on a written proof of treatment issued to the consignor, consignee, carrier, the person in charge of the conveyance or their agent, respectively.

3. States Parties should accept disinfecting, deratting and other control measures for conveyances applied by other States if methods and materials advised by the Organization have been applied.

4. States Parties shall establish programs to control vectors that may transport an infectious agent that constitutes a public health risk to a minimum distance of 400 meters from those areas of point of entry facilities that are used for operations involving travelers, conveyances, containers, cargo and postal parcels, with extension of the minimum distance if vectors with a greater range are present.

5. If a follow-up inspection is required to determine the success of the vector control measures applied, the competent authorities for the next known port or airport of call with a capacity to make such an inspection shall be informed of this requirement in advance by the competent authority advising such follow-up. In the case of ships, this shall be noted on the Ship Sanitation Control Certificate.

6. A conveyance may be regarded as suspect and should be inspected for vectors and reservoirs if:

(a) it has a possible case of vector-borne disease on board;

(b) a possible case of vector-borne disease has occurred on board during an international voyage; or

(c) it has left an affected area within a period of time where on-board vectors could still carry disease.

8. A State Party may apply vector control measures to a conveyance arriving from an area affected by a vector-borne disease if the vectors for the foregoing disease are present in its territory.

1.8 Guidance Manual for the Control of Transboundary Movements of Recoverable Waste

ANNEX B: OECD consolidated list of waste subject to the green control procedure

B3140. Waste pneumatic tires, excluding those destined for Appendix 5A operations

1.9 United Nations Convention on the Law of the Sea

PART XII: Protection and Preservation of the Marine Environment

SECTION 6. Enforcement

Article 217

Enforcement by flag States

1. States shall ensure compliance by vessels flying their flag or of their registry with applicable international rules and standards, established through the competent international organization or general diplomatic conference, and with

their laws and regulations adopted in accordance with this Convention for the prevention, reduction and control of pollution of the marine environment from vessels and shall accordingly adopt laws and regulations and take other measures necessary for their implementation. Flag States shall provide for the effective enforcement of such rules, standards, laws and regulations, irrespective of where a violation occurs.

2. States shall, in particular, take appropriate measures in order to ensure that vessels flying their flag or of their registry are prohibited from sailing, until they can proceed to sea in compliance with the requirements of the international rules and standards referred to in paragraph 1, including requirements in respect of design, construction, equipment and manning of vessels.

3. States shall ensure that vessels flying their flag or of their registry carry on board certificates required by and issued pursuant to international rules and standards referred to in paragraph 1. States shall ensure that vessels flying their flag are periodically inspected in order to verify that such certificates are in conformity with the actual condition of the vessels. These certificates shall be accepted by other States as evidence of the condition of the vessels and shall be regarded as having the same force as certificates issued by them, unless there are clear grounds for believing that the condition of the vessel does not correspond substantially with the particulars of the certificates.

4. If a vessel commits a violation of rules and standards established through the competent international organization or general diplomatic conference, the flag State, without prejudice to articles 218, 220 and 228, shall provide for immediate investigation and where appropriate institute proceedings in respect of the alleged violation irrespective of where the violation occurred or where the pollution caused by such violation has occurred or has been spotted.

5. Flag States conducting an investigation of the violation may request the assistance of any other State whose cooperation could be useful in clarifying the circumstances of the case. States shall endeavor to meet appropriate requests of flag States.

6. States shall, at the written request of any State, investigate any violation alleged to have been committed by vessels flying their flag. If satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, flag States shall without delay institute such proceedings in accordance with their laws.

7. Flag States shall promptly inform the requesting State and the competent international organization of the action taken and its outcome. Such information shall be available to all States.

8. Penalties provided for by the laws and regulations of States for vessels flying their flag shall be adequate in severity to discourage violations wherever they occur.

Article 218

Enforcement by port States

1. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may undertake investigations and, where the evidence so warrants, institute proceedings in respect of any discharge from that vessel

outside the internal waters, territorial sea or exclusive economic zone of that State in violation of applicable international rules and standards established through the competent international organization or general diplomatic conference.

2. No proceedings pursuant to paragraph 1 shall be instituted in respect of a discharge violation in the internal waters, territorial sea or exclusive economic zone of another State unless requested by that State, the flag State, or a State damaged or threatened by the discharge violation, or unless the violation has caused or is likely to cause pollution in the internal waters, territorial sea or exclusive economic zone of the State instituting the proceedings.

3. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State shall, as far as practicable, comply with requests from any State for investigation of a discharge violation referred to in paragraph 1, believed to have occurred in, caused, or threatened damage to the internal waters, territorial sea or exclusive economic zone of the requesting State. It shall likewise, as far as practicable, comply with requests from the flag State for investigation of such a violation, irrespective of where the violation occurred.

4. The records of the investigation carried out by a port State pursuant to this article shall be transmitted upon request to the flag State or to the coastal State. Any proceedings instituted by the port State on the basis of such an investigation may, subject to section 7, be suspended at the request of the coastal State when the violation has occurred within its internal waters, territorial sea or exclusive economic zone. The evidence and records of the case, together with any bond or other financial security posted with the authorities of the port State, shall in that event be transmitted to the coastal State. Such transmittal shall preclude the continuation of proceedings in the port State.

Article 219

Measures relating to seaworthiness of vessels to avoid pollution

Subject to section 7, States which, upon request or on their own initiative, have ascertained that a vessel within one of their ports or at one of their off-shore terminals is in violation of applicable international rules and standards relating to seaworthiness of vessels and thereby threatens damage to the marine environment shall, as far as practicable, take administrative measures to prevent the vessel from sailing. Such States may permit the vessel to proceed only to the nearest appropriate repair yard and, upon removal of the causes of the violation, shall permit the vessel to continue immediately.

2 American regulatory framework

2.1 Federal Law

2.1.1 US Disposal of Solid Waste Code – Section 6002 - 102

(e) GUIDELINES — The Administrator, after consultation with the Administrator of General Services, the Secretary of Commerce (acting through the Bureau of Standards), and the Public Printer, shall prepare, and from time to time, revise, guidelines for the use of procuring agencies in complying with the requirements of this section. Such guidelines shall—

(1) Designate those items which are or can be produced with recovered materials and whose procurement by procuring agencies will carry out the objectives of this section, and in the case of paper, provide for maximizing the use of postconsumer recovered materials referred to in subsection (h)(1); and

(2) Set forth recommended practices with respect to the procurement of recovered materials and items containing such materials and with respect to certification by vendors of the percentage of recovered materials used, and shall provide information as to the availability, relative price, and performance of such materials and items and where appropriate shall recommend the level of recovered material to be contained in the procured product. The Administrator shall prepare final guidelines for paper within one hundred and eighty days after the enactment of the Hazardous and Solid Waste Amendments of 1984, and for three additional product categories (including tires) by October 1, 1985. In making the designation under paragraph (1), the Administrator shall consider, but is not limited in his considerations, to—

(A) The availability of such items;

(B) The impact of the procurement of such items by procuring agencies on the volume of solid waste which must be treated, stored or disposed of;

(C) The economic and technological feasibility of producing and using such items; and

(D) Other uses for such recovered materials.

2.2 State laws

2.2.1 State of Texas

2.2.1.1 Texas Health and Safety Code 361.112 - Storage, Transportation, and Disposal of Used or Scrap Tires

TEXAS CODES
HEALTH AND SAFETY CODE
TITLE 5
Subtitle B
CHAPTER 361
Subchapter C
361.112 - Storage, Transportation, and Disposal of Used or Scrap Tires
Current as of: 2009

(a) A person may not store more than 500 used or scrap tires for any period on any publicly or privately owned property unless the person registers the storage site with the commission. This subsection does not apply to the storage, protection, or production of agricultural commodities.

(b) The commission may register a site to store more than 500 used or scrap tires.

(c) A person may not dispose of used or scrap tires in a facility that is not permitted by the commission for that purpose.

(d) The commission may issue a permit for a facility for the disposal of used or scrap tires

(e) The commission by rule shall adopt application forms and procedures for the registration and permitting processes authorized under this section.

(f) A person may not store more than 500 used or scrap tires or dispose of any quantity of used or scrap tires unless the tires are shredded, split, or quartered as provided by commission rule. The commission may grant an exception to this requirement if the commission finds that circumstances warrant the exception. The prohibition provided by this subsection regarding storage does not apply to a registered waste tire energy recovery facility or a waste tire energy recovery facility storage site. The prohibition provided by this subsection does not apply to a person who, for eventual recycling, reuse, or energy recovery, temporarily stores scrap tires in a designated recycling collection area at a landfill permitted by the commission or licensed by a county or by a political subdivision exercising the authority granted by Section 361.165.

(g) The commission shall require a person who transports used or scrap tires for storage or disposal to maintain records and use a manifest or other appropriate system to assure that those tires are transported to a storage site that is registered or to a disposal facility that is permitted under this section for that purpose.

(h) The commission may amend, extend, transfer, or renew a permit issued under this section as provided by this chapter and commission rule.

(i) The notice and hearing procedures provided by this subchapter apply to a permit issued, amended, extended, or renewed under this section.

(j) The commission may, for good cause, revoke or amend a permit it issues under this section for reasons concerning public health, air or water pollution, land use, or violation of this section as provided by Section 361.089.

(k) The commission may not register or issue a permit to a facility required by Section 361.479 to provide evidence of financial responsibility unless the facility has complied with that section.

(l) In this section, "scrap tire" means a tire that can no longer be used for its original intended purpose.

(m) The commission may adopt rules to regulate the storage of scrap or shredded tires that are stored at a marine dock, rail yard, or trucking facility for more than 30 days.

2.3 Local Law

Based on Code of Ordinances for the following cities.

2.3.1 City of El Paso

2.3.1.1 Chapter 9.04 - Solid Waste Management

ARTICLE I - General Provisions

9.04.010 - Creation and purpose of department

The city is responsible for public health, cleanliness and sanitation in El Paso. The purpose of this chapter is to provide for protection of the health, safety and welfare of the residents of the city by prescribing minimum standards for the generation, storage, collection, transportation and disposal of solid waste and related matter, by providing for the issuance of permits to persons engaging in those activities, by providing for the payment of fees, and by providing for enforcement techniques, including inspections of premises and equipment, the revocation of permits and the issuance of citations. The department of environmental services was created to carry out this purpose as well as to oversee and perform duties and services relating to areas of environmental concerns, including ordinance, statutory and other regulatory enforcement by the director and his designees and by the employees in the code enforcement division of the department, who shall also have enforcement authority as authorized and provided in this Code; and to generally perform duties and services relating to areas of public health, animal related regulatory services, cleanliness and sanitation concerns as to be determined by the city manager. In partial furtherance of the purpose discussed herein, curbside recycling reduces the amount of refuse sent to landfills.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17634, § 2, 8-30-2011)

9.04.020 - Definitions.

As used in this chapter the following words, terms, and phrases shall have the following meanings, except where the context clearly indicates a different meaning:

3. "Bulk waste" means municipal solid waste composed of materials not easily containerized in a cart such as, but not limited to, appliances, brush, carpet, furniture, pallets and other large items. Bulk waste shall exclude animal waste, dead animals, construction or demolition material, and excluded waste.

4. "Cart" means any watertight plastic receptacle approved by the department for the purpose of containing municipal solid waste or program recyclable materials that is equipped with wheels and an attached tight-fitting lid designed or intended to be mechanically or manually dumped into a garbage collection truck.

5. "Citizen collection station" means a site designated by the department for the drop-off of municipal solid waste and/or recyclable material, by residential property occupants.

6. "Collection" means as defined in 30 TAC § 330.3.

7. "Commercial property" means all improved property other than a residential property.

8. "Composting" means as defined in 30 TAC § 330.3.

11. "Container" means a dumpster or compactor.

12. "Compactor" means a watertight receptacle, regardless of its size, which has a compaction mechanism, whether stationary or mobile, equipped with closeable doors intended to be loaded onto a motor vehicle.

14. "Department" means the department of environmental services.

15. "Designated or authorized municipal solid waste facility" means any municipal solid waste facility designated by the city manager in the case of a designated municipal solid waste facility, or by the environmental protection agency in the case of an authorized municipal solid waste facility, for processing, storing, or disposing of municipal solid waste, including construction or demolition material, generated within the city.

16. "Director" means the director of the department of environmental services or his designee or other designees of the city manager.

17. "Discard" means as defined in 30 TAC § 330.3.

18. "Disposal" or "dispose" means the deposit of any solid waste at a municipal solid waste facility.

19. "Dumpster" means a watertight receptacle, with a capacity of approximately two cubic yards up to approximately eight cubic yards, equipped with tight-fitting lid and designed or intended to be mechanically dumped into a loader-packer type truck.

21. "Established fee" means the fee that is authorized in this chapter which is set in the amount identified in the adopted budget resolution for the current fiscal year or by other duly adopted resolution of the city council.

22. "Excluded waste" means solid waste not accepted by any designated or authorized municipal solid waste facility as posted at such designated or authorized municipal solid waste facility.

24. "Garbage" means as defined in 30 TAC § 330.3.

25. "Generator" means as defined in 30 TAC § 330.3.

27. "Hauler" means a person other than a self-transporter who provides collection of solid waste or recyclable materials within the city.

28. "Hauler permit" means the authorization of a hauler by the department for the privilege to provide collection of solid waste and/or recyclable materials within the city and/or delivery of solid waste to a designated or authorized municipal solid waste facility during the term of such permit and subject to all the terms and conditions imposed by this ordinance and related laws and other ordinances and resolutions of the city.

29. "Hazardous waste" means as defined in 30 TAC § 330.3.

30. "Household hazardous waste" means as defined by 30 TAC § 330.402.

31. "Illegal dumping" means the offense as defined by Texas Litter Abatement Act.

32. "Industrial solid waste" means as defined in 30 TAC § 330.3.

34. "Landfill" means as defined in 30 TAC § 330.3.

35. "Litter" means as defined in Texas Litter Abatement Act; garbage, rubbish and refuse; decayable waste and non-decayable solid waste.

40. "Municipal solid waste" means as defined in 30 TAC § 330.3 excluding animal waste and excluded waste.

41. "Municipal solid waste facility" means as defined in 30 TAC § 330.3.

42. "Nuisance" means as defined in 30 TAC § 330.3.

46. "Permitted hauler" means hauler holding a valid hauler permit.

47. "Permitted vehicle" means a vehicle or trailer used by a permitted hauler within the city for the purpose of collecting solid waste and/or recyclable materials generated within the city.

48. "Permitted hauler vehicle log" means a form provided by the department to record deliveries of solid waste regulated by this chapter by permitted haulers to a designated or authorized municipal solid waste facility.

49. "Processing" or "processed" means as defined by 30 TAC § 330.3.

50. "Program recyclable materials" means recyclable materials defined by the department as part of the residential recycling program.

52. "Recyclable material" means as defined by 30 TAC § 330.3.

53. "Recycling" means as defined by 30 TAC § 330.3.

54. "Recycling facility" means a facility that either has the required authorization from Texas Commission on Environmental Quality, or equivalent state agency, for processing of recyclable materials and is in compliance with local, state, and federal laws.

56. "Residential recycling program" means the collection of recyclable materials, as defined by the department, from residential properties.

57. "Retail or service establishment" means a business operation located on an improved property that has as its primary purpose the selling of goods, merchandise and/or providing services to members of the public from a fixed location, such as a shop, store or building complex. Examples of retail or service establishments include, but are not limited to restaurants and bars, gas stations, convenience stores, and shopping centers.

58. "Roll-off" means any watertight receptacle, with a capacity of approximately ten cubic yards up to approximately forty cubic yards, intended to be loaded onto a motor vehicle.

59. "Rubbish" means as defined by 30 TAC § 330.3.

60. "Scavenging" means as defined by 30 TAC § 330.3.

61. "Self-transporter" means the following:

a. Generator, who directly, without use of a hauler, transports solid waste generated by the generator to a municipal solid waste facility or recyclable materials generated by the generator to a recycling facility; utilizing the following methods of transport:

1. A factory-unmodified Class 1, 2, or 3 truck, based on US DOT Federal Highway Administration Vehicle Inventory and Use Survey standards; or

2. A vehicle as described in 1. above, with an attached single axle trailer.

b. A person conducting services on behalf of a generator, including, but not limited to building contractors, home repairmen/handymen, landscapers, or roofers, at that generator's location of business or residence, may be considered a self-transporter of solid waste or recyclable materials generated as a result of such service, provided the vehicle limitations specified in Part 1 of this definition are met.

63. "Side door" means a collection location for a municipal solid waste and/or program recyclable materials cart other than curbside. Side door can be at the front, or side of a residential property for collection of municipal solid waste

and program recyclable materials. The department shall designate the location for side door collection of municipal solid waste and program recyclable materials.

65. "Solid waste" means as defined by 30 TAC § 330.3.

66. "Special waste" means as defined by 30 TAC § 330.3.

67. "Storage" means as defined by 30 TAC § 330.3.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, §§ 1, 2, 12-21-2010; Ord. No. 17604, § 1, 7-19-2011)

9.04.030 - Applicability.

A. Except where expressly provided otherwise in this chapter, this chapter shall apply to the solid waste and recyclable materials generated, collected, disposed, processed, and/or otherwise found in the area under jurisdiction of the city as presently or hereafter established.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.040 - Purpose.

The purposes of this chapter include, but are not necessarily limited to, the following:

A. To protect the health, safety, and general welfare of the city and the city residents;

B. To provide environmentally sound, cost-efficient solid waste management;

C. To provide for the safe and proper handling of solid waste generated, stored, collected, and/or disposed of within the city;

D. To develop data to ensure sufficient disposal capacity and/or recycling programs for solid waste and recyclable materials generated, stored, collected, disposed, processed, and otherwise found within the city;

E. To deter illegal dumping;

F. To facilitate conservation of vital natural resources;

G. To protect against risk that current municipal solid waste facilities become unable to accept municipal solid waste generated within the city;

H. To encourage and enforce recycling programs, including source separation at point of generation, throughout the city; and

I. To provide a convenient and effective means of financing the city's solid waste services.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE II - Municipal Solid Waste and Recyclable Materials Generated at Residential Properties

9.04.050 - Applicability.

This article shall apply to:

A. Owners of residential properties in the city, where an owner is also the occupant;

B. Owners of residential properties in the city, where the residential property is vacant;

C. Occupants of residential properties in the city, where an owner is not an occupant;

D. Self-transporters of municipal solid waste and recyclable materials generated at residential properties in the city; and

E. Haulers of municipal solid waste generated at residential properties in the city.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.060 - Accumulation and storage.

Municipal solid waste and recyclable materials generated at residential properties applicable to this article shall be accumulated and stored in compliance with the following provisions:

A. Municipal solid waste. Excluding bulk waste, municipal solid waste shall be contained in secured, odor, and vector-tight plastic bags, and stored in carts. Municipal solid waste shall not be accumulated or stored outside of carts, and cart lids shall remain closed at all times when not adding municipal solid waste to carts.

B. Recyclable materials. Program recyclable materials shall be stored, uncontainerized (with the exception of shredded paper), in carts designated by the city for collection of program recyclable materials. Program recyclable materials shall not be accumulated or stored outside of carts, and cart lids must remain closed at all times when not adding program recyclable materials to carts. Recyclable materials other than program recyclable materials may only be accumulated and stored at the residential property if in accordance with federal, state and local laws.

C. Prohibited waste. The following waste and materials are prohibited from being placed for collection in carts:

1. Household hazardous waste; and

2. High-density waste or material, including, but not limited to sand, gravel, bricks, rock, concrete and tree stumps.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.070 - Collection provider.

Excluding self-transporters, the city shall be the exclusive hauler of municipal solid waste and program recyclable materials generated at residential properties; however, an owner or occupant of residential properties containing a triplex or quadriplex shall have the option to utilize a permitted hauler other than the city as collection provider.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17604, § 2, 7-19-2011)

9.04.080 - Disposal provider.

The self-transporter or the permitted hauler shall deliver municipal solid waste to a designated or authorized municipal solid waste facility.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE III - Solid Waste and Recyclable Materials Generated at Commercial Properties and Mixed-Use Properties

9.04.150 - Applicability.

This article shall apply to:

A. Owners and occupants of commercial properties in the city;

B. Owners and occupants of mixed-use properties in the city;

C. Self-transporters of solid waste, other than Class 1 industrial waste, and recyclable materials generated at commercial properties in the city;

D. Self-transporters of solid waste, other than Class 1 industrial waste, and recyclable materials generated at mixed-use properties in the city;

E. Haulers of solid waste, other than Class 1 industrial waste, and recyclable materials generated at commercial properties in the city; and

F. Haulers of solid waste, other than Class 1 industrial waste, and recyclable materials generated at mixed-use properties in the city.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.160 - Accumulation and storage.

Solid waste and recyclable materials generated at commercial property and mixed-use property within the city shall be accumulated and stored in compliance with the following provisions:

A. Solid waste. Excluding bulk waste, solid waste shall be contained in carts and/or containers. Cart or container lids shall remain closed at all times when not adding solid waste to the carts or containers. Solid waste, including bulk waste, shall not be stored in a manner that constitutes a nuisance.

B. Recyclable materials. Commercial property and mixed-use owners or occupants are encouraged to participate in recycling. Commercial property and mixed-use property occupants who elect to participate in recycling shall accumulate and store such recyclable materials in accordance with federal, state and local laws.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.170 - Collection provider.

Excluding self-transporters, owners or occupants of commercial properties and mixed-use properties shall contract with a permitted hauler to collect all solid waste and recyclable materials generated at such commercial properties and mixed-use properties.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.180 - Disposal provider.

Self-transporters and permitted haulers shall deliver all solid waste to a designated or authorized municipal solid waste facility.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.200 - Authority to mandate collection.

A. Overflowing carts and/or containers. Excluding bulk waste, solid waste shall be contained in secured, odor, and vector-tight plastic bags, and stored in carts and/or containers designated by the director for the collection of municipal solid waste. Municipal solid waste shall not be accumulated or stored outside of carts and/or containers, and cart and/or container lids must remain closed at all times when not adding municipal solid waste to the cart and/or container.

B. Harborage of vectors or other health hazards. In any instance where the director finds that a cart and/or container requires immediate emptying or replacement due to breeding or harborage of vectors or circumstances creating significant potential for breeding or harborage of vectors, or other health hazards,

the city official is authorized to order the owners and/or occupants of such commercial property or mixed-use property to have such condition corrected within twenty-four hours of written notice from the city official.

C. Protection of public health and safety. Evidence of overflowing or uncollected solid waste and for harborage of vectors or other health hazards constitutes evidence that the owner and/or occupant of commercial property or mixed-use property is in violation of 9.04.170, which status allows the city to exercise its option of collecting the solid waste from that property. Prior to the city collecting the solid waste from the commercial property or mixed-use property in violation of 9.04.170, the city shall issue a notice to the owner/occupant of said property that said violation must be corrected within twenty-four hours of delivery of the notice. Failure to comply with the notice shall result in the city collecting the solid waste and for billing the owner/occupant of the property. The owner/occupant remains subject to applicable criminal penalty for continued non-compliance. (Ord. No. 17380, § 1, 8-24-2010)

ARTICLE V - Identification as Recyclable Materials for Commercial Collection

9.04.350 - Identification as recyclable materials.

Material managed in accordance with all of the following requirements shall be considered commercial recyclable materials for purposes of this chapter. The management of carts and program recyclable materials identified as being included within the residential recycling program are not subject to the requirements of this article.

A. Separation. Commercial recyclable materials shall:

1. Be separated by the generator from any solid waste generated at the property; and

2. Be composed of cardboard, paper, plastic, glass, metal or other materials as designated by the director from time to time.

B. Storage. Commercial recyclable materials shall:

1. Not be commingled with any solid waste during storage and/or collection;

2. Be stored in carts, containers and/or roll-offs specifically designated to store commercial recyclable materials, or bulked and secured in a manner not contributing to a nuisance or potential fire hazard;

3. Be stored in carts, containers, roll-offs or as bulked material with affixed labels, decals, paint or signs that clearly indicate "RECYCLABLE MATERIAL" in letters at least two inches in height, in a color boldly contrasting the paint color of the cart, container, roll-off or bulked material; and

4. Be stored in carts, containers, roll-offs or as bulked material in a manner not constituting a nuisance or contributing to windblown litter or discharge to the environment.

C. Records. In order to verify commercial recyclable material collection service, generator shall retain a copy of a written contract or agreement securing recyclable material collection service with an identified third party and retain written copies of bills or invoices for the most recent period of twelve calendar months.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, § 10, 12-21-2010)

ARTICLE VI - Other Waste

9.04.380 - Other waste.

Generators of waste, other than waste described in Article II, III, IV, and V above, shall be solely responsible for the accumulation and storage, collection, processing, and disposal of such waste in full compliance with federal, state, and local laws regarding such waste. Generators of waste, other than waste described and permitted in Article II, III, IV, and V above, shall not place such waste in carts, containers, or roll-offs for municipal solid waste, recyclable materials, and/or construction or demolition material.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, § 1, 12-21-2010)

ARTICLE VII - Haulers

9.04.390 - Hauler permit required.

A. No hauler shall collect, process or dispose of solid waste or other materials at the designated or authorized municipal solid waste facility without holding a valid hauler permit granted in accordance with this chapter. A hauler permit issued pursuant to the provisions of this chapter shall be a mere grant or privilege during the term of such permit and subject to all terms and conditions imposed by this chapter and related laws and other ordinances and resolutions of the city. This chapter shall not be construed to require a hauler permit for the transportation of waste through the city, provided that such waste was not generated, collected, or otherwise found within the city and such waste was not disposed at the designated or authorized municipal solid waste facility.

B. No hauler permit shall be issued under this Article VII unless the hauler enters into a franchise agreement with the city. Each franchise agreement shall be subject to the following provisions:

1. All permitted haulers shall maintain their cart or container free of graffiti; and.

2. All permitted haulers shall report their customers who are not purchasing adequate waste services to the department.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.400 - Hauler permit term.

Upon the effective date of this ordinance, the city may grant a hauler permit for a term commencing on the date of the issuance of the hauler permit, as set forth in Section 9.04.390, and expiring on August 31st of each calendar year.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.410 - Hauler permit application, issuance, and appeal procedures.

A. Hauler permits application. To acquire a hauler permit for the first time, or to add any additional vehicles to a current, valid hauler permit, a hauler must submit an application to the department for a hauler permit a minimum of fourteen calendar days prior to the proposed commencement of collection within the city. Any currently-permitted hauler must submit an application for renewal to the director for a hauler permit a minimum of sixty calendar days prior to the expiration of the valid hauler permit.

Haulers shall submit a hauler permit application in accordance with this chapter and the policies and procedures established by the director. The hauler

shall, under penalty of perjury, swear that all information contained in the hauler permit application and all information submitted in connection with the hauler permit application is true and correct. At a minimum, the application for a hauler permit shall require a hauler to provide the following information:

1. The name, address and telephone number of the applicant;

2. All names under which the applicant is doing business or has conducted business during the past three calendar years;

3. A list of all proposed permitted vehicles to be used within the city for the purpose of collecting solid waste and/or recyclable materials including the following information for each vehicle:

a. The state motor vehicle registration number;

b. Description of chassis by year and manufacturer;

c. Description of the body by year and manufacturer;

d. The legal weight limit;

e. The volume of the body of the vehicle in cubic yards; and

f. Copy of insurance coverage for each vehicle in an amount not less than the minimum coverage required by Texas law.

4. The types of solid waste and/or recyclable materials to be collected, transported, processed, and/or disposed.

5. Proof of an executed, current franchise agreement with the city for hauler services.

6. Any additional data and information deemed necessary by the director in order to verify the accuracy of information contained in the permit application forms and attendant documents.

B. Review, issuance, denial and appeal of hauler permit application. An application for an initial or renewed hauler permit submitted pursuant to this article may be granted or denied by the director. Such application may be denied for one or more of the following reasons:

1. The applicant has failed to provide some or all of the information required by Section 9.04.410A, including, but not limited to, proof of an executed, current franchise agreement with the city for hauler services.

2. The applicant has supplied false information to the city in connection with any matter regulated under this chapter.

3. The applicant has failed to pay all or any portion of the established hauler permit fee, franchise fees, other fees, penalties, or interest required or imposed pursuant to this chapter.

4. The applicant has failed to comply with Texas state requirements for vehicles governed by 30 TAC § 330.105.

The director shall grant or deny a hauler permit application within sixty calendar days of the applicant's submission of a completed application. In the event the hauler permit application is denied by the director, the appeals process shall be conducted in accordance with this chapter.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.420 - Permitted vehicle requirements.

A. Permitted vehicle ownership, identification, and appearance. Permitted hauler shall submit any changes to the information provided in the hauler permit to the director within fourteen calendar days of such change.

Permitted hauler shall use only permitted vehicles identified on the hauler permit application to collect solid waste and/or recyclable materials within the city. Hauler shall solely utilize permitted vehicles within the city that are:

1. Owned or leased by the hauler;

2. Listed in the hauler permit application as a permitted vehicle;

3. Cleaned regularly and upon the request of the director as to maintain permitted vehicles in accordance with 30 TAC § 330.105;

4. Affixed to the windshield with the city permitted hauler decal as designated by the director; and

5. Identified with paint or decal on the driver's-side door, indicating hauler permit number and permitted vehicle number or letter identifier below hauler permit number. Numbers or letters must be a minimum of two inches in height and of a color contrasting to the paint color of the vehicle.

B. Permitted vehicle construction and maintenance. Permitted haulers shall use only permitted vehicles identified on the hauler permit application to collect solid waste and/or recyclable materials that meet the following minimum requirements, both prior to and after the issuance of a hauler permit:

1. The permitted vehicle body shall be capable of being readily emptied;

2. The permitted vehicle shall be kept in a sanitary condition, in accordance with 30 TAC § 330.105;

3. The permitted vehicle shall be so equipped that all loading openings on the bodies have tightly fitting doors or covers which latch, clamp or fasten to keep them closed and rubber or other suitable gasket to render them leak proof, spill proof, dust proof, and odor proof to the maximum extent practicable;

4. The permitted vehicle shall be equipped with heavy-duty front hooks, loops or shackles, good and serviceable tires and other accessories as necessary for operation and/or navigation in or about any designated or authorized municipal solid waste facility; and

5. The permitted vehicle shall meet all other requirements as determined by current and adopted State of Texas and local regulations to protect the health, safety, and general welfare of the city and the city residents.

C. Inspection and documentation of permitted vehicles. The director may inspect any permitted vehicle used or proposed for use by a permitted hauler together with the contents of such permitted vehicle. Haulers shall maintain accurate documents in each permitted vehicle which identify the contents as solid waste or recyclable materials and the city, county, and state of origin of the solid waste or recyclable materials.

D. Permitted hauler vehicle log. A single copy of the permitted hauler vehicle log will be provided by the department to each permitted hauler upon the granting or renewal of a hauler permit; whereupon the hauler is permitted to reproduce as many copies as needed during the validity of the hauler permit to accommodate each load of waste collected in accordance with this chapter. The permitted hauler shall utilize a log for each load of solid waste and recyclable materials collected or otherwise found in the city by the permitted hauler for each permitted vehicle. Permitted haulers shall comply with the following requirements:

1. Ensure that each delivery to a designated or authorized municipal solid waste facility or recycling facility of solid waste and recyclable materials

collected or otherwise found in the city is identified on the permitted hauler vehicle log;

2. Ensure that all information required on the permitted hauler vehicle log is provided on the log;

3. Ensure that the permitted hauler vehicle log is maintained in the permitted vehicle identified on the log at all times until the end of the month indicated on the log;

4. At the end of the month identified on the permitted hauler vehicle log, remove the log from the permitted vehicle and maintain each log at the permitted hauler's place of business for a period of twenty-four months; and

5. Supply, upon request by the director, any requested permitted hauler vehicle log.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, § 11, 12-21-2010)

9.04.430 - Cart, container, and roll-off requirements.

Permitted haulers shall provide collection of solid waste and recyclable materials with carts, containers, and roll-offs that are owned or leased by the permitted hauler and meet the following minimum requirements:

A. Each cart, container, and roll-off shall be painted with or securely affixed with the owner's name and business address or telephone number on at least one side of each receptacle. Lettering shall be of sufficient size and of contrasting color to be easily visible at a distance of twenty feet;

B. Each container and roll-off shall be painted, or securely affixed, with the tare weight on two opposite sides of the respective container and roll-off; and

C. Each container and roll-off shall be cleaned regularly.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.440 - Transporting waste.

Each permitted hauler shall comply with the following requirements for transporting solid waste and recyclable materials within the city:

A. Permitted haulers shall suitably enclose or cover solid waste and recyclable materials prior to transportation to a designated or authorized municipal solid waste facility or a recycling facility to prevent littering, spillage of materials or fluids, and/or infiltration of rainwater inside the solid waste or recyclable materials. Tarpaulins must be used to cover compactor box openings, roll-off tops, or other openings. Tarpaulins must be kept in good repair at all times.

B. Permitted haulers shall immediately clean and remove any litter and spillage of materials or fluids upon the roads caused by the permitted hauler or the permitted hauler's permitted vehicles. Permitted hauler shall remit payment to city within thirty (30) calendar days, upon written notification by the city, for any and all costs incurred by the city related to any such removal of litter, spillage of materials or fluids, and/or infiltration of rainwater caused by the permitted hauler or the permitted hauler's permitted vehicles. This provision shall be in addition to any penalties authorized elsewhere by this chapter or any other provision of law.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.450 - Disposal of solid waste.

Except as otherwise specifically provided in this chapter, permitted haulers who collect solid waste generated or otherwise found within the city shall deliver such solid waste, other than excluded waste, to a designated or authorized municipal solid waste facility. For excluded waste, permitted haulers shall dispose of such solid waste in accordance with federal, state and local laws. This section shall not be construed to prohibit the source separation of recyclable materials from solid waste prior to collection of such solid waste for disposal.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.460 - Hauler records.

Each permitted hauler shall maintain current customer records, including customer name, address, service level information, and routing records, including permitted vehicle number, collection day and daily routes. In addition, each permitted hauler shall keep such records, including scale house tickets, receipts, invoices, manifests, and other pertinent papers, in such form as the director may require and for a period no less than two consecutive calendar years. Such records shall include, but not be limited to, documents evidencing the permitted hauler collection of solid waste and recyclable materials provided within the city and the municipal solid waste facility and recycling facility where such solid waste and recyclable materials was delivered. The director may examine the books, papers, records, financial reports, equipment, and other facilities of any permitted hauler in order to verify compliance with this chapter.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.470 - Violations.

A. Notice of correction. The city shall issue a written notice of correction to a driver of a permitted hauler who fails to meet the requirements of a haulers permit.

1. The responsible party in receipt of a written notice of correction shall complete any and all necessary corrective actions to correct and remediate the documented violations within seven calendar days; and

2. Upon completion of the necessary corrective actions, the responsible party shall provide a written or verbal description of the corrective action within seven calendar days to the city official identified on the written notice of correction, or for matters that cannot be reasonably corrected and remediated within seven calendar days, the responsible party shall provide a written statement indicating how compliance with the provisions set forth in this chapter will be achieved within seven calendar days to the city official identified on the written notice of correction.

B. A written citation shall be issued by the appropriate city official, to a permitted hauler who violates any provision set forth in this Article VII, such as in the case of a responsible party who fails to correct and remediate the documented violation on written notice of correction within the seven-day period or other period allowed in this subchapter.

C. Delinquent fees. If the holder of any hauler permit issued pursuant to this chapter becomes delinquent in the payment of fees, the director is authorized, upon ten calendar day's notification to the hauler, to refuse access to city disposal

facilities. The director may further, upon thirty calendar days notification, suspend such hauler permit, as provided in 9.04.480

D. History of delinquency. If the holder of any hauler permit has a history of delinquency in payment of fees as evidenced by having been issued more than one notice from the director, such permitted hauler shall be required to establish an account with the department and shall pay the estimated monthly amount of such fees in advance each month. The estimated monthly amount shall be as established by the director.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.480 - Suspension, revocation of hauler permit; appeals.

A. Suspension of hauler permit.

1. For any permitted hauler that has been named as a responsible party and been issued three written notices of correction by the city within a consecutive twelve-month span, the director may suspend the hauler permit for such hauler.

2. A hauler that has had its hauler permit suspended is eligible to re-apply for a hauler permit sixty days from the date of suspension.

3. A hauler may appeal the suspension of its hauler permit in accordance with this subsection.

B. Revocation of hauler permit.

1. A hauler permit may be revoked for any of the following reasons:

a. The hauler has had two prior suspensions in a consecutive twelve-month span;

b. The hauler interferes with an investigation of the director in the performance of official duties;

c. A hauler operates under a suspended hauler's permit;

d. After having received written notice from the city that a franchise agreement is required within thirty days of the issuance of the hauler's permit or the effective date of this ordinance and after said period of time, hauler has not entered into a franchise agreement with the city;

e. Hauler's franchise agreement required by Chapter 9.04 of the City Code is revoked by the city.

2. For any permitted hauler that has had its hauler permit revoked by the director, the hauler shall not be eligible to receive a hauler permit for a period of twelve months from the date of written notice of revocation from the director for that hauler.

C. Hauler permit appeals.

1. If the director denies an application for a hauler permit or suspends or revokes a hauler permit or denies the ability of a person to purchase construction or demolition manifests from the department, the director shall prepare a report within ten business days of taking such action, indicating the reasons for the denial, suspension or revocation. The director's decision is final unless, within ten calendar days from the date of receiving the director's notice of the action, the appealing party files with the city clerk a written appeal to the city manager specifying reasons for the appeal. Said appeal shall also include a written rebuttal to the director's report.

2. The city manager or his designee shall review the director's report and the appellant's rebuttal. The city manager or his designee shall make a ruling on the appeal within a reasonable period of time after the appeal has been filed.

3. The city manager or his designee shall sustain, reverse or modify the action of the director. The decision of the city manager is final.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, § 12, 12-21-2010)

9.04.490 - Ownership of solid waste and recyclable materials.

Title to all solid waste and recyclable materials placed for collection shall be vested in the permitted hauler upon collection of a cart, container, or roll-off by the person discarding of such solid waste and recyclable materials at the collection location. For solid waste and recyclable materials that the designated or authorized municipal solid waste facility and recycling facility is prohibited by law or permit from processing or disposing, the responsibility for properly discarding of such solid waste and/or recyclable materials shall remain with the person generating such waste and only be transferred to the permitted hauler upon collection of such waste by permitted hauler. Scavenging by any person from any cart, container or roll-off placed for collection within the city is prohibited.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.500 - Permitted hauler recycling rebate.

A. Excluding the city, permitted haulers will be eligible for a recycling rebate for recyclable materials identified as commercial recyclable materials by article v and collected from commercial properties and mixed-use properties in the city provided that such permitted hauler meets the following requirements:

1. Permitted hauler is in good standing with the city;

2. Permitted hauler has not received more than two written notices of correction from the city during the prior twelve calendar months;

3. Permitted hauler has entered into a written agreement with the city for the permitted hauler recycling rebate program; and

4. Other requirements as established by the city.

B. The permitted hauler recycling rebate shall be applied quarterly to the established tipping fees paid to the city for solid waste disposed by such permitted hauler at the designated or authorized municipal solid waste facility for the prior three calendar month period. The permitted hauler recycling rebate calculation shall be developed by the city manager or his designee. The permitted hauler recycling rebate amount shall be set by resolution of the city council. The permitted hauler recycling rebate shall not apply to construction or demolition material.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, §§ 1, 13, 12-21-2010)

9.04.510 - Emergency powers; right to assume collection.

A. The city may assume responsibility for all or part of the collection of solid waste within the city should the city determine it to be in the best interest of the health and welfare of the citizens of the city. Such action shall be on a temporary basis within which time a hearing before the city council is held to determine whether to continue this emergency action.

B. Prior to any hearing described in Subsection A. of this section, a written notice to all affected permitted haulers setting forth the time, place, and purpose of such hearing shall first be sent via electronic mail and then a hard copy of said notice shall be mailed within a minimum of seventy-two (72) hours to the last known addresses of such permitted haulers.

C. The proceeding shall be conducted informally with the procedures established by the city manager in consultation with the city attorney. All interested parties, including the city manager or his designee, shall be allowed to present any evidence, documents, or statements in support of their position. The city council shall then determine whether the action described in Subsection A. of this section should be made permanent or whether any other action by the city council is appropriate under the circumstances.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE VIII.-Designated or Authorized Municipal Solid Waste Facilities

9.04.520 - Designated municipal solid waste facility.

A. For purposes of this Article VIII, the term "designated municipal solid waste facility" shall mean any municipal solid waste facility designated by the city manager. Except as otherwise specifically provided in this chapter, any person who collects or transports solid waste generated and/or otherwise found in the city shall deliver such waste to and shall be required to comply with all posted rules at a designated municipal solid waste facility operated by the city. Any failure of any person to deliver such waste to a designated municipal solid waste facility or to adhere to posted rules at such facility shall be considered a violation of this chapter and is subject to enforcement in accordance with Article X of this chapter. This article shall not be construed to prohibit the source separation of recyclable materials from solid waste prior to collection of such solid waste. In addition, this article shall not be construed to apply to solid waste not permitted to be accepted at said designated municipal solid waste facility.

B. In the case of a permitted hauler, the city shall through franchise regulate any conduct regulated by this chapter. Where such franchise is approved by ordinance, that ordinance shall supersede any terms or provisions that conflict with the regulations contained in this chapter.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17604, § 3, 7-19-2011)

ARTICLE IX - Fees and Payments Procedures

9.04.530 - Fees general.

Fees for collection, disposal, processing, environmental services, and other fees as set forth in this chapter are established and required and paid as provided herein.

A. Residential properties fees.

1. Base rate. Each residential property unit for which service has been initiated pursuant to this chapter shall be charged the established monthly fee.

2. Senior and disabled citizens discount. The monthly charge for residential property unit which is owned and occupied, or rented and occupied by a person sixty-five or more years of age or by a person who presents proof of disability in accordance with this section will be discounted by the stated

percentage or amount stated in the budget resolution or other duly adopted resolution of the city council. The fee discount shall only apply to the first cart.

No fee discount shall be granted or remain in effect unless the following conditions are met:

a. The person claiming such discount must be sixty-five or more years of age, or must present proof of disability when the discount is requested and must file a notarized application on a form provided by the department.

b. A written request for such discount may be filed with the department at any time when the applicant reaches eligibility and will take effect at the first billing cycle which starts thirty calendar days thereafter, remaining in effect until eligibility lapses. Such request shall give the street address, dwelling unit number, if any, and the water utilities account number of the property being served, the name and addresses of the owner-occupant or renter-occupant, the day and year of his birth in the case of a person sixty-five or more years of age, and a substantiating document in the case of a disabled person. The request shall be signed by the person seeking the discount or someone authorized by him and having personal knowledge of the facts.

c. Proof of age shall consist of one of the following:

i. If the person seeking the discount presents a valid driver's license or state-issued identification card showing the day and year of birth;

ii. If the person seeking the discount currently holds a Sun Metro Senior Citizen reduced fare card;

iii. If the request is signed by the director of a city senior citizen center or nutrition center or other agency approved by the department.

iv. All other requests shall be verified by the signed and sworn affidavit of the person seeking the discount or someone authorized by him and having personal knowledge of the facts.

d. Proof of disability shall consist of one of the following:

i. Certification from the Social Security Administration that the applicant is the recipient of a social security or supplemental security income disability pension;

ii. Certification from the proper administrative officer that the applicant is the recipient of a public disability pension and classified one hundred percent disabled; or

iii. Certification from the Veterans Administration that the applicant is the recipient of the Veterans Administration disability payments and classified one hundred percent disabled.

e. The person claiming a discount must be the same person who is billed by the water utilities for water service to the residence to which such discount applies.

f. Approved discounts are not transferable to another person or address.

g. No person shall be entitled to a discount for more than one residence at the same time and only for the residence the person occupies, nor shall any person be entitled to claim both a sixty-five years and over discount and a disabled discount at the same time.

h. In all cases, the director shall have the right to investigate the information given on requests for discount, and to make reasonable requirements for supporting evidence.

i. The discount provided in this section shall not apply to charges for additional carts, special collections, collection of solid waste from commercial properties and mixed-use properties, or from any location of any type utilizing containers or roll-offs.

j. Any change which results in loss of eligibility for a discount for a residence will be reported to the department within thirty calendar days, and full charges will be restored during the next billing cycle.

k. Eligibility for the senior and disabled citizens' discount shall lapse at the end of each anniversary of determination of eligibility.

l. The director shall have the authority to investigate and verify that applicants continue to be eligible for this discount.

m. The discount shall in no way be considered as approval of side door collection under Section 9.04.100. Such approval must be separately requested pursuant to that provision, and if granted shall result in the termination of any discount provided under this section.

n. Persons receiving side door collection under Section 9.04.100 are not eligible for the discount.

3. Failure to comply with residential carts/containers requirements. In addition to any other actions or remedies the city may pursue, in the case of residential municipal solid waste accounts, the city shall charge the established fee to a person who fails to comply with the requirements regarding the carts or containers.

B. Commercial properties and mixed-use properties fees. The established monthly fee for services provided pursuant to this chapter by the city from commercial properties and mixed-use properties shall be charged.

D. Other fees.

1. Each person or entity requesting or needing the delivery or relocation of a cart, container, or roll-off provided by the city, each person or entity who cancels cart, container, or roll-off service provided by the city, and each person or entity who requests special services from the city such as the collection and disposal of bulk waste, infectious waste, dead animals, or an extra collection shall be charged the established service charges and special collection fees.

2. The service charges shall be imposed each time a cart, container, or roll-off is delivered, moved or relocated by the department or recovered by the department due to cancellation of service.

3. The special collection service fees shall be imposed for extra collections, unscheduled collections, collections for bulk waste, collection of infectious waste, and collections of dead animals as defined in this chapter.

4. The established cart, container, and/or roll-off replacement fee shall be charged for the replacement of cart, container, and/or roll-off that are lost, burned, damaged or destroyed by the customer and the customer requests replacement or the director determines that the cart, container, and/or roll-off is no longer serviceable by the department.

E. Franchise fees. Commencing on a date as established by city council, haulers providing collection of solid waste generated and/or otherwise found within the city may be required to pay a franchise fee as approved by city council, provided however, no franchise fee may be imposed before April 28, 2014.

As provided in this chapter, any city official authorized to enforce the provisions of this chapter may upon written notice or request examine the books, papers, records, financial reports, equipment, and other facilities of any hauler to verify compliance with this article.

F. Environmental services fee. The owner, agent or occupant of every residence, business, establishment, industrial, educational, institutional, religious or other premises shall be charged the established monthly user service fee. Such fee shall relate to the provision of environmental services by the city and is intended to defray city expense necessary to cleaning up illegally dumped waste, compliance with environmental laws, collecting and disposing of dead animals from public rights of way and equitably sharing costs for business and neighborhood area cleanups and graffiti removal, benefiting residents and businesses in the city.

(Ord. No. 17380, § 1, 8-24-2010; Ord. No. 17471, § 1, 12-21-2010)

9.04.540 - Permit fees.

A. Hauler permit. The established annual fee for a hauler permit shall be charged for every permitted vehicle used by the permitted hauler. The fee shall be prorated for the number of months said hauler permit is issued on or after September 1, 2010 until the end date of August 31, 2011, and shall be charged for a twelve-month period each year for which it is issued on or after September 1, 2011.

B. Additional vehicle registration fee. The fee for either registering an additional or substituting a previously registered vehicle shall be one hundred percent of the annual fee for the vehicle to be added or substituted.

C. Special waste disposal fees. The special disposal fee is established and shall be charged for the disposal of special waste.

D. Container location on sidewalk or on public right-of-way. When permitted under this chapter, the annual established fee shall be paid by the container owner for each cart, container, and/or roll-off located on the public right-of-way. It shall be the container owner's responsibility when placing a cart, container, and/or roll-off on public right-of-way to pay this annual fee to the department. Failure to pay shall result in (1) having the cart, container, and/or roll-off removed from the public right-of-way; and/or (2) imposing a fee charged at the same amount as the fee to the generator or hauler providing such services.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.550 - Disposal Fees.

A. Landfill fees. Landfill fees are established and shall be charged by both type of material and vehicle type.

B. Fees subject to fraction. All fees or rates established as landfill or disposal are subject to, "or any fraction thereof."

C. Waste tires. Disposal fees for waste tires from residential users who have exceeded the eight tires per year limit or from commercial users are established and shall be charged.

D. Surcharge for uncovered loads. In conjunction with the city's enforcement of this chapter and Texas Commission on Environmental Quality rules, the city is authorized to charge the established surcharge fee for vehicles

that are not provided with a tarpaulin, net, or other means to effectively secure the load in order to prevent the escape of any part of the load by blowing or spilling to the person or company hauling waste to the facility when the director observes or otherwise acquires credible information that the hauler has spilled waste materials along and within the right-of-way of the public access roads serving the facility within a two-mile distance from the facility entrance.

E. Transfer fees. Fees for disposal at any city transfer station are established and shall be charged based on compacted or uncompacted cubic yard.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.570 - Solid waste management fund.

Each year, all fees collected for the environmental and solid waste management services provided by the city under this chapter shall be deposited into a solid waste management fund. Payment for the operations of the department attributable to its solid waste management services function shall be made from this fund. Fund balance reserves shall be established as directed by the city council and managed for these purposes by the city manager or his designee. The annual budget for the department shall show these reserves as a separate use of fund balance. Corresponding expenses will be incorporated into the annual operating budget.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE X – Enforcement

9.04.600 - General authority.

The city may initiate an action to enforce the provisions of this chapter, including legal proceedings to compel compliance.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.610 - Authority to issue citations.

The following city officials are authorized to enforce the provisions of this chapter and shall have the power to issue warnings and citations to any persons violating the provisions of this chapter:

A. City manager or his designee;

B. Code enforcement division;

C. Police; and

D. Fire chief or designees.

The city officials designated above are authorized to conduct inspections of any property necessary, conduct audits of records and documents required to be utilized and maintained by this chapter, and to investigate instances of non-compliance with this chapter to enforce the provisions of this chapter. If the occupants in possession of any property refuses to allow the city officials permission to enter the property, at any reasonable time, those officials shall have recourse to every remedy provided by law to secure entry including obtaining the proper judicial warrants.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.630 - Other penalties.

Any person violating any provision of this chapter shall be deemed guilty of a misdemeanor and shall be punished by a fine up to two thousand dollars. If any such violations of this chapter are continuous, each day that the violation occurs shall constitute a separate offense.

In addition to any penalties provided for in this chapter, this chapter is enforceable by injunction.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XI - Exclusive Franchise

9.04.640 - Exclusive franchise.

The city reserves the right to enter into an exclusive franchise agreement for the collection of solid waste and/or recyclable materials within the city.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XII - Exclusive Hauler

9.04.650 - Exclusive hauler.

The city reserves the right to become the sole collection, processing, and/or disposal provider for any or all solid waste and recyclable materials generated within the city.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XIII - Litter and Illegal Dumping

9.04.660 - Applicability.

This article shall apply to:

A. Persons in the city;

B. Owners of improved properties in the city, where the residential property is vacant;

C. Occupants of improved properties in the city, where an owner is not an occupant; and

D. Owners of improved properties by the city where an owner is also an occupant.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.670 - Litter and illegal dumping prohibited.

No person shall dump, throw, drop, discard or otherwise dispose of litter on any public or private property within the city. This prohibition shall not be construed to limit persons placing litter in public receptacles or in authorized private receptacles in such a manner as to prevent it from being carried or deposited by the elements upon public or private property.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XV - Prohibited Accumulation of Solid Waste, Recyclable Materials, or Other Waste

9.04.800 - Applicability.

This article shall apply to:

A. Persons in the city;

B. Owners of improved properties in the city, where the residential property is vacant;

C. Occupants of improved properties in the city, where an owner is not an occupant; and

D. Owners of improved properties in the city, where the owner is also an occupant.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.810 - Responsibility for prohibiting accumulation of solid waste, recyclable materials, or other waste.

It is unlawful for the owner, or any person having the right of possession of any property within the city to accumulate or to permit the accumulation of solid waste, recyclable materials, or other waste on such property or on the sidewalks, parkways, street gutters or alleys abutting such property. Any such accumulation is declared to be a public nuisance, the prompt abatement of which is deemed to be a public necessity.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XVI - Unsecured Loads

9.04.820 - Applicability.

This article shall apply to all persons in the city.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.830 - Unsecured loads prohibited.

No person shall transport material, including solid waste, recyclable materials, or other waste unless such material is completely enclosed, covered, and/or secured as to prevent the load or any part of the load from being carried or deposited by the elements upon public or private property.

(Ord. No. 17380, § 1, 8-24-2010)

ARTICLE XIX – Severability

9.04.950 - Severability.

It is hereby declared to be the intention of the city council that the sections, paragraphs, sentences, clauses, and phrases of this ordinance are severable and if any section, paragraph, sentence, clause, or phrase shall be declared unconstitutional or otherwise invalid by a court of competent jurisdiction, such unconstitutionality or invalidity shall not affect any of the remaining sections, paragraphs, sentences, clauses, or phrases herein.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.961 - Types of permits.

No person, business, institution or agency shall collect, remove, transport or dispose of any solid waste without obtaining one of the following permits from the director, with the exception of private homeowners when acting in accordance with Section 9.04.180 of this chapter.

A. Solid waste operations permit. A solid waste operations permit entitles the holder to collect, remove and transport solid waste, other than liquid and semi-

solid waste and sludge, generated by the permittee or those businesses, institutional or industrial operations using the services of the permittee.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.962 - Application for permits.

A. Solid waste operations permit.

1. Applicants for solid waste operator permit shall furnish an application, accompanied by proof of prepayment of the permit fee, to the director at the department offices.

2. All holders of valid permits as of the effective date of the ordinance codified in this chapter may continue to operate under such permits until the permits expire.

3. Applicants for permits shall furnish the following information with their application:

a. Name of the applicant and the name under which doing business;

b. The types of solid waste to be collected, transported and disposed, categorized as:

i. Putrescible materials (garbage) or mixed putrescible and rubbish,

ii. Nonputrescible materials only, (i.e., rubbish, construction debris),

iii. Vegetation (i.e., tree limbs, grass clippings, etc.),

iv. Septic tank pumpings, sanitary sewer, catchbasin, grease, sand and grit trap waste, or

v. Other waste (specifying the character of each type waste);

c. Whether waste is to be collected incidental to the applicant's business or institutional purpose or whether it is to be collected from other parties for a fee;

d. The mailing and street address and telephone number of the applicant's business office and hours;

e. Name and telephone number of applicant's emergency after-hours contact;

f. The number and net carrying capacity (in tons) of each vehicle to be used for collection and transportation of solid waste and the location where such vehicles are stored when not in use. In any case where a vehicle is rated in cubic yards capacity rather than tons, three cubic yards shall be considered equal to one ton of capacity;

i. A valid standard certificate of public liability and property damage insurance, executed by a company authorized to do business in the state and performable in the county, insuring the general public against loss or damage that may result to any person or property from the operation of the refuse collection service. Such insurance policy shall insure each vehicle and piece of equipment operated by the refuse collection service and shall have limits of not less than one hundred thousand dollars for injury or death to one person; not less than three hundred thousand dollars for injuries or death to two or more persons resulting from any one accident; and not less than one hundred thousand dollars for damage or destruction to property resulting from any one accident,

ii. A statement from the insurance company that in the event the policy or policies are canceled, the insurer shall furnish to the city written notice of intention to cancel at least ten days before the liability of the insurer expires,

iii. A statement listing all claims, suits or other actions pending against him for personal injuries or property damage arising out of the operation of the vehicles and equipment the applicant proposes to use, together with the amount of such claim and the status thereof,

iv. In lieu of the certificate of insurance required in this section, a firm desiring to self-insure shall submit a financial statement certified by a certified public accountant showing a net worth of not less than five hundred thousand dollars.

g. Vehicle registration.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.963 - Vehicle standards and markings.

A. Vehicles used by permittees for collection and transportation of solid waste must have cargo beds fully enclosed or must be enclosed at the bottom and all sides, and equipped with a tarpaulin or other cover and method of fastening that will reasonably prevent spillage or wind transport of waste.

B. Each vehicle of any size used by permittees for collection or transportation of solid waste must be inspected and the vehicle capacity established by the director or designee prior to being used for solid waste collection or transportation. The director may conduct random inspections to verify continued compliance.

C. Each vehicle used by permittees for collection or transportation of solid waste must display the assigned number on both sides and rear of each vehicle in numbers and letters not less than three inches high.

D. Vehicles used for collection and transportation of liquid and semi-solid waste and sludge must have completely watertight tanks or containers. Piping and valving systems shall not leak.

E. No person, business or institution shall paint or identify vehicles or equipment in a manner which may lead an ordinarily observant person to confuse such equipment with equipment of the department.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.964 - Term of permit.

All permits, other than special disposal permits, shall be valid for twelve months from the date of issuance. There shall be no permits issued for a shorter term.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.965 - Permit transferability.

No permit issued under this chapter may be transferred.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.966 - Violation of permit.

A. Compliance with laws and regulations. Permit holders shall comply with local, state and federal laws regulating the collection, transportation and disposal of waste.

B. Warning. The director shall issue a notice of violation to any permittee who violates any of the provisions of Article V of this chapter. The permittee shall correct any such violation within seven calendar days of receipt of such notice.

C. Vehicles in violation. In any instance where the violation is due to a failure of a vehicle to meet the minimum standards prescribed in Section 9.04.963 of this article, such vehicle shall no longer be used for collection or transportation of solid waste until such violations have been corrected and verified by reinspection of the vehicle.

D. Suspension—Revocation. In any instance where a permittee fails to correct violations of which notice has been given by the director, or where there have been more than three violations recorded in a period of twelve months or where any violation constitutes a significant hazard to public health, the director shall give the permittee at least ten days written notice that on a specified date and at a specified time and location, the director will determine whether the permit should be suspended or revoked. The permittee shall have the right to appear and explain why the permit should not be suspended or revoked. The director's decision shall be final unless appealed as provided for in Section 9.04.967 of this article.

(Ord. No. 17380, § 1, 8-24-2010)

9.04.967 - Appeal from denial, suspension, revocation.

A. A person who has a permit issued under this title, who has been served with a denial, suspension or revocation notice of said permit, may appeal the director's action to the city manager as provided herein. Within ten business days of taking such action, the director shall prepare a report indicating the reasons for the denial, suspension or revocation, and shall provide a copy to the person. The director's decision is final unless within ten calendar days from the date of receiving the director's report, the person files with the city clerk a written appeal to the city manager specifying reasons for the appeal. Said appeal shall also include a written rebuttal to the director's report.

B. The city manager or his designated deputy city manager shall review the director's report and the appellant's rebuttal. The city manager or designee may allow the appellant to make an oral presentation or submit additional rebuttal. The city manager or designee shall make a ruling on the appeal within a reasonable period of time after the appeal has been filed.

C. The city manager or designee shall sustain, reverse or modify the action of the director and shall notify the appellant of his decision in writing. The decision of the city manager or designee is final.

(Ord. No. 17380, § 1, 8-24-2010)

2.3.2 City of Del Rio

2.3.2.1 CHAPTER 24 - Solid Waste

ARTICLE I. - In General

Sec. 24-1.- Definitions.

For the purposes of this chapter:

Garbage shall mean table garbage, paper, rubbish, trash, refuse, prunings, glass, tin cans, grass clippings, ashes, leaves and other debris of like nature. Garbage does not include: concrete; asphalt; metal waste; waste or rubbish from building, renovating or remodeling; rubbish from buildings; materials removed from buildings or structures as a result of renovating or remodeling the same; household appliances such as dishwashers, ranges, ovens, trash compactors, microwaves, stoves, refrigerators, freezers, washing machines, dryers, water heaters, televisions, air conditioners, and similar appliances; and furniture such as sofas, couches, mattresses, box springs, beds, bed frames, dressers, tables, chests, bureaus, armoires, electronic equipment, and similar objects. There shall be no distinction between wet and dry garage. Dead animals shall not be included in the garbage.

Landfill shall mean the area provided by the city in which garbage and other debris shall be accumulated or disposed of.

(Ord. No. 2003-23, § 1, 8-12-03; Ord. No. 2005-07, § 1, 2-22-05, eff. 3-15-05)

Sec. 24-1.1.- Exemption to applicability of chapter.

Notwithstanding any other provision contained in this chapter, the regulations contained in this chapter shall not be applicable to any land or territory located within the "Agriculture-Open District" created by Article III of Chapter 30 of this Code. (Ord. No. 85-47, § 2, 11-26-85)

Sec. 24-2.- Collection limitation.

Nothing in this chapter shall require the collection and disposition by the garbage collector of garbage items as heretofore defined which are of such a nature and size as to not allow for the collection and disposition thereof by the personnel, equipment and facilities of the garbage collector available from time to time for the collection and disposition of garbage; it being the responsibility of the person disposing of such items to arrange for the removal and disposition thereof. (Code 1962, § 8-5-2)

Sec. 24-3.- Littering—Prohibited.

(a) The offense of littering as defined and prohibited in this section is hereby declared to constitute a public nuisance.

(b) The following terms, words, or phrases as used in this section are hereby defined as follows:

(1) Deposit. The term "deposit" shall mean to cast, throw, discharge, drop, place, or cause to be placed, dump, sweep, sift, accumulate, or allow to accumulate.

(2) Property. The term "property" shall mean any private or public property located within the city and outside the corporate limits of the city for a distance of five thousand (5,000) feet. The term "property" shall include, but is not limited to, any real property, river, canal, public water, drain, sewer, or receiving basin.

(3) Public property. The term "public property" shall include, but is not limited to, any publicly owned property, property dedicated for the public's use, and property used by the public.

(4) Litter. The term "litter" shall include, but is not limited to, garbage, offal, bottles, broken glass, ashes, paper, boxes, cans, tree or brush trimmings, dirt, rubbish, refuse, trash, junk lumber materials, or any other liquid or solid waste article or substance.

(Code 1962, § 8-5-13)

Sec. 24-10.- Landfill site fees; disposal of garbage.

(a) Definition. The term contractor shall mean any person or firm who, under contract, is responsible for the collection, hauling, and disposal of garbage at the city landfill site, as well as, the operation site, as well as, the operation and maintenance of such landfill site.

(b) The city council hereby approves the following fees, rates, and charges heretofore set by the contractor in connection with the hauling and disposal of garbage and other refuse at the city landfill site:

1. Local self-haulers: .....Amount:

Contractors, commercial haulers, etc.

All vehicles per ton or fractions thereof (Includes TNRCC fee) $24.83

2. Industrial waste haulers from outside the city limits (Maquiladoras) per ton or fractions thereof (includes TNRCC fee) 50.00

5. Tire:

Passenger car tires 1.00

Truck tires 4.00

(c) Notwithstanding any other provision of this chapter, the contractor shall never be authorized to charge and collect a fee from any individual resident of the city who hauls and disposes of their own residential garbage or refuse, excluding tires.

(Ord. No. 85-02, § 1, 1-22-85; Ord. No. 90-02, § 1, 1-9-90; Ord. No. 92-02, § 1, 1-14-92; Ord. No. 94-39, § 1, 9-27-94; Ord. No. 96-18, § 1, 4-23-96; Ord. No. 97-59, § 1, 12-9-97; Ord. No. 2001-67, § 1, 11-13-01)

ARTICLE II. – Containers

Sec. 24-21.- Prohibited use.

No manure, animal droppings, human excretion or dead animals shall be placed in garbage cans, but shall be placed in separate refuse receptacles and disposed of by the owner at his own expense in accordance with the foregoing provisions of this chapter.

(Code 1962, § 8-5-11)

Sec. 24-22.- Tampering.

Meddling with garbage receptacles or pilfering, scattering contents and junking in any alley or street within the corporate limits of the city is prohibited.

(Code 1962, § 8-5-15)

Sec. 24-23.- Required.

Every owner, occupant, tenant or lessee using or occupying any building, house or structure within the corporate limits of the city, for residences, churches, schools, colleges, lodges, commercial businesses or other purposes shall provide and maintain garbage cans or receptacles in sufficient number and size, as specified in this article, to hold the garbage that will normally accumulate on the premises.

(Code 1962, § 8-5-4)

Sec. 24-24.- Specifications.

Every owner, occupant, tenant or lessee shall provide a container or containers for garbage and rubbish of not less than twenty- nor more than thirty-two-gallon capacity, constructed of metal, plastic or rubber with a tight-fitting lid of the same material. No container with its contents shall exceed 75 pounds.

(Code 1962, §§ 8-5-5, 8-5-9)

Sec. 24-25.- Location.

In residential areas, receptacles as required in this article shall be placed inside of the property line at the edge of the alley where there is no alley fence, and where there is an alley fence the receptacle or receptacles must be placed against the outside of the fence. Where there is no alley, the receptacle or receptacles must be placed in front of said property between the sidewalk and curb or at a place most accessible to the collector. The garbage collector shall have the right to refuse to pick up garbage on any property where dogs are loose in the yard.

(Code 1962, § 8-5-8)

Sec. 24-26.- Condemnation.

Garbage containers that have deteriorated to the extent of having jagged or sharp edges capable of causing injury to the garbage collectors or others whose duty it is to handle the containers, or to such an extent that the lids will not fit tightly or securely, will be condemned by the city, acting through the sanitarian of the health department.

(Code 1962, § 8-5-6)

ARTICLE III. - Garbage Collection Services

Sec. 24-40.- "Residence" defined.

The term "residence" shall mean a single-family unit or other structure designed and used primarily for residential purposes. The term "residence" shall include a family living unit that is a part of a larger structure. Provided, however, the term "residence" shall not include a structure that contains three (3) or more family living units.

(Ord. No. 83-40, § 1, 8-9-83)

Sec. 24-41.- Garbage fee imposed.

The occupant or user of each residence in the city shall be required to pay monthly the fee or rate specified in section 24-42 for the collection, hauling, and disposal of garbage.

(Ord. No. 83-40, § 1, 8-9-83)

Sec. 24-42.- Rates.

The city manager is hereby authorized and directed to charge and collect from each occupant of a residential unit in the city the sum of twelve dollars and fifty cents ($12.50) per month for the collection, hauling, and disposing of garbage.

(Ord. No. 83-40, § 1, 8-9-83; Ord. No. 85-19, § 1, 7-19-85; Ord. No. 86-46B, § 1, 10-28-86; Ord. No. 89-020, § 1, 7-25-89; Ord. No. 91-21, § 1, 8-13-91; Ord. No. 92-03, § 1, 1-14-92; Ord. No. 93-27, § 1, 8-10-93; Ord. No. 94-32, § 1, 8-23-94; Ord. No. 97-30, § 1, 7-8-97; Ord. No. 2001-03, § 3, 2-27-01)

Sec. 24-42.1.- Outside city limits.

The charge for the collection, hauling and disposal of garbage to users outside the city limit who use the city garbage collection system shall be one and one-fifth (1 1/5) times the rate charged to users inside the city limits.

(Ord. No. 92-05, 1-28-92)

Sec. 24-42.2.- Franchise fee.

A customer shall be charged a fee equal to four (4) per cent of the monthly bill charged to the customer for the collection, hauling and disposal of garbage.

(Ord. No. 95-45, § 2, 10-10-95)

Sec. 24-43.- Collection of charges; statement.

The amount specified in section 24-42 shall be included in the bill that is submitted monthly to the utility customers of the city. The garbage fee or rate shall be set out separately from all other utility charges in said utility bill.

(Ord. No. 83-40, § 1, 8-9-83)

Sec. 24-44.- Due date.

The garbage fees specified herein shall be due and payable at the same time that the other utility charges are due and payable to the city.

(Ord. No. 83-40, § 1, 8-9-83)

Sec. 24-45.- Rules.

All of the rules, ordinances, and code provisions concerning the collection of utility charges shall be applicable to the rates for the collection, hauling and disposal of garbage.

(Ord. No. 83-40, § 1, 8-9-83)

2.3.3 City of Eagle Pass

2.3.3.1 CHAPTER 14 - Municipal Solid Waste [26]

Sec. 14-1. - Short title.

This chapter shall be known as the "Municipal Solid Waste Ordinance of the City of Eagle Pass, Texas."

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-2. - Purpose and intent.

The purposes of this chapter include, but are not necessarily limited to, the following:

A. To protect the health, safety, and general welfare of the people;

B. To provide environmentally sound, cost-efficient solid waste management;

C. To provide for regulations to ensure the safe and proper handling of solid waste generated, stored, hauled, collected, and/or disposed of within the collection service area;

D. To develop data to ensure sufficient disposal capacity and/or recycling programs for solid waste and recyclable materials generated, stored, collected, disposed, processed, and otherwise found within the collection service area;

E. To deter illegal dumping;

F. To facilitate conservation of vital natural resources;

G. To protect against risk that current municipal solid waste facilities become unable to accept municipal solid waste generated within the city;

H. To encourage and enforce recycling programs, including source separation at point of generation;

I. To provide a convenient and effective means of financing the city's solid waste services.

J. To designate the public works director and/or his designee as the director of the city's solid waste management division; and

K. To designate the city's type IV landfill site, collections, hauling and disposal, recycling operations and the municipal solid waste program as the Municipal Solid Waste Management Division of the City of Eagle Pass.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-3. - Applicability**.**

This chapter shall apply to:

A. Any person, owner and/or occupant of real property in the city or in the collection service area, which may include all or some parts of Maverick County pursuant to an interlocal agreement;

B. Self-transporters of municipal solid waste and recyclable materials generated at commercial and residential properties in the city or its ETJ; and

C. Haulers of municipal solid waste generated at commercial and residential properties in the city or its ETJ.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-4. - Definitions.

As used in this chapter, the following terms shall have the meanings shown:

"Authorized municipal solid waste facility" shall mean any designated or authorized municipal solid waste facility designated by the city manager in the case of a designated municipal solid waste facility, or by the Texas Commission on Environmental Quality in the case of an authorized municipal solid waste facility, for processing, storing, or disposing of municipal solid waste, including construction or demolition waste. This includes City of Eagle Pass Type IV AE, Landfill Permit 1918 located on 123 State Highway 131 in Maverick County,

Texas, and the Maverick County Solid Waste Authority Type I Landfill Permit 2316 located at 16179 Farm to Market Road 1021, El Indio, Texas 78860 (County Landfill), and the City of Eagle Pass Recycling Center located at 1180 Eidson Road, Eagle Pass, Texas.

"Bulky" waste shall include only municipal solid waste in the forms of irregularly sized items that do not readily fit into refuse containers, which include but are not limited to, large appliances (e.g., refrigerators, water heaters, washers, and dryers), toilets and furniture, also small and medium-sized appliances, and other domestic waste and discards which are commonly regarded as large non-putrescible municipal solid waste items. Bulky waste does not include household hazardous waste, hazardous or special waste, construction and demolition waste, vehicle parts, commercial tires, brush, electronics, or products containing glass which may break during collection.

"Business customer" shall mean a person that produces business municipal waste that the city has agreed to collect.

"Business services" shall mean collection of business municipal waste (brush, bulky and special bagged leaf collection not included) from business customers, provided by the city. Refuse and recycling collection service at such location must be feasible and within existing collection routes.

"Business municipal waste or commercial refuse" shall mean garbage and recycling municipal solid waste similar, in both content and volume, to that generated at a business or commercial establishment.

"Cart or container" shall mean any watertight plastic receptacle approved by the department for the purpose of collection and containing municipal solid waste or program recyclable materials that is generally equipped with wheels and an attached tight-fitting lid designed or intended to be mechanically or manually dumped into a garbage collection truck.

"Cart dumper" shall mean a mechanical device used in semi-automated and fully-automated collection to lift and empty carts, also called flippers and tippers.

"Central Business District" (CBD) shall mean all streets and portions of street with the area bounded as follows: Beginning at the intersection of Ryan Street and Garrison Street; thence along Ryan Street to Ford Street; thence along Ford Street to the Union Pacific Railroad Tracks; thence along the Union Pacific Railroad Tracks to Garrison Street; thence along Garrison Street to the Point of Beginning.

"City" shall mean the City of Eagle Pass, Texas.

"Collection" shall mean the act of removing accumulated matter, garbage, solid waste or recyclables from the point of collection and transporting it to a solid waste management facility; collection may occur at centralized points where generators deliver their solid waste.

"Collection assistance service" shall mean a collection service provided to a customer residence wherein there is no able-bodied individual capable of setting out refuse or recyclables at the public right-of-way. The director shall approve of or discontinue this service in writing.

"Collection frequency" shall mean the number of times per week that collection service is provided.

”Collection service area” shall mean the City of Eagle Pass, Texas. The city may also provide service within the ETJ of the city or in Maverick County, Texas pursuant to an interlocal agreement with Maverick County, Texas.

”Collection/service stop” shall mean a unique address or location that is a point of collection and requires collection services, i.e., a geographical point within a service area that requires the collection vehicle to stop and collect solid waste and/or recyclables, or other materials.

”Collection system” shall mean the collection and transportation of matter, garbage, solid waste or recycling in a specially designed truck, some of which may have an affixed mechanical arm assembly. Service may be provided in the form of either automated (one-person crew) or semi-automated method (multiple-person crew) and these systems may utilize specially designed containers.

”Co-collection/dual collection” shall mean a simultaneous collection of two (2) solid waste, e.g., residential solid waste and residential recyclables; residential solid waste and yard waste; residential recyclables and yard waste; or two (2) recyclables.

”Commercial property” shall mean all property other than a residential property; this includes vacant premises.

”Commercial” refuse shall include any solid waste generated as a by-product of any commercial operation, but shall not include swills, slops, toxic or corrosive materials, manure, or any other material found harmful to personnel or equipment as determined by the director or his designee. Commercial refuse shall also include MSW that was not generated at the customers EPWWS account address and non-residential MSW that may be collected from businesses such as law offices, community centers and pools or vacant premises.

”Commercial establishment or business customer” shall mean any structure or premises other than residential structures or premises and shall include the following: stores (including second-hand stores), flea markets, restaurants, gas stations, apartments, malls, oil and gas well locations, bars, theatres, and any others conducting business.

”Compactor” shall mean a watertight receptacle, regardless of its size, which has a compaction mechanism, whether stationary or mobile, equipped with closeable doors intended to be loaded onto a vehicle.

”Contaminated pile” shall include (i) any pile of items or matter or materials containing material not provided for (or specifically prohibited) in its respective definition; and/or (ii) piles in which the contaminating materials are commingled with, or placed on top of, the pile, or if such items are placed so close to the pile or in such large amounts that the items cannot reasonably be removed from the pile.

”Current utility bill” shall mean a bill issued by the EPWWS that includes a charge for collection, which is not more than sixty (60) days old.

”Debris” shall mean large waste materials, including but not limited to ashes, dirt, automobile frames, tires, or other bulky and heavy materials.

”Department” shall mean the Solid Waste Management Division of the City of Eagle Pass or its successor which is part of public works.

”Designated or authorized municipal solid waste facility” shall mean any municipal solid waste facility designated by the city manager in the case of a

designated municipal solid waste facility, or by the Texas Commission on Environmental Quality in the case of an authorized municipal solid waste facility, for processing, storing, or disposing of municipal solid waste, including construction or demolition waste. This includes City of Eagle Pass Type IV AE, Landfill Permit 1918 located on 123 State Highway 131 in Maverick County, the Eagle Pass Recycling Center located at 1180 Eidson Road, Eagle Pass, Texas, and the Maverick County Solid Waste Authority Type I Landfill Permit 2316 located at 16179 Farm to Market Road 1021, El Indio, Texas 78860 (County Landfill).

”Detachable containers” shall mean waste containers such as carts, dumpsters and roll-off containers.

”Director” shall mean the director of public works or his successor or predecessor. The director may designate a fully authorized representative to act on his behalf or the department's behalf.

”Disposal” shall mean the discharge, deposit, dumping, spilling, leaking, or placing of any matter, solid or liquid waste (whether containerized or non-containerized) into, under, or on any land or body of water.

”Drop-off event” shall mean an event sponsored by the city allowing eligible users to drop-off MSW materials for disposal or recycling.

”Drop-off centers” shall mean collection sites where solid waste, recyclables, or other materials are taken by generators and deposited into designated containers.

”Dumpster” shall mean a container, which holds more than one (1) cubic yard, used to store solid waste until it is collected for disposal. The term also includes roll-on/roll-off containers that are used to transport solid waste on a vehicle chassis.

”Established fee” shall mean the fee that is authorized in this chapter, which is set in the amount identified in the adopted budget resolution for the current fiscal year or by other duly adopted action of the city council.

”Enclosure” shall mean a man-made structure built for the specific purposes of shielding a refuse container. These enclosures may be built so that the refuse collection vehicles have access to the container. If enclosures are built with doors, these shall be opened on the day of collection. Doors shall be made with anchor devices that will keep the doors from inadvertently closing on the collection vehicles. Enclosures shall be at least thirteen (13) feet wide and ten (10) feet deep for ease of collection. Any enclosure that is locked on the day of collection will not be collected. If a request is made for collection, after the regularly scheduled collection, the request will be considered a request for extra pick up subject to an additional fee.

”EPA” shall mean the United States Environmental Protection Agency.

”EPWWS” shall mean the City of Eagle Pass Water Works System. EPWWS is the billing agent for solid waste fees. EPWWS water meters may serve as the initial basis for residential, business and/or commercial service eligibility.

”ETJ” shall mean the extra-territorial jurisdiction, as defined or described in the city's subdivision ordinance.

”Excluded waste” shall mean solid waste not accepted by any designated or authorized municipal solid waste facility, as posted, at such designated or authorized municipal solid waste facility.

”Fully-automated collection” shall mean a method of collecting solid waste where the generator places the storage container or cart at the point of collection and collection is done without the operator leaving the collection vehicle. The collection vehicle is equipped with special mechanical devices that are extended to grasp, lift, empty and then replace the storage containers back to the point of collection. Normally, the point of collection for fully-automated collection is curbside or alley.

”Garbage”. See "Refuse."

”Generator” shall mean the person or entity whose name appears on the EPWWS billing system or places solid waste or recyclables in containers for collection.

“Hauler” shall mean person other than a self-transporter who provides collection of construction and demolition materials within the city and its ETJ.

”Hauler permit” shall mean the authorization of a hauler by the department for the privilege to provide collection of construction and demolition and recyclable materials within the city and its ETJ and/or delivery of construction and demolition and recyclable materials to a designated or authorized municipal solid waste facility during the term of such permit and subject to all the terms and conditions imposed by this chapter and other laws.

”Hazardous waste” shall mean any liquid or solid waste identified or listed as a hazardous waste by the administrator of the EPA pursuant to the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976.

”Illegal dumping” shall mean any offenses defined by this chapter or Texas Litter Abatement Act in Chapter 365 of the Texas Health and Safety Code.

”Industrial solid waste” shall mean waste determined to be of industrial origin and classified by the Texas Commission on Environmental Quality as Class I, Class II, or Class III.

”Legal disposal” shall mean the deposit of any solid waste at a registered or authorized municipal solid waste facility.

”Lot” shall have its ordinary meaning but it shall also include, in addition to the land within its boundaries, all land adjacent to and extending beyond the property line to the curb line of adjacent streets, and where no curb exists, to the existing street surface. The word lot shall also include all land lying between the property line of any lot and the center of adjacent alleys and/or easements.

”Manual collection system” shall mean the collection and transportation of matter, MSW, garbage or recyclables by means of a system that requires a person to manually lift and load the material into the collection vehicle.

County or Maverick County shall mean the County of Maverick, Texas.

”MCSWA” shall mean the Maverick County Solid Waste Authority.

Mixed-use property shall mean an improved property containing both residential properties and commercial properties, where the municipal solid waste generated at such improved property cannot be readily separated by source of generation.

”Municipal solid waste (MSW) ” shall mean solid waste resulting from or incidental to municipal, business, hospital, community, commercial, institutional, or recreational activities, and includes garbage, rubbish, recyclable materials, ashes, street cleanings, dead animals, abandoned automobiles, and other solid waste other than industrial solid waste.

”Municipal solid waste facility” shall mean all contiguous land, structures, other appurtenances, and improvements on the land used for processing, storing, or disposing of solid waste. The facility must be licensed and may consist of several processing, storage, or disposal units.

”Occupant” shall mean any person occupying or having possession of premises or any portion thereof.

”Owner” shall mean any person who, alone or with others, has title or an interest in premises with or without accompanying actual possession thereof, and including any person who as agent, or as executor, administrator, trustee or guardian of an estate, has charge, care or control of any premises.

”Permitted hauler” shall mean a hauler holding a valid hauler's permit for the collection or disposal of construction and demolition and recyclables materials at an authorized facility.

”Permitted vehicle” shall mean a vehicle or trailer used by a permitted hauler within the city for the purpose of collecting and disposing of construction and demolition and/or recyclable materials.

”Permitted hauler vehicle log” shall mean a form provided by the department to record deliveries of solid waste regulated by this chapter by permitted haulers to a designated or authorized municipal solid waste facility, in substantially the same form attached as Exhibit A.

”Person” shall mean an individual, entity, corporation (including a government corporation) organization, governmental subdivision or agency, federal agency, state, political subdivision of a state, interstate agency or body, business or business trust, partnership, association, firm, company, joint stock company, commission, or any other legal entity.

”Point of collection” shall be a convenient location at or in the right-of-way accessible to collection trucks or equipment from a passable roadway adjacent to each premises, which is often curbside. The point of collection for brush and bulky waste is at the curb or edge of curb.

”Private franchised hauler” shall mean a person that has a nonexclusive right and privilege to collect, convey, or transport solid waste.

”Prohibited waste” shall mean any waste prohibited from landfill disposal by the EPA, the city, TCEQ, or landfill-operating permit. Prohibited waste also include waste that may be injurious to collectors or may cause damage to collection vehicles.

”Public trash container” shall mean and include all approved waste containers or containers designed for public use and placed on the streets and sidewalks by the city or by anyone else under the direction of the city.

”Recyclable materials” shall mean those solid waste that are separated for recycling or reuse such as newspaper, mixed office paper, corrugated cardboard, craft paper, container glass, aluminum and tin cans, magazines, steel aerosol cans, and plastic bottles and containers.

”Recycling” shall mean the collection, separation, recovery and sale or reuse of metals, glass, paper, plastics, cardboard, and other materials which would otherwise be disposed or processed as municipal solid waste.

”Recycling facility” shall mean a facility that either has the required authorization from Texas Commission on Environmental Quality, or equivalent state agency, for processing of recyclable materials and is in compliance with local, state, and federal laws. The Eagle Pass Recycling Facility is located at 1180 Eidson Road, Eagle Pass, Texas.

”Refuse” shall mean garbage and/or municipal solid waste generated at a residential or commercial property. Refuse does not include recycling commodities intended to be placed in recycling containers, industrial waste, hazardous waste, or any other prohibited waste.

”Residential customer” shall mean a person living in a residential dwelling with two (2) units or less that produces refuse that the city collects.

Residential property shall mean all improved property, which is used, or is capable to be used as a residence, a single-family dwelling, duplex, or mobile home property, and does not include improved property used primarily as a commercial property, mixed-use property, or multifamily dwellings.

”Retail or service establishment” shall mean a business operation located on premises that has as its primary purpose the selling of goods, merchandise and/or providing a services to members of the public from a fixed location, such as a shop, store or building complex. Examples of retail or service establishments include, but are not limited to restaurants and bars, gas stations, convenience stores, shopping centers, and second hand stores, flea markets, etc.

”Route” shall mean a round of stops to collect solid waste or a path regularly visited by a collection vehicle.

”Rubbish” shall mean non-putrescible solid waste, excluding ashes, consisting of both combustible and noncombustible waste materials; combustible rubbish includes paper, rags, cartons, wood, excelsior, furniture, rubber, plastics, yard trimmings, leaves, and similar materials, unless placed on property pursuant to and in compliance with other ordinances or regulations of the city; noncombustible rubbish includes glass, crockery, tin cans, aluminum cans, metal furniture, and like materials which will not burn.

”Scavenging” shall mean an unauthorized partial or total removal of contents of a cart or container or recycling containers or any other item set out by a customer with the intent of collection by the city.

”Self-transporter” means the following:

a. Generator, who directly, without use of a hauler, transports solid waste generated by the generator to a municipal solid waste facility or recyclable materials generated by the generator to a recycling facility, utilizing the following methods of transport: [1] a factory-unmodified Class 1, 2, or 3 truck, based on US DOT Federal Highway Administration Vehicle Inventory and Use Survey standards; or [2] a vehicle as described in [1] above, with an attached single-axle trailer.

b. A person conducting services on behalf of a generator, including, but not limited to building contractors, home repairmen/handymen, landscapers, or roofers, at that generator's premises, may be considered a self-transporter of solid waste or recyclable materials generated as a result of such service.

Semi-automated collection shall mean a method of collecting solid waste where the generator places the storage container at the point of collection and the collection is done by a collection vehicle which requires the operator or collector to leave the collection vehicle and manually connect the container(s) to a lifting device (flipper or tipper) fastened to the mainframe or hopper of the collection vehicle. Normally the point of collection for semi-automated collection is curbside or alley.

Side door shall mean a collection/service stop location for a municipal solid waste and/or program recyclable materials cart other than curbside. Side door can be at the front, side or rear of a residential property for collection of municipal solid waste and program recyclable materials. The department shall designate the location for side door collection of municipal solid waste.

"Solid waste" shall mean any refuse, rubbish, soil or construction materials, white goods, recyclable materials, sludge from a waste water treatment plant, water supply treatment plant or air pollution control facility, and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from municipal, commercial, and agricultural operations, and from community and institutional activities (changes in state and federal regulations may change these definitions) but does not include:

1. Solid or dissolved material in domestic sewage or solid or dissolved materials in irrigation return flows or industrial discharges subject to regulation.

2. Soil, dirt, rock, sand, and other natural or manmade inert solid materials used to fill land if the object of the fill is to make the land suitable for the construction of surface improvements.

3. Waste materials that result from activities associated with the exploration, development, or production of oil or gas and are subject to control by the Railroad Commission of Texas.

4. Special waste as defined by this chapter.

5. Hazardous waste.

Special waste shall mean any liquid, semi-liquid, solid waste or combination of solid waste that because of its quantity, concentration, physical or chemical characteristics or biological properties, require special handling and disposal to protect the human health or the environment and as further defined in 3 TAC 330 Municipal Solid Waste Regulations. Special waste include, but are not limited to:

11. Tires.

Special waste may need pretreatment before it is disposed of.

"Storm damage" shall primarily refer to organic materials generated as a result of forces of nature that may end up in the city's storm drain, including but not limited building materials, roofing materials, and other personal property or refuse.

"TCEQ" shall mean Texas Commission on Environmental Quality and its successor and predecessor agencies.

"TDSHS" shall mean Texas Department of State Health Services and its successor and predecessor agencies.

"Transfer station" shall mean a fixed facility used for transferring solid waste from collection vehicles to long-haul vehicles.

"TxDOT" shall mean the Texas Department of Transportation and its successor and predecessor agencies.

"Vector" shall mean an agent such as an insect, snake, rodent, bird or animal capable of mechanically or biologically transferring a pathogen from one (1) organism to another.

"Vehicle" shall mean any device used to transport matter or solid waste and include, but is not limited to cars, pickups, vans, dumps trucks, trailers, roll-off containers, tractor trailers, rear and side loading packer trucks.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-5. - Garbage and rubbish—Procedures for residential property refuse collection.

Any owner, occupant or person in possession or control of any residential property shall place the containers for collection at such locations as are required by this chapter or directed by the director, which is generally a location easily accessible for the collection vehicle.

Any container not easily accessible to the collection vehicle will not be emptied until the next regularly scheduled collection following the proper placement. If the owner requests that the container be emptied before the next regularly scheduled collection, an extra pick up collection fee of fifteen dollars ($15.00) in the city and twenty-five dollars ($25.00) outside the city will apply and will be added to the monthly bill.

1. Residential containers. Residents serviced by the city's collection system shall use the city provided and owned reusable wheeled containers unless the director approves, in writing, the use of a manual collection system for a premise.

All materials placed out for collection must be within the container or it will not be collected.

2. MSW placement. Municipal solid waste shall be placed in carts in a secured, odor and vector-tight plastic bags.

3. MSW storage. Municipal solid waste shall not be accumulated or stored outside of carts and/or containers. The cart and/or container lids must remain closed at all times when not adding municipal solid waste to carts or containers. The department is authorized to require resolution of overflowing carts and/or containers within twenty-four (24) hours of written notice from the city.

4. Disposable receptacles for leaves only. Disposable receptacles may be of the following types:

A. Plastic bags. Plastic bags shall have a minimum film thickness of one and five-tenths (1.5) mils. When placed for collection they shall be securely tied with wire, twine, tape, or ends fashioned into a knot. Broken bottles or other sharp items are not to be placed into these containers. Plastic bags shall be used for collection of leaves and yard waste only. In the Central Business District, plastic bags shall not be used as containers for any commercial refuse collection.

B. Paper bags. Paper bags shall be of two-ply kraft and have a wet strength of forty (40) pounds. When placed for collection they shall be securely tied with wire, twine or tape. These containers must at all times be able to maintain their structural integrity when lifted. Paper bags shall be used for

collection of leaves and yard waste only. In the Central Business District, paper bags shall not be used as containers for any commercial refuse collection.

5. Mechanized (automated) collection containers. These receptacles will be issued by the city to residents living within areas serviced by the city's mechanized garbage collection system. Use of these containers within these designated areas is mandatory.

6. Deposit into containers. Every person owning, managing, operating, leasing or renting any residential property shall place the daily accumulations of garbage and rubbish in the mechanized container or containers and to eliminate as much as possible all water and liquid. Every person shall place garbage which is subject to decomposition in mechanized (automated) collection containers and to securely wrap garbage in paper or other suitable material before placing the same in such containers. Animal parts that may putrefy (such as fish heads, entrails, or animal carcasses) must be kept cool and not placed in a refuse container until the night before the scheduled collection date.

7. Weight limitations. The owner, tenant or occupant of any residential property shall ensure that the total weight of any container and contents does not exceed one hundred twenty-five (125) pounds for a forty (40) gallon or smaller container, two hundred (200) pounds for a sixty-four (64) gallon container, three hundred thirty-five (335) pounds for a ninety-six (96) gallon container or the maximum weight rating imprinted on the container, whichever is greater.

8. Number of receptacles.

A. Manual garbage collection system routes. The owner, manager, tenant, or occupant of any residential property utilizing manual collection system shall provide a sufficient number of receptacles to contain the solid waste produced at such dwelling, building, or premises from one (1) pickup time to the next pickup time. Manual garbage collection must be approved, in writing, by the director or his designee.

B. Mechanized (automated) garbage collection routes.

i. Types of approved containers. Containers to be used for the pickup of garbage and rubbish shall be ninety-six (96), sixty-four (64), forty (40) or thirty-five (35) gallon, two-wheeled refuse-collection carts provided and owned exclusively by the city. Each container will bear a unique serial number that will be assigned to each dwelling or business unit. All containers shall remain the property of the city and shall not be removed from the property on which the dwelling or business unit is located without the written consent of the director of solid waste.

ii. Disposal in refuse-collection carts required for routes with automated collection equipment. It is unlawful to dispose of any garbage or rubbish material anywhere in the city except through placement of such material in the approved cart placed for collection as herein prescribed. City will not collect any garbage or rubbish material which is not placed in an approved container as provided above.

10. Replacement of city refuse-collection carts. Each customer shall be responsible for the safekeeping and maintenance of each cart issued to the customer for their premises. If a cart is damaged (other than by city collectors), stolen or misplaced, the customer shall pay the city the cost to repair or replace said cart.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-6. - Residential brush/bulky waste collection procedures**.**

The city may collect and dispose of brush and bulky waste from residential properties only. The collection of these items may be scheduled on a three (3) times per year basis, as published from time to time by the department, located at 1100 Eidson Road, Eagle Pass, Texas, and as periodically revised by such department based on operational changes. During city-sponsored clean up campaigns, collection trucks will only pass by each residence once per campaign. An out-of-schedule request for collection of these materials or waste shall be charged at the rate of nine dollars and seventy-five cents ($9.75) per cubic yard but such charge shall not be less than fifty dollars ($50.00) per collection. Property owners may dispose of their construction and demolition materials, brush and yard waste and bulky items at the City of Eagle Pass Type IV AE Permit 1918 landfill site located on 123 State Highway 131. There shall be no charge for city residents that take trash to the type IV landfill site provided they present a Texas Driver's License or State of Texas-issued identification form that shows the same address as the EPWWS bill showing payment of garbage fees.

Persons residing outside the corporate city limits may also use the city type IV AE landfill located on 123 State Highway 131 to dispose of type IV waste only, and will be charged twenty-four dollars ($24.00) per ton or eight dollars ($8.00) per cubic yard or any fee designated by the city council.

City and county residents may also dispose of all type I municipal solid waste at the Maverick County Solid Waste Authority Landfill Permit 2316 Solid Waste site located at 16179 Farm to Market Road 1021, El Indio, Texas, 78860.

B. The person making the request shall place these items at the curb in a segregated manner. The person making the out-of-cycle brush cuttings and bulky waste items collection request shall ensure that the items are not placed on or near curbs in violation of this chapter.

C. The person desiring bulky waste collection shall place all large white goods, furniture, mattresses and cabinets separate from all other items placed for removal by city trucks. These items have no size or weight limitation, but are limited to residential items only.

D. No items designed for commercial use will be collected.

E. The person desiring bulky waste collections shall remove the door or lids of all refrigerators, freezers and similar air-tight appliances for safety. Doors or lids shall be placed alongside said appliances.

F. No bulky waste collection in alleys. It shall be unlawful for any person to place bulky waste in alleys.

G. The property owner or occupant shall be primarily responsible to the city for reimbursement of any and all remediation expenses incurred by the city as a result of damage to personal or real property that may occur during any brush or bulky waste collection action (whether regular, specially scheduled, or ordered for purposes of protecting the public health, safety, or welfare) caused by waste materials obscuring the property or impeding the city's ability to address the waste matter. Damages to property may include damage to meters, sprinkler systems, plumbing appurtenances, fencing, mailboxes, automobiles, or any other item of personal or real property. Costs may be undertaken, at the discretion of the city, to repair or replace items in order to preserve public health or safety. Tenants and other persons shall be secondarily responsible for reimbursement to the city. The

same priority for reimbursement responsibility shall apply to direct fees and payment of administrative costs for extraordinary solid waste services.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-9. - General prohibitions and enforcement.

1. Violation; penalty. It shall be unlawful for a person to intentionally, knowingly, or recklessly do or perform any act prohibited hereby, and it is an offense for a person to fail to do or perform any act required hereby. Each day's violation hereof shall constitute a separate offense. The person, firm or corporation violating any provisions of this chapter shall be fined not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00) for each offense, and a separate offense shall be deemed committed on each day during which the violation occurs or continues to occur. Any person, firm, corporation or agent or employees thereof who knowingly, intentionally or recklessly violates any of the provisions of burning of solid waste shall be fined an amount not less than one hundred dollars ($100.00) and not more than two thousand dollars ($2,000.00). However, in the event a defendant has once previously been convicted under this chapter, the defendant shall be fined an amount nor less than two hundred dollars ($200.00) and shall be fined an amount nor less than three hundred dollars ($300.00) for a third conviction and for each conviction thereafter. Should the court impose or charge a person with a violation in which the fine may be in excess of five hundred dollars ($500.00), the finder of fact must find that the offense was committed knowingly, intentionally, or recklessly. In addition to the foregoing, the city is authorized to seek injunctive relief and/or a civil penalty of up to one thousand dollars ($1,000.00) per day, per violation to compel and encourage compliance with the provisions of this chapter.

2. Unfranchised residential and/or commercial collection prohibited. It shall be unlawful for a person to provide or attempt to provide garbage collections service within the city without first obtaining from the city or its ETJ a franchise to conduct such business on public streets.

3. Tampering with and defacing receptacles.

A. It shall be unlawful for any person to remove, displace, injure, deface, destroy, uncover, or in any manner remove, withdraw or disturb any part or portion of the contents thereof.

B. It shall be unlawful for any person to tamper with, injure or deface any automated/mechanized and/or other containers or public trash receptacle for solid waste in the city.

4. Placement of public trash receptacles. It shall be unlawful for a person to place public trash receptacles other than mechanized containers upon the streets, plazas, parks and other public property of the city for the reception of such trash without the consent of the city given by the solid waste director of solid waste.

5. Scavenge or salvage. It shall be unlawful for any person, firm, corporation or entity except a duly authorized agent or employee of the city to scavenge or salvage the solid waste or recyclables once they are placed for collections.

6. Collection of garbage, trash or recyclables by any person, business, corporation or entity other than the city is prohibited. No person, firm, corporation

or entity without a permit, except a duly authorized agent or employee of the city, shall collect garbage, trash or recyclables, including but not limited to cardboard of any other person or entity, or convey or transport such garbage, trash, or recyclable on the streets, alleys and public thoroughfares of the city, or dispose of such garbage or trash.

7. No city employee shall collect refuse located within private property unless as provided below. The collection of refuse shall be made from the public way; and the owner, occupant, tenant or lessee of the premises, whether residential or commercial, may place the receptacles for refuse at the driveway entrance or on the parkway near the public way. Refuse containers shall not be placed in the middle of the street for collection. It will be the responsibility of the owner, occupant, tenant or lessee of the premises to place containers in the appropriate curbside location for pick up as designated by the director of solid waste.

8. Collection assistance service shall be provided, at the discretion of the director of solid waste, when requested by a residential customer wherein there is no able-bodied individual capable of setting out refuse or recyclables at the public right-of-way. In the event city employees are required to enter onto private property for pick up, the property owner must provide prior written consent to the city using the form designated by the director.

9. Placement. It shall be unlawful for the owner of a vehicle to park a vehicle within five (5) feet of a recycling or refuse container on collection day.

10. Cul-de-sac. It shall be an offense to park a vehicle head-in in a cul-de-sac so as to impede refuse or recycling collection on collection day.

11. Non-compliant loads.

A. Loads placed for collection which do not meet requirements as set out by this chapter will not be serviced by the city and will be the responsibility of the owner, manager, tenant or occupant of any dwelling, building or premises to correct the situation immediately.

B. Origin of waste. It shall be unlawful for any person to place brush and or bulky waste that did not originate at the residence from which it is being collected curbside for collection. Furthermore, all materials placed out for collection, and any additional waste which might accumulate on or contiguous with said piles, are considered the responsibility of the owner, manager, tenant or occupant of any dwelling, building, or premises in front of which the materials are placed.

C. It shall be unlawful for any person to place for collection by the city any earth, rock, gravel, construction materials or assembled pallets.

D. It shall be unlawful for any person to place broken glass, ashes, or manure in any receptacle without first wrapping same securely in paper or other combustible material.

E. No large metal machinery or automotive parts will be collected.

F. It shall be unlawful for any person to place for collection by the city any liquids in containers.

G. It shall be unlawful for any person or entity to place hazardous or medical waste for collection.

H. It shall be unlawful for any person to place syringes from home health care in any refuse container without first securely enclosing them in a sealed canister or bottle. Syringes shall not be placed in recycling containers.

I. It shall be unlawful for any person to place in a recycling container for collection by the city any item other than those on the listing of acceptable recycling materials.

J. Loose and scattered waste will not be collected and the owner may be issued a citation for littering.

K. Tires may not be set out for collection. If any tires are set out for collection, in addition to any fine that may be assessed for a violation of this section, the director may assess a surcharge of five dollars ($5.00) per tire for each tire set out for collection that is picked up, which will be applied to the customer's water bill. A citation may be issued for violation for failure to comply.

L. It shall be unlawful for any person to place waste or other materials in a residential, commercial, institutional, or industrial container, which was not generated from the same location. If the source of such waste or materials is located or identified, a citation may be issued to the person or persons placing such items in the container. In any situation in which hazardous waste or other prohibited materials are found in such containers, any person in charge of the premises shall be responsible for allowing such materials to be placed in the container.

M. It shall be unlawful for any person to place at or near curbside on sidewalks, easements or alleys, or on their property or to allow to remain at curbside, sidewalks, alleys or easements any waste, including out of schedule waste, brush or construction and demolition materials regardless of character, for collection, or intended for collection, or to so place or allow any such waste to rest or remain at or near curbside, on sidewalks, alleys or easements for purposes of temporary storage, regardless of disposal intent, which material rests or remains at or near curbside, on sidewalks, alleys or easements in excess of any forty-eight-hour period, inclusive of weekends and holidays. It shall be an affirmative defense to a violation of this prohibition that the responsible person placed the material at or near curbside or sidewalks or allowed the material to rest or remain there in response to official written notice from the city that instructed such waste placement in comportment with a designated or specially scheduled city collection event, for example: the city's brush and bulky item collection program. Such written notice will designate the specific period during which materials may be placed for collections during the official clean up campaign.

N. It shall be unlawful for any person living outside the city limits to bring MSW or garbage into the city for collection.

12. Vehicles transporting refuse to be covered. Any authorized vehicle used to transport municipal solid waste in any of the public ways within the corporate limits of the city shall be fitted with a good substantial cover thereon. The covering shall be of wood, metal or canvas and shall be so closely fitted as to prevent the escape or flying about of any of the refuse. All vehicles entering a disposal, recycling, deposit, or waste management facility, whether the facility is city or privately owned, shall have sufficient load restraints to prevent loss or spillage of load due to wind or motion of the vehicle on the road. Any vehicle

driver who does not comply, will be required to pay an uncovered or inadequately secured load penalty of fifteen dollars ($15.00) per load at the gate.

13. The director has authority and discretion to direct collection and disposal of otherwise impermissible waste left at or near curbside in violation of this chapter, when in his respective judgment, the public health, safety or welfare requires removal and legal disposal of such waste, and in such case the responsible party, deemed to be the owner of the property benefited or person in control of the premises, shall pay the city its reasonable costs for loading, transport, and due disposal of the material, plus an administrative fee of ten (10) percent which administrative fee is here deemed reasonable and necessary due to the small and irregular volumes of individual waste to be addressed by this provision for benefit of the health, safety, and welfare, and for which volumes economies of scale and schedule will not be possible. (This fee is separate and independent of any other fees recited in this chapter). Any such costs may include testing and/or analysis of material necessary to its safe and legal disposal. Even if such tests show a benign character capable of disposal as municipal solid waste or household hazardous waste, the benefited property owner or responsible person shall be responsible for such charges, when in the opinion of any of the directors referenced above, such testing was necessary to verify worker safety or legal options for disposal or any other health or safety concern of the city official. Costs for such extraordinary city services may and shall attach as a lien to the benefited property when perfected according to law under such conditions as state law may allow, under authority of the Texas Health and Safety Code.

14. Unlawful damage to city refuse-collection carts and containers. Except as authorized by the city council, it shall be unlawful for any person, firm or corporation to remove from a residential or a commercial property at which it is located or to damage any city refuse-collection cart and/or container. The customer shall be liable for any damage to containers located on the customer's premises except for damage caused by the collector.

15. It is the affirmative duty of any person responsible for solid waste to ensure and perform legal disposal of solid waste. Persons responsible for solid waste are property owners, tenants/occupants, or generators. Persons alleged to be in violation of this chapter must present to the judge or trier of fact a true and credible receipt from a duly licensed and regulated landfill or disposal facility to demonstrate the waste in question has been legally and properly disposed according to its character (type of material).

16. No bulky waste collection in alleys. It shall be unlawful for any person to place bulky waste in alleys.

17. Refusing material for disposal, deposit, or recycling. The director or the director's authorized representative, shall have the right to refuse acceptance of any material for disposal or deposit for recycling at any city-owned facility when, in his/her opinion, such material poses by its nature a threat to the health and safety of any employee, may result in pollution of the environment, pose a detriment to the site, or violate state operation permits as a result of its disposal or deposit in facility or site area. This discretionary authority pertains to any city operated facility, including, but not limited to, public works recycling facility, the city's type IV landfill site(s), and any other fixed or temporary sites used by the city for purposes of solid waste management.

18. It shall be unlawful for the owner, manager, tenant or occupant of any premises or building within the city, or the agent or employee of any such person to place, allow or suffer to remain after it has been emptied by the garbage collector, any container for solid waste, rubbish, or trash in, on, or about any street, plaza, park, sidewalk, or other public place, except in an alley in the rear of such premises.

19. Burning of solid waste. It shall be unlawful for any owner, manager, tenant, and or occupant of any dwelling unit, building, and/or premises to burn solid waste on any premise within the city or its ETJ, unless approval has been granted by the Texas Air Control Board and/or TCEQ and the fire department, and any other local, state or federal agency whose approval is required.

20. Objectionable or unsightly matter and dumping declared public nuisances.

A. It shall be unlawful and declared a nuisance for any person owning, claiming, occupying, or having supervision or control of any real property, occupied or unoccupied, within the corporate limits of the city or its extraterritorial jurisdiction to permit or allow any refuse, rubbish, trash, debris, filth, carrion, junk, garbage, impure or unwholesome matter of any kind, or other objectionable or unsightly matter of whatever kind to remain upon any such real property, or within any public easement on or across such real property, or upon any adjacent public street or alley right-of-way between the property line of such real property and where the paved surface of the street or alley begins, or that is visible from another's property.

B. It shall be unlawful and declared a nuisance for any person, entity, or an agent or employee for a person or entity to cast, throw, drop, place, sweep, deposit, accumulate, or spill refuse, rubbish, trash, debris, filth, carrion, junk, garbage, impure or unwholesome matter of any kind, or other objectionable or unsightly matter of whatever kind in or upon any street, sidewalk, park, canal, stream, drain, sewer receiving basin, or any other public or private property within the city or its extraterritorial jurisdiction, except as provided in this chapter.

21. False information. It shall be unlawful for a person to provide false information on a document required under this chapter, including all applications, permits, or request for exceptions or discounts.

22. Distribution of handbills and other materials.

A. Applicability. This section shall apply to all persons in the city.

B. Handbills in public places. No person shall throw, post, or deposit any handbill within the city. Nor shall any person hand out or distribute or sell any handbill in any public place in the city. Provided, however, a person on any sidewalk, street or other public place within the city may hand out or distribute, without charge to the receiver thereof, any handbill to person willing to accept it.

C. Placing handbills in or upon vehicles. No person shall throw, post, deposit, hand out or distribute any handbills in or upon any vehicle. Provided, however, a person may hand out or distribute, without charge to the receiver thereof, a noncommercial handbill to any occupant of a vehicle who is willing to accept it.

D. Depositing handbills on properties. No person shall throw or deposit any handbill in or upon any property except by handing such handbill directly to the owner, occupant or other person then present in or upon such property. In

case properties which handbills are prohibited in accordance with this section, such person, unless requested by anyone upon such property not to do so, may place or deposit any such handbill in or upon such inhabited property, if such handbill is so placed or deposited as to secure or prevent such handbill from being blown or drifted about such property or sidewalks, streets or other public places and except that mailboxes may not be so used.

E. Handbills prohibited. No person shall throw, post, deposit, hand out or distribute any handbill upon or to any private property, if requested by any one thereon not to do so, or if there is placed on said property in a conspicuous position near the entrance thereof a sign bearing the words: "No Trespassing," "No Peddlers or Agents," "No Advertisement" or any similar notice, indicating in any manner that the occupants of said property do not desire to have their right of privacy disturbed, or to have any such handbills left upon such property.

23. General authority. The city may initiate a civil and/or criminal action to enforce any of the provisions of this chapter, including legal proceedings to compel compliance.

24. Authority to issue citations. The following city personnel are authorized to enforce the provisions of this chapter and shall have the power to issue notices, warnings, or citations to any persons violating the provisions of this chapter:

1. City manager or his designee;
2. Code enforcement officers;
3. Police officers;
4. Fire marshal or designees;
5. Planning director or designees;
6. Municipal solid waste management division director or his designee;
7. Public works director or his designee;
8. All city personnel duly authorized by statute, to issue citations for class C criminal misdemeanors, may assist the city in enforcement of this chapter; and
9. The aforementioned personnel or any private individual may make accompanying affidavits to support prosecution as part of the city's ongoing efforts to regulate and manage waste for the benefit of the public health, safety, and welfare, in coordination with the office of the city attorney, the municipal courts, the police department, the Texas Commission on Environmental Quality, and any agencies with jurisdictional interests in solid waste regulation and management.

25. The city personnel designated above are authorized to conduct inspections of any property necessary, conduct audits of records and documents required to be utilized and maintained by this chapter, and to investigate instances of non-compliance with this chapter to enforce the provisions of this chapter. If the persons, occupants or owner in possession of any premises refuses to allow the city officials permission to enter the property, at any reasonable time, those officials shall have recourse to every remedy provided by law to secure entry including obtaining the proper judicial warrants.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-10. - Schedule of rates/fees.

1. Service fee for residential properties and multifamily dwellings shall be as follows:

A. City residents within corporate limits.

i. A monthly garbage collection fee (service fee) of thirteen dollars and fifty cents ($13.50) will be charged to individual residences inside the city limits. This service fee will apply to each and every residential unit, regardless of the type of residential structure. In the case of multifamily structures, each residential unit therein will be charged the residential garbage collection fee of thirteen dollars and fifty cents ($13.50). If a customer requires more than one (1) refuse collection cart, an additional cart may be requested for a fee of thirteen dollars and fifty cents ($13.50) per month.

ii. If a person having care, custody and control of a container requests an additional collection out of the regularly scheduled collection for any reason, including failure to place the container out for collection on a regularly scheduled collection, there will be an extra charge of fifteen dollars ($15.00) added to the monthly bill.

iii. At the option of the City Council of the City of Eagle Pass, prior to the beginning of any given fiscal year, each residential premises, as defined above, which is owned and occupied by a person or persons sixty-five (65) years of age or older and or by a disabled veteran, as such person or persons appear on the tax roll of the city for each respective fiscal year, may be given such discount from the monthly collection fee for garbage and rubbish as is specified in such ordinance or resolution. In this event, the Maverick County Appraisal District shall prepare a list of such residential premises which are qualified for said discount at the beginning of such given fiscal year, and shall deliver such list to EPWWS and the department. This discount is intended to assist qualified persons due to their age and/or disability, therefore, such discount shall become null and void at the time said qualified persons cease to own and occupy such residential premises.

iv. Senior citizens and disabled veteran's discount within the city limits. The monthly charge for residential refuse service to any dwelling unit or manufactured home which is owned and occupied, or rented and occupied by an individual sixty-five (65) or more years of age or by a disabled veteran who presents proof of disability in accordance with this section will be discounted as specified in such ordinance or resolution. The discount shall only apply to the first container. No fee discount shall be applied to additional containers. No fee discount shall be granted or remain in effect unless the following conditions are met:

(a) The individual claiming such discount must be sixty-five (65) or more years of age, or must present proof of disability when the discount is requested and must file a notarized application on a form provided by the director with the department.

(b) A written request for such discount may be filed with the director at any time when the applicant reaches eligibility and will take effect at the first billing cycle which starts thirty (30) days thereafter, remaining in effect until eligibility lapses. Such request shall give the street address, dwelling unit number, if any, and the water utilities account number of the property being served, the name and addresses of the owner-occupant or renter-occupant, the day and year of his birth

in the case of a person sixty-five (65) or more years of age, and a substantiating document in the case of a disabled person. The request shall be signed by the person seeking the discount or someone authorized by him and having personal knowledge of the facts.

(c) The person claiming such discount shall place the container as required by this chapter.

v. Proof of age shall consist of one (1) of the following:

(a) Person seeking the discount presents a valid Texas driver's license or State of Texas-issued identification card showing the day and year of birth; document submitted must show the same address as the address for which the collection fee for garbage and refuse exemption is being applied.

(b) Applicant must submit a copy of their vehicle registration receipt with their application and the address must show the same address as the address for which the collection fee for garbage and refuse exemption is being applied. Those who do not own a vehicle will be required to submit a notarized affidavit certifying that that fact and provide a copy of a current bill received from EPWWS or a utility company. The address on the utility bill must be the same as the address on the application for the collection fee for garbage and refuse exemption.

(c) For those seeking the collection fee for garbage and refuse exemption status on a manufactured home, the applicant must also provide documentation as noted below.

•Statement of ownership and location issued by the Texas Department of Housing and Community Affairs;

•A copy of the purchase contract or payment receipt that the applicant is the purchaser of the manufactured home, or:

•A sworn affidavit that:

a. The applicant is the owner of the manufactured home.

b. The seller of the manufactured home did not provide the applicant with a purchase contract, and

c. The applicant could not locate the seller after making a good faith effort.

vi. Proof of disability shall consist of one (1) of the following:

(a) Certification from the social security administration that the applicant is the recipient of a social security or supplemental security income disability pension;

(b) Certification from the proper administrative officer that the applicant is the recipient of a public disability pension and classified one hundred (100) percent disabled; or

(c) Certification from the Veterans Administration that the applicant is the recipient of the Veterans Administration disability payments and classified one hundred (100) percent disabled.

(d) The individual claiming a discount must be the same individual who pays or is billed by the water utilities for water service to the residence to which such discount applies.

(e) When a person to whom a discount is granted ceases to occupy the applicable residence, the discount shall be withdrawn as of the month immediately following such cessation of occupancy.

(f) Approved discounts are not transferable to another person or address.

(g) No person shall be entitled to a discount for more than one (1) residence at the same time, nor shall any person be entitled to claim both sixty-five (65) years and over discount and a disabled discount at the same time.

(h) In all cases, the director shall have the right to investigate the information given on requests for discount, and to make reasonable requirements for supporting evidence.

(i) The discount provided in this section shall not apply to charges for special collections, collection of solid waste from institutional or commercial establishments, or from any location of any type utilizing roll-off, waste wheelers or containers holding more than ninety-six (96) gallons.

(j) Any change which results in loss of eligibility for reduced charges for a residence shall be reported to the director within thirty (30) days, and full charges will be restored during the next billing cycle.

(k) Eligibility for the senior and disabled citizens' discount shall lapse on the death of the applicant, or recovery from the claimed disability.

(l) The director shall have the authority to investigate and verify, from time to time, either by personal contact by a department official or by mail out verification, that applicants continue to be eligible for this discount.

B. County residents (outside corporate city limits). This section applies if there is an interlocal agreement with the county to provide collection service. Alternatively, county residents and the city may agree to the terms provide collection service.

i. A monthly garbage collection fee (service fee) of sixteen dollars and fifty cents ($16.50) per month shall be charged to individual residences outside city limits but within the County of Maverick. This service fee will apply to each and every residential unit, regardless of the type of residential structure. If a customer requires more than one (1) refuse collection cart, an additional cart may be requested for a fee of sixteen dollars and fifty cents ($16.50) per month. In the case of multifamily structures, each residential unit therein will be charged the residential garbage collection fee of sixteen dollars and fifty cents ($16.50) per month.

Single family residences on premises not abutting public roadways, and to which access is possible only across private property, and premises abutting public roadways but on which the dwelling is so remote from such roadway as to make city collection of garbage impracticable, may be exempted from such collection service and charges. For such exemption to be granted, written application must be submitted to and approved by the solid director or his representative in writing.

ii. If a person having care, custody and control of a container requests an additional collection out of the regularly scheduled collection for any reason, including failure to place the container out for collection on a regularly scheduled collection, there will be an extra charge of twenty-five dollars ($25.00) which will be added to the monthly bill.

iii. Senior citizens and disabled veteran's discount within the county. The monthly charge for residential refuse service to any dwelling unit or manufactured home which is owned and occupied, or rented and occupied by a an individual sixty-five (65) or more years of age or by a veteran shall be fourteen dollars and fifty cents ($14.50) per month No fee discount shall be applied to additional

containers. No fee discount shall be granted or remain in effect unless the following conditions are met:

(a) The individual claiming such discount must be sixty-five (65) or more years of age, or must present proof of disability when the discount is requested and must file a notarized application on a form provided by the director with the department.

(b) A written request for such discount may be filed with the director at any time when the applicant reaches eligibility and will take effect at the first billing cycle which starts thirty (30) days thereafter, remaining in effect until eligibility lapses. Such request shall give the street address, dwelling unit number, if any, and the water utilities account number of the property being served, the name and addresses of the owner-occupant or renter-occupant, the day and year of his birth, and a substantiating document in the case of a disabled person. The request shall be signed by the individual seeking the discount or someone authorized by him and having personal knowledge of the facts.

iv. Proof of age shall consist of one (1) of the following:

(a) Person seeking the discount presents a valid Texas driver's license or State of Texas-issued identification card showing the day and year of birth; document submitted must show the same address as the address for which the collection fee for garbage and refuse exemption is being applied.

(b) Applicant must submit a copy of their vehicle registration receipt with their application and the address must show the same address as the address for which the collection fee for garbage and refuse exemption is being applied. Those who do not own a vehicle will be required to submit a notarized affidavit certifying that that fact and provide a copy of a current bill received from a EPWWS or a utility company. The address on the utility bill must be the same as the address on the application for the collection fee for garbage and refuse exemption.

(c) For those seeking the collection fee for garbage and refuse exemption status on a manufactured home, the applicant must also provide documentation as noted below.

- Statement of ownership and location issued by the Texas Department of Housing and Community Affairs;
- A copy of the purchase contract or payment receipt that the applicant is the purchaser of the manufactured home, or:
- A sworn affidavit that:

a. The applicant is the owner of the manufactured home.

b. The seller of the manufactured home did not provide the applicant with a purchase contract, and

c. The applicant could not locate the seller after making a good faith effort.

v. Proof of disability shall consist of one (1) of the following:

(a) Certification from the social security administration that the applicant is the recipient of a social security or supplemental security income disability pension;

(b) Certification from the proper administrative officer that the applicant is the recipient of a public disability pension and classified one hundred (100) percent disabled; or

(c) Certification from the Veterans Administration that the applicant is the recipient of the Veterans Administration disability payments and classified one hundred (100) percent disabled.

vi. The individual claiming a discount must be the same individual who pays or is billed by the water utilities for water service to the residence to which such discount applies.

vii. When an individual to whom a discount is granted ceases to occupy the applicable residence, the discount shall be withdrawn as of the month immediately following such cessation of occupancy.

viii. Approved discounts are not transferable to another individual or address.

ix. No individual shall be entitled to a discount for more than one (1) residence at the same time, nor shall any individual be entitled to claim both sixty-five (65) years and over discount and a disabled discount at the same time.

x. In all cases, the director shall have the right to investigate the information given on requests for discount, and to make reasonable requirements for supporting evidence.

xi. The discount provided in this section shall not apply to charges for special collections, collection of solid waste from institutional or commercial establishments, or from any location of any type utilizing roll-off, waste wheelers or containers holding more than ninety-six (96) gallons.

xii. Any change which results in loss of eligibility for reduced charges for a residence will be reported to the director within thirty (30) days, and full charges will be restored during the next billing cycle.

xiii. The director shall have the authority to investigate and verify, from time to time, either by personal contact by a department official or by mail out verification, that applicants continue to be eligible for this discount.

3. Special service fee.

A. For special events requiring garbage pickup outside of the normal working criteria, there will be a fee of ninety dollars ($90.00) per hour based on actual time worked. This fee excludes all city-sponsored events. This will include all non-profit organizations.

B. When a request is made to search the contents of a city refuse truck for personal items, the requestor shall be charged ninety dollars ($90.00) per hour and said fee will not be prorated, but instead rounded up to the nearest hour. Searching for personal items is prohibited if the contents have been deposited in the working face of the landfill.

C. Hauler permit: One hundred fifty dollars ($150.00) per year paid at time of application.

D. Additional vehicle registration fee: Twenty-five dollars ($25.00) per vehicle per year and paid at time of application.

E. Container location on sidewalk or on public right-of-way: Annual fee of fifty dollars ($50.00) per container. Must first receive written approval from director and subject to city council approval.

F. Special waste disposal fee: Actual cost plus twenty-five (25) percent administrative fee.

4. Type IV landfill regulations and fees. All household and commercial, rubbish, refuse, trash, yard waste, construction demolition debris, and non-

putrescible waste which may be disposed of at a type IV landfill site by any person shall not be improperly disposed of at any place within the city limits thereof except at such sites as may be designated by the director. Persons desiring to dispose of such solid waste at the type IV landfill shall pay the following fees for each vehicle load entering the landfill:

A. Noncommercial vehicles.

i. Cars, pickups and trailers used by city residents to transport type IV landfill waste or construction demolition waste from the resident's home shall be not be charged a fee. upon showing a valid Texas driver's license or identification and a current utility bill showing the same city residence address.

ii. Cars, pickups and trailers used by non-city residents or residents who cannot show proof of residency as required by this section, transporting type IV landfill waste or construction demolition waste from the resident's home:

Per ton $24.00

Per cubic yard $8.00

B. *Commercial vehicles.*

i. Commercial vehicles including pickups, trailers, and compacted vehicles used by private businesses and commercial haulers transporting type IV waste generated from within Maverick County:

Per ton $24.00

Per cubic yard $8.00

ii. Commercial vehicles including pickups, trailers, and compacted vehicles used by private businesses and commercial haulers transporting type IV landfill waste generated from outside Maverick County:

Per ton $50.00

Per cubic yard $16.67

iii. Commercial vehicles including pickups, trailers, and compacted vehicles used by private businesses and commercial haulers transporting merchandise required to be destroyed as required by the Texas Commission on Environmental Quality:

Per ton $50.00

Per cubic yard $16.67

iv. Commercial vehicles transporting type IV landfill waste for a residential customer, when accompanied by the residential customer. The residential customer must be the driver or a passenger in the commercial vehicle or arrive in a separate vehicle at the landfill with the residential customer's waste and must show proof of residency within the city, as required by this section.

Up to and including one (1) ton or three (3) cubic yards, flat fee $2.00

Subsequent weight over one (1) ton or over three (3) cubic yards:

Per ton $24.00

Per cubic yard $8.00

v. County of Maverick. The County of Maverick shall pay the city for use of the type IV landfill, pursuant to settlement agreement between the City of Eagle Pass and the County of Maverick dated April 14, 2008, or any subsequent adopted agreement or amendment.

vi. City vehicles except sanitation department must pay a fee of $1.25/ton or $0.42/cubic yard or the current state solid waste fee.

5. Tires delivered to the Eagle Pass Recycling Center.

A. Passenger tires (up to nineteen-and-one-half-inch rim diameter), per tire $2.00

B. Truck tires (nineteen-and-six-tenths to twenty-four-and-one-half-inch rim diameter), per tire $10.00

C. Special size tires (greater than twenty-four-and-one-half-inch rim diameter), per ton $100.00

6. Payments at city landfill are required at time of disposal.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-11. - Billing and collection.

EPWWS is hereby authorized to serve as the entity to collect the monthly garbage and refuse service collection fees provided for herein. Such services will be billed monthly with the water and sewer service charge of EPWWS. In instances where several residential or commercial premises, or a combination thereof, exist within one (1) structure or within one (1) property, each premise shall be billed at the appropriate individual rate.

Each residential and commercial property (including for-profit, non-profit, institutional and governmental organizations) which receives water service from EPWWS shall be charged the applicable rate for garbage services to such premises. However, if a premise does not receive monthly collection service, the director may exempt the following persons from the monthly garbage collection fee: (1) property owners that only have a sprinkler system or a livestock meter on their lot or parcel; (2) property owners of vacant and unoccupied land; and (3) property owners that are migrant farm workers (a migrant farm worker is a person who is engaged in farm or agricultural work away from his property for a period of ninety (90) consecutive days) while they are engaged in farm or agricultural work away from their permanent residences. To qualify and receive an exemption: (1) a property owner must not receive monthly collection service during the period of exemption; (2) a property owner must make a written request for an exemption on the city's forms, a sample of which is attached as an exhibit to this chapter; and (3) the director must confirm that basis for the exemption and approve the exemption in writing on the city's forms, a sample of which is attached as an exhibit to this chapter.

Failure to pay for anyone of the above services within the prescribed period of time shall be subject to discontinuation of all such services to the delinquent commercial or residential property as the case may be. No rate adjustment will be made for temporary nonuse of service unless the water meter is disconnected and the waste container picked up by the city.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-12. - Exclusive franchise.

The city is the exclusive collector of solid waste within the city but reserves the right to enter into an exclusive franchise agreement for the collection of solid waste, construction and demolition waste and/or recyclable materials within the city.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-13. - Exclusive hauler.

The city reserves the right to become the sole collection, processing, hauler and/or disposal provider for any or all solid waste and recyclable materials generated within the city.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-14. - Franchise required for collector other than the city.

No person or entity, except a duly authorized agent or employee of the city, shall collect municipal, recyclables or industrial solid waste of any other person or entity, or convey or transport same on the streets, alleys, and public thoroughfares of the city, or dispose of same for a fee unless and until such person or entity has first obtained a franchise from the city to collect, transport and/or dispose of same. The City of Eagle Pass reserves the right to deny any and all requests for a franchise that may affect the solid waste collections.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-15. - Certificate of occupancy.

A certificate of occupancy shall not be issued for any premises within the city limits unless the applicant has demonstrated that the premises provides an individual water meter and individual solid waste disposal services for each residential or commercial unit on said premises.

(Ord. No. 2012-06, § 1, 3-6-2012)

Sec. 14-16. - Severability.

In the event that any one (1) or more of the provisions, clauses or words of this chapter or the application thereof to any situation or circumstance shall for a reason be held to be invalid or unconstitutional, such invalidity or unconstitutionality shall not affect any other provisions, clauses or this chapter of the application thereof to any other situations or circumstances and it is intended this chapter shall be severable and that it shall be construed and applied as if such invalidity or unconstitutional clause, section, provision or word had not been included herein.

(Ord. No. 2012-06, § 1, 3-6-2012)

2.3.4 City of Laredo

2.3.4.1 ARTICLE IV. - Tire Business Registration Program

Sec. 15-59. - Definitions.

As used in this article, the following words shall have the meaning herein ascribed to them:

“Health director” shall mean the person designated as being director of the health department of the City of Laredo or authorized representative(s) who are empowered to enforce the provisions of this article.

“Mobile tire repair road service unit” shall mean and include any motorized vehicle occupied, used or maintained for the purpose of providing tire repair road services that includes selling, offering or exposing for sale, keeping

with the intention to sell, generating, transporting, repairing, processing, storing, utilizing, and disposing of any and all types of tires.

"Scrap tire" shall mean a whole tire that can no longer be used for its original intended purpose. A whole used tire that can be used for its original intended purpose is not a scrap tire.

"Tire business" shall mean and include any place or establishment occupied, used or maintained for the purpose of offering or exposing for sale (for either retail or wholesale), keeping with the intention to sell, generating, transporting, repairing, processing, storing, utilizing, and disposing of any and all types of tires.

"Tire business" operator(s) shall mean the individual(s) having supervisory or management responsibilities, as well as any other person working in a tire shop or a mobile tire repair road service units who may be the person in charge at any given time.

"Tire recycling facility" shall mean a state registered facility that processes, conducts energy recovery or recycles scrap tires.

"Tires" shall mean all motorcycle, automobile, truck, trailer, tractor or other vehicle tires.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-60. - Tire business registration program.

The city, by and through the health director, will institute a tire business registration program including mobile tire repair road service units located within the city limits. The health department will establish and conduct regular inspections and annual registration of all tire businesses and mobile tire repair road service units located within the city limits. The tire business registration program shall be consistent with requirements established in Chapter 15, Health and Sanitation, Article V, Dengue Fever Prevention, and all applicable city ordinances.

The police department is hereby authorized to stop and investigate all persons subject to the regulation requirements of this article in order to verify compliance with this article.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-61. - Tire business and mobile tire repair road service units application.

Every person, firm, or corporation desiring to establish, maintain or operate a tire business or a mobile tire repair road service unit in the City of Laredo shall make written application for registration thereof. The application shall be made on a form obtained from the City of Laredo Health Department. The following must be provided to the health director:

(1) The name, mailing address, county, telephone and facsimile numbers of the applicant; and

(2) The name, mailing address, county, and telephone number of the property owner where the tire business is located; and

(3) The physical address where the tire business is located; and

(4) The approximate number of tires that will be stored on site; and

(5) The existing zoning of the site and certified compliance with zoning laws by the City of Laredo zoning enforcement supervisor or designated representative; and

(6) Compliance with building codes and all applicable health and safety ordinances; and

(7) The tax identification number or tax payer identification number; and

(8) Mobile tire repair road service units shall provide and demonstrate proof of vehicle license, current vehicle inspection sticker, current liability insurance and driver's license; and

(9) The required annual registration fee.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-62. - Terms of registration.

The health director or his authorized representative shall issue a permit to a tire business and/or mobile tire shop road repair unit to any person who submits the required and completed application, pays to the city the fee as required in this article, and demonstrates compliance with this article and Chapter 15, Health and Sanitation, Article V, Dengue Fever Prevention, and all applicable city ordinances. Every person registered in accordance with the provisions of this article shall immediately post such registration(s) and inspection report(s) or cause same to be posted in a conspicuous place within the premises where such tire shop and or mobile tire business road repair unit is thereby authorized to be established, maintained or operated.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-63. - Denial of permit or renewal; suspension or revocation of permit.

The health director may refuse to issue or renew a tire business and/or a mobile tire repair road service units permit(s) or may suspend or revoke such permit(s) if:

(1) The applicant or permit holder refuses to permit entry into the tire business by the health director or his authorized representative or otherwise willfully obstructs the inspection of the tire business and or mobile tire repair road service unit; or

(2) There are repeated or a serious violation(s) of any city ordinance by the tire business and or mobile tire repair road service units; or

(3) The tire business and or mobile tire repair road service units fails to comply with any provisions of the Article, or Chapter 15, Health and Sanitation, Article V, Dengue Fever Prevention and or any applicable city ordinance.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-64. - Fees.

(a) All tire business and/or mobile tire repair road service units registration fees are due annually by June 1 of each calendar year at the City of Laredo Health Department; the annual registration fee shall be determined by the number of persons employed in connection with such tire business and/or mobile tire repair road service unit, including the applicant for such registration, and shall be paid in advance of the issuance of such registration as follows:

(1) One (1) to five (5) persons .....$ 35.00
(2) Six (6) to ten (10) persons 70.00
(3) Eleven (11) or more persons 140.00
(4) Mobile tire repair road service unit, per mobile unit 100.00

(b) A current valid tire business registration or a mobile tire repair road service unit registration may be replaced by the health director or his authorized representative(s) for a fee of ten dollars ($10.00).

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-65. - Disposal of tires.

Tires shall be disposed of in the following manner:

(1) Individuals, tire businesses and mobile tire repair road service units may dispose of tires at the city landfill at a fee established by city ordinance, provided that the city landfill accepts the tires

and/or signs a transmittal manifest. All landfill fees will be payable to the City of Laredo upon entrance to the city landfill; or

(2) Tires may be disposed of by delivery and manifesting of tires through a registered tire transporter to a registered tire recycling facility or a tire disposal facility regulated and licensed by the state for the disposal and/or processing of tires, provided said transporter signs transmittal manifest and authorized disposal facility accepts the tires and signs the transmittal manifest.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-66. - Penalty for violation.

Any person who violates a provision of this article and/or Chapter 15, Health and Sanitation, Article V, Dengue Fever Prevention, or any applicable city ordinance, shall upon conviction by the municipal court of the city be subject to a minimum fine of five hundred dollars ($500.00) or a fine not to exceed two thousand dollars ($2,000.00) for each offense, and each day of violation of said article shall constitute a separate offense.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-67. - Injunctive relief.

In addition to and cumulative of all other penalties, the health director shall have the right to seek injunctive relief for any violation(s) of this article.

(Ord. No. 2000-O-021, § 1, 1-24-00)

Sec. 15-68. - Severability.

If any provision, section, sentence, clause or phrase of this article or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void or invalid (or for any reason unenforceable), the validity of the remaining portion of this article, or its application to other persons or sets of circumstances, shall not be affected thereby, and it being the intent of the City Council of the City of Laredo in adopting and approving this article, that no portion hereof or provisions or regulations contained herein, shall become inoperative or fail by reason of any unconstitutionality or invalidity of any other portion of this ordinance.

(Ord. No. 2000-O-021, § 1, 1-24-01)

2.3.4.2 ARTICLE V. - Dengue Fever Prevention [45]

Sec. 15-75. - Definitions.

(a) Short title. This article shall be known as "The Dengue Fever Prevention Ordinance of the City of Laredo."

(b) Premises. The term "premises" as used in this article shall mean business houses, boardinghouses, offices, theaters, hotels, restaurants, cafes, tourist camps, apartment houses, schools, private residences and the ground or grounds pertaining to the same, vacant lots and any other places within the city where tires and other containers, whether one (1) or more, are stored or left lying around or allowed to accumulate.

(c) Tires. The term "tires" shall mean all motorcycle, automobile, truck, trailer, tractor or other vehicle tires, whether one (1) or more, stored or left lying around or allowed to accumulate.

(d) Container. The term "container" shall mean tin cans, bottles (whole or broken), tin boxes, tanks, barrels, troughs, tubs, buckets, defective flush toilet tanks and all such similar containers where water collects and remains stagnant.

(Ord. of 4-21-81, art. I)

Sec. 15-76. - Accumulation of tires and other containers; inspection of premises.

(a) Sufficient storage required. It shall be the duty of every person owning, managing, operating, leasing or renting any premises where new, used or old tires and other containers whether one (1) or more, are stored or allowed to accumulate or allowed to lie around to provide and maintain in good order at all times on any such premises an enclosed structure of sufficient capacity to accommodate within and to keep away from rain, irrigation or any other source of water, any tire or tires and other containers located on such premises. Such enclosed structure or structures shall be kept clean and free from the accumulation of any material or substance which may or might attract flies, rodents or other insects or pests.

(b) Inspections, investigations authorized. It shall be the duty of the city health officer and his authorized agent or representative, police officers, ordinance enforcement officers and anyone designated by the mayor, and they are hereby directed, to make any and all necessary inspections and investigations of any and all premises to see that the terms of this article are complied with.

(c) Enforcement of penal provisions. The penal provision of this article shall be enforced by the city health officer or his authorized agent or representative, and by all police officers of the city and by the ordinance enforcement officers of the city.

(Ord. of 4-21-81, art. II)

Sec. 15-77. - Penalty.

Any person violating any provision of this article or failing to comply with any requirement of this article will be guilty of a misdemeanor and subject to a fine of not to exceed two hundred dollars ($200.00) upon conviction. Each day during or upon which such person shall violate or continue violation of any provision of this article or noncompliance with any requirement of this article shall constitute a

distinct and separate offense. The violation of any provision of this article or the failure to comply with any requirement of this article shall each constitute a distinct and separate offense.

(Ord. of 4-21-81, art. III, § 1)

2.3.5 City of McAllen

2.3.5.1 CHAPTER 90 - Solid Waste

ARTICLE I. - In General

Sec. 90-1. - Definitions.

The following words and phrases, when used in this chapter, shall have the meanings ascribed to them in this section as follows; provided, that, to the extent that such definitions do not conflict with the defined or intended definitions in this chapter, the defined terms as provided for in the city zoning ordinance shall be used for the purposes of this chapter:

"Approved container" means any dumpster or roll-off container being provided by the city or a permittee. Open-top roll-offs shall not be a substitute for bins or dumpsters unless approved by public works director or designee.

"Citizens' collection station" means a facility established by the city for the convenience and exclusive use of city residents, but not commercial or industrial users or customers of private collection vehicles, and which may consist of one or more approved containers.

"Composting" means a controlled process of degrading organic matter by microorganisms.

Cubic yard means a unit of garbage or trash having a measurement of one yard (three linear feet) in width, one yard (three linear feet) in depth, and occupying one cubic yard of space, regardless of density or degree of compaction of such garbage or trash in place.

"Customer" means any owner, occupant, tenant, itinerant vender licensee, or person otherwise in possession or control of any premises in the city, or their agents, on which any material regulated by this chapter, including garbage, trash, brush, and recyclables exist or are accumulated or from which such is removed or required to be removed pursuant to the terms of this chapter.

"Disposal fee" means the price charged for the disposal of waste at a landfill, incinerator or recycling facility; usually expressed in dollars per ton.

"Dumpster" means a commercial type container provided by the city for the deposit of garbage, trash, and/or recyclables.

"Dumpster removal" means the removal from the premises of the dumpster.

Garbage or trash means, interchangeably, anything discarded; any accumulation of waste that results from the use, preparation, processing, consumption, handling, packing, canning, storage, transportation, decay or decomposition of animal, vegetable, or other matter, or any refuse or rubbish, but does not include "recyclables," "bulky waste," "hazardous waste," "household hazardous waste," "construction debris," dead animals, stable matter or "brush."

"Hazardous waste" means any waste or combination of waste of a solid, liquid, contained gaseous, or semisolid form, which is identified by the

Environmental Protection Agency (EPA) or any state agency as hazardous, and which exceed the threshold limits set forth by any such regulatory agency, or which because of its quantity, concentration or physical, chemical or infectious characteristics, may (i) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or (ii) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Such waste include, but are not limited to, those which are toxic, corrosive, flammable, irritants, strong sensitizes, or which generate pressure through decomposition, heat or other means ; or any chemical, compound, mixture, substance or article which is designated by the EPA or the Texas Commission on Environmental Quality (TCEQ) as "hazardous."

"Household hazardous waste" means discarded products normally used at residences that are discarded in municipal solid waste and that contain substances already regulated under the Resource Conservation and Recovery Act of 1976 as an industrial hazardous waste.

"Land clearing" means the removal of trees, vegetation, soil or debris typically in the preparation of a tract of land for construction of structures or infrastructure.

"Service" means the picking up and removal of garbage or trash and recyclables, regardless of density of compaction in place.

"Unit" means each individual customer responsible for the payment of any fees or charges for any service rendered under this chapter.

"Waste" means any substance or object whose producer or the person in possession of which discards, or intends to or is required to discard.

(Code 1966, § 16-1; Ord. No. 1996-57, § I, 8-26-96; Ord. No. 1997-96, § I, 10-13-97; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-2. - Purpose of chapter.

The purpose of this chapter is to provide and establish a method or system of collecting and disposing of garbage or trash, recyclables, brush, and all waste originating in the city, to provide and establish reasonable rules and regulations pertaining thereto, and to establish reasonable, fair, uniform and equitable charges for the services of the city in collecting and removing garbage or trash, recyclables and brush all in order to protect the health and welfare of the citizens of the city and the general public.

(Code 1966; Ord. No. 1996-57, § II, 8-26-96; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-3. - Penalty for violation of chapter.

Any person violating or found not complying with the provisions of this chapter shall be fined as provided in section 1-14.

(Code 1966, § 16-13; Ord. No. 2008-41, § I, 5-27-08; Ord. No. 2008-41, § I, 5-27-08)

ARTICLE II. - Collection

DIVISION 1. – Generally

Sec. 90-26. - Duty of city to collect and remove.

(a) Residential collection and removal of recyclables, garbage or trash shall be made two times each week, once for garbage or trash, once for recyclables, to be scheduled as determined by the public works director.

(b) Garbage or trash in dumpsters shall be collected according to a schedule or on an as-needed basis as determined by the public works director. In no event shall collection be scheduled less than twice per week. Provided, however, a commercial account may utilize a trash compactor upon the approval of the public works director, in which case the approval shall also specify the required weekly pickups which in any case shall not be less than one.

(Code 1966, § 16-8; Ord. No. 1994-37, § I, 6-13-94; Ord. No. 1996-57, § III, 8-26-96; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-27. - Certain persons to provide own facilities for removal of trees, etc.

It shall be the responsibility of all tree surgery operators, commercial tree pruning and/or nursery persons or public utilities to provide their own equipment and personnel for removal and disposal of all accumulations created by their work and actions to an approved composting facility. Further, it shall be the responsibility of the premises owner to remove and dispose to an approved disposal composting facility all trees, limbs, trunks and stumps, and similar accumulations where it is not possible to reduce same to an acceptable size and length for city or permittee pick up as required by this chapter.

(Code 1966, § 16-9; Ord. No. 1996-57, § IV, 8-26-96; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-28. - Removal of brush, soil, and trash resulting from land clearing or yard levelling operations.

Brush, soil, and trash resulting from land clearing, yard leveling or similar operations shall be removed by the party responsible for such operations, and at his own expense.

(Code 1966, § 16-10; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-29. - Removal of waste, debris, and materials after construction or general cleanup operations**.**

No debris or other materials, including, rocks, bricks, waste building materials, scraps, and no trash resulting from construction, remodeling, repair or demolition operations or resulting from general cleanup of property, and no bulky waste will be removed by the city.

Such materials shall be promptly deposited in a roll-off container by the customer and properly disposed of, unless public works director or designee determines that the use of a roll-off container is not necessary. Bulky waste shall be promptly collected and disposed of by customer at an approved landfill or recycling facility.

(Code 1966, § 16-11; Ord. No. 1996-57, § V, 8-26-96; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-30. - Removal of automobile bodies, bulky waste, industrial waste, etc.

Discarded automobile bodies or parts thereof, all bulky waste, and all industrial waste resulting from manufacturing operations, canning plants, packing plants, fruit and/or vegetable sheds, cotton gins, slaughterhouses for animals or poultry, or fish houses must be properly disposed of by the customer. Disposal of the items referred to in this section shall be conducted under, and in compliance with, all applicable state and federal regulations relating to disposal of such items, and all applicable city ordinances, including those regulating the use of city or state rights-of-way, and motor vehicle regulations.

(Code 1966, § 16-12; Ord. No. 2008-41, § I, 5-27-08)

DIVISION 2. – Containers

Sec. 90-41. - Containers required ; proper use of same.

(a) It shall be the duty of every residential customer to use and maintain in good order and repair, any bin or container provided by the city for the deposit of waste for collection by the city or for other proper disposal as provided in this chapter.

(b) In business, commercial, industrial, or multi-family premises, dumpsters are required and provided by the city and, unless otherwise authorized by the public works director or designee, it shall be unlawful to use any other container for garbage or trash or recyclable disposal. Where a customer deems it necessary to use a roll-off container in the management of garbage, trash or recyclables, said service shall be provided exclusively by the city. It shall be the duty of all persons using dumpsters to place waste therein compactly. All boxes and cartons must be broken down. All boxes and cartons shall be placed in a recycling dumpster, if available. The space in such dumpsters must be efficiently used. All doors must be closed and properly latched after any waste is placed therein. Such dumpsters shall be used exclusively for garbage, trash, or recyclables, as applicable. All garbage, including wet slop shall be placed in plastic bags designed specifically for garbage disposal, a minimum five mil. in thickness. The plastic bags shall be of sufficient strength to resist tearing under normal handling and shall be tied or fastened when placed for collection.

(c) No person utilizing any bin as specified in subsection (a) or dumpster as specified in subsection (b) shall place any waste in any of such containers, unless it may be placed therein without spillage or overflow from such containers, nor shall any waste be placed along the side of, or otherwise on the top of, any such container when such container is properly closed. In any commercial establishment or multi-family units being served by a dumpster, the customer shall also be responsible for complying with the provisions of this subsection.

(d) No person utilizing a recycling container shall place materials therein other than those recyclable materials listed in the following table.

Recyclable Materials

PAPER

Newspaper	Catalogs
Magazines	Cardboard Materials
Cardboard Cereal Boxes	Office Paper

PLASTICS (Coded 1 & 2)

Soda Bottles	Milk & Water Jugs
Detergent/Cleaning Bottles	Plastic Bottles & Jugs
CANS	
Aluminum & Tin	Aerosol Cans
Food and Beverage Cans	

This table may be periodically amended by the public works director or designee, and a current table shall be on file in the office of the public works director.

(e) No person shall transport waste to another location except for purposes of:

(1) Approved recycling,

(2) Sale, or

(3) Other permitted disposal.

(f) Only a duly authorize agent or employee of the city may remove or relocate a dumpster or roll-off container from its city-approved location.

(Code 1966, § 16-4; Ord. No. 1996-57, § VI, 8-26-96; Ord. No. 1997-96, § II, 10-13-97; Ord. No. 2008-41, § I, 5-27-08)

ARTICLE III. - Charges and Billing

DIVISION 1. – Generally

Sec. 90-66. - Levy and assessment**.**

(a) The charges fixed in this article for the collection, removal and disposal of brush, garbage or trash, and recyclables by the city shall be levied and assessed by the city against each customer. Since the prompt and proper removal of all brush, garbage or trash, and recyclables is essential to the preservation of the health, safety and general welfare of the citizens and people of the city, and protection against fire hazards, it is deemed necessary that such charges be assessed, levied and collected as provided for in this article.

(b) Each customer shall enter into a sanitation solid waste collection agreement with the city or a city-approved agent as described in section 90-121. Each unit shall be charged separately and billed to the person responsible for the sanitation billing.

(c) An exemption from payment of trash or garbage charges established by this chapter may be granted by the public works director only to the extent that no other city collection services are provided.

(Code 1966, § 16-23; Ord. No. 1996-57, § IX, 8-26-96; Ord. No. 2007-26, § 1, 3-26-07; Ord. No. 2008-41, § I, 5-27-08)

DIVISION 2. – Rates

Sec. 90-75. - Citizen collection station.

The public works director shall make available a disposal drop-off site only for residential customers to dispose of waste. The fee for this service, available to McAllen residents, shall be $21.82 per ton. Brush will be accepted at the city compost facility and recycling center from commercial or for-profit establishments that primarily engage in providing landscape care and

maintenance services and/or install or remove trees, shrubs, plants, lawns or gardens. A disposal fee of $1.00 per cubic yard and $2.00 per cubic yard will be assessed for this service at the compost facility and recycling center, respectively.

(Ord. No. 2008-41 § 1, 5-17-2008; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-80. - Rates for, commercial and other properties not described in sections 90-75 through 90-79.

(a) Rate for commercial trash compactor service.

For new businesses or for businesses changing operations using an approved commercial trash compactor, the monthly rate shall be based on a calculation as follows:

Size (cubic yards)	Frequency of collections per week					
	1	2	3	4	5	6
6	349.52	699.05	1,048.57	1,398.10	1,747.62	2,097.14

Commercial trash compactors larger than 6 cubic yards shall be serviced with a roll-off truck; those serviced by the city shall be assessed the hauling and landfill disposal fees as per section 90-84.

(b) The rate or charge for dumpsters. For all business, commercial or other non-residential establishments or uses where a dumpster is used, the monthly basic rate or charge for garbage or trash removed shall be as follows:

	Monthly Dumpster Collection Rate				
	Frequency of Collections Per Week				
Dumpster Size (Cubic Yard)	2	3	4	5	6
2	73.37	110.72	$146.75	$175.60	$200.11
4	140.07	209.44	276.14	297.49	378.86
6	174.76	261.47	348.18	434.89	520.28
8	232.12	348.18	464.24	580.30	696.36

Charge for Miscellaneous Services			
Container Size (Cubic Yard)	Extra Service Per Container	Wash and Deodorize Per Container	Lid Lock Fee Per Dumpster
2	$14.00	$52.03	$33.08
4	25.20	52.03	33.08
6	33.60	52.03	33.08
8	42.00	58.70	33.08
6 cyd compactor	139.93	78.75	N/A
20 cyd compactor	See, Hauling + Disposal Fees in Sec. 90-84	147.00	N/A
30 cyd compactor	See, Hauling + Disposal Fees in Sec. 90-84	220.50	N/A
40 cyd compactor	See, Hauling + Disposal Fees in Sec. 90-84	294.00	N/A

(1) Temporary bin charge—At customer's request an eight-yard bin may be temporarily placed for a daily fee of $52.50.

(2) When more than one customer shares any container, unless otherwise agreed to in writing by each affected customer, each customer shall be charged an equal pro rata share of the total charge. Where the waste volume generated is not reasonably expected to exceed the volume capacity of the dumpster, a maximum of four customers may share a single container, unless otherwise determined by the public works director or designee.

Unless otherwise approved by the public works director, restaurants and other food establishments shall not be allowed to share a dumpster.

(3) In properties where the use of a dumpster is required and the placement of said dumpster is not feasible, as determined by the public works director or designee, sanitation service can be provided through the use of bins. The minimum monthly collection rate shall be $36.69 for two bins.

(c) Rate for non-scheduled collection. In those places where no approved container is located and a non-scheduled pick up is requested by the customer for waste, including uncontained brush or garbage or trash, there is hereby established for removing such brush and garbage or trash a flat rate of $4.78 per minute for the time that is required to remove such brush and for the use of the necessary and required equipment for such removal. In determining such charge, the city has taken into consideration labor costs, including fringe benefits, cost of trucks or other equipment, cost of fuel, insurance, depreciation, distance traveled, bookkeeping and time records, and other similar related costs.

(d) In addition to the monthly charge and other charges as provided for in this section, there shall be charged to the individual accounts provided for in this section the amount of $3.40 for every two cubic yard solid waste collection volume available for the premises, for the purpose of funding the operation of the city's recycling program, as mandated by state law. Such charge shall be reviewed by the board of commissioners, from time to time, considering the cost of the city's mandatory recycling program and the revenues it generates.

(Code 1966, § 16-46; Ord. No. 1994-37, § II, 6-13-94; Ord. No. 1996-57, § XV, 8-26-96; Ord. No. 1997-96, § VII, 10-13-97; Ord. No. 1998-91, § 4, 9-28-98; Ord. No. 1999-86, § 1, 10-11-99; Ord. No. 2006-103, § 8, 10-9-06; Ord. No. 2008-41, § I, 5-27-08; Ord. No. 2009-05, § I, 2-2-09; Ord. No. 2012-14, § I, 2-27-12)

Sec. 90-83. - Property where no garbage or trash collects.

On those commercial, industrial or multi-family properties where no garbage or trash collects in connection with its operation and /or maintenance, or where no service is required or necessary, there shall be a minimum service charge of $11.32 per month which shall be considered as the fair and reasonable cost to the city to keep its records on such properties, and to make necessary inspections thereof to see if the service is required or necessary, and as payment of the cost of such record keeping, inspection, and personnel costs.

(Code 1966, § 16-49; Ord. No. 1996-57, § XVII, 8-26-96; Ord. No. 1997-96, § VIII, 10-13-97; Ord. No. 1998-91, § 5, 9-28-98; Ord. No. 2006-103, § 8, 10-9-06; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-84. - Rates for commercial trash, roll-off pick ups, and disposal service.

On all commercial business, construction projects, and other properties where a roll-off system is required, or a compactor is serviced, the basic rates and fees charged shall be as follows:

Roll-off/compactor size	Monthly/Weekly Rental for Roll-Off	Hauling per load	Disposal Fee	
20 cubic yard	$97.02/mn	$36.38/wk	$144.38	$17.64/ton
30 cubic yard	$97.02/mn	$36.38/wk	$151.60	$17.64/ton
40 cubic yard	$109.15/mn	$36.38/wk	$165.17	$17.64/ton

(Ord. No. 1996-57, § XIX, 8-26-96; Ord. No. 1997-96, § IX, 10-13-97; Ord. No. 1998-91, § 6, 9-28-98; Ord. No. 2006-103, § 8, 10-9-06; Ord. No. 2008-41, § I, 5-27-08)

DIVISION 3. - Billing Procedure

Sec. 90-96. - Billing; when due and payable; collection.

(a) In order for the city to effect the collection of charges levied and assessed under this article from the persons who owe the same, and in order to avoid duplication of expense and effort, such charges shall be billed each month as a separate item on the water bill of all persons who receive water bills from the public utilities department of the city or a third party water supply utility with which the city has entered into a contractual agreement to collect charges on behalf of the city. Such charges shall be due and payable at the same time and place and in the same manner as such water bill, and contemporaneously therewith. If a person receives brush and garbage or trash, and if applicable, recyclable, collection service but has no water meter, or where the city has been unable to establish a contractual agreement with an appropriate third party water supply utility, the charge for the brush and garbage or trash collection service shall be billed each month through regular United States mail channels, addressed to such person's address, and shall be due and payable by such person to the city within ten days of the bill date.

(b) The public utilities department or where applicable, the third party water utility is hereby authorized to collect all applicable brush, garbage or trash, and recyclables collection charges for the city, and shall account to the city for such collections, and the sum so collected shall be paid into the sanitation fund of the city.

The city shall pay the public utilities department or where applicable the appropriate third party water supply utility a reasonable sum for its services in billing, collecting and keeping records of such brush, garbage or trash, and recycling charges.

(Code 1966, § 16-24; Ord. No. 1996-57, § XX, 8-26-96; Ord. No. 2007-26, § 2, 3-26-07; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-97. - Payment of bills.

(a) All garbage or trash, brush and recyclables collection bills under any schedule contained in this chapter shall be due and payable and shall become delinquent if not paid by the day from the due date of such bill. The city manager or his authorized representative is hereby authorized to discontinue brush,

garbage or trash, and recyclables collection and water service for any delinquent account according to the procedure as set out in section 106-221

(b) The security deposit, as set out in section 106-84, shall be applicable for all new accounts receiving brush, garbage or trash, or recyclables collection services from the city. Such security deposit shall be applied in accordance with the provisions of section 106-84 relating to amounts due for water, sewer, and garbage or trash service.

(Code 1966, § 16-25; Ord. No. 1994-57, § II, 8-22-94; Ord. No. 1996-57, § XXI, 8-26-96; Ord. No. 2006-83, § 1, 8-14-06; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-98. - Roll-off services—Billing and payment of bills.

(a) Public Works shall collect the fees for all roll-off services rendered by city. Invoices for roll-off services shall be due and payable and shall become delinquent if not paid by the 15th day after the invoice date.

(b) When invoices become delinquent the public works director or designee shall discontinue roll-off service relating to such delinquent account(s) and assess a late payment fee of $35.00 per invoice to said account.

(c) Whenever a roll-off container is removed following discontinuance of service due to non-payment, a $50.00 container removal fee shall be assessed in addition to any other service charges assessed under this chapter.

(d) A security deposit shall be required for all roll-off service customers in the amount of $250.00 for non-commercial use and $500.00 for commercial / contractor use. This deposit shall be required for all new accounts as provided for in this section, save and except for any existing customer who shall transfer an account from one location to another or who shall request additional account(s) to be established under such customer's name. The deposit shall be applied to any final balance due; any credit balance shall be refunded to the account holder within ten (10) working days.

(e) Whenever a payment is not honored by a bank or financial institution for any reason, an additional $20.00 processing fee shall be added to such account.

(f) A container inactivity charge of $155.00 shall be assessed to each customer account for every thirty (30) calendar day period during which no container activity is registered.

(Ord. No. 2008-41 § I, 5-27-08)

ARTICLE IV. - Private Roll-Off Collection And Disposal Services [111]

Sec. 90-121. - City to provide garbage, brush and recyclable collection services; exceptions; license required.

(a) Only the duly authorized agents or employees of the city shall provide garbage or trash, brush or recyclable collection service, and roll off container service to residential or commercial or industrial customers within the city.

(b) Except as may otherwise be specifically provided herein, no one may provide hauling services, including roll-off services, without a private hauler's permit issued by the public works director.

(c) The provisions of this article relating to license requirements shall not apply to persons who haul trash or brush for hire incidental to services otherwise

provided relating to yard cleanups or minor remodeling projects, where such service is provided on an interim basis.

(Code 1966, § 16-63; Ord. No. 1996-57, § XXII, 8-26-96; Ord. No. 2002-81, § 1, 12-9-02; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-122. - Application generally; limitations and conditions; permit fee; nontransferability of permit; posting of permit sticker on vehicles; appeal of denial of permit.

(a) Any person seeking to provide hauling services, including roll-off services within the city must file an application for a private hauler's permit with the public works director. Such permits may be issued only for the collection, removal and disposal of construction debris and/or land clearing waste. The public works director or designee shall make or cause to be made an investigation as may be necessary in order to determine whether or not the applicant meets the requirements. The applicant shall file an application providing such information as may be required by the public works director, including the following:

(1) Name and address of the applicant.

(2) The trade name of the applicant.

(3) The number of vehicles the applicant will operate within the city.

(4) The class, size and design of the vehicles which the applicant will operate.

(5) The nature and character of the services the applicant proposes to render in the city.

(6) The experience that the applicant has in rendering the services cited in subsection (a)(5) (for informational purposes only and not related to determination of issuance).

(7) Submit a schedule of rates that the applicant will be charging his customers (for informational purposes only and not related to determination of issuance).

(b) As a condition for the issuance of a private hauler's permit under this article the applicant shall file:

(1) A certificate of general liability insurance showing coverage in the amount of $1,000,000.00 for personal injury and $100,000.00 for property damage for each vehicle to be operated in the city and showing the city as one of the insured thereunder. Proof of workers' compensation insurance shall also be provided.

(2) A hold harmless indemnity agreement in which the applicant agrees to hold harmless the city from any liability for damages which may occur as a result of the applicant's operation in the city and indemnify the city for liability or damages created as a result of the applicant's operation in the city.

(3) A copy of any license agreement, lease, deed or title of ownership and Texas Commission on Environmental Quality (TCEQ) approval identifying the landfill site for which the garbage or trash collected in the city will be finally deposited. Such evidence of right to use any landfill site will be for a period of at least one year from the date of the granting of the private hauler's permit by the city.

(4) An agreement from the applicant to the city stating that the applicant will furnish to the city on a quarterly basis information updating its customer list,

routes to be traveled within the city, and any additional vehicles to be used within the city during the period of the private hauler's permit.

(5) An agreement from the applicant to pay to the city a sum equal to five percent of any and all customer-assessed fees and charges derived from the operation of the permitted collection service by such applicant, such payments to be made quarterly no later than by the fifteenth day of the month following the end of each quarter. On the first day after the date in which such payment shall be due and payable, there is hereby added to such payment a penalty equal to five percent of the amount of such payment. If any such payment remains delinquent for 30 days after such due date, there is hereby added to such payment an additional penalty of ten percent of the amount of such payment. If any such payment remains delinquent for a period of 60 days after such due date, then in addition to such payment and penalty, there is hereby imposed an interest payment on the amount of such delinquent tax equal to ten percent per annum until the amount of such payment or any remaining portion thereof is finally paid in full. In addition to the amount of any payment, penalties and interest owed as provided herein, a private hauler who fails to timely make payment is liable to the municipality for the municipality's reasonable attorney's fees in collecting the same. A statement of fees and charges assessed by the applicant for the applicable period, in such preformatted forms as may be provided by the public works director, shall be filed in hard copy and in digital format on a monthly basis.

(6) An agreement from the applicant to the city stating the applicant will terminate service to any residential customer after annexation by the city and upon its existing service contract termination or one year from annexation date, whichever comes first. No new contracts or renewals for residential service will be allowed in annexed areas. Applicants shall provide for such termination contingency in all residential contracts in the extra territorial jurisdiction of the city.

(7) An agreement to allow the director of finance, or designee, during reasonable business hours, access to the books and records of any applicant, permittee or other person subject to this article, as shall be necessary to ascertain the accuracy of any report filed as required by this article, to determine whether any calculation of the amount due under any provision of this article needs correction, or to determine whether a report should have been filed and the amount, if any, of fees due.

Failure to meet any of the obligations as set out in this section for the granting of the private hauler's permit or any of the requirements or restrictions in section 90-123 shall constitute grounds for denial or revocation of a permit by the public works director. The city attorney may enter an appropriate pleading in a court of competent jurisdiction to prevent and enjoin the private hauler's permit holder or any person engaging in such activities without any required permit from operating any waste collection service within the city.

(c) When all conditions set out in this section have been met, the public works director shall issue an annual private hauler's permit which will cover the period January 1 through December 31 of each year. The fee for this annual private hauler's permit shall be $220.50. The permits granted under this section shall be renewable from year to year upon filing of a new permit application, which shall be filed for existing permits on or before December 1 of the current year for the permit. No grant, right or privilege afforded to the applicant under this article

shall be assigned or transferred in any manner without the expressed written approval of the public works director.

(d) In addition to the private hauler's permit, a permittee must apply for and receive a vehicle permit for each vehicle operated in the collection of waste. The public works director for the city is hereby authorized to issue a permit sticker or other indicia which must be attached to each vehicle used for the purposes of this article by any private hauler's permit holder as required by the public works director. No vehicle may be employed in the permittee's operations within the city unless the vehicle permit is so posted.

(e) If the public works director shall refuse to issue a private hauler's permit to any applicant, the action of the public works director shall be final unless the applicant shall, within ten days after such refusal to issue such a permit, file a written appeal with the city secretary addressed to the city manager requesting review. Should the city manager concur in the decision of the public works director, that decision shall be final, unless the applicant shall, within ten days after such concurrence, file a written appeal with the city secretary addressed to the board of commissioners requesting review of the decision of the public works director and the city manager. Such applicant shall have the right to present evidence of why a permit should be granted. The appeal procedure for revocation of a permit shall be the same as stated in this section for refusal to grant a permit. The authority conducting any such hearing shall give written notice of the decision on the appeal within ten days from the closing of such hearing, and the hearings provided for in this section shall be conducted so as to allow necessary due process application to the applicant or permit holder, as applicable.

(Code 1966, § 16-64; Ord. No. 1996-57, § XXIII, 8-26-96; Ord. No. 1997-96, § XII, 10-13-97; Ord. No. 2006-103, § 8, 10-9-06; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-123. - Equipment requirements and restrictions for permittees.

(a) All vehicles used by any permittee within the city shall meet the minimum specifications relating to safety and health as promulgated and established by any applicable state law or regulation.

(b) It shall be the obligation of the permittee to see that all containers used for its collection service meet all the specifications and requirements for such containers under applicable state laws and regulations.

(c) Anyone's use of city rights-of-way to place any container is hereby expressly prohibited.

(d) Should any customer of a permittee cancel or have service canceled, it shall be the responsibility of the permittee to remove its container and any accumulation of garbage, trash or brush at the location as a final collection. The permittee shall notify the city in writing of the date of termination and the date of the abovementioned final collection.

(Code 1966, § 16-65; Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-124. - Duties, authority of director of finance.

The director of finance may adopt and amend procedures, rules and regulations as are reasonably necessary to effectively collect the fee levied in this article, and shall, upon request of any permittee hereunder, furnish a copy of such

procedures, rules and regulations for the guidance of such person and facilitate the collection of such fee as such collection is required in this article.

(Ord. No. 1996-57, § XXIV, 8-26-96; Ord. No. 2008-41, § I, 5-27-08)

ARTICLE V. - Miscellaneous

Sec. 90-146. - Authorized disposal of waste.

(a) It shall be unlawful for any person hauling, conveying or transporting waste upon the streets, alleys or public thoroughfares of the city to unload or dump such waste at or upon any public or private property within the city other than at a citizen collection station, a facility licensed under Ord. Sec. 86-66, or at any other approved facility or state-approved public landfill.

(b) It shall be unlawful for any owner or occupant of property within the city to permit the unloading or dumping of brush, garbage or trash or recyclables at or upon any property owned or occupied by that person. Notwithstanding such prohibition, this section does not apply to the hauling, conveying, transporting, unloading or dumping of earth or inert materials, otherwise not prohibited by law, including but not limited to concrete materials for landfill and leveling purposes.

(Ord. No. 2008-41, § I, 5-27-08)

Sec. 90-147. - Anti-scavenging.

No person except for the duly authorized agents or employees of the city, or a person with the customer's consent, shall remove any garbage or trash, recyclable materials, or other waste from an approved container.

(Ord. No. 2008-41 § I, 5-27-08)

Sec. 90-148. - Penalty for violation of chapter.

(a) Any person who shall violate any of the provisions of this chapter or shall fail to comply with any of the requirements of this chapter shall, upon conviction thereof, be punished as prescribed in section 1-14

(b) In the event of a violation of this chapter, the city may, in addition to other remedies, institute any appropriate action or proceedings to prevent such violation, including the right to restrain, enjoin, correct or abate such violation in any court of competent jurisdiction, in accordance with the laws of the state.

(Ord. No. 2008-41 § I, 5-27-08)

2.3.6 City of Pharr

2.3.6.1 ORDINANCE NO. O-2010-33

TIRE BUSINESS AND TIRE HAULER REGISTRATION

Sec 26-186 Purpose and Intent It is declared to be the purpose and intent of the City to protect the public health safety and welfare of its citizens prevent the spread of disease and creation of nuisances and to protect and enhance the quality of its environment. The purpose of this Article is to institute and maintain a comprehensive citywide program for tire disposal which will assure that the storage transportation collection processing and disposal of tires does not

adversely affect the health safety and wellbeing of the public and does not degrade the quality of the environment.

Sec. 26-187 Definitions. As used in this Article the following words and phrases shall have the meaning ascribed to them herein

A. “Dump” shall mean to throw discard place deposit discharge bury or dispose of.

B. “Health” Director shall mean the person designated as being Director of Health Department of City of Pharr or Authorized representative who are empowered to enforce the provisions of this article

C. “Manifest” shall mean a form or document used for identifying the quantity and the origin routing and destination of tires during transportation from the point of generation through any intermediate points to an end user processor or disposer.

D. “Mobile” Tire Repair Road Service Unit shall mean and include any motorized vehicle occupied used or maintained for the purpose of providing tire repair road services that include selling offering or exposing for sale keeping with the intention to sell generating repairing processing storing utilizing and disposing of any and all types of tires.

E. “Person” shall mean any and all persons natural or artificial including any individual firm or association.

F. “Tire” shall mean a continuous solid or pneumatic rubber covering encircling the wheel of a bicycle motorcycle automobile truck trailer tractor or other vehicle.

H. “Tire” Recycling Facility shall mean any facility mandated and licensed which recycles or properly disposes tires.

I. “Scrap/Used/Waste” tire shall mean a tire that is no longer suitable for its original intended purpose because of wear damage or defect Waste tire also includes any tire that is destined for a tire disposer or reprocessor (i.e. recapper).

J. “Waste tire hauler” shall mean any person or company engage in the business of picking up or transporting waste tires for the purpose of removal to a tire recycling facility waste tire disposer processor end user or disposal facility.

K. “Waste tire disposer” shall mean any person or company who is approved to receive waste tires from waste tire generators or waste tire haulers for the purpose of waste tire processing shredding or otherwise facilitating recycling or resource recovery techniques for waste tires.

L. Waste tire generator shall mean any person or entity that generates waste tires Generators may include but are not limited to retail tire dealers retreaders tire shops waste tire disposers not approved by TCEQ EPA automotive dealers maintenance shops garages service stations any tire business.

Sec. 26-188 Residential Property Owners or renters of property within the City of Pharr’s city limit and its J.T.E. may not cause or let cause suffer the accumulation of scrap waste tires within their private property or right-of-way City of Pharr will not pick up used or waste tires from private property or right-of-way.

A. Accumulation. No Residential zoned property will be allowed to store more than five 5 Scrap waste tires on or around property which they own or occupy In case of a tire dump the property owner contractor developer builder or

other person responsible for the property shall cause the property to be cleaned and to come into full compliance with this ordinance City of Pharr shall not be responsible for any cost of cleanup or remediation.

B. Right-of-way. Scrap used tires are not to be placed on street Right-of-way Residential properties that cause or let cause the accumulation of used tires on street right-of-way shall be solely responsible for the pickup and delivery of such used tires to a tire recycling facility at their own cost.

C. Enforcement. The City of Pharr Code Enforcement Division Police Department and Public Works Department shall be responsible for enforcement of ordinance.

D. Disposal of tires Residents can dispose of four 4 rimless tires a month at City's recycle center free of charge Any tire thereafter can be disposed of for a fee of150 each.

E. Violation and Penalties Any resident violating or failing to comply with any provision of this ordinance shall be guilty of a misdemeanor subject to a civil penalty of $100.00 up to $1000.00 for each offence as determined by the City's Municipal Court Each day of continued violation's shall constitute a separate offence The expenses incurred by the City of Pharr for cleanup enforcement of violations and penalties shall be chargeable to the violator including but not limited to court costs filing fees special investigations mutual aid assistance from other agencies and other costs necessary for the reasonable enforcement of this ordinance Remedies will be as follows:

1. In the event that any person violates any provision of this ordinance the City or other appropriate authority may in addition to other remedies institute an action for injunction cleanup or stop work orders mandamus irreversible damage fines lien on property or other appropriate action or proceeding to prevent such unlawful acts or to correct or abate any such violation. In addition the City may immediately revoke or suspend any and all business issued permit until such time that compliance is met or until the ruling of a Court of competent jurisdiction is obtained at which time respective permits may be reissued and

2. Upon finding evidence of violation a Notice of Violation may be issued at the discretion of the enforcing officer's in lieu of a citation In the absence of corrective action or in the event that a second violation occurs the evidence constituting the Notice of Violation may be submitted as evidence for consideration as a first offense before a Court with competent jurisdiction, and

3. If a person is found guilty of a violation of the provisions of this ordinance the Court and/or the City Commission may cause written notice to be given or incorporate into the Court Order to the violator instructing that person to properly address any provision still remaining in violation of this ordinance for which said violator is convicted

Sec. 26-189 Tire Business Permits All tire businesses located within the City limits and its E.T.J., engaging in the resale of tires or the generation of waste tires shall be issued a permit annually by the City of Pharr Public Works Department for a non refundable fee of thirty-five ($35.00) dollars Tire businesses with multiple locations must purchase a permit for each location Tire businesses

that have their own trucks utilized to transport waste tires will receive one (1) decal included with the permit fee A separate decal must be purchased by such business for any additional truck utilized by the tire business to transport waste tires at a cost of twenty ($20.00) dollars per decal If such business has a Mobile Tire Repair road service unit the permit/decal will be one hundred dollars ($100.00) for each unit in service The City's Code enforcement department will conduct random inspections of such tire business for the sake of monitoring compliance with the foregoing requirement.

A. Application. Every person firm or corporation obligated to comply with the permit requirement set forth herein shall make written application to the City The application shall be made on a form obtained from the City of Pharr Public Works Department setting forth among other things the following:

1. Name physical address telephone and facsimile number if applicable of the applicant.
2. Tax identification number or tax payer identification number.
3. Proof of current county business license issued to the applicant at the proposed business address.
4. Conditional Use Permit issued by Planning and Zoning Department.
5. Name mailing address telephone and facsimile number of the owner of the tire business (if different from #1 above).
6. Estimated number of tires that will be stored on site.
7. The current physical address of the site.
8. A statement setting forth and describing the available space for properly accommodating and protecting all tires site plan showing storage area and buildings.
9. Proof of insurance required as per Texas Financial Responsibility laws.
10. Such other and further information as the Public Works Department may require.

B. Annual Fees.

1. All permit and decal fees are due annually by October 1 of each calendar year at the City of Pharr's Public Works Department office. These annual fees shall be paid in advance of the issuance of such permit and decal and shall be prorated as necessary
2. A current valid permit or decal may be replaced by the Public Works Department for a fee of twenty ($20.00) dollars

C. Issuance. The Public Works Department shall issue a permit and decal to a tire business which submits the required and completed application pays to the City the fee as required in this Article and has demonstrated compliance with this Article and all applicable city ordinances Each tire business registered in accordance with the provisions of this Article shall immediately post such permit and decal in a prominent manner or cause such permit to be posted in conspicuous place within the premises where such tire business in thereby authorized to be established maintained or operated The decal shall be conspicuously displayed on each vehicle owned by such tire business that is utilized to transport used or waste tires. Any permit or decal issued hereunder shall not be sold assigned mortgaged or otherwise transferred by doing so permit

and decal shall be revoked and will be considered null and void and person or company will not be allowed to apply for reissue of permit till after a term of one (1) year from date of citation Permit and decal shall expire upon termination of the existence of the tire business or revocation of such business's permit.

D. Effective Period. The permit shall be effective beginning on October first until the next ensuing thirtieth day of September on and after which date it shall be null and void.

Sec. 26-190 Tire Hauler Permit All tire haulers not affiliated with a tire business that is property permitted as required herein transporting used or waste tires within the City limits shall be issued a permit and decal annually by the City of Pharr Public Works Department for a non refundable fee of Twenty-five ($25.00) dollars Tire haulers with multiple locations must purchase a permit for each location Tire haulers will receive one 1 decal included with the permit fee A separate decal must be purchased by such hauler for any additional vehicles utilized by the hauler to transport waste tires at a cost of $15.00 per decal/vehicle

A. Application. Every person firm or corporation obligated to comply with the permit and decal requirements set forth herein shall make written application to the City The application shall be made on a form obtained from the City of Pharr Public Works Department setting forth among other things the following:

1. Name physical address telephone and facsimile number for the applicant.
2. Tax identification number or tax payer identification number if applicable.
3. Proof of current State County City License.
4. Proof of insurance required in accordance with the State of Texas Financial responsibility laws.
5. Such other and further information as the Public Works Department may require

B. Annual Fees

1. All permit and decal fees are due annually by October 1 of each calendar year at the City of Pharr's Public Works Department These annual fees shall be paid in advance of the issuance of such permit such fee shall be prorated as necessary.
2. A current valid permit or decal may be replaced by the Public Works Department for a fee of fifteen ($15.00) dollars

C. Issuance. The Public Works Department shall issue a permit and decal to a tire hauler who submits the required and completed application pays to the City the fee as required in this Article and has demonstrated compliance with this Article and all applicable city ordinances Each waste tire hauler registered in accordance with the provisions of this Article shall conspicuously post and maintain such decal in his/her vehicle which is used for transporting tires at all times Any permit or decal issued hereunder shall not be sold assigned mortgaged or otherwise transferred by doing so permit and decal shall be revoked and will be considered null and void and person or company will not be allowed to apply for reissue of permit till after a term of one (1) year from date of citation The permit or decal issued shall expire upon termination of the tire hauler's business or revocation of such hauler's permit.

D. Effective Period The permit shall be effective beginning on October 1 until the next ensuing thirtieth day of September on and after which date it shall be null and void

E. Permit Exemptions The following entities are exempt from the tire hauler permit requirements

1. A tire hauler who is regulated or licensed by and is currently in compliance with state or federal agencies such as the DOT or
2. A private entity transporting the individual's own waste tires to an approved disposal or tire recycling facility

Sec. 26-191 Denial of Permit or renewal; suspension or revocation of permit. In addition to the penalties set forth in Sec 26201 the Public Works Department may refuse to issue or renew a tire business or tire hauler permit or may suspend or revoke such permit or decal if:

1. The applicant or permit holder refuses to allow entry into the tire business by the authorized representative's of the City or otherwise willfully obstructs the inspection of the tire business or;
2. There are repeated or a serious violation's occurs of any City Ordinance by the tire business or tire hauler or;
3. The tire business or tire hauler fails to comply with any provisions of this Article and/or any other applicable city ordinance's or;
4. The tire business or tire hauler fails to comply with any applicable state or federal law rule or regulation or;
5. The tire business knowingly authorizes a tire hauler who is not property permitted as required in Section 26190 to transport tires on behalf of such business.

Sec. 26-192 Destruction of Tires Any tire that is no longer suitable for its original intended purpose or deemed unfit for resale by a tire business shall be rendered unusable and shall be properly disposed of at an authorized tire disposal or recycling facility Each tire business shall have six 6 months from the effective date of this ordinance to comply with this provision Failure to comply with this requirement shall be grounds for revocation of the permit holder's permit in accordance with Section 26-191.

Sec 26-193 Storage of Tires Tire Business shall properly store tires at each facility in accordance with local state and federal law To eliminate potential nuisances of litter insect breeding fire hazards and other health and safety risks each tire business shall at all times during storage:

1. Store tires in covered or enclosed areas or under an impermeable cover in accordance with applicable health and safety laws included but not limited to the City's fire code or Property Maintenance Code to prevent the accumulation of water
2. Secure tires at each facility to prevent easy access or theft Lock chain or store inside a building or other securable structure
3. Accumulate tires in piles in accordance with the City's fire prevention code

4. Isolate tires from other stored materials that may create hazardous products if there is a fire including but not limited to paints fuels electricity lead acid batteries fuel tanks solvent barrels and pesticide container's and such

5. Store no more than 10 per 250 square feet out side storage

Sec. 26-194 Disposal of Tires

(a) It shall be unlawful for any person or tire business to cause suffer or allow the dumping of tires at any place in the City of Pharr including without limitation in or on any public highway road street alley or thoroughfare including any portion of the right of way thereof any public or private property in the City or any waters in the City

(b) It shall be unlawful for any person in a residential zone to accumulate more than five 5 scrap tires on or around property which they own or occupy

(c) A retail tire dealer may hold up to 250 scrap tires in storage

(d) It shall be unlawful for any person or tire business to cause, suffer or allow the disposal of whole tires in a landfill

(e) Tires shall be properly disposed of in accordance with Section 26-195 by the delivery and manifesting of tires to an authorized tire disposal or tire recycling facility designated by the City Tire Businesses contracting with a tire hauler's for the proper disposal of tires generated by such business shall require such hauler's utilize a transmittal manifest documenting the pickup and delivery of the tires to an authorized tire disposal or tire recycling facility.

Sec. 26-195 Disposal Records/Transmittal Manifest

A. Tire Businesses shall keep disposal records in the form of a transmittal manifest as prescribed by the City at each business location for a minimum of three (3) years and make such records readily available upon request at reasonable hours for inspection by representatives of the City The manifest must be maintained and signed off in triplicate and clearly state the following information:

1. Name address telephone number permit number and authorized signature for the tire hauler and

2. Name address telephone number and authorized signature of the tire business who is contracting for the removal of the tires along with the permit number for such business and

3. Date of removal/transport and the number of tires being transported and

4. Name address and telephone number of the location where the tires are to be delivered and

5. Upon delivery the name and signature of the person accepting the tires including the date of acceptance

B. The manifest required by this section shall at all times accompany tires while in transit Any tire business directly delivering waste or used tires generated at its business location to a tire disposal or tire recycling facility must also utilize the transmittal manifest and make such manifest available for production or inspection by representatives of the City upon request The original

manifest shall be maintained by the tire business evidencing all information and signatures required herein notwithstanding the use of a tire hauler or direct delivery by the tire business A tire hauler contracted to deliver tires to a recycling facility or disposal facility must maintain a duplicate copy of the manifest reflecting the delivery of such tires for proper disposal. The tire recycling or tire disposal facility shall sign the manifest upon acceptance of the tires and also maintain a copy of the manifest for the facility's records

Sec 26-200 Administration/Enforcement

A. Administration and Enforcement of this Article shall be the responsibility of the Code Enforcement/Public Works Department/Police Department/Community Planning and Development Department/Health Director. The City by and through its authorized representatives is hereby authorized to enter any property regulated by this ordinance at reasonable or necessary times in order to properly inspect for violations

B. The Public Works Department/Code Enforcement is hereby authorized to promulgate all such rules and regulations considered necessary and proper to effectuate the implementation and enforcement of this Ordinance.

C. The Police Department is hereby authorized to stop and investigate any and all trucks trailers or persons engaged in scrap tire selling hauling moving transporting or delivering and subject to the regulation requirements of this ordinance in order to verify compliance with this ordinance

D. Should a violation or attempted violation of this ordinance occur the City Attorney and other city personnel may take any action to enforce this ordinance to prevent and summarily abate the action remove or seize any goods and other objects used to violate this ordinance. These actions may also include but not be limited to allowing for municipal resources and personnel to abate any premises or property closure remove any person or thing court action suspend cancel or void any license or permit issued by the City of Pharr and any and all other relief as may be necessary.

Sec. 26-201 Violations and Penalties In addition to the penalties set forth in Sec 26-191 any tire business or tire hauler violating or failing to comply with any provision of this ordinance shall be guilty of a misdemeanor subject to a civil penalty of $50.00/$500.00 up to $1000.00/$2000.00 for each offence as determined by the City's Municipal Court Each day of continued violation's shall constitute a separate offence

(a) The improper storage of one or more tires shall constitute a separate offense per tire and be punishable by a fine of fifty050dollars for each improperly stored tire on the location of the tire business. Each day of continued violation of this subsection constitutes a separate offence

(b) The transport of one or more tires without the required permit and decal shall constitute a separate offense per tire and be punishable by a fine of fifty ($50.00) dollars for each tire being transported in violation of this Article. Each day of continued violation of this subsection constitutes a separate offense.

(c) The improper dumping of a tire shall constitute a separate offense per tire and be punishable by a fine of one hundred ($100.00) dollars for each tire

found improperly dumped that is related back to a specific tire business. Each day of continued violation of this subsection constitutes a separate offense.

(d) Any violation of this Ordinance shall be subject to both civil and criminal penalties A criminal conviction shall be a Class C misdemeanor. A violator shall also be subject to the maximum penalties allowed by law for failing to appear in Court when charged with an offense as described herein. If conduct constituting an offense under this ordinance also constitutes an offense under another law the person may be prosecuted under all applicable laws.

Sec. 26-202 Injunctive Relief. In addition to, and cumulative of, all other penalties herein provided, the City of Pharr shall have the right to seek injunctive relief for any violation(s) of this Article.

2.3.7 City of Brownsville

2.3.7.1 CHAPTER 82 - Solid Waste

ARTICLE I. - In General

Sec. 82-1. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

“Alley” means any public way, generally of less width than a street, used for public utility purposes and right-of-way and as an alternate secondary or emergency route for vehicle and pedestrian traffic, generally situated at the rear of or alongside a tier of lots.

“Building code” means the Standard Building Code adopted in section 18-116.

“Commercial establishment” means any structure intended or used for the purpose of conducting a commercial business enterprise.

“Container” means a receptacle for the deposit of solid waste.

“Director of public works” means the head of the city public works department or anyone authorized to act for him.

“Garbage” means solid waste consisting of putrescible animal and vegetable waste materials resulting from the handling, preparation, cooking and consumption of food, including waste materials from markets, storage facilities, handling and sale of produce and other food products.

“Manager” means the person in charge of real estate used for apartment, institutional or commercial purposes.

“Manual collection” means the service rendered in collecting municipal solid waste from containers, which containers can be handled in part by persons picking up containers, as distinguished from picking up containers by mechanical means and which containers are too large for handling by manual means.

“Municipal solid waste” means solid waste resulting from or incidental to municipal, community, trade, business, and recreational activities, including garbage, rubbish or trash, ashes, street cleanings, dead animals, and all other solid waste other than industrial solid waste.

“Owner” means the record title holder of real property.

"Property line" means a peripheral boundary of real estate.

"Public utility easement" means a right-of-way used or dedicated to be used by any public utility, including but not limited to services such as electricity, telephone, gas, solid waste collection, water, sewer and drainage.

"Public way" means any street, alley, easement or other right-of-way.

"Rubbish and trash" mean nonputrescible solid waste, consisting of both combustible and noncombustible waste materials; combustible rubbish or trash includes paper, rags, cartons, wood, excelsior, furniture, rubber, plastics, yard trimmings, leaves and similar materials; noncombustible rubbish or trash includes glass, crockery, tin cans, aluminum cans, metal furniture and like materials which will not burn at ordinary incinerator temperatures (1,600 degrees Fahrenheit to 1,800 degrees Fahrenheit).

"Sanitary landfill" means a method of disposing of municipal solid waste on land without creating a nuisance or hazard to public health or safety, by utilizing the principles of engineering to confine the solid waste to the smallest practical area, to reduce it to the smallest practical volume and to cover it with a layer of earth at appropriate periodic intervals.

"Sanitary service" means service provided by a sanitary service contract with the city.

"Special service" means any service provided above and beyond the normal services provided for in the rate schedule, to include but not be limited to the following:

(1) Carrying from the rear of a residence where an alley is not available; and

(2) Carryout service from business establishments not fronting on an alley.

"Street" means any public thoroughfare for the passage of vehicle and pedestrian traffic.

"Vehicle" means any wheeled conveyance.

(Code 1971, § 15-2)

Sec. 82-2. - Penalty; citation for violation.

(a) Any person who shall violate any of the sections of this chapter or who shall fail to comply with this chapter or with any of the requirements of this chapter shall be guilty of a misdemeanor and, upon conviction, shall be liable to a fine as provided in section 1-13 for each offense; provided, however, that such fine shall not exceed the maximum fine allowed by both the state and the Charter for each offense.

(b) The police department, the public health director and the director of public works are authorized to issue citations to any person for violations of this chapter. The citation issued shall state the alleged violation, the date of the violation, and the section of this Code violated.

(Code 1971, § 15-12)

Sec. 82-3. - Containers for materials.

The containers for solid waste collection shall be as required in the city sanitary service contracts.

(Code 1971, § 15-3)

Sec. 82-4. - Collection by sanitation service from residences and duplexes.

(a) Generally. It shall be the duty of every occupant of any residence or duplex to provide a sufficient number of solid waste containers, at the place designated by the director of public works for collection of municipal solid waste from the particular premises, to provide adequate capacity for the solid waste placed out for collection without overloading the capacity of the containers provided therefor in accordance with the following:

(1) All containers shall conform to the requirements as provided in section 82-3

(2) All collection of solid waste materials from residences or duplexes shall be by the sanitation service contracts, and such service shall not be performed through any other person.

(3) Garbage and refuse collection personnel will not be allowed to enter dwelling units nor will they be allowed to go through fence gates into yards for the collection of refuse nor shall they accept any money for their services from persons served.

(b) Placement of containers for alley refuse collection service. Containers for alley refuse collection service shall be placed as follows:

(1) In accordance with subsection (a)(3) of this section, it shall be the duty of each homeowner, occupant, tenant or lessee to place the refuse containers at the property line where they will be easily accessible to sanitation collectors. When the yard is fenced, the containers must be placed outside the fence for collection.

(2) It shall be the duty of the homeowner, occupant, tenant or lessee to keep the alley abutting his property clean of spilled garbage and/or rubbish, weeds, etc.

(c) Placement of containers for collection where no alley exists. Where a residence or duplex is not served by an alley, public utility easement or other public way in the rear or alongside thereof, all containers shall be placed just behind the curbline of the street abutting such property, but shall not be placed in the street or on the sidewalk or in any manner placed where the containers will interfere with vehicular or pedestrian traffic.

(d) Placement of containers for backdoor collection service. Garbage containers shall be placed at the location and under such conditions approved by the director of public works for backdoor collection by the sanitation service.

(e) Placement of rubbish or trash or brush for collection. Rubbish or trash or brush shall normally be collected from the alley where one exists and from the street when no alley exists in accordance with the following:

(1) Where rubbish or trash or brush is collected from the alley, public utility easement or public way and not from the street, all rubbish, trash or brush shall be placed at the property line, but shall not be placed inside the alley, easement or public way in such a manner as to obstruct or interfere with vehicular or pedestrian traffic.

(2) Where rubbish or trash or brush is collected from the street, it shall be placed just behind the curbline of the street abutting the premises, but shall not be placed in the street or on the sidewalk in such a manner as to obstruct or interfere with vehicular or pedestrian traffic.

(3) Where the quantity of brush set out for collection is excessive, the superintendent of sanitation shall determine the amount of brush to be collected at any one time, the day of its collection and any other matters pertaining to brush collection in order not to disrupt normal service to other premises.

(4) Rubbish or trash consisting of small, loose items shall be placed in an approved container as specified pursuant to section 82-3

(Code 1971, § 15-4)

Sec. 82-7. - Materials not handled by sanitation service.

(a) *Generally.* The scope of the service rendered by the sanitation service in the collection and removal of solid waste materials is intended, in general, to serve the needs of dwelling units and their directly related activities, operating businesses, and commercial establishments, except as exempted from this chapter. It is considered to be beyond the scope of such service to collect or remove solid waste materials generated by clearing, construction, demolition and other such solid waste materials resulting from an activity beyond the scope described in this subsection.

(b) *Materials.* Rock, scrap building materials or other trash resulting from construction, remodeling or destruction by fire, the elements, acts of God, or other causes resulting from a general cleanup of vacant or improved property or trees, brush and/or debris cleared from property, in preparation for construction or occupancy, shall not be collected and removed as a regular service, but these materials must be removed at the expense of the owner or developer.

(Code 1971, § 15-7)

Sec. 82-8. - Processing and disposal of materials.

(a) General regulations. All garbage and rubbish or trash or other solid waste materials must be processed and/or disposed of at a location and in a manner approved by the director of public works. All landfill operations including disposal procedures and determination of acceptable users are the responsibility of the director of public works. Requirements for the use of the landfill and disposal sites are as follow:

(1) The city sanitary landfill will be open to the general public and to private commercial haulers from the hours of 8:00 a.m. to 4:30 p.m., Monday through Saturday. An individual bringing garbage or trash or rubbish to the sanitary landfill must present a valid driver's license as proof of residency or a valid commercial hauling permit.

(2) It shall be unlawful to deposit live ashes or other similar materials capable of creating fires or fire hazards in the sanitary landfill. Smoking by any individual at the sanitary landfill is prohibited.

(3) Any person entering upon a city-operated disposal site for any purpose shall be conclusively presumed to know and appreciate the hazards and the extent of the damage which accompanies the accumulation of scrap wood, glass, nails, trash, brush, waste and garbage in every description and the use of trucks, vehicles and heavy machinery to move, remove, bury and dispose of such. Every person entering upon any such site shall be conclusively presumed to have assumed the risk of injury connected with or resulting from such hazards and danger. By his actions in entering upon such site and for and in consideration of

the permission granted by the city to enter upon such site, every person shall covenant and shall be deemed to have covenanted not to sue and to indemnify and save harmless and defend the city, its agents, officers and employees from and against any and all claims of any nature whatsoever for injury or damage to person or property, whether real or asserted, arising out of or resulting from the entry by such person upon the sanitary landfill.

(b) Processing and disposal facilities and sites. Requirements for solid waste processing and disposal facilities and sites are as follow:

(1) It shall be unlawful for any person to take, remove or carry away from any processing or disposal facility operated by the city any garbage, rubbish, trash or other solid waste material, article, thing or object situated thereon, whether or not such has monetary value, without prior written permission and approval of the director of public works. In prosecutions for this offense, it shall not be necessary to describe the thing taken, removed or carried away other than as generally described or as "article," "thing," or "item," and it shall not be necessary to allege that the thing had value.

(2) The director of public works shall have the authority to designate which processing and/or disposal sites are to be opened to the public and which are to be restricted to municipal vehicles, only, provided that no processing or disposal facility within the city will be opened to solid waste materials originating outside the city limits without prior written permission and approval of the director of public works.

(Code 1971, § 15-9)

ARTICLE II. - Rates And Charges

Sec. 82-36. - Charges for sanitation service**.**

(a) Method of charging and billing for sanitation service. The method of charging and billing for sanitation service is as follows:

(1) All solid waste collection and disposal charges and fees shall be billed through the accounting and billing mechanics of the public utilities board in a manner which will show each customer's fees and charges separately from the utilities bill. The charges and fees established and authorized shall be billed to the person in whose name the utilities service connection is taken where the premises are served with electricity, water and/or sewer and shall be billed to the person in control of the premises at other locations. If this fact cannot be ascertained, the bill shall be directed to the record owner of such premises. The person who is so billed and to whom the services are made available shall be indebted to the city for services and shall be obligated to make payment therefor as provided in this section.

(2) In addition to all other legal remedies available for the collection of a debt, the following actions and remedies are authorized for delinquent payment of the charges authorized:

a. The sanitation service may refuse to pick up and dispose of the garbage at the delinquent location.

b. The utilities, if any, serving the delinquent premises in question may be terminated.

c. A penalty of ten percent of the total net bill shall be charged if payment is received after the due date as specified in the public utilities board billing.

(b) Basis for establishing charges. Establishment of service charges will be based upon the current use of the property rather than being based upon the zoning.

(c) Proration of charges; initial and final billing. There shall be no proration of service charges for a portion of a billing period. The initial billing shall be made concurrent with the initial water billing. No final billing for sanitation charges for less than a full billing period shall be rendered.

(d) Schedule of service charges.

(1) A collection service charge is hereby established for all single-family residences, duplexes, triplexes, quadplexes, and mobile homes as follows:

a. Alley or curb collection service: $17.86 per dwelling unit per month.

For two containers: $22.91 per dwelling unit per month.

b. Any resident requiring special service (walk-in service) shall be charged $25.16.

c. Where detachable containers are employed, the normal commercial rate will apply.

(2) A collection service charge will be made for all apartment owners, apartments, condominiums, and recreational vehicle parks which receive collection service from the sanitation service as follows:

a. Alley or curb collection service for municipal solid waste shall be as follows:

Number of Pickups Per Week	Cost Per Unit
2	$5.50
3	8.50

b. Any resident requiring special service (walk-in service) shall be charged $14.00.

c. Where detachable containers are employed, the normal commercial rate will apply.

(3) Miscellaneous collection service charges will be as follows:

a. Public housing will be charged as follows:

1. A flat rate as established on commercial collection fee schedule for hi-rise apartments.

2. $17.46 per unit per month for all other units.

b. Churches, clinics, hospitals, public buildings and schools will be charged as commercial locations.

c. Unscheduled and/or extraordinary service such as collection of old tires, unusually large amounts of brush, etc., will be charged at cost.

d. Any account, business or residential, requiring special service shall be charged at the rate of 1½ times the normal rate.

(4) Sanitation service charge credits will be granted for vacant or unoccupied dwelling units in apartment or condominium complexes which contain three or more dwelling units upon receipt from the applicant of proof of such vacancy, but such credits shall be limited to only those units which are continuously vacant or unoccupied for 30 days or more.

(5) Backdoor or drive-in service for certain handicapped persons meeting uniform requirements specified by the director of public works will be provided at the rate for alley or curb collection service.

(6) Any applicant for such credit under subsection (d)(4) of this section or for such reduced rate under subsection (d)(5) of this section who intentionally makes any misrepresentation in any written statement required by such uniform requirements shall be guilty of a misdemeanor and, upon conviction, shall be subject to a fine as provided in section 1-13

(Code 1971, § 15-8; Ord. No. 856-I, § 1, 9-11-1990; Ord. No. 92-856-K, § 1, 4-7-1992; Ord. No. 92-856-N, § 1, 4-21-1992; Ord. No. 92-856-P, § 1, 9-30-1992; Ord. No. 93-856-Q, § 1, 4-6-1993; Ord. No. 94-856-T, § 1, 2-1-1994; Ord. No. 94-856-V, § 1, 10-25-1994; Ord. No. 95-856-W, § 1, 3-28-1995; Ord. No. 96-856-X, § 1, 3-29-1996; Ord. No. 97-856-Y, § 1, 4-1-1997; Ord. No. 99-856-BB, § 1, 6-8-1999; Ord. No. 2000-856-CC, § 1, 4-4-2000; Ord. No. 2001-856-FF, § 1, 3-6-2001; Ord. No. 2001-856-HH, § 1, 10-3-2001; Ord. No. 2002-856-II, § 1, 10-1-2002; Ord. No. 2004-856-JJ, § 1, 4-17-2004; Ord. No. 2006-856-MM, § 1, 3-21-2006; Ord. No. 2007-856-LL, § 1, 3-20-2007)

Sec. 82-37. - Method of charging and billing for disposal of solid waste materials.

The following charges are established for disposing of municipal solid waste at city disposal sites:

(1) City residents or inside city limits:

1—300 lbs. $ 9.00
301—1000 lbs. 15.00
1001—1900 lbs. 21.00
2000 lbs and over (tonnage) 30.00

(2) Outside city limits:

1—300 lbs. 16.00
301—1000 lbs. 25.00
1001—1900 lbs. 33.00
1 ton to 19,999 tons 42.00
20,000 tons and over 25.00

Any entity disposing of 20,000 tons or more of solid waste collected from city residents or inside the city limits shall pay $25.00 a ton for disposing of solid waste from outside the city limits, regardless of the quantity of such waste disposed.

(3) Special waste:

Where Texas Natural Resource Conservation Commission authorization is required for acceptance of any non-hazardous Class I industrial waste or waste requiring special handling or manifest; $54.00 per ton and a minimum charge of $54.00 per trip.

(4) Tires, per ton 200.00
(5) Inside city (clean brush), per ton 15.00
(6) Sale of compost, per ton 45.00
(7) Sale of mulch, per ton 25.00
(8) Sale of recyclable tires for recapping, per ton 15.00
(9) Sale of pallets, per ton 15.00

(10) Sale of steel, per ton 15.00

(Code 1971, § 15-10; Ord. No. 856-I, § 2, 9-11-1990; Ord. No. 856-J, § 1, 12-4-1990; Ord. No. 92-856-L, § 1, 4-7-1992; Ord. No. 92-856-O, § 1, 9-29-1992; Ord. No. 93-856-R, § 1, 8-31-1993; Ord. No. 94-856-S, § 1, 2-1-1994; Ord. No. 94-856-U, § 1, 10-25-1994; Ord. No. 97-856-Z, § 1, 3-25-1997; Ord. No. 2001-856-GG, § 1, 9-25-2001; Ord. No. 2002-856-II, § 1, 10-1-2002; Ord. No. 2005-856-KK, § 1, 4-19-2005; Ord. No. 2008-856-NN, 5-20-2008)

Sec. 82-38. - Service charges for maintenance of city easements and rights-of-way.

(a) Definition. Maintenance of city easements and rights-of-way shall be defined to mean the sweeping of city streets and other beautification and maintenance services, but not including garbage collection.

(b) Charges. Charges shall be as follow:

(1) A service charge of $4.50 per month is established for all single-family residences, duplexes, and mobile homes, apartments, and condominiums.

(2) A service charge of $10.00 per month is established for all mobile home parks, mobile home subdivisions, recreational vehicle parks, and all commercial establishments in the city.

(3) A service charge of $30.00 per month is established for all industrial establishments in the city.

(4) These service charges shall be billed per public utilities board account if one exists; if no public utilities board account exists, they shall be billed separately.

(Code 1971, § 15-11; Ord. No. 97-856-AA, § 1, 9-16-1999; Ord. No. 2000-856-EE, § 1, 10-9-2000)

Sec. 82-39. - Service charges for funding of federal unfunded environmental compliance mandates.

(a) Definition. Federal unfunded environmental compliance mandates shall include federal subtitle D landfill compliance costs, National Pollutant Discharge Elimination System costs, and any further environmental compliance costs imposed by the federal government.

(b) Charges. Charges shall be as follow:

(1) A service charge of $2.50 per month is established for all single-family residences, duplexes, mobile homes, apartments, and condominiums.

(2) A service charge of $10.00 per month is established for all mobile home parks, mobile home subdivisions, recreational vehicle parks, and all commercial establishments in the city.

(3) A service charge of $30.00 per month is established for all industrial establishments in the city.

(4) These service charges shall be billed through the respective public utilities board account if one exists; if no public utilities board account exists, the charges shall be billed separately.

(Ord. No. 96-1309, § 1, 9-17-1996; Ord. No. 99-1309-A, § 1, 9-16-1997; Ord. No. 99-1309-B, § 1, 10-5-1999; Ord. No. 2000-1309-C, § 1, 10-9-2000)

ARTICLE III. - Disposal Siting

Sec. 82-56. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning;

"Disposal" means the discharging, depositing, injecting, dumping, spilling, leaking, or placing of solid waste unto any land or water.

"Solid waste" means solid, liquid, semisolid, or contained gaseous waste resulting from or incidental to municipal, community, commercial, industrial, institutional, agricultural, mining, or recreational activities, including sludge, garbage, rubbish, refuse, ashes, street cleanings, dead animals, abandoned automobiles, and other discarded material. The term does not include either solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows, or industrial discharges subject to regulation by permit issued under V.T.C.A., Water Code Chapter 26, or soil, dirt, rock, sand, and other natural or man-made inert solid materials used to fill land if the object of the fill is to make the land suitable for the construction of surface improvements.

(Ord. No. 2005-1434, 6-10-2005)

Sec. 82-57. - Applicability.

This chapter does not apply to:

(1) Areas for which an application for a permit or other authorization under V.T.C.A., Health and Safety Code Chapter 361 has been filed with and declared administratively complete by the Texas Natural Resource Conservation Commission or its successor agency;

(2) Areas for which a permit or other authorization under V.T.C.A. Health and Safety Code Chapter 361 has been issued by the Texas Commission on Environmental Quality or any of its predecessor or successor agencies; or

(3) Areas to which V.T.C.A., Health and Safety Code § 361.090 applies.

(Ord. No. 2005-1434, 6-10-2005)

Sec. 82-58. - Disposal of solid waste allowed.

The disposal of solid waste is allowed within the following location(s):

Being 274.94 acre tract of land, out of the Brownsville Navigation District 2,800 acre tract of land, conveyed to the Brownsville Navigation District recorded in Volume 297, page 55 to 57 of the Deed Records of Cameron County, Texas, including all of a 257.63 acre tract of land out of Share 32 Espiritu Santo Grant, Cameron County, Texas, including all of the City of Brownsville Municipal Landfill Permit No. 1273 tract containing 257.73 acres as described by Edmundo R. Gonzalez Jr., on the fourteenth day of March 1995, and the West line being the East line of Share 31, Espritu Santo Grant, the South line being the North line of Wentz Subdivision as recorded in Volume 5, page 44, the East line being the East line of Share 32, and the North being the South Line an 80 acre tract and a 70 acre tract of land leased to the City of Brownsville Public Utilities Board as per monuments found on the ground and said 274.94 acre tract of land being more fully described as follows:

Beginning at a point of intersection of the projection of the South line of said 80 and 70 acre tract with the East line of El Jardin Subdivision, being the

Common line between Share 31 and Share 32, of the Espiritu Santo Grant, Cameron County, Texas, for the Northwest Corner and Point of beginning of the tract herein described;

Thence South 00 Degrees 01 Minutes 00 Seconds East, with and along the Common line between Share 31 and Share 32, Espiritu Santo Grant, for a distance of 2,331.61 feet to a point for the Northwest corner of a certain 289.65 acre tract sold by Browne Land & Cattle Company to C.C. Wentz for the Southwest corner of a said 2,800 acre tract of land conveyed to the Brownsville Navigation District recorded in Volume 297, Page 55 to 57 of the Deed Records of Cameron County, Texas;

Thence South 90 Degrees 00 Minutes 00 Seconds East, with an along the North line of said C.C. Wentz Tract for a distance of 5,155.00 feet to a point of intersection with the East Boundary of Share 32, for the Southeast corner of said 2,800 acre tract, and the Southeast corner of the tract herein described;

Thence North 00 Degrees 39 Minutes 00 Seconds West for a distance of 2,326.74 feet to a point of intersection the Easterly projection of the South line of said 80 acre tract and the 70 acre tract of land, for the Northeast corner of the tract herein described;

Thence North 89 Degrees 56 Minutes 38 Seconds West, at a distance of 102.51 feet passing a ½" steel re-bar set on the Northerly projection of the East line of said 257.53 acre tract of land, at a distance of 1,524.67 feet passing a ½" steel re-bar found for the Southeast corner of said 70 acre tract, at a distance of 3,154.16 feet passing the Southeast corner of said 80 acre tract of land, at a distance of 5,016.42 feet passing the Southwest corner of said 80 acre tract of land, at a distance of 5,064.47 feet passing a ½" steel re-bar set on the Northerly projection of the West line of said 257.53 acre tract of land, for a total distance of 5,129.29 feet to the point of beginning and containing 274.94 acre tract of land.

(Ord. No. 2005-1434, 6-10-2005)

Sec. 82-59. - Disposal of solid waste prohibited.

(a) Generally. The disposal of solid waste is prohibited everywhere in the city and its extraterritorial jurisdiction other than those locations where the disposal of solid waste is specifically allowed under this chapter.

(b) Enforcement.

(1) Violations under this article constitutes a Class C misdemeanor punishable by a fine of not to exceed $500.00. Each day that a violation is on-going constitutes a new violation.

(2) The city may bring a legal action to enjoin violations of this article and seek judgment for any civil penalties not to exceed $10,000.00 for each violation. Each day that a violation is on-going constitutes a new violation.

(Ord. No. 2005-1434, 6-10-2005)

Sec. 82-60. - Variance.

The city may grant variances to the requirements of this chapter if the city finds that granting the variance would not be inconsistent with the promotion of public health, safety, and welfare.

(Ord. No. 2005-1434, 6-10-2005)

3 Mexican Regulatory framework

3.1 Federal laws

3.1.1 General Law for the Prevention and Integrated Management of Waste

TITLE FIRST: General Dispositions.

SINGLE CHAPTER: Objective and scope of application of the law

Article 5.- For purposes of this Act means:

XXIX. Waste: Material or product whose owner or holder disposes and it is in solid or semisolid state, or is a liquid or gas in containers or tanks, and can be valuated or requires treatment or disposal under the dispositions of this Law and other regulations derived from it.

XXX. Special Management Waste: Those generated in productive processes that do not meet the characteristics to be considered hazardous or solid urban waste, or that are produced by large generators of urban solid waste.

TITLE THIRD: Classification of waste

SINGLE CHAPTER: Purposes, criteria and General Basis

Article 19.- Special Management waste are classified as follows, except in the case they are considered hazardous waste in this Law and the Mexican Official Standards:

IV. Transport services waste, as well as those generated as a result of the activities conducted in ports, airports, railway and port stations and customs.

TITLE SIXTH: Prevention and integrated Management of solid urban waste and special management waste.

SINGLE CHAPTER

Article 95.- The regulation of the generation and integrated management of solid urban waste and special management waste, will be carried out according to the stipulations of this Law, the dispositions issued by the legislatures of the states and other applicable dispositions.

Article 96.- The states and municipalities, within their respective competence, with the purpose of promoting the reduction of the generation, valuation and integrated management of solid urban waste and special management waste, in order to protect health and prevent and control environmental pollution produced by its management, must perform the following actions:

I. The control and surveillance of integrated waste management in the field of its competence.

II. Design and implement programs to encourage large waste generators to reduce their generation and bring them to an integrated management.

III. Promoting the subscription of agreements with the large generators of waste within the scope of their competence, to formulate and implement management plans for their generated waste.

IV. Integrate the registration of large waste generators in its scope of competence and waste management service providers, as well as the database in

which information is collected on the type, volume and the way waste are managed.

V. Integrate information regarding the integrated management of municipal solid waste and special management waste, to Environmental Information and Natural Resources National System.

VI. Prepare, update and spread the basic diagnostic for integrated management of municipal solid waste and special management waste.

VII. Coordinate with federal authorities, with other states or municipalities, as appropriate, and arrange with of private and social organizations representatives to achieve the purposes this Law is refered and for the implementation of management plans for waste that are within its jurisdiction.

VIII. Establish programs to improve the environmental performance of supply chains involved in segregation, collection and preparation of municipal solid waste and special management waste for recycling.

Article 97.- Official Mexican Standards establish the terms which shall be subject the site locations, design, construction and operation of facilities for disposal of municipal solid waste and special management waste, in landfills or in controlled confinements.

The standards will specify the conditions to be met by facilities and waste types which may be disposed in them, to prevent leachate formation and its migration from the confinement cells. Also, the standards will rise in which cases can be allowed the biogas formation for its utilization.

Municipalities will regulate land use in accordance with the environmental regulatory and urban development programs, which will consider the areas where will be established the final disposal sites for municipal solid waste and special management waste.

Article 98.- For generation prevention, valuation and integrated management of special management waste, states will establish obligations of generators, distinguishing large and small, and special management service providers, and will formulate criteria and guidelines for its integrated management.

3.1.2 Regulation of the General Law for the Prevention and Integrated Management of Waste

TITLE FIRST: Preliminary Dispositions

Article 8. The Secretariat will publish on its Website the criteria and methodology for developing and updating the inventory of waste dumps or places where they have left waste of different types in each state and, under the second paragraph of the Article 39 of the Law, will integrate the three levels of government.

Article 9.- In an emergency situation related to integrated waste management, the first authority to take cognizance must notify the federal, state or municipal authorities so that they act in accordance with established programs in terms of the provisions of the Civil Protection General Law and other applicable provisions.

Article 11.- The determination to classify a waste as special management, in terms of Article 19, section IX of the Law, will be established in the corresponding Official Mexican standard.

Article 12.- Mexican Official Standards issued by the Secretary for the classification of urban solid waste and special management that will be subject to management plans shall contain:

I. Criteria to be taken into consideration to determine the urban solid waste and special management waste that will be subject to management plan;

II. Criteria for the preparation of listings;

III. Waste listings subject to management plans;

IV. Criteria to be considered for inclusion and exclusion of waste in the listings, at the request of the states and municipalities;

V. Type of management plan, based on the characteristics of waste and associated control mechanisms, and

VI. Elements and procedures to be taken into account in the preparation and implementation of management plans.

The validity of the special management and urban solid waste listings subject to management plans will start from the date determined by the Official Mexican Standards provided in this article.

Article 14.- The principle of shared responsibility, established by the Law, shall also apply to integrated waste management of special management and urban solid waste that are not subject to management plans under the Law, this Regulation and the Official Mexican Standards.

Article 15.- Authorities of the three government levels can coordinate for the exercise of its powers to:

II. Support the dissemination of information needed to boost the valuation culture and exploitation of hazardous, special management and urban solid waste, and

III. Encourage voluntary instrument implementation such as environmental audits, process certification or other forms of agreements proposed by stakeholders to reduce the generation or look for the exploitation of urban solid and special management waste, and avoid the pollution.

TITLE SECOND: Management Plans

Chapter I Generalities

Article 18.- Municipal authorities, in coordination with the Secretary, will implement management plans that incorporate integrated management of hazardous waste generated in households in quantities equal to or lower than those generated by microgenerators, when disposing of consumer products containing hazardous materials, as well as homes or offices, institutions, agencies and entities and will be implemented by them.

States and municipalities providing cleaning public service or execute programs for the separation, collection and storage of waste identified in the previous paragraph and for that reason hold hazardous waste shall comply with

the management criteria set out in the Law, this Regulation and Official Mexican Standards.

Management plans set out in this Article may include other special management waste and urban solid waste that, according to the Law; are not subject to a management plan.

TITLE FOURTH: Hazardous waste

Chapter II Generators Categories and Registration

Article 42.- According to the categories established in the Law, hazardous waste generators are:

II. Small generator: Whoever performs an activity that generate a greater amount than four hundred kilograms and less than ten tons gross weight of hazardous waste per year or its equivalent in another unit of measure.

TITLE SIXTH: Polluted site remediation

Chapter II Remediation Programs

Section V Remediation Proposals

Article 143.- Proposals for emergency remediation and environmental liabilities will be integrated into the remediation program and shall contain:

IX. Evacuation plan for urban solid waste, construction waste, special management waste and hazardous waste on the site in the case of environmental liabilities.

3.2 State and local laws

3.2.1 Chihuahua

3.2.1.1 State laws

3.2.1.1.1 Law of Ecological Equilibrium and Environmental Protection of the State of Chihuahua

TITLE FIRST: General Dispositions

Article 5.- For purposes of this Law means:

VI. Utilization of waste: Set of actions aimed to recover the economic value of waste that can be recycled and does not pose a risk in reuse;

XXI. Disposal: Action to permanently deposit or confine waste in sites and facilities whose characteristics allow to prevent their liberation to environment and the consequent affectations to health and ecosystems and their elements.

XXXI. Waste Management: Articulated and interrelated set of normative, operative, financial, planning, administrative, social, educational, monitoring, supervision and evaluation actions, for waste management, from generation to final disposal, in order to achieve environmental benefits, economic optimization of management and social acceptance, responding to the needs and circumstances of each locality or region;

XXXII. Environmental impact: Modification of the environment caused by the action of man or nature;

XXXIII. Waste Inventory: Database in which waste generation volumes are settled with order and classification, which is integrated from the information provided by generators in the formats established for this purpose, in accordance with this ordinance.

XXXVII. Integrated Management: Activities of source reduction, separation, reuse, recycling, co-processing, biological, chemical, physical or thermal treatment, collection, storage, transportation and disposal of waste, individually made or combined appropriately, to adapt to conditions and needs of each place, fulfilling objectives of valuation, sanitary, environmental, technological, economic and social efficiency.

XLI. Management Plan: Instrument used to minimize generation and maximize the value of urban solid waste, special management waste and specific hazardous waste, under criteria of environmental, technological, economic and social efficiency, based on the Basic Diagnostic for Integrated Waste Management, designed under the principles of shared responsibility and integrated management, which considers the set of actions, procedures and practical means and involves producers, importers, exporters, distributors, traders, consumers, byproduct users and large waste generators, as appropriate, as well as all three levels of government;

XLVIII. Waste: Any material generated in the processes of extraction, beneficiation, processing, production, consumption, use, control or treatment, which its quality does not allows to use it again in the process that generated it.

LIV. Special Management Waste: Waste generated in production processes, that do not have the characteristics to be considered hazardous waste or urban solid waste, or are produced by municipal solid waste large generators as defined in the General Law for the Prevention and Integrated Management of Waste.

TITLE SECOND: Concurrence of the State and Municipalities and Environmental Management.

CHAPTER I: Jurisdiction of State and Municipalities

Article 8.- It corresponds to the Executive of the State, by conduit of the Secretary:

XIII. Formulate, lead and evaluate State policy and elaborate special management waste programs, according to National Program for the Prevention and Integral Management of waste and remediation of polluted sites.

XIV. Issue, in accordance with its powers and in accordance with the General Law for the Prevention and Integral Management of Waste, the guidelines on special management waste, as well as prevention of the pollution of sites and their remediation. Likewise, authorize the comprehensive management of waste and to identify those may be subject to management plans, treatment and confinement within the territory of the State.

XVII. Establish the registration of management plans and programs for the installation of systems for its collection, storage, transport, treatment, valuation and disposal, in accordance with the guidelines established in this law,

in the Mexican Official Standards in the environmental field and in the State Ecological Technique Standards that are issued, in the ambit of its competence.

XVIII. Promote, in coordination with the Federal Government and the relevant authorities, the creation of infrastructure in the State for the Integrated management of urban solid, special management and hazardous waste, with the participation of investors and social representatives.

XIX. Promote and follow up on State and municipal programs for saving electricity, classification, separation, management, collection and transport of urban, organic and inorganic solid waste, and prevention and management of waste within their competence, as well as prevention of pollution of polluted sites and their remediation, with the active participation of interested parts.

XXII. Promote the involvement of the private and social sectors, in the design and implementation of actions to prevent the generation of special management waste, and carry out its proper management, as well as for the prevention of the pollution of sites with these waste and its remediation, along the guidelines of this law and the corresponding Official Mexican Standards.

XXIX. Submit for consideration by the Secretary, programs for the establishment of Integrated waste management systems of special management waste and the construction and operation of landfills, to receive technical assistance from the Federal Government for this purpose.

TITLE SEVENTH: Environmental Protection

CHAPTER I: Prevention and control of pollution of the atmosphere.

Article 98.- In the field of air pollution and in accordance with provisions of this law, the State and the municipalities, within their respective jurisdictions, will make the following:

X. They will issue the provisions and shall establish measures to prevent the burning of any type of solid or liquid waste, including domestic trash, litter, dried herb, agricultural esquilines, tires, plastics, lubricants, solvents and others, as well as burnings for the purpose of land clearing or weeding.

CHAPTER III: Noise, vibration, odors, and energy pollution control

Article 117.- It is forbidden to throw any type of waste in public streets, highways and roads. The State Government through the Secretary, and the municipalities, shall take the necessary measures in this regard and, where appropriate, apply corresponding sanctions.

TITLE EIGHT: Regulations of activities that may cause harmful effects.

CHAPTER III: Municipal services

Article 129.- Confinement or the final disposal of non-hazardous solid waste that can accumulate and are deposited in the soil or are incinerated, must be done exclusively on the sites or facilities that are operated by the municipality for that purpose or concessions to individuals.

CHAPTER VI: Waste Classification

Article 148.- Special Management waste are classified as indicated below, except in the case of waste considered as hazardous in the corresponding Mexican Official Standards:

VIII. Technological waste from computing industries, electronics or motor vehicle manufacturers and others at the end of their lifetime, because of their characteristics, require a specific management.

CHAPTER VII: Integration of waste management programs

Article 150.- The secretary will develop and implement local programs for the prevention and urban solid and special management waste management, in accordance with this Law, with the Basic Diagnosis for the Integrated Waste management and other applicable provisions. These programs shall contain at least the following:

II. The local policy of urban solid and special management waste;

III. The definition of objectives and local goals for the prevention and improvement of the management of urban solid and special management waste, as well as strategies and timelines for their implementation.

CHAPTER VIII: Management plans

Article 152.- They will be obliged to the manifestation of their waste generation and to the formulation and implementation of management plans, large generators and producers, importers, exporters and distributors of the products when discarded turns in solid urban waste or special management waste that are included in the list of waste subject to management plans in accordance with the corresponding Mexican Official Standards and the applicable state ecological technique Standards.

Article 155.- Companies or establishments responsible for management plans will submit to the Secretary, for its information and registration, special management waste, a list of non-hazardous solid waste requiring special management for recycling. To the same effect, the municipalities the urban solid waste, in accordance with the provisions of this law and as determined by its regulation and other legal ordainment derived from it.

When it is intended to make changes, modifications, or alterations in its activities, that cause increases in the amount of generated waste, must first obtain the authorization of the Direction of Ecology, the update of the special management waste generating company.

CHAPTER IX: Prevention and urban solid and special management waste integrated management.

Article 156.- Regulation of generation and integrated management of urban solid and non-hazardous waste requiring special management, be carried out in accordance with that established by this law and other applicable provisions

Article 157.- State Executive, through the Secretary, and the municipalities, within the scope of their respective competencies, with the purpose of promoting the reduction of the generation, recycling and integrated management of urban solid waste and the special management waste, in order to protect health and prevent and control environmental pollution caused by their management, must be carried out the following actions:

V. Integrate the information concerning the management of urban solid waste and special management waste to the National System of Environmental Information and Natural Resources.

VI. Develop, update and disseminate the basic diagnosis for the integrated management of urban solid waste and the special management waste.

VIII. Establish programs to improve the environmental performance of the productive chains involved in segregation, collection and preparation of urban solid waste and special management waste for their recycling.

IX. Develop guidelines for segregation, collection, storage, recycling, treatment and transport of waste.

Article 158.- The Official Mexican Standards, will establish the terms which the location of sites, design, construction and operation of facilities intended for the final disposal of urban solid waste and those requiring special management shall be subject, in landfills or controlled confinement.

Standards specify the conditions to be met by the facilities and the types of waste that can be disposed on them, to prevent the formation of leachate and migration of these outside the confinement cells. They also will arise in which cases may allow the formation of biogas its use.

Municipalities regulate land uses, in accordance with ecological land and urban development programs, which will consider the areas where final disposal of urban solid waste and special management waste can be conducted.

Article 159.- For the prevention of the generation and integrated management of special management waste, State Executive, through the Secretary, shall establish the obligations of generators, distinguishing large and small, and those of the service providers of the collection, disposal and treatment of waste, will formulate criteria and guidelines for its integrated management.

3.2.1.2 Local laws

3.2.1.2.1 City of Juarez

Municipal Regulation of Ecology and Environmental Protection of the Municipality of Juarez, Chih.

TITLE FIRST: Generalities

Chapter I Ecological terms definitions

Article 1.- For all relating to this regulation, will apply the following definitions, unless the term is defined differently in the General Law of Ecological Equilibrium and Environmental Protection, in which case the definition established in the Law will prevail.

II. Storage: Action of temporarily retain raw materials and waste as long as are processed for their use, are delivered to the collection services or is disposed.

XXVI. Final disposal: Action of permanently deposit waste in appropriate sites and conditions to prevent damage to the environment.

XLVII. Generation manifesto: Document by which every waste generator expresses the amount of waste generated, as well as their characteristics and origin.

LXIII. Recycling: Method of treatment, which consists in the waste transformation with productive purposes.

LXIV. Collection: Action of gathering and transferring waste of equipment designed to lead them to storage, treatment or reuse facilities or final disposal sites.

Chapter II General Provisions

Article 7.- Corresponds to the Direction and where appropriate to the Municipal Water and Sanitation Council:

X. The vigilance in regard to the management and final disposal of non-hazardous solid waste, as well as monitoring the management of non-hazardous industrial waste.

XV. Coordinate and execute, direct actions of protection in environmental restoration, such as reforestation, non-hazardous solid waste management, prevention of erosion, urban impacts generated by the industry studies and those activities that degrade the population quality of life.

Article 9.- Corresponds to the Municipal Committee of Ecology:

IX. Assist in the actions to be taken for environmental restoration, such as reforestation, management of solid waste, erosion, land use, urban impacts in the establishment of industries and activities that degrade the population quality of life.

TITLE SECOND: Air quality

Chapter I Emitting Sources

Article 11.- It is the responsibility of the direction to carry out actions to prevent and control the pollution of the atmosphere in municipal competition sources being able to:

VIII. Issue agreements in coordination with the federal authorities or the State, according to its competition, to prevent the unauthorized burning of any type of solid or liquid waste, including domestic trash, litter, dried herb, agricultural esquiline, tires, plastics, lubricants, solvents as well as burning of agricultural fields or urban lands for the purpose of clearing or weeding.

TITLE FOURTH: Ecologic Policy Instruments

Chapter II: Environmental Impact

Article 127.- It is required the following minimum information on related to the project or activity for the evaluation of environmental impact:

II. Description of the work or projected activity from the stage of site selection for the project execution in the development of the activity; the area of land required; construction program, facilities mounting and corresponding operation; the type of activity, in its case, expected production volumes, and necessary investments; the type and quantity of natural resources to be used, both in the construction and operating stage; the program for waste management;

in the construction, operating and development of the activity; and the program for the site abandonment or activities cessation.

TITLE FIFTH: Environmental Protection

Chapter I Non-Hazardous Solid Waste

Article 137.- Must attach to the authorization of the Direction according to the current Standards, location, installation and operation of collection, storage, transport, accommodation, recovery, treatment and disposal of non-hazardous solid waste systems, whether operated by the municipality itself or granted to individuals.

Article 138.- Non-hazardous solid waste management must be based on the following criteria:

I. Solid waste constitute the main source of soil pollution, so their control is unavoidable.

II. Municipal and industrial, non-hazardous solid waste contain reusable and recyclable materials, whose recovery through appropriate procedures and techniques contributes to reduce the generation of such waste.

III. For vehicles used tires, the municipality will establish a program for their proper disposal for whose effect rights must payed established in the in the law of income municipality law.

Article 139.- All merchant or dealer of used tires that generate waste must be channeled to points of accumulation and must pay for the final disposition.

Article 140.- Collection centers are required to recycle tires or, dispose them adequately, complying with the guidelines established by the municipality.

Article 141.- Vulcanizers, merchants or distributors are obliged to render the tire useless in the presence of the user at the time that is considered as waste.

Article 142.- Points of accumulation or in its case municipality will extend a tax receipt in which will be recorded the number of tires and quantity that will be received, and the size of them, carrying a logbook in coordination with the Direction.

Article 144.- For the location, installation and operation of non-hazardous waste management systems, will be taken into account the ecological regulation and urban development plans.

Article 145.- Non-hazardous solid waste that build up or can accumulate and are deposited in the soil, must meet the conditions necessary to prevent or avoid:

I. Subsoil pollution.

II. Harmful alterations in biological processes occurring in soils.

III. Alteration of the characteristics of the soil that limit or prevent its use or exploitation.

IV. Risks and health problems.
V. Visual pollution.

Article 146.- Any discharge or non-hazardous solid waste deposit in soils will be subject to the provisions of this regulation, the Official Mexican Standards and State and municipal regulations.

Article 147.- In order to preserve environment and ecosystems, Cleaning Management in coordination with the Direction and the Municipal Committee will monitor the following actions are carried out:
I. Make the cleaning of the city through:
a) Collection and transport of urban solid waste to its final destination.

CONSTRUCTION REGULATION OF THE MUNICIPALITY OF JUAREZ, STATE OF CHIHUAHUA

TITLE FIRST: Administrative dispositions
CHAPTER 22- Requirements of the constructions destined for warehouses
SECTION 2201. Definition
b) The buildings, structures, establishments on the open in which vehicles are stored or used parts for automobiles, storage centers of recyclable materials, or parts of them which store highly flammable materials or hazardous, with high risk of fire, will have to comply with what's stated on chapter 21. The buildings destined to the storage of rubber foams, rubber sponges or plastic foams, whether as raw materials or as manufactured products, and rubber tires, must comply with what's stated in this chapter 22 but they won't be allowed to have basements.

3.2.1.2.2 City of Ojinaga

REGULATION OF THE PUBLIC CLEANING SERVICE FOR THE MUNICIPALITY OF OJINAGA

EIGHTH CHAPTER: Final disposition of non-hazardous solid waste
Article 33.-In the final disposal site of non hazardous waste of the municipality it's forbidden to store, dispose of and treat hazardous waste.

Non hazardous waste originated from tree pruning, construction debris, tires and other similar waste must be located in places specifically assigned by the Direction of Municipal Cleaning Service.

NINTH CHAPTER: Treatment of non-hazardous solid waste.
Article 37.- The incineration of non-hazardous solid waste can only be performed in equipment designed for this end use.

3.2.2 Coahuila

3.2.2.1 State laws

3.2.2.1.1 Law of Ecological Equilibrium and Environmental Protection of the State of Coahuila

TITLE FIRST: General Dispositions
CHAPTER I: Objectives and Definitions
Article 3. - For purposes of this Act is meant by:
XXXVII. - Jales: Waste generated in the primary operations of separation and concentration of minerals. Mexican term which applies to the deposit of residual materials resulting from the process of useful minerals. It is build by the action of man, which can occupy areas of several square kilometers and heights of ten or more meters.
XXXVIII. - LGEEPA: General Law of Ecological Equilibrium and Environmental Protection
XLI. - Hazardous Material. The elements, substances, compounds, mixtures of them or residues that regardless of their physical condition, pose a risk to the environment, health or natural resources due to their corrosive, reactive, explosive, toxic, flammable or biological-infectious characteristics.
LI. - Waste: Any material generated in the processes of extraction, beneficiation, transformation, production, consumption, utilization, control or treatment, whose quality does not allow use again in the process that produced it.
LIII. - Municipal solid waste: Solid waste resulting from domestic, commercial and small-scale services which are not considered hazardous according to current environmental regulations.
LIV. – Nonhazardous solid waste: Any material which is not dangerous according to the listings for that purpose by the Secretary of Environment, Natural Resources and Fisheries.
LVI. - Reuse: The use of all waste or solid waste, liquid or gas that can be used again, either in its present form or through physical, chemical, mechanical or biological transformations.

CHAPTER II: The Distribution and Coordination Competencies
Section I: The Attributes of Authorities
Article 10.- The Main Office shall have the following powers:
XXIX. - Regulate collection systems, transportation, storage, management, treatment and disposal of industrial solid waste which are not considered hazardous in accordance with the provisions of this Act;

Article 11.- For purposes of this Act, municipalities have the following powers:
V. - Implement legal provisions on the prevention and control of environmental effects caused by the generation, transportation, storage, management, treatment and disposal of municipal solid waste and industrial that are not considered hazardous;

VIII. - Implement legal provisions on the prevention and control of noise pollution, vibration, heat, light, electromagnetic radiation and harmful odors to the ecological balance and environment from stationary sources that function as local commercial or service, as well as from the outcome of the open-fire burning of any type of nonhazardous solid waste;

Section II: Coordination of Competencies between the State and Municipalities

Article 12.- The State Executive may enter into agreements or arrangements for coordination and implementation with federal and municipal governments, with the participation, if any of the sectors of society, in order to fulfill the objectives of this Act and with the following functions relating to:

II. - The control of hazardous waste considered as low hazard in accordance with the provisions of the LGEEPA;

CHAPTER IV: The instruments of environmental policy state

Section II: Programs of Ecological Ordering State and Municipal

Article 25.- The Municipal Ecological Program must include:

V. - A balance of natural resources including:

d) An inventory of the different generators of nonhazardous solid waste and the amount produced by each one of them;

TITLE FOURTH: The environmental protection

CHAPTER I: General Dispositions

Article 99.- The Authority, in coordination with the agencies of Public Administration from the State and municipal authorities in their respective areas of responsibility shall integrate an inventory of air emissions, wastewater discharges into the sewer systems and materials and nonhazardous solid waste in the terms of this law, as well as coordinating the records established by this law and create a consolidated information system based on the authorizations, licenses or permits granted.

CHAPTER II: Prevention and control of pollution of the atmosphere

Section II: Control of Emissions from Stationary Sources

Article 113.- It is forbidden to burn municipal solid waste and vegetable material resulting from cleaning, disassembling, or paring of any land for purposes of construction or any other purpose, except when performed under a permit written exclusively by the Direction or, when applicable, the municipalities. Only in cases where the burn will not seriously impact air quality and justified for social reasons or agricultural.

CHAPTER III: The noise, the vibration, the energies of heat and light, the smells and the visual pollution

Article 126.- Those responsible for noise sources shall provide to the competent authorities the information they require for emissions that they generate, as well as a justification in case of no to comply with the permissible

limits for technical or socio-economic reasons, in which case the authority of knowledge set the maximum permissible levels, specific to these sources.

CHAPTER V: The prevention and pollution control of soil and organic deterioration in urban areas

Section I: Management and Disposal of Non-Hazardous Waste

Article 142.- For the prevention and control of pollution of the ground, consider the following criteria:

II. - Nonhazardous solid waste must be managed properly, since they are a major source of soil contamination;

III. - It is necessary to prevent and reduce the generation of solid and industrial waste that are not considered hazardous, to incorporate techniques and procedures for reuse and recycling, and to regulate their management and disposal, and

IV. - In soils contaminated by the presence of materials or non-hazardous waste must be carried out to recover or restore their conditions, so that they can be used in any type of activity planned in urban development plan or land-use where applicable.

Article 143.- The criteria to prevent and control pollution of the soil are considered, particularly in:

II. - Operating systems and clean disposal of nonhazardous solid waste, including sanitary landfills

Article 144.- The waste that accumulate or may accumulate and are deposited or infiltrated in the soil must meet the conditions necessary to prevent or avoid:

I. - Soil contamination;

II. - The harmful alterations in the biological process of soils;

III. - The soil disturbances that may impair your benefit, use or exploitation;

IV. - Risks and health problems.

Article 145.- Corresponds to municipalities to implement the dispositions of law relating to the management and disposal of municipal solid waste, for which they can:

I. - Implement legal dispositions on the prevention and control of environmental effects caused by the generation, transportation, storage, management, treatment and disposal of municipal solid waste;

II. - Authorize the establishment of sites for disposal of municipal solid waste;

III. - Exercising control over the facilities and operation of landfills or storage of such waste;

IV. - Exercising control and issuing the appropriate permits with respect to the operation of collection systems, storage, transport, accommodation, reuse, treatment and disposal of municipal solid waste;

Article 146.- Generation, management and disposal of slow degradation waste shall be subject to the establishment in the official Mexican standards issued by the Federation. Also, the generator is responsible to reuse and / or disposal.

Article 147.- Any discharge or deposit of non-hazardous solid waste in the soils of local competition, will be subject to the provisions of this Act, its regulations and Mexican Official Standards issued by the Federation to that effect.

Article 148.- For the location, installation and operation of management systems for nonhazardous solid waste shall take into account the land-use plans and urban development programs from State and its Municipalities.

Article 149.- The municipal authorities shall take the necessary measures in order to rationalize the generation of municipal solid waste and industrial non-hazardous and incorporate techniques and procedures for sorting, reuse and recycling. In the case of hazardous materials or waste shall be subject to the provisions of LGEEPA on the matter.

Article 150.- The municipalities, when they find it necessary, may apply to the Federation or the State technical assistance required for:

I. - Implementation and improvement of collection systems, treatment and disposal of nonhazardous solid waste, and

II. - Identification of alternatives for reuse and disposal of the waste in question, including inventories of themselves and their generating sources.

3.2.2.1.2 Law for the Prevention and Integrated Management of Waste of the State of Coahuila

TITLE FIRST: General Dispositions

SOLE CHAPTER: Subject to this Law

Article 1.- This law is a public order and social interest and aims to ensure the right of everyone to an adequate environment and promote sustainable development through regulation of the generation, recovery and integrated management of urban solid waste and special management waste, as well as pollution prevention and remediation of soil contaminated with waste.

Article 2.- For purposes of this Act, apply the definitions contained in the General Law for Prevention and Integral Management of Waste and other legal regulations as well as the following:

I. Collecting: The act of gathering waste in a particular place and appropriate to prevent risks to health and the environment, to facilitate their collection;

II. Storage: temporary retention of waste in placed to prevent damage to the environment, natural resources and the health of the population, since they are reused, recycled, treated for their use or available;

IV. Container: The vessel destined for the environmentally storage and temporary form of urban solid waste or special management during collecting and transfer;

VI. Company management service: A person or company registered and authorized to provide services to third parties to perform any of the steps involved in integrated waste management and those special stages of the comprehensive management of urban solid waste subject to authorization;

VII. Large generator: A person or company that generates an amount equal or greater than ten tons of waste per year;

XI. Collection: The action of receiving municipal solid waste or special management from its generators and transfer to authorized facilities, store, reuse, recycle, treat or dispose of in landfills or controlled sites;

TITLE SECOND: Distribution of competencies and coordination of authorities.

First Chapter: Authorities and Powers

Article 5.- The State Executive shall have the following powers:

I. Establishing state policy on waste;

II. Linking and integrating environmental policy and the provisions established by this law on integrated waste management;

III. Develop and evaluate the state program for the prevention and integrated waste management, and where appropriate regional programs;

IV. Develop and evaluate the program for the prevention and management for special management waste;

V. Regulate integrated waste management of special management waste and prevent and control of pollution caused by such waste;

VI. Promote coordination with the federal government and municipalities, the creation of infrastructure for the integrated management of urban solid waste, special management and hazardous waste in the state, with the participation of investors and representatives of social sectors;

VII. Promote research, development and application of technologies, equipment, systems and processes that eliminate, reduce or minimize environmental release and transfer from one to another of its elements, pollutants from the integrated management of urban solid waste and special management;

Article 6.- The Secretary shall have the following powers:
I. Develop, conduct and review government policy on special management waste;

III. Establish and maintain a register of waste management plans for special management waste in accordance with the guidelines determined in the regulations of this law;

V. Authorize the integrated waste management of special management waste;

VIII. Performing the studies and infrastructure projects to manage urban solid waste and special management waste;

IX. Deliver an opinion on the design, construction, operation and closure of transfer stations, plant selection and treatment, and disposal sites of waste;

XIII. Promote prevention programs and comprehensive management of municipal solid waste and special management waste, with the participation of concerned parties;

XIV. Propose to the holder of the Executive the legal issue enabling the integrated management of special management waste and prevention of pollution of the waste sites and their remediation;

Article 7.- The Secretary shall have the following powers:

I. Verify compliance of the instruments and legal provisions on special management waste;

II. Inspect and monitor the integrated management of special management waste;

Article 8.- Municipalities have the following powers:

IV. Prevent the generation and control the integrated management of urban solid waste;

V. Train public servants involved in the provision of clean public service, collection, transfer, treatment and disposal of waste;

XIV. Avoid open dumps or sites not controlled of urban solid waste;

XV. Spread among the population practices of separation, reuse and recycling;

TITLE THIRD: Instruments of Prevention Policy and Integral Management of Waste

FIRST CHAPTER: State Program for Prevention and Integrated Waste Management

Article 11.- The State Executive through the Secretary set the state program for the prevention and integrated waste management in accordance with this law, with the initial analysis for the integrated management of urban solid waste and special management and other applicable provisions.

The state program for the prevention and integrated management of waste must be made in accordance with the stipulations of the national program of the matter, considering the following guidelines:

I. Apply the principles of recovery, shared responsibility and integrated waste management;

II. Take action to reduce waste generation, separation at source of origin, and its proper utilization, treatment and disposal;

IV. Promote the reduction of the amount of waste which reach disposal;

VIII. Promote measures to prevent the collection of residues in areas or conditions not authorized by the competent authority;

V. Provide the necessary infrastructure to ensure that waste is managed in environmentally adequate manner;

VI. Harmonization of policies for land use and ecological integrated waste management, identifying appropriate areas for the implementation of infrastructure for storage, treatment and disposal;

Article 12.- The Secretary will develop, will implement and will review the program for the prevention and integrated management of waste requiring special management.

Similarly, municipalities will develop, will implement and will evaluate municipal programs for the prevention and comprehensive management of urban

solid waste, who may require technical support from the Secretary for that purpose.

Article 13.- The programs referred to in the preceding article shall contain at least the following:

I. Policy on urban solid waste and special management waste, as appropriate;

II. Definition of objectives and targets for the prevention of the generation and improving the management of urban solid waste and special management waste, and the strategies and timelines for compliance;

SECOND CHAPTER: Management Plans

Article 14.- Management plans of urban solid waste and special management waste shall be aimed, among others, to:

I. Identify ways to prevent or reduce their generation;

II. Establish management regimes in which apply the principle of shared responsibility of the various sectors involved;

III. Establish mechanisms to reuse, recycle or take advantage of waste that cannot be avoided, in accordance with applicable laws and as far as this is environmentally appropriate, economically viable and technologically feasible;

IV. Reduce the volume and risk on management of waste that cannot be valued, in accordance with applicable laws;

V. Encourage innovation in processes, methods and technologies to achieve an integrated waste management that will be economically feasible, and

VI. Dispose finally in a landfill or in a controlled site, as appropriate, waste that cannot be susceptible valorized.

Article 16.- Shall be obliged to the formulation and implementation of management plans large generators and producers, importers, exporters and distributors of products that, when they are disposed, become in urban solid waste or special management waste which are included in the lists of waste subject to management plans in accordance with the relevant Mexican Official Standards.

Article 18.- The large generators of urban solid waste and special management waste should incorporate a proposal to support the development of individual management plans, to be presented to the Secretary for validation and in which, based on, among others, the following :

I. The name, corporate name of the person submitting the proposal, the legal representative if applicable, the name of those authorized to receive notices, the administrative body to that address, place and date of preparation. The proposal must be signed by the applicant or his legal representative;

II. The waste generated will be the subject of management plans;

Article 19.- The Secretary may convene gradually, jointly with the councils , producers, importers, distributors and marketers of consumer products that, when they are disposed, become urban solid waste and special management waste, which may be subject to management plans under the provisions of general law, the Mexican Official Standards and this law in order to:

I. Publicize that are priorities for attention for the degree of difficulty involved on relevant waste management or environmental problems that have been associated with common forms of disposal thereof;

II. Propose the development of pilot projects to gradually allow the return of waste by consumers, in order to deal with recycling, treatment or disposal;

THIRD CHAPTER: Instruments to encourage prevention and integrated waste management

Article 22.- The State Executive, in coordination with the competent authorities, evaluate, develop and promote the implementation of economic instruments, tax, financial or market incentives for the prevention of the generation, separation, storage and use, and treatment and final disposal of waste subject to the dispositions of this law.

In those cases where it is technically and economically feasible, promote the creation of production chains and provide incentives for the establishment of management plans.

Article 23.- The Secretary will promote the application of incentives to encourage private sector investment in technology development, equipment acquisition and construction of infrastructure to facilitate the prevention of the generation, reuse, recycling, treatment and final disposition of urban solid waste and special management waste and hazardous waste generated by home and micro cogeneration, in a way environmentally appropriate.

FOURTH CHAPTER: From Environmental Culture

Article 24.- State education authorities will promote the incorporation of environmental culture contents of study programs to enable the development of habits designed to achieve waste minimization.

The state's educational institutions are obliged to incorporate as part of their equipment, separate storage containers for urban solid waste and special management waste in accordance with the provisions of this law and other legal regulations.

The Secretary will support these institutions, to promote the education and environmental culture in the state.

TITLE FOURTH: The Integral Management Waste

FIRST CHAPTER: From Waste Classification

Article 29.- Special management waste are classified as follows, except in the case considered hazardous waste by the general law and in the Mexican Official Standards for:

I. Waste rocks or decomposition products that may only be used for the manufacture of building materials or are intended for this purpose, as well as the products derived from the decomposition of rocks, excluding federal jurisdiction under Sections IV and V of Article 5 of the Mining Law;

II. Health services waste generated by establishments performing medical-care activities to human or animal populations, research centers, with the exception of biological-infectious;

III. Waste generated by fish farming, agriculture, forestry, poultry or livestock waste including the inputs used in these activities;

IV. Non-hazardous industrial waste generated by industrial processes or installations which do not have hazardous characteristics in accordance with existing environmental regulations;

V. Waste from transport services, as well as those generated as a result of the activities taking place in airports, railway terminals and customs;

VI. Sludge from wastewater treatment;

VII. Waste from department stores or shopping centers generated in large volumes;

VIII. Construction waste, general maintenance and demolition;

IX. Technological waste from the industries of information technology, electronics manufacturers or motor vehicles and others which, passing its life, by their nature, require specific management and

X. Others who are determined as such by the Secretary.

SECOND CHAPTER: General Obligations of Waste Generators

Article 32.- The individuals and businesses that generate urban solid waste and special management waste will be responsible until their reuse and / or disposal.

Article 33.- Is the obligation of every person generating urban solid waste and special management waste:

I. Separate and reduce waste generation;

II. Encourage the reuse and recycling of waste;

III. Comply with specific criteria, standards and technical recommendations applicable to the integrated management of urban solid waste and special management waste;

IV. Make known to the competent authorities deemed violations were committed against the regulation of waste

Article 34.- Large generators of special management waste, are obliged to:

VI. Submit to the Secretary an annual generation volumes and forms of waste management of special management generated in large volumes.

TITLE FIFTH: Integrated Waste Management

FIRST CHAPTER: Of the authorizations

Article 37.- The integrated management of waste comprises the following steps:

I. Source reduction;

II. Separation;

III. Reuse;

IV. Clean or sweep;

V. Collection;

VI. Gathering;

VII. Storage;

VIII. Moving or transportation;
IX. Co-processing;
X. Treatment;
XI. Recycling,
XII. Disposal.

The clean or sweep stage is excluded from the integrated waste management of special management waste

In the case of urban solid waste, clean or sweep stage , collection, transfer, or transportation treatment and disposal shall be provided by the municipalities for being a public service

Article 38.- Authorization is required from the Secretary to carry out the stages of integrated waste management of special management established in sections II, III and V to XII of the preceding article.

Municipalities may authorize the stages of the integrated management of urban solid waste identified in Sections V, VII, IX and XI of the preceding article.

The authorizations shall be granted for time.

The Regulation of this Act, shall indicate the terms and conditions of licenses.

SECOND CHAPTER: Phases of Integrated Waste Management

Article 43.- It is the responsibility of all urban solid waste and special management generators look for alternatives and implement actions to reduce or minimize the generation or where appropriate, strive for the biodegradability of these.

Article 51.- Collection of special management waste is obligation of its generators who may contract a management service company to perform this step.

Article 53.- Transportation of urban solid waste and special management waste in the state, will be made with the approval of state and municipal authorities in their jurisdiction.

For the transportation of urban solid waste and special management waste should be considered:

I. Necessary conditions for transportation, depending on the type of waste in question;

II. Security measures in the transport, both environmental in an integral way and human health as a priority,

III. The best transport routes, depending on points of departure and destination of waste.

Article 54.- Sites for the treatment and final disposal of urban solid waste and special management waste, in addition to complying with the requirements set forth in Article 39 of this Act, shall require authorization of environmental impact in the terms established by the Law of Ecological Equilibrium and Environmental Protection of the State and other applicable regulations.

TITLE SEVENTH: Safety measures, penalties, and repair of damage and resource review

SIXTH CHAPTER: Public Information

Article 80.- The State and municipal authorities develop, update and disseminate inventories of hazardous waste, urban solid waste and special management waste generation, according to their respective powers, for which will be based on data provided to them by generators and companies of waste management services, accordance with this Law and legal orders derived from it.

In addition, will integrate inventory of waste dumps or sites where have been abandoned illegally waste of different types in each state, in which settle data about their location, origin, characteristics and other information that are useful to the authorities, to develop measures to avoid or reduce risks. Integration of inventory will be based on criteria, methods and systems, previously agreed, standardized and disseminated.

3.2.2.1.3 Regulation of the Ecological Balance and Environmental Protection Law of the State of Coahuila de Zaragoza on matter of Environmental Impact

THIRD CHAPTER: Works and activities that require authorization in Environmental Impact and Exceptions

Article 7.- Those pretending to conduct or develop any of the following Works or activities, must submit to evaluation and require authorization from the Secretary on matters of environmental impact:

1. Works and activities of environmental sanitation such as wastewater treatment plants and integrated management of non-hazardous waste

2. Construction and operation of accumulation centers (acopio) and/or temporary storage of special-management waste.

3. Construction and operation of facilities for the segregation of special-management waste.

4. Construction and operation of facilities or systems for special-management waste treatment.

5. Construction and operation of special-management waste transfer stations.

8. Construction and operation of facilities for shelter of equipments, machinery and vehicles use on the transportation of special-management and solid-urban waste.

9. Construction and operation of final disposal sites of solid-urban and special-management waste.

10. Works and activities for the remediation of sites contaminated with special-management or solid-urban waste with a surface equal or higher that one hectare.

FIFTH CHAPTER: Procedure for evaluation of Environmental Impact Manifest

Article 23.- When is about works or activities of mining, parks, corridors, industrial zones or developments where no high-risk activities are considered;

storage, segregation, treatment facilities, transfer stations and final disposal sites of special-management and solid-urban waste that must be subject of the environmental impact evaluation procedure in conformance to this regulation, the Secretary will notify municipal governments, within the five following working days of the integration of the file, that a related environmental impact assessment has been received, with the objective that these, emit the opinion they consider opportune during the evaluation procedure.

Municipal authorities must emit their opinion in a time frame not longer that five working days, from the notification, in case of no response to the above, it will be understood that there are no observations to the project.

The authorization that the Secretary issues, does not obligate in any way to the municipal authorities to issue any authorization that corresponds to their applicable jurisdiction.

3.2.2.1.4 Regulation of the Ecological Balance and Environmental Protection Law of the State of Coahuila de Zaragoza on matter of Contaminants Emissions and Transfer Registry

FIRST CHAPTER: General Provisions

Article 3.- For the effects of this Regulation the definitions content in the Ecological Balance and Environmental Protection Law of the State of Coahuila de Zaragoza and other applicable laws, as well as the following:

XIII. Report: Annual Operations Report (COA), reporting instrument and compilation of information or the emissions and transfers of contaminants to air, water, soil sub-soil, special-management waste and materials, used for the updating of the Registry Database;

XIV. Registry: The Contaminants Emissions and Transfer Registry (RETC) of State jurisdiction, that integrates the information of the facilities subject to report about their contaminant emissions to the air, water and soil and sub-soil, special-management materials and waste, as well as those substances that competent authorities determinate, which will be operated and managed by the Environmental Secretary of the State of Coahuila de Zaragoza

XVII. Transfer: Translation of substances subject to report to a place physically separated from the facility that generated, with the intention of reuse, recycle, energy obtaining, treatment or confinement; including water discharges and management of special-management waste, except for their storage;

SECOND CHAPTER: Attributions on Registry of Emissions and Pollutant Transfer.

Article 4.- The Secretary is empowered to:

II. Integrate and keep the Registry updated with the information of fixed sources of their jurisdiction, about their contaminants emissions and transfers to the air, waste, soil and sub-soil, materials and waste, as well as the substances subject to State jurisdiction report for the contaminants emissions and transfer registry, and those established on the Mexican Official Norm or State Technical Norm published for such effect. Such registry will be operated and managed by the Secretary;

Article 5.- Corresponds to the Municipalities:

II. To integrate and keep the Registry updated with the information of fixed sources of their competence, about their contaminants emissions and transfers to the air, waste, soil and sub-soil, materials and waste, as well as the substances subject to municipal jurisdiction report for the contaminants emissions and transfer registry, and those established on the Mexican Official Norm or State Technical Norm published for such effect. Such registry will be operated and managed by the municipalities;

Article 7.- The information integrated to the Registry Database presented by facilities subject to report, will be updated with the data corresponding to their contaminants and substances, materials and special-management waste emissions and transfer subject to report of State competence.

Article 8.- The Registry Database will be updated with the information presented by persons and companies responsible of facilities subject to report, to the Secretary or the competent authority of the municipalities, in which, the specific data per substance, material or special-management and solid-urban waste, will be integrated by source.

SECTION II: Conformation of the State Information Database.

Article 10.- Subject to reporting to State jurisdiction are those indicated in the article 101, fraction I, letters a, b and c of the Law, large-quantity generators of special-management waste in terms of the legal applicable dispositions, services providers that conduct one or more of the stages of separation, reuse, accumulation, recollection, storage, translation or transport, co-processing, treatment, recycle and final disposition, of special-management waste, as well as those that discharge wastewater into receptor bodies of State competence.

Article 11.- For the update of the Registry Database, facilities subject to report, must present the information regarding their contaminants emissions and transfer to the air, water, soil, sub-soil, materials and special-management waste, in conformance to the indicated in the articles 20 and 21 of this Regulation, as well as those substances established in the corresponding Mexican Official Norm or State Technical Norm.

The information pointed in the previous paragraph will be provided through the Report, which will be available at the Single Desks and the electronic portal of the Secretary, and will contain the following information:

VII. The inherent to the generation and transfer of special-management waste, which will contain the registry number of the generator, generation and transfer of special-management waste information, including the related to their storage within the facility, and their treatment and final disposition;

3.2.2.2 Local laws

3.2.2.2.1 City of Acuña

Regulation of Ecology of the Municipality of City of Acuña, Coahuila.

CHAPTER II: Distribution and Coordination of Competencies.
SECTION I: Powers of the Authorities.

Article 8.- For the effects of this Regulation, the Municipal President will have the following attributions:

XVII. Apply the legal dispositions related to the prevention and control of the effects occurring for the generation, transport, storage, handling, treatment and final disposition of municipal solid waste;

XX. Apply the legal dispositions related to the prevention and control of the pollution caused by noise, vibration, thermal energy, light, electromagnetic radiations and odors harmful to the ecological balance and the environment, originated by fixed sources of air emissions operating as commercial or services facilities, as well as the result of open-fire burning of any type of non-hazardous waste;

FOURTH TITLE: From Environmental Protection.
CHAPTER I: General Provisions.

Article 70.- The office of the municipal public administration on environmental matters, in coordination with the offices and entities of the State public administration, and other authorities, in their corresponding competence ambit, must integrate an inventory of atmospheric emissions, wastewater discharges into sewer systems of their competence and materials and solid non-hazardous waste, in term of this Regulation; as well as coordinate the registries that the law establishes and create a consolidated information system based on the authorizations, licenses or permits that in the matter must be granted.

CHAPTER II: Prevention and Control of Atmospheric Pollution.
SECTION II: Control of Emissions from stationary sources.

Article 84.- The open-fire burning of any type of solid or liquid non-hazardous waste is forbidden; such as: tires, materials, plastics, oils and lubricants, solvents, used batteries, domestic trash and other; also the burning of dry grass and leaves, for the purpose of clearing o cleaning of urban properties.

Article 90.- Incineration, through controlled methods, of any type of waste considered as non-hazardous is subject to control dispositions indicated in the law.

CHAPTER V: Prevention and Control of Pollution of Soil and ecological deterioration in urban areas.
SECTION I: Handling and Disposal of Non-Hazardous Waste.

Article 129.- For the prevention and control of soil pollution, the following criteria will be considered:

II. That the non-hazardous solid waste must be handled properly, since they constitute one of the main sources of soil pollution;

III. That it is necessary prevent reduce the generation of solid and industrial waste that are not considered as hazardous; incorporate techniques and procedures for the reuse and recycle, and also regulate their management and final disposition; and,

IV. That in sites, contaminated due to the presence of non-hazardous materials or waste, actions for the recovering or reestablishment of its conditions must be carried out, in ways that they could be used for any type of activity established in the urban development plan or ecological order applicable.

Article 130.- The criteria to prevent and control the soil pollution will be considered, particularly in:

II. The operation of systems for cleaning and final disposition of non-hazardous solid waste, including those known as sanitary landfills.

Article 132.- Corresponds to the municipality to apply the legal dispositions related to the management and final dispositions of municipal solid waste, for which they could:

I. Apply the legal dispositions related to the prevention and control of effects over the environmental occurring for the generation, transport, storage, handling, treatment and final dispositions of municipal solid waste;

II. Authorize the establishment of site designated for the final disposition of the municipal solid waste;

III. Enforce control over the installation and operation of the confinement or deposit of such waste;

IV. Enforce control and issue the corresponding authorizations related to the operation of the collection, storage, transport, housing, reuse, treatment and final disposition of municipal solid waste;

Article 133.- The generation, handling and final disposition of slow-degrading waste must observe the established on Mexican Official Norms that for such purpose the Federation issues. Also, generator will be responsible until its reuse and/or final disposition.

Article 135.- For the location, installation and operation of systems for the management of municipal solid waste, ecological orders, and municipal urban development plans and programs will be taken under consideration.

Article 136.- Competent municipal authorities will adopt the necessary measures with the purpose of restraining the generation of municipal solid waste and will incorporate techniques and procedures for its classification, reuse and recycle.

Article 137.- The municipalities, when consider necessary, could request to the Federation or the State the technical advice for:

I. The implementation and improvement of systems for the collection, transport and final disposition of municipal solid waste; and,

II. The identification of alternatives for the reuse and final disposition of the waste mention, including the elaboration of inventories of the same and the generation sources.

Article 140.- To enforce what's disposed in the previous article, the Ecology and primary services direction will have the following attributions:

XIV.- To orient the community about the waste and tires most convenient handling and recycling. The service providers dedicated to changing tires must charge $7.00 extra to users as cost of final disposition of the tires.

Article 163.- It is the obligation of neighbors, habitants and visitors of the municipality, to observe the dispositions previously described in this Chapter, in addition to the following determinations:

V. Not throwing or abandon in vacant lots or public ways, dead animal, toxic waste or substances or any other waste that could present unpleasant odors;

IX. Avoid open-fire burning of tires, plastics, leaves and in general, any solid waste which combustion pollutes the environment.

3.2.2.2.2 Piedras Negras

Regulation of Ecology and Environmental Protection of the Municipality of Piedras Negras, Coahuila.

CHAPTER II: Distribution and Coordination of Competencies

SECTION I: Powers of the Authorities.

Article 8.- For the effects of this Regulation, the Municipal President will have the following attributions:

XVII. Apply the legal dispositions related to the prevention and control of the effects occurring for the generation, transport, storage, handling, treatment and final disposition of municipal solid waste;

XX. Apply the legal dispositions related to the prevention and control of the pollution caused by noise, vibration, thermal energy, light, electromagnetic radiations and odors harmful to the ecological balance and the environment, originated by fixed sources of air emissions operating as commercial or services facilities, as well as the result of open-fire burning of any type of non-hazardous waste;

Article 90.- The open-fire burning of any type of solid or liquid non-hazardous waste is forbidden: such as: tires, materials, plastics, oils and lubricants, solvents, used batteries, domestic trash and other; also the burning of dry grass and leaves, for the purpose of clearing o cleaning of urban properties.

Article 96.- Incineration, through controlled methods, of any type of waste considered as non-hazardous is subject to control dispositions indicated in the law.

CHAPTER IV: Prevention and Control of Water Pollution.

Article 124.- To avoid water pollution, will be subject of regulations that, in their respective ambits of competence, municipalities issue:

VI. The discharges of waste, substances or waste generated by the activities of extraction of non-renewable resources;

VII. The discharge of solid waste, hazardous materials, and non-hazardous, and sludge coming from wastewater treatment into water bodies and flows.

CHAPTER V: Prevention and Control of Pollution of Soils and ecological deterioration in urban areas.

SECTION I: Handling and Disposal of Non-Hazardous Waste.

Article 135.- For the prevention and control of soil pollution, the following criteria will be considered:

II. That the non-hazardous solid waste must be handled properly, since they constitute one of the main sources of soil pollution;

III. That it is necessary prevent reduce the generation of solid and industrial waste that are not considered as hazardous; incorporate techniques and procedures for the reuse and recycle, and also regulate their management and final disposition; and,

IV. That in sites, contaminated due to the presence of non-hazardous materials or waste, actions for the recovering or reestablishment of its conditions must be carried out, in ways that they could be used for any type of activity established in the urban development plan or ecological order applicable.

Article 136.- The criteria to prevent and control the soil pollution will be considered, particularly in:

II. The operation of systems for cleaning and final disposition of non-hazardous solid waste, including those known as sanitary landfills.

Article 137.- Waste that accumulate or could accumulate and are deposited or infiltrated in the ground must comply the necessary conditions to prevent or avoid:

I. Soil contamination;
II. Alterations harmful to the biological process of the soil;
III. Alterations to the soil that damage its profit, use or exploitation; and,
IV. Health risks and problems.

Article 138.- Corresponds to the municipality to apply the legal dispositions related to the management and final dispositions of municipal solid waste, for which they could:

I. Apply the legal dispositions related to the prevention and control of effects over the environmental occurring for the generation, transport, storage, handling, treatment and final dispositions of municipal solid waste;

II. Authorize the establishment of site designated for the final disposition of the municipal solid waste;

III. Enforce control over the installation and operation of the confinement or deposit of such waste;

IV. Enforce control and issue the corresponding authorizations related to the operation of the collection, storage, transport, housing, reuse, treatment and final disposition of municipal solid waste.

Article 139.- The generation, handling and final disposition of slow-degrading waste must observe the established on Mexican Official Norms that for such purpose the Federation issues. Also, generator will be responsible until its reuse and/or final disposition.

Article 140.- All discharges or deposits of municipal solid waste, will be subject of what this Regulation establishes, the law and the Mexican official norms that the Federation for such effect issues.

Article 141.- For the location, installation and operation of systems for the management of municipal solid waste, ecological orders, and municipal urban development plans and programs will be taken under consideration.

Article 143.- The municipalities, when consider necessary, could request to the Federation or the State the technical advice for:

I. The implementation and improvement of systems for the collection, transport and final disposition of municipal solid waste; and,

II. The identification of alternatives for the reuse and final disposition of the waste mention, including the elaboration of inventories of the same and the generation sources.

Article 169.- It is the obligation of neighbors, habitants and visitors of the municipality, to observe the dispositions previously described in this Chapter, in addition to the following determinations:

VI. Not throwing trash into vacant lots, empty house or in general, in place not authorized for the deposit of waste;

Avoid open-fire burning of tires, plastics, leaves and in general, any solid waste which combustion pollutes the environment.

3.2.2.2.3 Nava

No regulatory waste tire management regulatory framework or agencies found in Nava legislation.

3.2.3 Nuevo Leon

3.2.3.1 State Laws

3.2.3.1.1 Environmental Law of the State of Nuevo Leon

TITLE FIRST: General Dispositions

CHAPTER I: Preliminary Norms

Article 3.- For purposes of this Act means:

XXXIV. Integrated waste management: articulated and interrelated set of normative actions, operational, financial, of planning, administrative, social,

educational, of monitoring, supervision and evaluation to waste management from generation to final disposal, to achieve environmental benefits, economic optimization of their management and social acceptance, responding to the needs and circumstances of each locality or region;

XXXVII. Incineration: Any process to reduce the volume and decomposing or change the physical, chemical or biological composition of a solid waste liquid or gaseous, by thermal oxidation, in which all the combustion factors such as temperature, time of retention and turbulence can be controlled in order to achieve efficiency, effectiveness and environmental parameters previously established. This definition includes pyrolysis, gasification and plasma, only when the combustible byproducts generated in these processes are subjected to combustion in an oxygen-rich environment;

LIV. Reuse: Use of a previously used material or waste, without an intervening processing;

LVII. Waste: Material or product whose owner or holder disposes and it is in solid or semisolid state, or is a liquid or gas in containers or tanks, and can be valuated or requires treatment or disposal under the dispositions of the General Law for the Prevention and Integrated Management of Waste and other applicable regulations.

LIX. Special Management Waste: those generated in the productive processes, which do not meet the characteristics to be considered as hazardous or urban solid waste, or which are produced by large generators of urban solid waste.

CHAPTER II: Prevention and control of pollution to the atmosphere.

Section II: Prevention and control of pollutants emissions from fixed sources

Article 143. - It is prohibited open-fire burning of urban solid waste as well as vegetable material resulting from cleaning, disassemble, or paring of any land for purposes of construction or any other purpose, except when conducted with a written authorization from the Secretary or, where appropriate, the municipal authorities as appropriate. The Secretary or the municipalities may only issue permits in cases where the burning will not cause an environmental risk or impact air quality and justified for social reasons or agricultural, or other applied in the opinion of the respective authorities. It also prohibits the incineration of municipal solid waste.

Incineration of special management waste only can be made on industrial processes or services as an alternate means for energy generation, To do this it must obtain prior authorization from the Secretary, for which those interested will formulate and submit Management Plan which state:

I. Residues are not susceptible to be valuated using other processes when they become available, are environmentally effective, technologically and economically feasible;

II. Description of the method of incineration and equipment to be used for efficient combustion, avoiding conditions for the formation of persistent organic pollutants, minimizing which are generated and managing generated waste material properly;

III. The obligation to comply with the provisions of this Act specified in emissions, and,

IV. The others which are specified in the Regulation of this Law

CHAPTER IV: Prevention and control of pollution of the soil

Article 166. - For the prevention and control of soil contamination is considered the criteria set forth in this Law, the Law for the Prevention and Integral Management of Waste, and other applicable ordinances.

Article 167. - For the prevention and control of pollution of the soil, will consider the following criteria:

I. Corresponds to the State, the Municipalities and society, preventing soil pollution by promoting waste separation at source and the control and reduction of the generation urban solid waste and Special Management waste and incorporating techniques and procedures for reuse and recycling as well as use of biogas production from decomposition of organic waste as a renewable source of energy;

Article 168.-The criteria specified in the foregoing article shall be regarded as in:

I. Land use, planning of human settlements and urban development planning;

II. The operation of the systems clean, management and final disposal of solid urban waste and special management waste in landfills.

CHAPTER V: Management and Integrated Waste Management.

Article 169. - The authorities specified in this Act, shall exercise their powers on waste legislation, in accordance with the distribution of powers established by the General Law for Prevention and Integral Management of Waste, this Act and other applicable ordinances.

Article 170. - The waste which accumulate or may accumulate and be deposited or infiltrate the soil, must meet the conditions necessary to prevent or avoid:

I. Soil contamination;

II. Harmful alterations in the biological process of soils;

III. Changes in soil that may impair your benefit, use or exploitation, and;

IV. The risks and health problems.

Article 172.- Any person or entity that generates special management waste, is responsible for its management to final disposal, and can transfer that responsibility to the service providers for collection, transport or treatment of such waste to the effect that contract.

Article 172-Bis. - The service providers collect, transport or treatment of special management waste shall be authorized and registered for such purpose by the Secretary, it being necessary verify generators of such waste that companies providing services management and disposal thereof, have the

respective authorizations and effect, otherwise shall be liable for damages that are caused by management.

In case of contract management services and disposal of special management waste by companies authorized by the Secretary and the waste is delivered to these, the responsibility for the operations will correspond to the company, regardless of the responsibility of the generator.

Article 172-Bis 1. - special management waste may be transferred to industries for use as inputs in their processes, making previously known to the Secretary through a management plan for these inputs, which will be based on minimization of risks.

Article 173. - The natural or legal persons responsible for the production, distribution or marketing of goods that, after completing their useful life, generate solid waste and special management waste in high volume or produce significant environmental imbalances, shall, addition to the obligations stipulated in this Law and other applicable provisions, with the following:

I. Implement management plans for urban solid waste and special management waste in their production processes, service delivery or the use of packaging as well as their manufacture or design, marketing or use that contribute to waste minimization and promote the reduction of generation at source, recovery or disposal, which cause the least environmental impact;

II. Adopt efficient recovery systems to minimize, recycle or reuse of urban solid waste and special management waste from the commercialization of their final products, and

III. Promote the use of packaging that once used are subject to recovery through reuse and recycling processes.

The Regulation of this Law shall define the cases where it is deemed that the individuals or companies generate solid waste and special handling in high volume.

Article 174. - For the prevention of the generation, valuation and waste management are regulated by this Act, be included in the Regulations make provisions for management plans, guidelines and guidelines for large generators of such waste.

Article 175.- It is considered conduct violations or infringement of this Act, on waste legislation, the following:

I. Throwing or leaving on public roads, vacant lots, open pit, surface water or groundwater, drainage systems, sewers, parks, ravines, roads, highways, rivers, streams and generally in places not authorized by the authority, or those specified in this Act, urban solid waste and special management waste;

VII. Diluting or mixing solid urban waste or special management waste or hazardous waste in any liquid and discharged into the sewer system, any body of water or soils with or without vegetation;

X. Using vehicles or conveyances for the collection, management, storage, transfer or disposal of urban solid waste or special management waste,

which are not registered, through a folio number, with the Secretary, or municipality, as appropriate.

Article 176. - The Secretary shall prepare and update an inventory of special management waste and their types of generating sources, in order to:

I. Guide decision-making aimed at prevention, control and minimization of the generation of special management waste;

II. Provide to who generate, collect, treat, recycle or dispose of special management waste, with indicators of physical condition or features to anticipate their behavior in the environment and

III. Identify sources of generation of special management waste and urban solid waste, the characteristics that constitute them and aspects related with their valuation.

Violations of the provisions of this Article shall be punished in accordance with the provisions of this Law, subject to the provisions of other applicable laws.

Article 177. - In the area of waste, the Secretary shall issue permits for:

I. Service delivery of integrated management of special management waste;

VII. Collection, transportation, recycling, reuse and disposal of special management waste;

VIII. Operation of collection vehicles of urban solid waste when they provide service to more than two municipalities and special management waste moving in the State;

XI. Specific Management Plans for special management waste.

Article 179. - Sites intended to be used for disposal of waste covered by this Act, shall comply with applicable Mexican Official Standards and resolutive environmental impact issued for such purpose. They must also adhere to the guidelines provided in the plans of State and municipal urban development and in programs on environmental management and planning.

Article 180. - Authorities will take the measures necessary to streamline the generation of waste covered by this Act, and will promote the techniques and procedures for separation, sorting, reuse and recycling. Will also promote the manufacture and use, within their respective jurisdictions, packaging and containers for all kinds of products, which materials to reduce pollution to the environment.

Article 181-Bis. - In the case of rims and tires new or previously used by motor vehicles or other kind, will seek their reuse, in whole or in part, in industrial or production processes, as well as applications that do not involve a risk environment, thus preventing their use by incineration methods, favoring reuse or recycling by cutting mechanical systems or the like.

In its case should be properly confined to the authorized disposal sites.

The state and municipalities will encourage development policies that allow the reuse or recycling of this waste, in conformity with the official Mexican standards, state environmental rules or other applicable ordinances.

Article 181 Bis 1. - It is forbidden open accumulation of rims or tires new or previously used by motor vehicles or other kind and their burning under these conditions.

Consenting may only be for temporary accumulation of rims or tires new or previously used in the open, through the authorization if issued by the Secretary, which set a deadline that in no case exceeding six months, for transfer to a suitable site for disposal or storage.

The violation of the provisions of this Article shall be subject to penalties, to the depositor of rims and tires and new or previously used for legitimate purposes or who in fact have the disposition of the property, either in accordance with the provisions of this law.

TITLE SIXTH: Inspection and surveillance, security measures, sanctions and appeal of discontent

CHAPTER III: Administrative sanctions

Article 236. - Are considered violative conduct of this Law, the following:

I. Deposit, throw, drop, spill or burn waste, roads, highways, rights of way, vacant lots, privately owned land and in bodies or streams, or assigned state jurisdiction;

II. Generate waste from the categories specified in this Act and not meeting the provisions established in thereof, and other applicable laws;

III. Carry out the management and disposal waste without authorization;

Article 237. - The temporary closure of all or part, shall occur when:

VII. Carry out the management and disposal waste without authorization;

3.2.3.1.2 Law of the Environment and Natural Resources Protection Agency

CHAPTER I: General dispositions

Article 5. - The purpose of the Agency is:

V. Establishing general policies on recycling and waste disposal;

CHAPTER II Attributions and structure of the Agency

Article 8. - For the proper fulfillment of its objective, the Agency shall have the following powers:

V. Regulating collection systems, transportation, storage, management, treatment and disposal of solid and industrial waste that are not considered hazardous;

Article 16.- City hall may establish working committees, whether permanent or temporary, in order to conduct studies, analyzes and investigations of certain subject or issue, that allow the formulation corresponding opinions to the Agency, or to propose specific actions in the issues related to areas of competence of the Agency. The standing committees shall be:

II. Soil and Waste;

3.2.3.1.3 Regulation of the Environmental Law of the State of Nuevo Leon

TITLE SECOND: Evaluation of Environmental Impact

CHAPTER I: Authorizations

Article 6. - Those who intend to do any of the following works or activities required prior authorization from the Agency regarding environmental impact:

VIII. Facilities that will make the collection, separation, sale of recyclable material in quantities of 10 or more tons per year, or in the establishments in which treatments are carried out in general special management waste and urban solid waste as well as those disposal sites urban solid waste and special management waste in accordance with the provisions of the General Law on the Prevention and Integrated Waste Management, Regulations and other applicable provisions, -

XVII. Commercial and service establishments that are included in the partial plans for urban development, as long as they are in any of the following assumptions:

f. Generated in quantities equal to or greater than 400 kilograms of waste per year of special management waste;

Article 11.- In the case of works or activities to be subject to the procedure of environmental impact assessment in accordance with the Act and this Regulation, consisting of state public works such as roads or highways, facilities for wastewater treatment, confinement of solid waste or special management, hazardous industries that do not fall within the federation, or tourist real estate developments of over 20 hectares, of over 20,000 m2 hotel, and generally works intending to be in flood zones or gradients greater than 30% in protected areas, in soils impacted with debris, or those not provided or prohibited in urban development plans, for which the Agency to require expansion of items and information shall be notified by official letter or official electronic mail municipal governments, in terms of the provisions of Article 41 of the Act where appropriate authorization issued by the Agency, not in any way require local authorities to issue authorizations to them in the scope of their respective competencies.

TITLE FOURTH: Self-Regulatory Instruments

CHAPTER II: Environmental Audits Development

Article 88. - The proposed action plan referred to in section VI of the previous article, incorporate preventive and corrective measures regarding the following matters, as appropriate:

IV. Urban solid waste and special management waste;

TITLE SIXTH: Environment Protection

FOURTH CHAPTER: Prevention and Control of Pollution on the Ground and Integrated Waste Management

Article 186.- Without prejudice to the provisions of the Act, it is prohibited:

I. Dispose of waste in a manner that causes harm to the environment or endangers the health, welfare and safety of persons;

II. Depositing waste in final destinations other than those provided in the Act or this Regulation;

III. Construct, operate or close a facility in which there is any of various forms comprising the integrated management of municipal solid waste or special management, without proper notification, registration or authorization by the Agency and / or the relevant municipality ;

VI. Deposited in landfills used tires that have not been previously crushed or cut into pieces to avoid the accumulation of air, water or liquid inside, except when competent authorities consider it justifiable;

IX. Discharge in aquifers or surface waters, wastewater generated in a facility of management of urban solid waste or special management waste, without compliance with applicable legal provisions;

XI. Store special management waste and urban solid that are inconsistent in terms of the applicable regulations;

XII. Store special management waste and urban solid in quantities exceeding the storage capacity and,

XIII. Store special management waste and urban solid in areas that do not qualify under the Act or this Regulation, or that are prone to flooding.

Article 187.- It is the responsibility of the municipal authority provide as necessary to prevent the clogging of storm sewer systems or sewage with solid waste or special management.

Article 191.- The facilities in which they perform the collection, separation, sale of recyclable material, or in the establishments in which treatments are carried out in general special management waste and urban solid as well as those disposal sites for urban solid waste and Special Management, whether public or private, require authorization from the Agency.

Article 192.- The person responsible for obtaining any authorizations referred to in the preceding article, shall submit the relevant application stating:

I. Name, address and particulars of the applicant and his legal representative, having to prove the personality that appears;

II. The kind of waste in question;

III. The composition waste generated;

IV. The volume waste generated;

V. The origin of the various waste;

VI. The frequency with which they generate;

VII. The process to be used for storage, treatment, transport or transfer and disposal;

VIII. The delimitation of the land area that is to make the storage, treatment or disposal of waste, pointing at a map or sketch, the location, boundaries and area;

IX. Evidence that the information provided, and,

X. Other established in the appropriate formats.

Once the Agency has received this information, it can make a visit to the place where these waste are generated in order to verify the information received.

Article 193. - The Agency shall issue the corresponding technical report to determine if the process of management or disposal of waste special management or urban or their confinement, can contaminate soil, alter or produce biological process risks or problems health or environmental emergency.

Also be made with regard to hazardous waste generated or managed by micro generators, in accordance with the agreements or coordination agreements for that purpose the Agency subscribes to the Federation and shall be published in the Official State Newspaper.

Article 195. - For purposes of Article 173 of the Act, it is considered that individuals or companies generate urban solid waste and Special Management waste at high volume they generate an amount not less than ten tons gross weight of waste per year or equivalent to another unit of measure.

Article 197. - To comply with Article 176 of the Act, generators and recyclers of waste special management shall be registered with the Agency in accordance with the procedure laid down in Article 208 of this Regulation.

Article 206. - Municipalities with each other, and these with the State, may enter into agreements for the implementation and improvement of collection systems and collection, storage, transfer, transport and disposal of municipal solid waste and for reuse or treatment, especially in the urban zones.

TITLE SEVENTH

SINGLE CHAPTER: State Environmental Information System and Natural Resources

Article 217.- The Agency shall keep a current inventory of discharges of wastewater into sewer systems, septic tanks or receiving bodies of their competence, as well as materials and waste that are not reserved to the Federation, such as special management waste and hazardous waste managed or generated by micro generators, as provided by the General Law on the Prevention and Integral Management of Waste and other regulations in the matter.

TITLE EIGHT: Record pollutant release and transfer of contaminants

CHAPTER II: The formation of the state information database register

Article 225.- Are considered liable to local competition report, those listed in Article 137 of this Regulation, the micro generators of hazardous waste or the terms of agreements with the Federation, the generators of waste special management in terms of the applicable provisions, as well as those who discharge wastewater into bodies of state competition or in the sewer system.

3.2.3.2 Local Laws

3.2.3.2.1 Anahuac

Civil Guard Regulation

Article 42.- It an obligation of the owners, tenants or users of barren areas of inhabited or uninhabited, within the population centers of the municipality, to maintain yards free of ignitable materials such as dry weeds or grass, wood, tires, solvents and garbage among others.

3.2.4 Tamaulipas

3.2.4.1 State Laws

3.2.4.1.1 Environmental Protection Law for the sustainable development of the State of Tamaulipas.

TITLE FIRST: General Provisions
SINGLE CHAPTER
Article 3.- For all relating to the present Law, it will be subject to the following definitions:
d) Special Management Waste Final disposal: Action to permanently deposit waste in and adequate sites and conditions to avoid damage to the environment.
r) Waste collection: Action to accept and transfer the waste to storage, treatment and reuse or disposal.
s) Recycling: Method of processing, transforming and adaptation of waste for productive purposes.
t) Special management waste: Remnants generated in production processes that do not have the characteristics to be considered hazardous waste or solid waste, or that are produced by large generators of urban solid waste.

TITLE SECOND: Competence Distribution and Coordination
CHAPTER I: Competence Distributions
Article 5.- Responsibility of the State, through the Secretary:
d) Regulation and Prevention of the generation, transportation, use and integrated management of special management waste and hazardous waste that has assigned.
Article 6.- Compete to City hall
x) Regulation of the generation, transportation, storage, manage, treatment and disposal of solid waste and special management waste that has assigned.

TITLE FOURTH: Environmental Policy Instruments
CHAPTER V: Environmental impact assessment
Article 34.- Whoever intend to conduct the following works or activities, whether public or private will need environmental impact authorization:

f) Facilities for treatment, recovery and disposal of urban solid waste and special management waste.

TITLE SEVENTH: Environmental protection and regulation

CHAPTER I: Prevention and control of Atmospheric pollution.

Article 115.- Secretary or City halls, within their jurisdiction, establish mechanisms to prevent or prohibit:

c).- Burning of waste and any solid or liquid residue, including among others, domestic trash, straw, dried grass, agricultural waste, used tires, plastics, lubricants and used solvents, and well as burnings clearing or weeding purposes, except those which are subject to compliance with applicable regulations.

CHAPTER V: Special management and urban solid waste

Article 138.- State and local authorities will promote rationalization in the production of waste and shall take the necessary measures to incorporate techniques and procedures for recycling and reuse.

Article 139.- Accumulated solid waste or may accumulate and be deposited or infiltrate the soil, must meet the necessary conditions to prevent or avoid:

a) Soil contamination
b) Changes harmful biological processes of soil
c) Changes in the soil that affect its development, use or exploitation
d) Risks and health problems.

Article 140.- There must be authorization from the respective City hall for the operation of collection, storage, transport, reuse, treatment and disposal systems of urban solid waste. Such authorization may be granted only when the operation of such systems is carrying out as established by regulations and Official Mexican Standards.

Article 141.- Generation, management and final disposal of slow degradation waste must be subject to what is established in State environmental regulations issued by the Secretary.

Article 143.- Applies to municipalities:

a) Formulate dispositions to regulate, within its jurisdiction, collection, treatment and disposal of urban solid waste, as well as provided in the General Law for the Prevention and Integrated Management of Waste, the present Law, its regulations and Mexican Official Standards for;

b).- Authorize the establishment of sites for the final disposal of urban solid waste

c).- Control facilities and operation of landfills or waste confinements.

d).- Exercise control and issue the appropriate permits for operation of collection, storage, transport, accommodation, reuse, treatment and disposal systems of urban solid waste

e).- Have an inventory of deposits or solid waste confinements and as well as generating sources whose data will be integrated into Environmental Information System operated by the Secretary**.**

Article 144.- Sites intended to be used for disposal of urban solid waste and special management waste, shall comply with relevant environmental regulations and environmental impact authorizations issued for this purpose and shall comply with the guidelines established in state and municipal urban development plans, and population centers, as well as Ecological Regulation Programs

Article 145.- In order to prevent and control the adverse effects which may cause the solid waste and special management waste, respective City hall, with the corresponding participation of the State, will boost the following programs:

a) Separation, reuse and recycling of waste;

b) Awareness and neighborhood organization to prevent waste of any kind to be deposited and thrown into public areas.

c) Cleaning and control of the vacant lands so that they do not become urban solid and special management waste dumps, as well as focus of public unsanitary and pollution;

d) Any other aimed at preventing and controlling pollution caused by waste

e) Remediation of polluted sites.

Article 146.- In the absence of normatively appropriate technique cells for the special management waste final disposal in authorized landfills, the petitioners must submit to the Secretary an executive project that establishes the possible site, design and construction, plus the environmental impact assessment that is required under the terms of this Law for the corresponding evaluation.

Article 147.- Establishes the following prohibitions:

a) Enabling waste dump or open-fire incineration.

b) Storage, housing, reuse and disposal of urban solid waste and special management waste, without complying with relevant environmental regulations or authorizations respective environmental impact.

d) Waste dumping on public roads, vacant lots, ravines, gullies, sewer pipes, electrical or telephone wiring, gas, in water bodies, underground cavities, natural protected areas and ecological conservation areas, rural areas and places without explicit authorization issued by competent authority.

e) Final disposal of sludge from industrial processes and treatment plants, as well as special management waste in authorized municipal landfills special management, except in the case the landfill has technical cells and normatively suitable for final disposal and previous authorization from the Secretary.

Article 148.- Every state or municipal waste generator will have shared responsibility with those responsible for transportation, management or waste disposal processes.

TITLE TENTH: Social participation

CHAPTER II: State and Municipal Ecology Committee

Article 161.- Ecological municipal committees will be agencies responsible for citizen dialogue and will look for the participation of the community in:

a) Information dissemination and training programs, urban solid, hazardous and non-hazardous industrial waste.

TITLE ELEVENTH: Inspection and surveillance, security measures and sanctions

CHAPTER III: Administrative sanctions

Article 173.- Violations to the provisions of this Law, regulations and dispositions derived from it constitute infringement and will be sanctioned administratively by the Secretary or municipalities within their jurisdiction, as follows:

b) Fine from 20 to 100 days of minimum salary effective in the State capital to anyone who:

I.- Deposit, abandon, spill or burn urban solid or special management waste in roads, highways, rights of way, vacant lots, private properties and bodies of water of State competition;

d).- Fine of 1,000 to 5,000 days of existing minimum salary effective in the capital of the State to anyone who:

III.- Generate, manage or dispose special management waste without previous authorization;

IV.- Being a rural or urban property owner authorizes its use for the disposal of urban solid or special management waste.

3.2.4.1.2 Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas

TITLE FIRST: General Provisions

CHAPTER I: Introductory rules

Article 4.- For purposes of this Act shall be considered, in addition to the definitions contained in the General Law of Ecological Equilibrium and Environmental Protection, the following:

Non-hazardous waste storage: Action for collection and retention of non-hazardous waste, while are processed for exploitation.

Deposit: Place intended for the conservation of materials or residues for control and exploitation.

Non-hazardous solid waste management: It is the set of operations related to harvest, transport, reuse, storage, treatment and disposal of non-hazardous solid waste.

Non-hazardous solid waste reuse: It is the process of utilization of non-hazardous solid waste that have been treated and can be applied to a new process of transformation or any other

Non-hazardous solid waste treatment: It is the process to transform non-hazardous waste whereby its characteristics are changed.

TITLE SECOND: Competence Distributions
SOLE CHAPTER: Competences
Article 6.- Responsibility of the State:
X. Regulate management and disposal of non-hazardous solid waste, according to the General Law of Ecological Equilibrium and Environmental Protection.

Article 7.- Responsibility of the Municipality:
XXVIII. Regulate management and disposal of non-hazardous solid waste, according to the General Law of Ecological Equilibrium and Environmental Protection.

TITLE FIFTH: Environmental Protection
CHAPTER IV: High Risk Activities
Article 95.- Correspond to City halls control of risky activities in following cases:
I.- When developing risky activities non-hazardous waste are generate and dumped into drainage and sewerage systems of population centers, or be integrated into the trash;
II.- When risky activities are related to non-hazardous waste generated in public services whose regulation or management corresponds to the municipalities or are related to these services.

Article 96.- When risky facilities exist or hazardous waste are generated causing or may cause environmental contingencies or ecological emergencies and by its effects go beyond the territory of the state, state authorities may apply by themselves the security measures necessary to protect the ecological equilibrium and the environment, without prejudice to the powers that Federation compete in this area.

CHAPTER V. Management and non-hazardous waste disposal
Article 97.- State and local authorities will promote the rationalization of waste generation and take the necessary measures to incorporate techniques and procedures for reuse and recycling.

Article 98.- Accumulate solid waste or may accumulate and be deposited or infiltrate the soil, must meet the conditions necessary to prevent or avoid
I. Soil pollution.
II. Harmful alterations to soil biological processes.
III. Soil alterations that affect its development, use or exploitation and,
IV. Risks and health problems.

Article 99.- There must be authorization from the respective City hall for the operation of collection, storage, transport, accommodation, reuse, treatment and disposal systems of non-hazardous solid waste. Such authorization may be granted only when the operation of systems is fulfilled according to established regulations and Ecological Technical Standards.

Article 100.- Industrial activities generating slow degradation residues, will be carried out in accordance with the provisions of General Law of Ecological Equilibrium and Environmental Protection and its regulations. In final disposal of waste will be attended as stated in this Law.

Article 102.- Collection, storage, transport, accommodation, reuse, treatment and disposal systems of non-hazardous solid waste may grant concessions for individuals subjecting to Standards issued by the Secretary.

Article 103.- Responsibility of the Municipality:

I.- Formulate regulating provisions, within its jurisdiction, the activities of collection, treatment and disposal of nonhazardous solid waste, according to the General Law of Ecological Equilibrium and Environmental Protection, present Law, its regulations and Ecological Technical standards for;

II. Authorize the establishment of sites for disposal of non-hazardous waste;

III. Control facilities and operation of confinements and waste deposits;

IV. Monitor and issue the appropriate authorizations with respect to the operation of collection, storage, transport, accommodation, reuse, treatment and disposal systems of non-hazardous solid waste.

V. Maintain an inventory of confinements or non-hazardous solid waste deposits, as well as generating sources whose data will be Integrated into the Environmental Information National System to be operated by the Urban Development and Ecology Secretary.

Article 104.- Powers of the state and municipalities in matters covered by this chapter may be exercised through:

I. Urban development regulations.

II. Cleaning and urban solid waste disposal systems operation.

III. Granting authorizations for installation and operation of landfills or waste deposits.

3.2.4.1.3 Code for Sustainable Development of the State of Tamaulipas

TITLE FOURTH: Integrated management of waste

CHAPTER II: Classifications

Article 136.- Except in the case of waste considered as hazardous by the General Law of Waste and the corresponding Official Mexican standards, special management waste are classified as follows:

V.- Transport services waste, as well as those generated as a result of activities conducted in ports, airports, rail and port and customs;

CHAPTER III: General Obligations

Article 139.- It is the obligation of every person generating urban solid waste or special management waste:

I. Minimize the generation of waste and carry out their separation;

II. Promote reuse and recycling of waste;

III. Comply with the provisions and technical standards for integrated management of solid waste generated;

IV. Inform the competent authorities violations were committed against waste regulations, and

V. Other established by legal regulations.

To fulfill these obligations the Environment Agency and the municipalities within their respective attributions shall carry out the actions of verification, inspection and monitoring of compliance of this Code.

Article 140.- Large generators of urban solid waste and special management waste generators, are obliged to:

I. Register with the Environmental Agency and obtain approval for waste generated management;

II. Submit management plans, request validation, modification and updating and register with the Environmental Agency;

III. Using the manifest system established by the Environment Agency to monitor the generation and types of integrated management of their waste throughout its life cycle;

IV. Develop and maintain logbooks updated where volume, type of waste generated and form of management is registered;

V. Operating the integrated management of waste themselves or through management service companies in accordance with the provisions of this Book and other ordinances that may apply;

VI. Submit to the Environmental Agency an annual generation volumes and forms of management for special management waste generated, and

VII. Have a environmental insurance, when required by the Environmental Agency.

3.2.4.2 Local laws

3.2.4.2.1 Nuevo Laredo

Regulations for the Ecological Equilibrium and Environmental Protection in the Municipality of Nuevo Laredo, Tamaulipas

TITLE FIRST: Generalities

CHAPTER II: Definitions

Article 6.- For all relating to the present regulation, it will be subject to the following definitions:

Storage: Action to temporarily retain waste, while processed for use, are delivered to the collection service, or are disposed.

Non-hazardous waste storage: Action for collection and retention of non-hazardous waste, while are processed for exploitation.

Dealer: Physical or moral authorized person by the municipality to collect, transport, store or recycle non-hazardous waste.

Deposit: Place intended for the conservation of materials or residues for control and exploitation.

Disposal: Action to permanently deposit waste in appropriate sites and conditions to prevent damage to the environment

Non-hazardous solid waste disposal: Action to permanently deposit of non-hazardous waste in appropriate sites and conditions to prevent damage to the environment

Incineration: Treatment method which consists in the oxidation of waste, through controlled combustion.

Non-hazardous solid waste management: It is the set of operations related to harvest, transport, reuse, storage, treatment and disposal of non-hazardous solid waste.

Environmental Impact Assessment: Document through which is given to know, based on studies, the potential and significant environmental impact which would generate a work or activity, as well as ways to prevent it or attenuate it, in case that it is negative.

Recycling: It is the method of treatment, transformation and adaptation of waste, with productive purposes.

Collecting: Action of transferring waste to the equipment designed to lead to storage, treatment or refusal facilities, or to its final disposal sites.

Waste: Any material generated in the processes of extraction, benefit, processing, production, consumption, use, control or treatment whose quality does not allow to use it again in the process.

Incompatible waste: Waste which cannot be mixed with another, reacts to produce heat or pressure, fire or evaporation; or particles, gases or hazardous vapors; it may be a violent reaction.

Non-hazardous solid waste reuse: Use of non-hazardous solid waste that have been treated and can be applied to a new transformation process or any other type.

CHAPTER III: Powers and functions of the City Hall

Article 9.- Powers and functions of the Ecology Municipal Advisory Council:

h) Assist in the actions taken, such as reforestation, solid waste management, soil erosion, urban impacts in the establishment of industries and activities that degrade population quality of life.

TITLE SECOND: Ecological Regulations and Land Use

CHAPTER II: Soil and Natural Resources protection

Article 27.- It is prohibited to deposit solid or liquids waste on unauthorized sites.

Article 27 BIS.- When transfer of solid or liquid non-hazardous waste activities are carried out to authorized places by people providing this service under economic compensation, must have an authorization of the authority except for shipments of non-hazardous waste made by individuals.

Precautions shall be taken in both cases to not allow during or after, spills in streets, otherwise they will be sanctioned.

TITLE TENTH: Safety measures

Article 179.- Where imminent danger of ecological disequilibrium exists, damage or deterioration to natural resources, pollution situation with danger for ecosystems, its components or public health, the dependence may order some of the following security measures:

III. Neutralization or any similar action, to prevent materials or non-hazardous waste to generate the effects provided in the first paragraph of this article. Likewise, the dependence may promote to the competent authority the execution of one or more of the security measures established in other legal systems.

3.2.4.2.2 Guerrero

No regulatory waste tire management regulatory framework or agencies found in Guerrero legislation.

3.2.4.2.3 Miguel Aleman

No regulatory waste tire management regulatory framework or agencies found in Miguel Aleman legislation.

3.2.4.2.4 Camargo

No regulatory waste tire management regulatory framework or agencies found in Camargo legislation.

3.2.4.2.5 Gustavo Diaz Ordaz

No regulatory waste tire management regulatory framework or agencies found in Gustavo Diaz Ordaz legislation.

3.2.4.2.6 Reynosa

Regulation for the Ecological Equilibrium and Environmental Protection in the Municipality of Reynosa, Tamaulipas

TITLE FIRST

SINGLE CHAPTER: General Provisions

Article 6.- For the purposes of the provisions contained in the present regulation, are considered the definitions and concepts established in the General Law of Ecological Equilibrium and Environmental Protection and those derived from the law of Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas.

Non-hazardous waste storage: Action for collection and retention of non-hazardous waste, while are processed for exploitation.

Deposit: Place intended for the conservation of materials or residues for control and exploitation.

Non-hazardous solid waste disposal: Action to permanently deposit of non-hazardous waste in appropriate sites and conditions to prevent damage to the environment

Non-hazardous solid waste management: It is the set of operations related to harvest, transport, reuse, storage, treatment and disposal of non-hazardous solid waste.

Recycling: It is the method of treatment, transformation and adaptation of waste, with productive purposes.

Waste: Any material generated in the processes of extraction, benefit, processing, production, consumption, use, control or treatment whose quality does not allow using it again in the process.

Solid Waste: Non-hazardous solid waste resulting from domestic, commercial and small-scale service within the municipality.

Reuse of nonhazardous solid waste: The process of using non-hazardous solid waste which has been treated and will be applied to a new process of transformation or any other.

TITLE THIRD

SINGLE CHAPTER: Municipal authority attributions

Article 10.- Corresponds to the City Hall, through the Municipal President or the ecology direction, the following attributions:

XXX. Decide on management and final disposal of solid waste that are not considered dangerous, by the General Law of Ecological Equilibrium and Environmental Protection

XLV. Management and final disposal of non-dangerous solid waste regulation, in accordance with the provisions of the General Law of Ecological Equilibrium and Environmental Protection, as well as established by Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas.

TITLE FIFTH

CHAPTER II: Atmospheric pollution prevention and control

Article 78.- It is prohibited to perform burnings of any material or waste, solid or liquid, or for the purpose of clearing or weeding, or simulacrum for fire control, without the authorization of the Ecology Direction, whoever intend to carry out a burning, must submit an application, largely justifying the reason why such action is required. The Municipal direction of Ecology will analyze the request and solve in one period not exceeding three days, approving, conditioning or denying permission.

CHAPTER III: Soil and subsoil pollution and prevention and urban solid waste management

Article 100.- Individuals carrying out activities that generate non-hazardous solid waste and do not use the authorized Municipal collection, management, transport and final disposal service, will be responsible for these activities, as well as damages to human health, environment and scenery.

Article 101.- City hall shall exercise the powers set out in this chapter in:

I. Management and disposal of non-hazardous solid waste.

II. Granting authorizations for the establishment of sites for the final disposition of non-hazardous solid waste.

IV Promotion and implementation of technical programs and procedures for reuse and recycling of non-hazardous solid waste, as well as promotion programs, techniques and procedures for the reduction of the generation of waste.

Article 102.- Authorizations issued by City hall to individuals for collection, transport, storage, hosting, reuse, treatment and final disposal of non-hazardous solid waste, shall be granted in accordance with the Ecological Techniques Standards and environmental control, as well as in accordance with other applicable provisions.

Article 103.- Established industries in the municipal territory are responsible for the storage, management, transportation and final destination of solid waste that can produce damage to human health and environment.

Article 104.- Established industries in the municipal territory, that in their production processes generate slow degradation or not degradable waste, will be subject to the provisions in this regulation, the General Law of Ecological Equilibrium and Environmental Protection, the Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas and the other applicable provisions

Article 105.- It is prohibited to deposit in the municipal territory, any solid waste coming from other municipalities, or other federal entities, without the prior consent of the City hall, which, in its case, before granting, will request the payment of the respective rights. The aforementioned authorization shall be granted once the study and analysis of the classification of the relevant solid waste has been made, by the Direction of ecology who shall deliver an opinion.

Article 106.- City Hall through the Direction of Ecology, will take a pollutants, landfills and solid non-hazardous waste-generating sources inventory. Data obtained will be forwarded to the competent authorities, State and Federal, in order that they may be in the possibility to take decisions within the scope of their respective attributions.

Article 107.- For the purposes of this regulation non-hazardous solid waste are classified in the following way:

III Class three: Slow degradation materials.

IV Class four: Rapid degradation materials but if incinerated can produce toxic fumes.

Article 111.- City hall may prepare coordinating and consulting agreements with the Social Federal Secretary, for:

I. Instrumentation and improvement of collection, processing, use and final disposal of solid waste systems.

II. Identification of alternatives for reuse and disposal of solid waste, including inventories and their generating sources.

3.2.4.2.7 Rio Bravo

Regulation for the Ecological Equilibrium and Environmental Protection in the Municipality of Rio Bravo, Tamaulipas

TITLE FIRST: General provisions

CHAPTER I: General Guidelines

Article 4.- For the purposes of this regulation, means:

Illegal dumping: Land spaces where waste are illegally deposited and produce an infection focus

Pollution: Action of harmfully alter a substance or organism due to effects of waste from human activity or the presence of certain germs.

CHAPTER III: Environmental protection local authority competence

Article 8.- Corresponds to the City Hall, through the Municipal President and the direction of ecology, the following functions:

XXX. Promote social participation in the management, treatment, disposal and separation of non-hazardous waste.

XXXII Advise social and private sectors in the evaluation and improvement of the collection, transfer, transportation, treatment and final disposal systems of waste, according to this regulation and in the formulation of the regulations for the provision of public services.

LX Preserve and restore the ecological equilibrium, and environmental protection in population centers, derived of services: sewerage, cleaning, markets, pantheons, trails, streets, parks, gardens, transit, local and foreign public transportation, bus stations, trucks, auto federal transportation workshops, garages individuals or private and those which change oil and tires located within the territory of the municipality.

LXI Decide on the management and final disposal of solid waste that are not considered hazardous, by the General Law of Ecological Equilibrium and Environmental Protection.

TITLE THIRD: Environmental Protection

CHAPTER II: Urban and suburban area common provisions

Article 50.- It is prohibited open-fire burning of trash, toxic materials, hospitals waste, fuel or tires. If necessary, it must be done under the authorization and supervision of the relevant authorities.

CHAPTER IV: Atmospheric environmental protection

Article 60.- It is prohibited the burning of any material or waste, solid or liquid, or for clearing or weeding purposes, either fire control simulacrum, without express authorization from the Direction of Ecology, whoever intend to carry out a burning, must submit an application, largely justifying the reason why such action is required. Direction will examine the request and will resolve in one period not exceeding 15 days, approving, conditioning or denying permission.

CHAPTER VI: Soil protection and Urban solid waste management

Article 83.- For the protection and utilization of soils, as well as the correct and effective collection, management, reuse and disposal of non-hazardous waste, City hall will consider the following criteria.

I.- The productive land uses must not alter the equilibrium of ecosystems, so it should always take care of their physical integrity and avoid any practice that promotes erosion and degradation of the topographic characteristics that go against the environment.

II.- Degradation erosion and soil pollution, as well as the decline in productivity, has in the generation and the poor management of solid waste, its causes, therefore to maintain or increase productivity and soil conservation, it must regulate correct and punish any action or activity that solid waste generation may lead to the diminution of the characteristics.

Article 84.- Regarding the soil protection and urban solid waste management, corresponds to the City hall, through the Direction of Ecology in coordination with the Primary services Direction, the following functions:

I. Monitoring municipal services does not promote or generate solid waste with no control.

II. Operate or Commission the establishment of municipal service of cleaning, collection, recycling and final disposal of urban solid waste.

III.- Celebrate coordination agreements with the neighboring municipalities city halls in order to receive or send solid non-hazardous waste for final disposal in officially established sites.

IV.- Make respective denunciation to PROFEPA, of hazardous waste generating sources; including a record of quantities produced, its components and characteristics of the systems and management sites, transport, storage, accommodation, recovery, treatment and final disposal.

V.- Promote education and dissemination among the population about recycling and integrated management of urban solid waste, in order to rationalize the use of raw materials and reduce waste generation.

Article 89.- Individuals carrying out activities that generate solid waste, which do not use municipal services of collecting, management, transport and disposal, will be responsible for these activities as well as the damage of health, environment or scenery, and may being sanctioned, economically or suffer administrative arrests up to 36 hours; that will be imposed by the corresponding Municipal Authority.

Article 90.- Industries will be responsible for storage, management, transportation and final destination of solid and liquids waste produced, as well as damage to health, environment or scenery.

Article 93.- Within the Municipality, responsible for the generation, storage, management, transportation and final destination of solid waste, as well as the general public, are required to support the implementation of preventive measures for the purpose identified, in case of federal competition and, in case of municipal competition, will be established City hall, and will be subject to the Ecological Standards.

Article 94.- it is prohibited in the municipality to transport and deposit, in the areas of final destination that purpose exist, all those solid waste from other municipalities or any other States, without the full consent and authorization of Public works, urban development, ecology and primary services Directions. Permission will be conditional to the type of solid waste, compliance with environmental standards issued and the payment of the corresponding fees.

Article 95.- It is prohibited to discharge solid and liquids waste of any kind in public roads, agricultural land, urban lands, vacant properties and abandoned farms.

3.2.4.2.8 Matamoros

Regulation for the Equilibrium and Environmental Protection in the Municipality of Matamoros, Tamaulipas

TITLE FIRST

CHAPTER I: General Provisions

Article 3.- For the purposes of this regulation, means:

XXIII. Non hazardous solid waste management: Joint operations of collection, transport, storage, recycling, treatment or disposal of waste.

XXXII. Landfills: Deposits of non-hazardous solid waste in the open, which must meet the characteristics described in this regulation.

XXXIII. Waste: Any material generated in extraction, benefit, processing, production, consumption, use, control or treatment processes, whose quality does not allow using it again in the process that generated it.

Article 4.- City hall is involved in:

XIII. The management and final disposal of solid waste that are not considered hazardous, by the General Law of ecological Equilibrium and Environmental Protection.

XXXII. Management and final disposal management of solid waste not considered hazardous, in accordance with the provisions of the General Law of ecological Equilibrium and Environmental Protection as well as established by the Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas.

CHAPTER III: Environmental control Direction

Article 9.- Matamoros Municipality for exercising the powers given to municipalities by the Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas will have the direction of Municipal Environmental Control, which shall have the following functions:

XVII. Management and final disposal of solid waste regulation that are not hazardous in accordance with the provisions of General Law of ecological Equilibrium and Environmental Protection, as well as according to the Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas.

TITLE THIRD
CHAPTER II: Soil and subsoil prevention and control of pollution.

Article 50.- It is prohibited to perform any act or activity, linked with non-hazardous solid waste, unless it is done according to the provisions in this regulation.

Article 51.- Individuals carrying out activities that generate non-hazardous solid waste, which do not use the municipal cleaning public service, will be responsible for their activities, as well as damages to human health and environment in general

Article 52.- City hall shall exercise the established in this chapter in:

I. Management and disposal of non-hazardous solid waste.

II. Granting authorizations for the establishment of sites for disposal of non-hazardous solid waste.

III. Control and permanent and continuous surveillance on the facilities and the operation of landfills and confinements.

IV. Promotion and implementation of technical programs and procedures for reusing and recycling non-hazardous solid waste, as well as the promotion of programs, techniques and procedures for the reduction of the generation of those waste.

V. Promotion of programs, techniques and procedures for the reduction of the generation of non-hazardous solid waste.

VI. Other powers derived from the applicable provisions.

Article 53.- Authorizations issued by the city hall for the operation, collection, transport, storage, hosting, reuse, treatment and final disposal of non-hazardous solid waste, shall be granted according to Ecological and environmental control Standards as well as in accordance with other applicable provisions.

*Article 54.- I*ndustries established in the municipal territory, will be responsible for storage, management, transportation and final destination of solid waste that can produce damages to human health and the environment in General.

Article 55.- Industries within the municipality, that in their production processes generate slow degradation or not degradable waste, will be subject to provisions in this regulation, the General Law of ecological Equilibrium and Environmental Protection, as well as according to the Law of Ecological Equilibrium and Environmental Protection of the State of Tamaulipas and other applicable provisions.

Article 56.- It is prohibited to deposit in the municipal territory, any solid waste coming from other municipalities, or other States, without the prior consent of the City hall, which before granted, will request the payment of the rights.

The aforementioned authorization shall be granted once the study and analysis of the classification of the corresponding solid waste has made by the, who shall deliver an opinion on the subject.

Article 57.- City Hall through the Municipal Environmental Control Direction, will conduct an inventory of the confinements, landfills and non-hazardous solid waste generating sources. Data obtained by City hall will forward them to the Federal Social Development Secretary and the State, with the finality that these dependencies can take decisions within the scope of their respective powers.

Article 58.- For the purposes of this regulation non-hazardous solid waste are classified in the following way:

B. CLASS II: Materials if incinerated generate fumes or highly toxic products.

C. CLASS III: Slow degradation materials.

Article 62.- City Hall may conduct coordinating and consulting agreements with the Social Federal Secretary, for:

I.- Introduction and improvement of systems of collection, processing, use and final disposal of solid waste.

II. Identification of alternatives for reuse and solid waste disposal including inventories and their generating sources.

4 Enforcement agencies

4.1 U.S. Enforcement Agencies

Two different levels of authority are involved in the main enforcement of applicable requirements for the management of scrap tires in the U.S. territory, as identified in the following sections.

4.1.1 Federal

The Federal authority is the Environmental Protection Agency (www.epa.gov).

4.1.2 State

Environmental Authority at State level in Texas is the Texas Commission on Environmental Quality (http://www.tceq.state.tx.us/).

4.2 Mexican Enforcement Agencies

Two different levels of authority are involved in the main enforcement of applicable requirements for the management of scrap tires in the U.S. territory, as identified in the following sections:

4.2.1 Federal

The Federal authority is the Mexican Secretary for the Environmental and Natural Resources (*Secretaria del Medio Ambiente y Recursos Naturales,* SEMARNAT) (www.semarnat.gob.mx). The prosecutor agency at the service of SEMARNAT for the supervision of the applicably of federal regulations is the PROFEPA (*Procuraduria Federal de Proteccion al Ambiente*).

4.2.2 State

Four Mexican States are involved in the Texas-Mexico border area as previously identified. Each State with an environmental office, identified as follows:

- ✓ State of Coahuila Environmental Office (*Secretaria del Medio Ambiente de Coahuila,* SEMAC) (http://www.semac.gob.mx/).
- ✓ State of Chihuahua Urban Development and Ecology Office (*Secretaria de Desarrollo Urbano y Ecologia*, SEDUE) (www.chihuahua.gob.mx).
- ✓ State of Nuevo Leon Environment Protection and Natural Resources Agency (*Subsecretaria de Proteccion al Medio Ambiente y Recursos Naturales*, SPMARN) (www.nl.gob.mx).
- ✓ State of Tamaulipas Urban Development and Environment Office (*Secretaria de Desarrollo Urbano y Medio Ambiente*, SEDUMA) (seduma.tamaulipas.gob.mx).

4.2.3 Municipal

Municipal Ecology and public Works departments are in charge of tire management enforcement in a municipal level when waste tires are generated as municipal solid waste.

ATTACHMENT 23
Disposal cost savings per tire when disposing cut tires in Texas

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Table 1. Disposal cost savings per tire when disposing cut tires in Texas					
City	**Waste tires proper disposal alternatives reported by generators and city authorities**	**Disposal fee per tire**			**Additional information**
		Whole tires (US dollars, dollars)	**Cut tires (dollars)**	**Difference (percentage)**	
Brownsville	City's solid waste dumpsters	$1.25	$0.25	80%	Comparing LIBERTY TIRE RECYCLING LLC price for a whole passenger tire in Pharr against disposal on Brownsville's city solid waste rental dumpsters.
Brownsville	City landfill	$0.91	$0.33	64%	Comparing whole tire and cut tire (shredded) disposal costs in Brownsville's landfill.
Pharr	Donna recycling center	$1.50	$0.35	77%	Comparing disposal price of LIBERTY TIRE RECYCLING LLC for a whole tire in Pharr against Donna recycling center fee for cut tires.
Pharr	Donna recycling center	$1.50	$0.50	67%	Comparing disposal price of LIBERTY TIRE RECYCLING LLC for a whole tire in Pharr against Donna recycling center fee for cut tires.
Mc Allen	DLD	$1.50	$1.25	17%	Comparing disposal price of LIBERTY TIRE RECYCLING LLC for a whole tire in Pharr against DLD fee for a cut tire.
El Paso	TRES PESETAS INC	$1.50	$0.75	50%	Comparing TRES PESETAS own fees.
El Paso	TRES PESETAS INC	$3.00	$0.75	75%	Comparing TRES PESETAS own fees.
Geometric mean of savings				**55%**	

ATTACHMENT 24
City of Laredo, TX and Pharr, TX Tire Ordinances common sections comparison

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Marked in blue are common contents in the Laredo and Pharr tire ordinance common sections. These contents should be present in any Tire ordinance to be passed on the Texas-Mexico border.

Note: Always under the supervision and approval of a legal professional with experience in law making.

Table 1. Comparison of ordinances common sections	
Laredo (Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)	**Pharr (Ordinance No. 0-2010-33)**
1.-Definitions	
	Dump
Health director	Health director
Mobile tire repair road service unit	Mobile tire repair road service unit
Scrap tire	Scrap/Used/Waste tire
Tire business	
Tire business operator	
Tire recycling facility	Tire recycling facility
Tires	Tire
	Manifest
	Person
	Waste tire hauler
	Waste tire disposer
	Waste tire generator

Table 2. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
2.-Tire business applications	
Annual fee established depending on the number of employees ranging from $35 to $140 USD	Annual permit non refundable fee of $35 USD
1) The name, mailing address, county, telephone and facsimile numbers of the applicant; and	1. Name, physical address, telephone and facsimile number (if applicable), of the applicant.
2) The name, mailing address, county, and telephone number of the property owner where the tire business is located; and	2. Name, mailing address, telephone and facsimile number of the owner of the tire business (if different from #1 above).
3) The tax identification number or tax payer identification number; and	3. Tax identification number or tax payer identification number.
4) The physical address where the tire business is located; and	4. Current physical address of the site.
5) The approximate number of tires that will be stored on site; and	5. Estimated number of tires that will be stored on site.
6) The existing zoning of the site and certified compliance with zoning laws by the City of Laredo zoning enforcement supervisor or designated representative; and	6. Conditional Use Permit issued by planning and Zoning Department.
7) Compliance with building codes and all applicable health and safety ordinances; and	
8) Mobile tire repair road service units shall provide and demonstrate proof of vehicle license, current vehicle inspection sticker, current liability insurance and driver's license; and	
9) The required annual registration fee.	
	7. Proof of current county business license, issued to the applicant at the proposed business address.

Table 2. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
2.-Tire business applications	
	8. A statement setting forth and describing the available space for properly accommodating and protecting all tires (site plan showing storage area and buildings)
	9. Proof of insurance required as per Texas Financial Responsibility laws.
	10. Such other and further information as the Public Works Department may require.

Table 3. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
3.-Denial of permit or renewal; suspension or revocation of permit	
The health director may refuse to issue or renew a tire business and/or a mobile tire repair road service units permit(s) or may suspend or revoke such permit(s) if:	...the Public Works Department may refuse to issue or renew a tire business or tire hauler permit or may suspend or revoke such permit or decal if:
1. The applicant or permit holder refuses to permit entry into the tire business by the health director or his authorized representative or otherwise willfully obstructs the inspection of the tire business and or mobile tire repair road service unit; or	1) The applicant or permit holder refuses to allow entry into the tire business by the authorized representative(s) of the City or otherwise willfully obstructs the inspection of the tire business; or
2. There are repeated or a serious violation(s) of any city ordinance by the tire business and or mobile tire repair road service units; or	2) There are repeated or a serious violation(s) occurs of any city ordinance by the tire business or tire hauler; or
3. The tire business and or mobile tire repair road service units fails to comply with any provisions of the Article, or Chapter 15, Health and Sanitation, Article V, Dengue Fever Prevention and or any applicable city ordinance.	3) The tire business or tire hauler fails to comply with any provisions of this Article and/or any other applicable city ordinance(s); or
	4) The tire business or tire hauler fails to comply with any applicable state or federal law, rule or regulation; or
	5) The tire business knowingly authorizes a tire hauler who is not property permitted as required in section 26-190(Tire hauler permit) to transport tires on behalf of such business.

Table 4. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
4.-Disposal of tires and manifests	
I. Individuals, tire businesses and mobile tire repair road service units may dispose of tires at the city landfill at a fee established by city ordinance, provided that the city landfill accepts the tires and/or signs a transmittal manifest. All landfill fees will be payable to the City of Laredo upon entrance to the city landfill; or	
II. Tires may be disposed of by delivery and manifesting of tires through a registered tire transporter to a registered tire recycling facility or a tire disposal facility regulated and licensed by the state for the disposal and/or processing of tires, provided said transporter signs transmittal manifest and authorized disposal facility accepts the tires and signs the transmittal manifest.	e) Tires shall be properly disposed of in accordance with Section 26-195 by the delivery and manifesting of tires to an authorized tire disposal or tire recycling facility designated by the City. Tire businesses contracting with a tire hauler(s) for the proper disposal of tires generated by such business shall require such hauler(s) utilize a transmittal manifest documenting the pick-up and delivery of the tires to an authorized tire disposal or tire recycling facility.
Note: Laredo ordinance requires manifest according to Texas regulations, the Pharr ordinance states in section 26-195 (Disposal records/Transmittal manifest) the minimum data that must be available in each manifest, as well as other disposal records requirements.	
	a) It shall be unlawful for any person or tire business to cause, suffer or allow the dumping of tires at any place in the city of Pharr including, without limitation, in or on any public highway, road, street, alley or thoroughfare, including any portion of the right of way thereof, any public or private property in the City or any waters in the City.

Table 4. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
4.-Disposal of tires and manifests	
	b) It shall be unlawful for any person in a residential zone to accumulate more than five (5) scrap tires on or around property which they own or occupy.
	c) A retail tire dealer may hold up to 250 scrap tires in storage.
	d) It shall be unlawful for any person or tire business to cause, suffer, or allow the disposal of whole tires in a landfill.

Table 5. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
5.-Penalties	
…upon conviction by the municipal court of the city be subject to a minimum fine of five hundred dollars **($500.00)** or a fine not to exceed two thousand dollars **($2,000.00)** for each offense, and each day of violation of said article shall constitute a separate offense.	**…**any tire business or tire hauler violating or failing to comply with any provision of this ordinance shall be guilty of a misdemeanor, subject to a civil penalty of **$50.00/$500.00 up to $1,000.00/$2,000.00** for each offence as determined by the city municipal court.
	a) The **improper storage** of one or more tires constitute a separate offense per tire and be punishable by a fine of **fifty ($50.00) dollars for each** improperly stored tire on the location of the tire business. Each day of continued violation of this subsection constitutes a separate offence.
	b) The **transport of one or more tires without the required permit** and decal shall constitute a separate offense per tire an be punishable by a fine of **fifty ($50.00) dollars for each tire** being transported in violation to this Article. Each day of continued violation of this subsection constitutes a separate offence.
	c) The **improper dumping** of a tire shall constitute a separate offense per tire and be punishable by a fine of **one hundred ($100.00) dollars for each tire** found improperly dumped that is related back to a specific tire business. Each day of continued violation of this subsection constitutes a separate offense.

Table 5. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
5.-Penalties	
	d) Any violation of this Ordinance shall be subject to both civil and criminal penalties. A criminal conviction shall be a class C misdemeanor. A violator shall also be subject to the maximum penalties allowed by law for failing to appear in Court when charged with an offense as described herein. If conduct constituting an offense under this ordinance also constitutes an offense under another law, the person may be prosecuted under all applicable laws.

Table 6. Comparison of ordinances common sections	
Laredo **(Article IV of the Chapter 15, Part II of the Laredo Code of Ordinances.)**	**Pharr** **(Ordinance No. 0-2010-33)**
6.-Injunctive relief	
In addition to and cumulative of all other penalties, the health director shall have the right to seek injunctive relief for any violation(s) of this article.	In addition to, and cumulative of, all other penalties herein provided, the city of Pharr shall have the right to seek injunctive relief, for any violation(s) of this Article.

ATTACHMENT 25
Crackdown on Illegal Dumping - Handbook for Local Government

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4.0 ILLEGAL DUMPING PREVENTION TECHNIQUES

When researchers at University College London studied the opportunities that give rise to illegal dumping they found that conventional enforcement tactics can sometimes reduce the activity quickly but the effects soon fade without additional preventive measures. Whereas well-designed and well-focused illegal dumping prevention programs can have a substantial and long-term impact on illegal dumping.[12]

Which techniques councils choose to adopt will depend on the analysis of existing data and information. Importantly, the decision must focus on the mechanism most suited to the problem, for example, increase the effort or reduce the rewards, before going on to select the particular technique that's most likely to trigger it. Too often practitioners jump to the technique before thinking through how it is supposed to work and whether this is likely in the circumstances of the particular problem.

You will then need to monitor how it is done and the outcome to identify the need for any further intervention. This may involve refining the initial response, or if necessary trying something completely different. It may also be necessary to keep an eye on newly emerging problems so that they can be dealt with as quickly as possible. Where appropriate, a combination of mechanisms, if used strategically, can often be more effective.[12]

Figure 17 summarises the techniques you can use to tackle illegal dumping.

4.1 Increase the effort: make access difficult

In most cases illegal dumping takes very little effort. It can take more effort to dispose of waste legally than to dump it illegally. Councils can change the balance to make it easier to comply with the law and make it harder to not do so. Many areas continue to experience illegal dumping problems after being cleaned up. Effective structural solutions will increase the effort and risk of being caught thereby deterring offenders. Structural solutions can reduce accessibility to popular sites for illegal dumping.[12] A clean up plus introducing signs, lighting, barriers, landscaping or increasing the visibility of a site can contribute to reducing or eliminating continued dumping.

Structural approaches

Councils across NSW have used the following structural approaches, usually combined with a mix of education and regulation.

Lighting

When lighting is used in other crime prevention strategies it can be an effective deterrent in poorly lit or remote areas. This may be useful where dumping occurs under the cover of darkness. Additional lighting increases the visibility of the offender and increases the risk of being caught. The impact of sensor lights has yet to be evaluated.

Solar lights in hotspots

City of Canada Bay Council installed solar lights and signs in a dumping hot spot.

Outcome

The enhanced lighting has deterred dumping in the area and resulted in fewer complaints to the council. Anecdotal opinion is that other known dumping areas near this hot spot are also experiencing less illegal dumping.

Figure 17: The five main illegal dumping prevention mechanisms

1. Increase the effort: make access difficult (see Section 4.1)

- Make access difficult to hot spots using **structural approaches**, such as:
  - lighting
  - landscaping, revegetation or beautification
  - barriers, such as fences and locked gates, concrete blocks, logs and boulders and earth mounds.

2. Increase the risk of getting caught (see Section 4.2)

- Strengthen **surveillance**:
  - use surveillance cameras and signs to indicate the area is being watched
  - increase patrols in hot spots
  - assist community surveillance and reporting of suspect activities
  - use aerial surveillance in rural and remote areas.
- Carry out periodic, high-profile **compliance campaigns**.
- Use **partnerships** with other councils, agencies and stakeholders.
- **Publicise successes** as widely as possible.

3. Reduce the rewards: deny financial benefits (see Section 4.3)

- Provide and/or promote **free or subsidised waste services**.
- Issue **fines** to offenders.
- **Require offenders to clean up**.

4. Reduce provocations: don't give them a reason to dump (see Section 4.4)

- Provide **efficient and well communicated waste services**.
- Ensure **reasonable waste service costs** where possible.
- Foster **community pride** by enhancing the area's aesthetic appeal.
- **Keep areas free of illegally dumped material**.

5. Remove excuses: educate and inform the community (see Section 4.5)

- **Publicise waste services**.
- Carry out **education programs** outlining responsibilities.
- **Keep areas free of illegally dumped material**.
- Install **signs** at hot spots with illegal dumping prevention messages.

It is crucial to alter the perceived as well as the actual degree of effort, risk and reward involved.[12]

Landscaping, revegetation and beautification

Landscaping and revegetating a site can indicate it is valued, monitored and used. Simple landscape activities, such as grass cutting and weed removal, can be enough in some areas to suggest that a site is cared for and maintained, which will deter some of the nuisance dumping offenders.

Beautification, such as benches, pathways, picnic tables, murals or flowerbeds, can change a community's perception of a site. Many communities will get involved in and take part in projects that build community pride and can lead to changed perceptions and increased community surveillance, which all contribute to increasing the risk for people illegally dumping.

Barriers

Physical barricades that restrict access are very effective for reducing dumping in areas with a single point of entry, such as lanes, fire trails and private roads. Fences, posts, earth mounds, bollards and rocks have all been used to prevent vehicle access. Each site is unique and therefore deterrents need to be carefully managed and planned. On some sites a single barrier blocking access is all that is required. In some cases offenders may be able to continue to dump over a barrier, but this increases the risk of being caught and may deter the majority of offenders.

Councils used funding from the 2002-2004 Illegal Dumping Clean-up and Deterrence Grants to build a range of physical barriers with varying success. They reported that some sites were difficult to enclose.

Beautification: Woollahra Municipal Council's 'Liveable Lanes' project

Woollahra Municipal Council's 'Liveable Lanes' project was designed to change its community's perception of back lanes as a dumping ground. The council was committed to beautify and improve the look and feel of the area to increase community pride and, therefore, reduce the incidence of illegal dumping. It used a 2002-2004 Illegal Dumping Clean-up and Deterrence grant to clean up dumping hot spots, landscape them and carry out an education campaign to deter future dumping. Minor capital works in the area complemented the educational component.

The council developed its project in an attempt to keep sites clean long after the campaign had finished. A second part of the project focused on a reserve that experienced persistent dumping. It used landscaping works, including new plants for garden beds, to improve the aesthetics of the area and detract dumpers. The new plants were selected to make it difficult to hide bags and other dumped rubbish, as was previously the case. Plants were widely dispersed so that the garden is more open to deter other anti-social behaviours. The council also built a retaining wall to stop bins being dragged through, presented and stored in the garden area.

Woollahra Municipal Council attributes the success of its project to a multidisciplinary team of council staff, including team members from communications, waste section, compliance, outdoor works and management, who collaborated and brought together areas of the project according to their expertise. A broader, more strategic prevention program can bring in representation from much wider sections of council asking for comments on program design, use and evaluation. The project is also a good example of community participation where the council values the community as a partner.

Outcome

The enhancement of the Oswald Street Reserve has provided the most positive results in improved environment. Dumps in this area have decreased and been maintained over a five-month period.

Fences and locked gates

Many councils used illegal dumping clean up and deterrence grants of 2002-2004 to install fences and locked gates.

Some councils indicated that new gates and locks were vandalised almost immediately after installation. Locks were tampered with or gates and fences broken down. For some dumpers, locked gates "just seem to be an invitation to become a vandal as well". Often there was no real alternative to fences and gates and so many councils need to consider vandalism in project planning as either programmed maintenance scheduled for a period of time or as the additional cost of vandal-resistant materials.

At a number of sites vandal-resistant locks, locking bollards and almost indestructible fence materials have been carefully selected.

Concrete blocks

A number of councils reported using concrete blocks to barricade entry to a site. This was described as a 'relatively cheap, inexpensive and effective option'. For many residents though the blocks are unsightly, do not fit in with the natural environment and may incur complaints to council. Some sites had experienced graffiti soon after installing the blocks.

Indestructable fencing materials

Tharawal Local Aboriginal Land Council (LALC) and DECC Parks and Wildlife Division used almost indestructible fence materials at a remote site in Wedderburn to prevent 4WD and commercial vehicles dumping materials. The adjoining landholder (industry) donated railway track and steel rope, which was used to erect a 500-metre fence line.

Outcome

The fence has remained intact and unauthorised vehicles have been kept out.

Fences to protect rural hotspots

Maitland City Council selected a rural style fence to restrict vehicle access at some rural sites.

Outcome

It helped reduce illegal dumping on the sites and restricted access to a small stockpile area for local road reconstruction works. Four of the five fenced sites continued to show little signs of illegal dumping activity 12 months after the project.

ATTACHMENT 26
2011 Scrap Tire Transporter Annual Report format

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13807, MC-174
Austin, Texas 78711-3087
Phone: (512) 239-2515 Fax: (512) 239-0404
www.tceq.texas.gov/compliance/tires/

2011 Scrap Tire Transporter Annual Report

Reporting Start Date: Reporting End Date:

Company Name:

Transporter No.: Business Tax ID: County:

Confirm with State Comptroller: or

Physical Location (Address):

Mailing Address:

Phone: Fax:

Email:

Fill in the blanks with information from manifests and other documentation regarding delivery of whole used or scrap tires.

Receiving Facility/Operator Address/Phone Number (Where I delivered Scrap Tires)	Facility Reg.#	Facility Type - State Registered or Permitted (one per blank) P - L - S - E	Type Tire (one per blank) P - T - O	Quantity Delivered
				0
				0
				0
				0
				0
				0
				0

I certify that the information provided in this report is true and correct and that I have been authorized by the Texas Commission on Environmental Quality to transport whole used or scrap tires. I am aware that falsification of this report may result in suspension, revocation, or denial of renewal of my transporter registration.

Print: Date:

Ready to submit? Reminder: Save your file before submitting Form.

Via Email:

Submit by Email

Via Fax:

Print and Fax to:
512-239-0404

Print

Via Mail:

Mail to: TCEQ - Scrap Tire Program, P.O. Box 13807, MC-174, Austin, Texas 78711-3087

ATTACHMENT 27
Estimated and consulted market prices of tire derived products currently supplying the identified markets

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Table 1.
Market prices for tire derived products or similar products.

Type of dead tire required	Tire part required	Image of tire part required image. Source: IEMS	End use market	Image of end use	market price (USD)	Notes and source
A	Tread		Landscaping edging.		$ 18.97	*Price in US dollars for a Master Mark Terrace Board 5 in. x 40 ft. Black Landscape Lawn Edging with Stakes. Price source: http://www.homedepot.com Image's source: IEMS
A	Tread		Tread cattle fence railing.		$ 1.89	*Price in US dollars for a treated wood lumber board 6 feet long, 1 by 3 inches. Price source: telephonic quotation from Zarsky lumber yard in Harlimgen, Texas. Image´s source: IEMS
A	Tread		Tread hog fencing.		$ 124.50	*Price in US dollars for a roll of 330 feet of a Hinge Lock woven wire fence. 8 horizontal wires (graduated spacing), 32" Tall , 6" spacing between vertical wires/stays, 330' per roll, 12-1/2 gauge intermediate wires,10 gauge Top and Bottom Wires, Galvanized. Price source: http://www.afence.com Image's source: IEMS

Table 1.
Market prices for tire derived products or similar products.

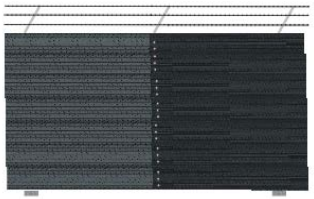
Type of dead tire required	Tire part required	Image of tire part required image. Source: IEMS	End use market	Image of end use	market price (USD)	Notes and source
A	Tread		Tread intruder control fencing.		$ 3.49	*Price in US dollars per foot of a chain link fabric 96" tall. Sold by the foot, Galvanized After Weaving (GAW), meets ASTM specification A392, 2" diamond mesh , weight 3.65 lbs, knuckle on bottom/twist on top (KT), 50 linear feet per roll, maintenance Free. Price source: http://www.afence.com Image's source: IEMS
A	Tread		Tree edging.		$ 11.99	*Retail price in US dollars for a Suncast Eco Edge Quick Edge Edging 20 ft long. Price source: http://outdoors.pricegrabber.com Image's source: IEMS
AB	Sidewall bead wire		Passenger tire sidewalls' bead wire (bulk).	NA	$ 164.66	USD/ton. Price based on the mean purchase price of tire wire in the Mexican scope border area of $2.48 mexican pesos per kilogram. This price was estimated using information of the 25 and 26 of June 2012 in the cities of Juarez, Matamoros and Reynosa.

Table 1. Market prices for tire derived products or similar products.						
Type of dead tire required	**Tire part required**	**Image of tire part required image.** Source: IEMS	**End use market**	**Image of end use**	**market price (USD)**	**Notes and source**
AB	Sidewalls		Passenger tire sidewalls (bulk).	NA	$ 2.39	USD/ton. Price for un-de beaded sidewalls from passenger tires slit at the shoulder, including 11", 12", 13", 14" 15" & P16"rim sizes. Price source: May 2012 ScrapIndex.com daily price mean.
AB	Sidewalls		de beaded passenger sidewalls (bulk).	NA	$ 64.56	USD/ ton. Price for passenger Sidewalls (black & white) which consist of de beaded sidewalls from passenger tires slit at the shoulder, including 11", 12", 13", 14" 15" & P16" rim sizes. May include white lettered or whitewalls. Price source: May 2012 ScrapIndex.com daily price mean.
AB	Sidewalls		Ground rubber for Athletic and recreational surfaces (bulk).		$ 291.20	USD/ ton. Price for No.2 Tire Granule (minus 20 mesh) consisting of granulated tire crumb, Black & White Guaranteed metal free, sized to minus 20 Mesh. Magnetically separated materials are not acceptable. Fluff from tire cord removed. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: Houston Astrodome (http://www.ballparksofbaseball.com/past/Astrodome.htm)

Table 1. Market prices for tire derived products or similar products.						
Type of dead tire required	**Tire part required**	**Image of tire part required image.** Source: IEMS	**End use market**	**Image of end use**	**market price (USD)**	**Notes and source**
AB	Sidewalls		Ground rubber for molded and extruded products (bulk).		$ 291.20	USD/ton. Price for No.2 Tire Granule (minus 20 mesh) consisting of granulated tire crumb, Black & White Guaranteed metal free, sized to minus 20 Mesh. Magnetically separated materials are not acceptable. Fluff from tire cord removed. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: IEMS, Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (US EPA, 2010)
AB	Sidewalls		Rubber mulch (bulk).		$ 86.08	USD/ton. Price for No.2 Rubber Chips consisting of uniform chipped bias tire or metal free sidewalls, sized to minus 2.5" plus 10 mesh. Must be guaranteed metal free (magnetically separated material is not acceptable) and may contain black & white. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (US EPA, 2010)

Table 1.
Market prices for tire derived products or similar products.

Type of dead tire required	Tire part required	Image of tire part required image. Source: IEMS	End use market	Image of end use	market price (USD)	Notes and source
AB	Sidewalls		Ground rubber for extruded products (bulk).		$ 313.00	USD/ton. Price for No.2 Tire Granule (minus 40 mesh) consisting of granulated tire crumb, Black & White Guaranteed metal free, sized to minus 40 Mesh. Magnetically separated materials are not acceptable. Fluff from tire cord removed. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: IEMS
A	Tread from Heavy truck and passenger tires		Tire-derived-geo-cylinders, (TDGC) or Geocells for civil engineering applications.		$ 2.00	Price per cylinder in US dollars, FOB. For purchases of over 20,000 cylinders price can be lowered to $2 USD. Price and image's source: Samuel G. Bonasso, P.E. Reinforced Aggregates Company P.O. Box 199, Morgantown, WV. U.S, Patent 7,470,092 B1
AB	Tread from Heavy truck and passenger tires		Tire treads (bulk).	NA	$ 25.82	USD/ton. Price for passenger treads (steel belt) consisting of treads or crowns from slit radial passenger tires, including 11", 12", 13", 14" 15" & P16"rim sizes. Price source: May 2012 ScrapIndex.com daily price mean.

Table 1. Market prices for tire derived products or similar products.						
Type of dead tire required	**Tire part required**	**Image of tire part required image.** Source: IEMS	**End use market**	**Image of end use**	**market price (USD)**	**Notes and source**
ABC	Whole or any part of truck and passenger		Ground rubber for Rubberized Asphalt (RA).		$ 0.05	USD /lb. Price for No.4 Tire Granule (minus 20 mesh) consisting of granulated tire crumb, Black & White Magnetically Separated, sized to minus 20 Mesh. Fluff from tire cord removed. Minus 20 mesh refers to material that has been sized by passing through a screen with 20 holes per inch. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: Arizona, USA, Department of Transportation's webpage. (http://www.azdot.gov/quietroads/photos.asp)
ABC	Whole or any part of truck and passenger		Type A tire derived aggregate (TDA).		$ 11.08	USD/ton. Price for No.2 Shredded Tires consisting of shredded whole tires sized to minus 3" (No warranty is given to assure shear shredding was employed, specific required size percentage is met nor metal wires are exposed in an amount less than the one required by TDA specifications) Price source: May 2012 ScrapIndex.com daily price mean. Image's source: Calrecycle's webpage (http://www.calrecycle.ca.gov/Tires/TDA/Uses/default.htm #Landfill)
ABC	Whole or any part of truck and passenger		Type B tire derived aggregate (TDA).		NA	Image's source: Calrecycle's webpage (http://www.calrecycle.ca.gov/Tires/TDA/Projects/Dixon.htm)

Table 1.
Market prices for tire derived products or similar products.

Type of dead tire required	Tire part required	Image of tire part required image. Source: IEMS	End use market	Image of end use	market price (USD)	Notes and source
A	Whole without one sidewall	 Source: http://www.rootsimple.com/2008/11/used-tire-compost-bin.html	Steel belted rubber for rammed-earth encased walls.		$ 25.82	*USD/ton. Price for passenger treads (steel belt) consisting of treads or crowns from slit radial passenger tires, including 11", 12", 13", 14" 15" & P16"rim sizes. Price source: May 2012 ScrapIndex.com daily price mean. Image's source: Owl swamp natural builder projects (http://picasaweb.google.com/115744233306866378689/TireWall?gsessionid=jJWIulHV57N4IPDhTDrfvQ#)

* Price cells colored in orange were estimated based on a similar product's retail price. The similar product's description is available on the cell located next to the price.

[1] Price in US Dollars estimated based on the FIX monthly average value of 13.6634 pesos per US dollar published by the Bank of Mexico (BANXICO) for May 2012.

[2] The description of each waste tire type is reported on Chapter 8.

[3] TDF markets are only available in the US, Mexico's interviewed cement companies do not compensate their TDF suppliers, for which TDF is considered by this study as a disposal option rather than a market.

Note: Information contained in ScrapIndex.com, (spot market prices, market trend reports and the historical pricing data) is generated from internal proprietary data from The Recycler's Exchange and Recycling Offset Credits (ROCs) Reports and may not reflect external markets or transactions. RecycleNet tracks 100's of individual grades of scrap and recyclable commodities from The Recycler's Exchange and a network of regional exchanges worldwide. Each day at 10:00am EST a snapshot is taken of the on-line spot market prices; this information is archived as historical pricing data. Information contained in the The RecycleNet Composite Index, the spot market prices and the historical pricing data is generated from internal proprietary data and may not reflect external markets or transactions. May 2012 ScrapIndex.com daily price mean estimations are presented as **Attachment 31** of this report. Other prices for tire parts and tire derived raw materials are available at www.scrapindex.com

USD = United States Dollars

Ton= 2000 pounds

Bulk refers to sorted and prepared materials, packaged and ready for shipment in typical truck load quantities (weight over 40,000 pounds).

ATTACHMENT 28
May 2012 ScrapIndex.com daily prices and estimation of a monthly mean price

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The purpose of this Attachment is to illustrate how some of the mean prices reported on **Attachment 27** were estimated. The tables below present the daily prices of tire parts and granules depending on their characteristics. All these prices were obtained from the web page: http://www.scrapindex.com/

Information contained in ScrapIndex.com, (spot market prices, market trend reports and the historical pricing data) is generated from internal proprietary data from The Recycler's Exchange and Recycling Offset Credits (ROCs) Reports and may not reflect external markets or transactions. RecycleNet tracks 100's of individual grades of scrap and recyclable commodities from The Recycler's Exchange and a network of regional exchanges worldwide. Each day at 10:00am EST a snapshot is taken of the on-line spot market prices, this information is archived as historical pricing data. Information contained in the The RecycleNet Composite Index, the spot market prices and the historical pricing data is generated from internal proprietary data and may not reflect external markets or transactions. Other prices for tire parts and tire derived raw materials are available at www.scrapindex.com.

Prices for un-de beaded sidewalls from passenger tires slit at the shoulder, including 11", 12", 13", 14" 15" & P16"rim sizes.	
Date	**Price (USD/ton)**
May 01, 2012	$ 2.38
May 02, 2012	$ 2.41
May 03, 2012	$ 2.41
May 04, 2012	$ 2.39
May 05, 2012	$ 2.39
May 06, 2012	$ 2.39
May 07, 2012	$ 2.39
May 08, 2012	$ 2.39
May 09, 2012	$ 2.38
May 10, 2012	$ 2.40
May 11, 2012	$ 2.40
May 12, 2012	$ 2.40
May 13, 2012	$ 2.40
May 14, 2012	$ 2.40
May 15, 2012	$ 2.40
May 16, 2012	$ 2.40
May 17, 2012	$ 2.41
May 18, 2012	$ 2.41
May 19, 2012	$ 2.41
May 20, 2012	$ 2.41
May 21, 2012	$ 2.41
May 22, 2012	$ 2.43
May 23, 2012	$ 2.41
May 24, 2012	$ 2.39
May 25, 2012	$ 2.39
May 26, 2012	$ 2.39
May 27, 2012	$ 2.39
May 28, 2012	$ 2.38
May 29, 2012	$ 2.37
May 30, 2012	$ 2.35
May 31, 2012	$ 2.31
Geometric mean	**$ 2.39**

Prices for passenger treads (steel belt) consisting of treads or crowns from slit radial passenger tires, including 11", 12", 13", 14" 15" & P16"rim sizes.	
Date	**Price (USD/ton)**
May 01, 2012	$25.85
May 02, 2012	$25.84
May 03, 2012	$25.84
May 04, 2012	$25.84
May 05, 2012	$25.84
May 06, 2012	$25.84
May 07, 2012	$25.84
May 08, 2012	$25.84
May 09, 2012	$25.84
May 10, 2012	$25.83
May 11, 2012	$25.83
May 12, 2012	$25.83
May 13, 2012	$25.83
May 14, 2012	$25.83
May 15, 2012	$25.82
May 16, 2012	$25.82
May 17, 2012	$25.82
May 18, 2012	$25.82
May 19, 2012	$25.82
May 20, 2012	$25.82
May 21, 2012	$25.81
May 22, 2012	$25.81
May 23, 2012	$25.81
May 24, 2012	$25.81
May 25, 2012	$25.81
May 26, 2012	$25.81
May 27, 2012	$25.81
May 28, 2012	$25.81
May 29, 2012	$25.81
May 30, 2012	$25.81
May 31, 2012	$25.80
Geometric mean	**$ 25.82**

Prices for passenger Sidewalls (black & white) which consist of de beaded sidewalls from passenger tires slit at the shoulder, including 11", 12", 13", 14" 15" & P16" rim sizes.	
Date	**Price (USD/ton)**
May 01, 2012	$64.63
May 02, 2012	$64.61
May 03, 2012	$64.61
May 04, 2012	$64.60
May 05, 2012	$64.60
May 06, 2012	$64.60
May 07, 2012	$64.59
May 08, 2012	$64.59
May 09, 2012	$64.59
May 10, 2012	$64.59
May 11, 2012	$64.58
May 12, 2012	$64.58
May 13, 2012	$64.58
May 14, 2012	$64.58
May 15, 2012	$64.56
May 16, 2012	$64.56
May 17, 2012	$64.55
May 18, 2012	$64.55
May 19, 2012	$64.54
May 20, 2012	$64.54
May 21, 2012	$64.54
May 22, 2012	$64.54
May 23, 2012	$64.53
May 24, 2012	$64.53
May 25, 2012	$64.53
May 26, 2012	$64.53
May 27, 2012	$64.52
May 28, 2012	$64.52
May 29, 2012	$64.52
May 30, 2012	$64.52
May 31, 2012	$64.51
Geometric mean	**$ 64.56**

Prices for No.2 Tire Granule (minus 20 mesh) consisting of granulated tire crumb, Black & White Guaranteed metal free, sized to minus 20 Mesh. Magnetically separated materials are not acceptable. Fluff from tire cord removed.		
Date	**Price**	
	(USD/lbs)	**(USD/ton)**
May 01, 2012	$0.13	$291.20
May 02, 2012	$0.13	$291.20
May 03, 2012	$0.13	$291.20
May 04, 2012	$0.13	$291.20
May 05, 2012	$0.13	$291.20
May 06, 2012	$0.13	$291.20
May 07, 2012	$0.13	$291.20
May 08, 2012	$0.13	$291.20
May 09, 2012	$0.13	$291.20
May 10, 2012	$0.13	$291.20
May 11, 2012	$0.13	$291.20
May 12, 2012	$0.13	$291.20
May 13, 2012	$0.13	$291.20
May 14, 2012	$0.13	$291.20
May 15, 2012	$0.13	$291.20
May 16, 2012	$0.13	$291.20
May 17, 2012	$0.13	$291.20
May 18, 2012	$0.13	$291.20
May 19, 2012	$0.13	$291.20
May 20, 2012	$0.13	$291.20
May 21, 2012	$0.13	$291.20
May 22, 2012	$0.13	$291.20
May 23, 2012	$0.13	$291.20
May 24, 2012	$0.13	$291.20
May 25, 2012	$0.13	$291.20
May 26, 2012	$0.13	$291.20
May 27, 2012	$0.13	$291.20
May 28, 2012	$0.13	$291.20
May 29, 2012	$0.13	$291.20
May 30, 2012	$0.13	$291.20
May 31, 2012	$0.13	$291.20
Geometric mean	**$ 0.13**	**$291.20**

Prices for No.2 Rubber Chips consisting of uniform chipped bias tire or metal free sidewalls, sized to minus 2.5" plus 10 mesh. Must be guaranteed metal free (magnetically separated material is not acceptable) and may contain black & white.	
Date	**Price (USD/ton)**
May 01, 2012	$86.18
May 02, 2012	$86.15
May 03, 2012	$86.15
May 04, 2012	$86.14
May 05, 2012	$86.14
May 06, 2012	$86.13
May 07, 2012	$86.12
May 08, 2012	$86.12
May 09, 2012	$86.12
May 10, 2012	$86.12
May 11, 2012	$86.11
May 12, 2012	$86.11
May 13, 2012	$86.11
May 14, 2012	$86.10
May 15, 2012	$86.08
May 16, 2012	$86.08
May 17, 2012	$86.07
May 18, 2012	$86.06
May 19, 2012	$86.06
May 20, 2012	$86.06
May 21, 2012	$86.05
May 22, 2012	$86.05
May 23, 2012	$86.04
May 24, 2012	$86.04
May 25, 2012	$86.04
May 26, 2012	$86.04
May 27, 2012	$86.03
May 28, 2012	$86.03
May 29, 2012	$86.03
May 30, 2012	$86.02
May 31, 2012	$86.02
Geometric mean	**$ 86.08**

Prices for No.2 Tire Granule (minus 40 mesh) consisting of granulated tire crumb, Black & White Guaranteed metal free, sized to minus 40 Mesh. Magnetically separated materials are not acceptable. Fluff from tire cord removed.		
Date	**Price (USD/lbs)**	**Price (USD/ton)**
May 01, 2012	$0.14	$313.60
May 02, 2012	$0.14	$313.60
May 03, 2012	$0.14	$313.60
May 04, 2012	$0.14	$313.60
May 05, 2012	$0.14	$313.60
May 06, 2012	$0.14	$313.60
May 07, 2012	$0.14	$313.60
May 08, 2012	$0.14	$313.60
May 09, 2012	$0.14	$313.60
May 10, 2012	$0.14	$313.60
May 11, 2012	$0.14	$313.60
May 12, 2012	$0.14	$313.60
May 13, 2012	$0.14	$313.60
May 14, 2012	$0.14	$313.60
May 15, 2012	$0.14	$313.60
May 16, 2012	$0.14	$313.60
May 17, 2012	$0.14	$313.60
May 18, 2012	$0.14	$313.60
May 19, 2012	$0.14	$313.60
May 20, 2012	$0.14	$313.60
May 21, 2012	$0.14	$313.60
May 22, 2012	$0.14	$313.60
May 23, 2012	$0.14	$313.60
May 24, 2012	$0.14	$313.60
May 25, 2012	$0.14	$313.60
May 26, 2012	$0.14	$313.60
May 27, 2012	$0.14	$313.60
May 28, 2012	$0.14	$313.60
May 29, 2012	$0.14	$313.60
May 30, 2012	$0.14	$313.60
May 31, 2012	$0.14	$313.60
Geometric mean	**$ 0.14**	**$313.60**

Prices for No.2 Shredded Tires consisting of shredded whole tires sized to minus 3"	
Date	**Price (USD/ton)**
May 01, 2012	$11.01
May 02, 2012	$11.16
May 03, 2012	$11.16
May 04, 2012	$11.09
May 05, 2012	$11.06
May 06, 2012	$11.04
May 07, 2012	$11.04
May 08, 2012	$11.04
May 09, 2012	$11.01
May 10, 2012	$11.13
May 11, 2012	$11.11
May 12, 2012	$11.11
May 13, 2012	$11.11
May 14, 2012	$11.11
May 15, 2012	$11.11
May 16, 2012	$11.11
May 17, 2012	$11.18
May 18, 2012	$11.16
May 19, 2012	$11.16
May 20, 2012	$11.14
May 21, 2012	$11.14
May 22, 2012	$11.23
May 23, 2012	$11.16
May 24, 2012	$11.08
May 25, 2012	$11.09
May 26, 2012	$11.09
May 27, 2012	$11.02
May 28, 2012	$11.00
May 29, 2012	$10.94
May 30, 2012	$10.88
May 31, 2012	$10.70
Geometric mean	**$ 11.08**

Prices for No.4 Tire Granule (minus 20 mesh) consisting of granulated tire crumb, Black & White Magnetically Separated, sized to minus 20 Mesh. Fluff from tire cord removed. Minus 20 mesh refers to material that has been sized by passing through a screen with 20 holes per inch.	
Date	**Price (USD/lbs)**
May 01, 2012	$0.05
May 02, 2012	$0.05
May 03, 2012	$0.05
May 04, 2012	$0.05
May 05, 2012	$0.05
May 06, 2012	$0.05
May 07, 2012	$0.05
May 08, 2012	$0.05
May 09, 2012	$0.05
May 10, 2012	$0.05
May 11, 2012	$0.05
May 12, 2012	$0.05
May 13, 2012	$0.05
May 14, 2012	$0.05
May 15, 2012	$0.05
May 16, 2012	$0.05
May 17, 2012	$0.05
May 18, 2012	$0.05
May 19, 2012	$0.05
May 20, 2012	$0.05
May 21, 2012	$0.05
May 22, 2012	$0.05
May 23, 2012	$0.05
May 24, 2012	$0.05
May 25, 2012	$0.05
May 26, 2012	$0.05
May 27, 2012	$0.05
May 28, 2012	$0.05
May 29, 2012	$0.05
May 30, 2012	$0.05
May 31, 2012	$0.05
Geometric mean	**$ 0.05**

ATTACHMENT 29
Potential revenue per passenger tire equivalent (PTE) for each market and formulas applied to obtain each

Table 1.
Formulas applied to obtain tire derived products potential revenue per passenger tire equivalent (PTE)

Market	Price per passenger tire equivalent (USD / PTE)	Applied formula	Notes	tire part considered as source
Passenger tire sidewalls (bulk).	$0.004	2.39*20*0.2/2240	1,4	sidewalls
Passenger tire sidewalls' bead wire (bulk).	$0.074	164.66*20*0.2*0.25/2240	1,4	sidewalls bead wire
De-beaded passenger sidewalls (bulk).	$0.086	64.56*20*0.2*0.75/2240	1,4	de-beaded sidewalls
Type A tire derived aggregate (TDA).	$0.099	11.08*20/2240	4	whole
Tire treads (bulk).	$0.184	25.82*20*0.8/2240	1,4	tread
Steel belted rubber for rammed-earth encased walls.	$0.207	25.82*20*0.9/2240	1	tread
Ground rubber for Athletic and recreational surfaces (bulk).	$0.390	291.2*20*0.2*0.75/2240	1,3,4	de-beaded sidewalls
Ground rubber for molded and extruded products (bulk).	$0.390	291.2*20*0.2*0.75/2240	1,3,4	de-beaded sidewalls
Ground rubber for extruded products (bulk).	$0.419	313*20*0.2*0.75/2240	1,3,4	de-beaded sidewalls
Tread hog fencing.	$0.455	((124.5/330)*4.82)/4	2,5	tread
Rubber mulch (bulk).	$0.769	86.08*20/2240	4	whole
Ground rubber for Rubberized Asphalt (RA).	$1.000	0.05*20	4	whole
Tread cattle fence railing.	$1.518	(1.89/6)*4.82	2	tread
Tire-derived-geo-cylinders (TDGC).	$2.000	Estimation not required		tread
Landscaping edging.	$2.286	(18.97/40)*4.82	2	tread
Tread intruder control fencing.	$2.403	3.49*4.82/7	2,6	tread
Tree edging.	$2.890	(11.99/20)*4.82	2	tread

* Highlighted cells were estimated based on a similar product's retail price.

[1] In order to perform these estimations the following assumptions were made since different tire parts are used to obtain different types of rubber: 1 PTE sidewall=10% of a PTE. 1 PTE posses 2 PTE sidewalls. 25% of a PTE sidewall's weight is bead wire. Meaning each PTE posses approximately 1 pound of bead wire. (TNRCC, 1999)

[2] PTE cut tire treads are considered on these estimations to be 1.47m (4.82 feet) long, which is the rim 15 tires mean tread length estimated in this report.

[3] The following are considered to use de-beaded tire sidewalls as rubber source, where magnetically separated materials are not acceptable: Ground rubber for athletic and recreational surfaces, molded and extruded products, and rubber chips for colored rubber mulch.

[4] A Passenger tire Equivalent (PTE) is equal to 20 pounds (9.07 kg).

[5] A tread Hog fence was assumed to use 4 horizontal parallel PTE cut treads.

[6] A tread intruder control fence was assumed to use 7 horizontal parallel PTE cut treads.

PTE= Passenger Tire Equivalent

Note: Prices for Type B tire derived aggregate were not available.

ATTACHMENT 30
Matrix of required equipment investment in order to be able to supply each market

Printed on 100% recycled fiber paper using solid ink

Table 1. Matrix of required equipment investment in order to be able to supply each market									
Image of equipment					**NA**	**NA**	**NA**		
Equipment / Cost (US dollars)	**Automatic passenger tire sidewall remover[1]**	**Automatic truck tire sidewalls remover[1]**	**Automatic Sidewall debeader[1]**	**Automatic passenger tire tread cutter[1]**	**Grinding equipment for nominal 1 inch shreds[3]**	**Grinding equipment for Type A TDA[3]**	**Grinding equipment for Type B TDA only [2]**	**Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[1]**	**Minimum investment on equipment**
Market	**$3,900.00**	**$7,000.00**	**$3,650.00**	**$3,400.00**	**$651,326.59**	**$651,326.59**	**$464,781.59**	**$662,500.00**	**(US Dollars)**
Passenger tire sidewalls (bulk).	1								**$3,900.00**
Tire-derived-geo-cylinders, (TDGC)	1								**$3,900.00**
Steel belted rubber for rammed-earth encased walls.	1								**$3,900.00**
Tire treads (bulk).	1								**$3,900.00**
De-beaded passenger sidewalls (bulk).	1		1						**$7,550.00**
Passenger tire sidewalls' bead wire (bulk).	1		1						**$7,550.00**
Cut treads for tree and landscape edging	1		1	1					**$10,950.00**
Cut treads for fencing	1		1	1					**$10,950.00**

Table 1.
Matrix of required equipment investment in order to be able to supply each market

Image of equipment					NA	NA	NA		
Equipment / Cost (US dollars)	**Automatic passenger tire sidewall remover[1]**	**Automatic truck tire sidewalls remover[1]**	**Automatic Sidewall debeader[1]**	**Automatic passenger tire tread cutter[1]**	**Grinding equipment for nominal 1 inch shreds[3]**	**Grinding equipment for Type A TDA[3]**	**Grinding equipment for Type B TDA only [2]**	**Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[1]**	**Minimum investment on equipment**
Market	**$3,900.00**	**$7,000.00**	**$3,650.00**	**$3,400.00**	**$651,326.59**	**$651,326.59**	**$464,781.59**	**$662,500.00**	**(US Dollars)**
Type B tire derived aggregate (TDA)							1		**$464,781.59**
Type A tire derived aggregate (TDA)						1			**$651,326.59**
Ground rubber for Rubberized Asphalt (RA)								1	**$662,500.00**
Ground rubber for Athletic and recreational surfaces (bulk).	1		1					1	**$670,050.00**
Rubber mulch (bulk).	1		1					1	**$670,050.00**
Ground rubber for molded and extruded products (bulk).	1		1					1	**$670,050.00**

Table 1.
Matrix of required equipment investment in order to be able to supply each market

Image of equipment					**NA**	**NA**	**NA**		
Equipment / Cost (US dollars)	**Automatic passenger tire sidewall remover[1]**	**Automatic truck tire sidewalls remover[1]**	**Automatic Sidewall debeader[1]**	**Automatic passenger tire tread cutter[1]**	**Grinding equipment for nominal 1 inch shreds[3]**	**Grinding equipment for Type A TDA[3]**	**Grinding equipment for Type B TDA only [2]**	**Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[1]**	**Minimum investment on equipment**
Market	**$3,900.00**	**$7,000.00**	**$3,650.00**	**$3,400.00**	**$651,326.59**	**$651,326.59**	**$464,781.59**	**$662,500.00**	**(US Dollars)**
Ground rubber for extruded products (bulk). [4]	1		1					1	**$670,050.00**

[1] Quotations obtained for these equipments are presented on **Attachment 17** of this report.

[2] Value updated from $441,000.00 USD in 2010 to 2012 prices using the United States Bureau of Labor Statistics CPI Inflation calculator. (http://www.bls.gov/data/inflation_calculator.htm). Quotations obtained from the Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico published on December 2012 by the Environmental protection Agency of the USA. Prices include only equipment and its installation, facilities or alternative equipment are not considered.

[3] Value updated from $618,000.00 USD in 2010 to 2012 prices using the United States Bureau of Labor Statistics CPI Inflation calculator. (http://www.bls.gov/data/inflation_calculator.htm) Quotations obtained from the Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico published on December 2012 by the Environmental protection Agency of the USA. Prices include only equipment and its installation, facilities or alternative equipment are not considered.

[4] The investment on this facility is larger than the one reported since additional granulators or grinding equipment is necessary.

The following uses are considered to use de beaded tire sidewalls as rubber source, where magnetically separated materials are not acceptable: Ground rubber for athletic and recreational surfaces, molded and extruded products, and rubber chips for colored rubber mulch.

Note: to remove sidewalls of passenger tires a linoleum knife of $15.2 US dollars may be employed.

ATTACHMENT 31
Equipment quotations and price sources

BIOS

Thomas Dom
- Founder/President
- Mechanical Engineer (ASU)

Alex Dom
- Mechanical Engineer (NYIT)

Matthew Dom
- Welding Degree (EVIT)
- 11 MIG and TIG certifications
- Fabricator

EECO'S BUSINESS ETHICS

At *EECO* we believe in manufacturing equipment using **3 simple** ideas:

- *Use ingenuity and creativeness to create simple operating machines*
- *Implement modern technology and efficient manufacturing methods*
- *Incorporate standard/common parts and hardware*

These **simple** rules result in **affordable**, dependable and **easily repairable** machines for anyone looking to improve their tire recycling business or to start their own.

ENGINEERING & EQUIPMENT CO.

FUN FACTS

- Founded in 1991
- ***3*** U.S. Patents
- Sold over ***380*** machines to ***11*** different countries

Because we are family owned and operated we focus our personal attention to suit any of your custom tire recycling needs.

6869 E. Vernon Ave.
Scottsdale, Az 85257
USA

Shop 480-264-8780
Office 480-990-2037
Fax 480-990-2037
www.eaeco.com

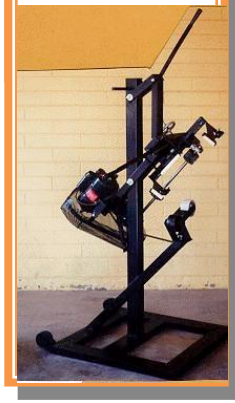
This brochure was designed to use less ink

EECO

www.eaeco.com

PRODUCTS

Sidewall Cutter



Production Rate:
180 sidewalls per hour (average)

Cutters:
Standard heavy duty utility knife blades

Price:
$3900 w/ **Free** shipping

Tread Cutter

Production Rate:
180 sidewalls per hour (average)

Cutters:
Hardened steel cutting disc

Price:
$3400 w/ **Free** shipping

DeBeader

Production Rate:
360 sidewalls per hour (average)

Cutters:
Standard heavy duty utility knife blades

Price:
$3650 w/ **Free** shipping

BACKGROUND

Engineering and Equipment Co. manufactures tire recycling equipment; our Sidewall and Tread Cutter as well as our Bead Remover use **simple**, **standard** and **easily accessible** parts. All machines are mobile and ***easy*** to ***operate***.

We also offer engineering design and analysis of any custom machine built to fit ***your*** needs.

- 3D Modeling with PRO/E and SolidWorks (drawings and stress analysis)
- Certified TIG, MIG and Arc Welding
- CNC Machining and CNC Plasma Cutting

Ever since the first version of our Sidewall Cutter we continue to improve our machines every step of the way.

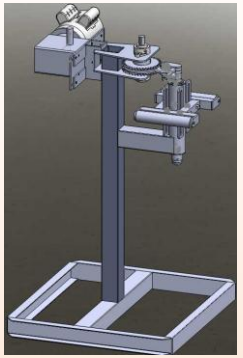
We perform ***Research and Development to develop better tire recycling machines*** as well as other innovative ideas. Check out our website to see our current projects.

www.eaeco.com

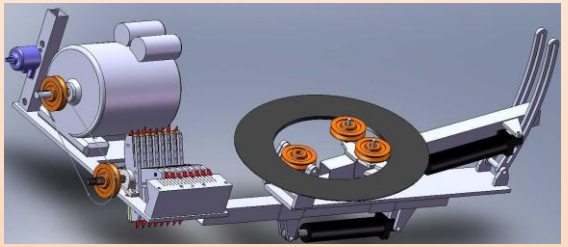
WHAT'S NEW

Research and Development is being conducted for **3 new machines** that will hit our product line by the end of 2011!

- Our Semi-Truck Sidewall Cutter will remove Semi-Truck Sidewalls at equal rates as our competitors, but at **half the cost!**

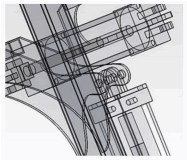


- Our up and coming Sidewall Chipper will produce a **chip size of ½"x ½"** from car and light truck tire sidewalls.



- We are in the midst of testing our Bead Stripping Machine that essentially peels away the rubber left on beads cut from car and light truck tires from our DeBeader Machine; leaving the clean high quality steel ring to be recycled!

Engineering & Equipment Co.
6869 E. Vernon Ave.
Scottsdale, Az USA 85257
www.eaeco.com
email eaeco@hotmail.com
tel 480-264-8780
fax 480-990-2037



SALES QUOTE

quote # SQ-000010
date 4/20/2012

billing address **Integrated Environmental Management Services**

shipping address **Integrated Environmental Management Services**
El Paso, TX
USA

contact Esteban Ibarra
phone 305-407-9964

sales rep
Alex Dom

payment terms
Payment Due Before Shipment

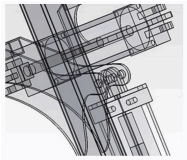
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	DISCOUNT	SUB-TOTAL
DeBeader	Removes bead from sidewall	3	$3,650.00	5 %	$10,402.50
Sidewall Cutter	Removes Sidewalls	3	$3,900.00	5 %	$11,115.00
Truck Tire Sidewall Cutter	Removes sidewalls from truck tires and super singles	3	$7,000.00	5 %	$19,950.00
TT Tread Cutter	Cuts Treads of Truck Tires	3	$4,400.00	5 %	$12,540.00
Tread Cutter	Tire Cutting Machine and manual - 1 Crate - 480 Lbs, 65"L x 37"W x 39"H	3	$3,400.00	5 %	$9,690.00

SUB-TOTAL $63,697.50

TOTAL $63,697.50

Make all checks payable to EECO
We Appreciate Your Purchase And Promise to Continue Our Service For As Long As You Own Our Equipment.

Engineering & Equipment Co.
6869 E. Vernon Ave.
Scottsdale, Az USA 85257
www.eaeco.com
email eaeco@hotmail.com
tel 480-264-8780
fax 480-990-2037



SALES QUOTE

quote # SQ-000010
date 4/20/2012

billing address **Integrated Environmental Management Services**

shipping address **Integrated Environmental Management Services**
Warez
Mexico

contact Esteban Ibarra
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ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	DISCOUNT	SUB-TOTAL
DeBeader	Removes bead from sidewall	3	$3,650.00	5 %	$10,402.50
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TT Tread Cutter	Cuts Treads of Truck Tires	3	$4,400.00	5 %	$12,540.00
Tread Cutter	Tire Cutting Machine and manual - 1 Crate - 480 Lbs, 65"L x 37"W x 39"H	3	$3,400.00	5 %	$9,690.00

SUB-TOTAL	$63,697.50
FREIGHT	$1,950.00
TOTAL	$65,647.50

Make all checks payable to EECO
We Appreciate Your Purchase And Promise to Continue Our Service For As Long As You Own Our Equipment.

APPENDIX G
Scrap Tire Processing Facility Economic Parameters

BASIS

The projected operating mode is a single facility capable of receiving and processing 250,000 to 1,000,000 passenger tire equivalents (PTEs)/year into specific shredded product sizes ranging from Class B tire-derived aggregate (TDA) to 1-inch nominal chips

SITE PARAMETERS

Property Size:

Approximately 5 acres of flat, dry land in a central location with highway access and stable soil, plus additional property for product storage if more than 1 month's inventory is required.

Property Use:

3 acres for site operations, equipment movement and limited tire storage

2 acres for office and maintenance trailers and limited product storage, as well as water storage if applicable

Common Property Improvements:

Fenced and gated perimeter provides access control to decrease theft, vandalism, and arson

Operating area lighting, and possibly storage area lighting (depending on surroundings), enhances operating flexibility, safety, and security

Soil stabilization of storage and working areas: (1) decreases tire contamination and associated equipment maintenance, and (2) decreases product contamination for greater marketability and value

Concrete over about 1 acre of the centralized operating area prevents water displaced from tires during handling and processing; creating wet and undesirable conditions. A berm (3 to 4 feet high) around the perimeter of the storage area controls dispersion of pyrolytic oil or water if there is a fire.

Water accessibility or a water storage pond (lined if necessary) for emergency fire fighting

Electrical power for processing equipment, including a transformer if the available power is not stepped down

Office and associated equipment required to conduct business

Shop area and tools required to maintain equipment

Basic operation can be conducted outside, but efficiency may be impaired by weather. A portable cover may be desirable for shredder maintenance.

Additional Product Storage Requirements:

Depending on the products and markets, seasonal markets may require inventory up to 80 percent of annual production in an environmentally safe manner that minimizes the probability of a fire and maximizes the ability to control a fire if one occurs. Such an inventory would require an additional:

5 acres for 10 piles 50 x 150 x 10 feet (with 50 feet clear around each one) for storage of 800,000 PTEs of TDA

About 760 meters (2,500 linear feet) of fencing to enclose this area

EQUIPMENT FOR TYPE B TDA

Processing - If the sole product is Type B TDA, one of the least expensive single machines to purchase and maintain is the Barclay 4.9-inch horizontal primary shredder mounted at a 45-degree angle with a classification and recycle system. Alternatives include tire shredders with 4-inch knife spacing, but these generally have higher capital and operating costs. The major components and approximate current costs in $US are as follows:

Shredder with extended infeed conveyor	$230,000
Classifier	$45,000
Recycle conveyors (local supply)	$36,000
Discharge conveyor (local supply)	$50,000
Transportation (estimated from California)	$5,000
Equipment Subtotal	**$366,000**
Installation (approximate)	$75,000
Spare parts	$40,000
Miscellaneous and contingency	$100,000
Total processing equipment	**$581,000**

Additional Equipment – Required for movement of tires and shreds

Front end loader (used)	$60,000
Supplemental Bobcat	$20,000
Electrical supply/controls (estimate)	$25,000
Dump truck/trailer for on-site shred movement	$20,000
Total additional equipment	**$125,000**

FOR NOMINAL 2 INCH SHREDS (3-4 INCH MAX SIZE)

Processing - Normal use is a single high-capacity tire shredder with a classification and recycle system for volumes up to 1 million tires/year. The major components and approximate current costs in $US are as follows:

Shredder	$350,000 - $500,000
Infeed conveyor/mechanical system	$ 25,000 - $150,000
Classifier	$ 45,000 - $230,000
Recycle conveyors (local supply)	$ 36,000
Discharge conveyor (local supply)	$ 50,000
Transportation (estimated)	$ 12,000 - $ 20,000
Equipment Subtotal	**$518,000 - $986,000**
Installation (approximate)	$100,000
Spare parts	$ 60,000
Miscellaneous and contingency	$125,000
Total processing equipment	**$803,000 -$1,271,000**

Additional Equipment – Required for movement of tires and shreds

Front end loader (used)	$60,000
Supplemental Bobcat	$20,000
Electrical supply/controls (estimate)	$ 25,000
Dump truck/trailer for on-site shred movement	$ 20,000
Total additional equipment	**$125,000**

FOR NOMINAL 1 INCH SHREDS

Processing – Processing capital costs will be the same as for 2-inch shreds, but magnets may be required to remove chips that contain bead wire for some applications. If there is no market or reasonable disposal alternative for this material (30 to 40 percent), then additional equipment can be installed to liberate the wire for sale (as previously discussed) and salvage the rubber in a variety of sizes down to crumb rubber. The major components and approximate current costs in $US are as follows:

Total 2-inch equipment	$803,000 - $1,271,000
Additional magnets/conveyors	$ 60,000 -$ 110,000
Total processing equipment	**$863,000 -$1,381,000**
Additional cost for wire liberation/recovery/ Classification equipment to produce saleable wire and some crumb rubber products	$500,000 -$1,200,000

OPERATING COST COMPONENTS

Typical Staffing level for one shift/5 day operation (some jobs can be combined in low-volume operations)

1 Manager

1 Office/accounting

1 Shipment receiving/monitoring

1 Supervisor/maintenance manager

1 Loader operator

1-2 Laborer/maintenance

Professional Services (such as accounting, marketing, and legal)

Processing/Maintenance

For Class B TDA

Processing equipment maintenance	$ 6.00/ton
Loader/Bobcat maintenance	$ 2.00/ton
Power for Equipment	

For 1.0 million tires/year
(150 hp x 70% load x .746 kilowatt [kW] conversion = 78 kW/hour x 2,080 hours/yr = 162,240 kW/year)

For 0.5 million tires/year, est 50 % load factor or 115,000 kW/year

For 0.25 million tires/year, est 40 % load or 92,000 kW/yr

For 2-inch nominal shreds

Processing equipment maintenance	$15.00/ton
Loader/Bobcat maintenance	$ 2.00/ton
Power for Equipment	

For 1.0 million tires/year

(250 hp x 70% load x .746 kW conversion = 131 kW/hour x 2,080 hours/yr = 272,480 kW/year)

For 0.5 million tires/year, est 50% load factor or 195,000 kW/year

For 0.25 million tires/year, est 40% load or 156,000 kW/yr

For 1-inch nominal shreds	
Processing equipment maintenance	$25.00/ton
Loader/Bobcat maintenance	$ 2.00/ton
Power for Equipment	

For 1.0 million tires/year
(250 hp x 85%load x .746 kW conversion = 159 kW/hour x 2,080 hours/yr = 330,000 kW/year)

For 0.5 million tires/year, est 70% load factor or 272,000 kW/year

For 0.25 million tires/year, est 55% load or 213,000 kW/yr

OTHER FIXED COST COMPONENTS

Insurance

Financing

Government Taxes

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ECO CR 1000 C Tire Recycling Plant Proposal

Prepared for: Esteban Ibarra

Prepared by: Brad Swenson

June 20, 2012

Proposal Number: 1-6170

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Scope of Project

The ECO CR 1000 C Tire Recycling Plant is designed to process up to 1000 kgs of input per hour. ECO Green's system is proven to turn whole scrap tires into high quality, uncontaminated crumb rubber. It is uniquely designed to allow the customer to adjust the equipment screens for precise sizing control and flexibility for output sizes. Our Crumb Rubber Systems also utilize a variety of conveying and separation technologies to minimize product losses, maximize efficiency, and maintain a clean operating environment.

System Capacity

Up to 1000 kgs of input per hour of SUV and Car Tires

Available Byproducts and Sizes:

Tire Derived Fuel Chips (TDF)-25-150 mm(1-6") Nominal Chip (Removed after Shredder)
Rubber Mulch-16 mm - 44 mm(.625-1.75") Mulch (removed after The Grater)
Rubber Powder-4 - 20 mesh(6-1 mm) (removed after the Granulators)
Steel
Fiber

Crumb Rubber Purity

98% Free of Textile.
98% Free of Steel.
98% Free of Stones and other contaminants.

Steel Purity

90%-92% Contaminant free.

Power

Power Type: 440V / 3Ph / 60Hz or 380V / 3 Ph / 50 Hz(Range)
Total Kilowatts: 417-476 Kw(559-638 HP)
Estimated Power Usage Per Hour of Operation: $50.04-57.12 USD per/hr
***Based on a price of $.12 per kilowatt hour.

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ECO Shredding Process

ECO 120-L TS Shredder

ECO Green's two-shaft shredders are designed with an aggressive low RPM, high torque shredding technology. The shredder blade thickness ranges from 25 mm to 152 mm(1-6") depending on the type of tires, throughput, and desired end product.

ECO 1200 Grater

The ECO 800 Grater is the ultimate machine for mid-stream grinding and steel separation. It is specifically designed to take pre-shredded tire chips and produce between 44-16 mm(1.75"and 0.625") wire free rubber chips.

ECO G1 Granulator

The ECO Granulators are designed to grind the rubber mulch from the Grater into small granules from 4-20 mesh. The granules are screened and re-circulated until the desired size is reached. During the granulation process, 99% of the fiber is removed, leaving a contaminant free crumb rubber granulate.

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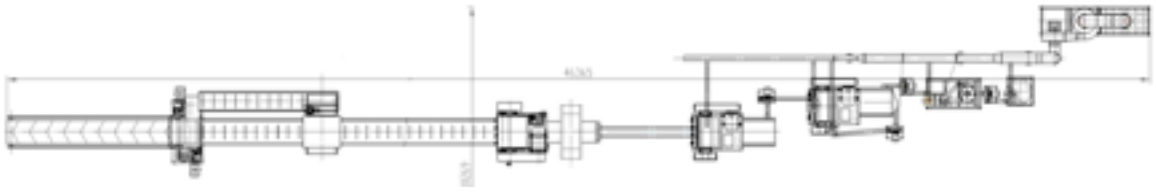
System Layout and Description



#	Qty	Item	Weight	Power Range
1	1	Infeed Conveyor	300 kgs	2.5-2.2 kW
2	1	ECO-120-L Shredder	6,300 kgs	50-44 kW
3	1	Recirculating Conveyor	300 kgs	2.5-2.2 kW
4	1	Conveyor	300 kgs	2.5-2.2 kW
5	1	NA	NA	NA
6	1	NA	NA	NA
7	1	Conveyor	300 kgs	2.5-2.2 kW
8	1	ECO-1200 Grater	6,100 kgs	150-132 kW

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9	1	Magnetic Conveyor Belt	350 kgs	2.5-2.2 kW
10	1	Vibrating Screen	1800 kgs	5-4.4 kW
11	1	Screw Loader	1800 kgs	5-4 kW
12	1	ECO-G1 Granulators	5,600 kgs	205-180 kW
13	1	Vibrating Screen	1400 kgs	4-3 kW
14	1	Blower	150 kgs	6-5.5 kW
15	1	Blower	150 kgs	6-5.5 kW
16	1	Blower	150 kgs	6-5.5 kW
17	1	Blower	150 kgs	6-5.5 kW
18	1	Central Dust Removal System	1000 kgs	12-10 kW
19	1	High Pressure Blower	150 kgs	8.5-7.5 kW
20	1	ECO BRAIN Control Center	NA	NA

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Maintenance

- Shredder-Allow for 20 minutes for every 8 hours of run time-tighten bolts, lubricate, and inspect
- Grater-Allow for 60 minutes for 8 hours of run time- tighten bolts, lubricate, inspect blades and screens
- Granulators-20 minutes for every 8 hours of run time-tighten bolts, lubricate, inspect blades and screens
- Maintenance and wear costs for the plant are estimated between $20-25.00 USD per ton

Environmental Compliance-

The dust removal and air filter system are included in this system. There are no harmful pollutants generated or released in the recycling process. All fiber or rubber that build up outside of the equipment can be disposed.

Human Resource Requirement-

The plant can be operated by 6-8 people per shift. Estimated employee breakdown-

- 1 Plant Manager
- 1 Maintenance Mechanics
- 3-5 material handlers
- 1 Quality and Packaging Specialist

Recommended Plant Area

- Warehouse Space*- 1,000 sq meters or 10,000 sq ft with celling clearance of 7.5 meters or 25 ft
- Outside Space Required- 250 sq meters or 2,700 sq ft
- Storage Area- determined by buyer
- Office Space-1000 sq meters or determined by the buyer
- All other space deemed as necessary by buyer.

Warehouse size does not take in consideration tire or product storage

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System Quote-

Sales Price Ex-Works: $662,500 USD

Terms of Sale: 50% down at time of order/50% prior to shipment

Quote Valid for 30 days

Buyer is Responsible for the following-

- Any custom duties, fees, taxes, etc are to be paid directly by buyer
- Freight
- Installation
- Electrical Power
- Cables and wiring
- Building or Land to house the system
- Source of Water
- Source of compressed air
- Ductwork
- Any Permits required
- Any auxiliary equipment-material handling, storage super sacks, tools, and any other equipment not listed on ECO Green's equipment list.

Timeline

Project begins when the purchase agreement is signed and the initial deposit is received. System will be manufactured within 3-4 months from the time the deposit is received. The client will receive a milestone outline within two weeks of placing the order that provide a detailed timeline of the manufacturing and estimated delivery time.

Confidentiality

This proposal and all of its contents, including but not limited to layouts, descriptions, machine information, etc. are for the exclusive use of person and/or company for whom this quote is prepared. This quote contains proprietary information and technical details the sole property of which belong to ECO Green Equipment. No release or disclosure of the technical or pricing information shall be released to any party without prior written consent from ECO Green Equipment. ECO Green reserves the right to prosecute to the fullest anyone who violates this confidentiality.

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Warranty

ECO Green Equipments warrants that at the time of shipment to the buyer, all equipment was free of any defects or damages. Twelve (12) months from the date of first use, based on a five (5) day work week and an eight (8) hour work day. For example, if you run your equipment for sixteen (16) hours in one day that would be considered two (2) days. Or eighteen (18) months from the time the first item is shipped to the buyer.

Warranty will become null and void if the machine is used in anyway improperly. Repairs and alterations to the system or machine have been done by someone outside of ECO Green Equipments representation. Failure to complete and return ECO Green Maintenance forms each month.

ECO Green Equipment only warrants items manufactured by ECO Green Equipment. All products manufactured by other companies will fall under that companies warrantee on the product.

It is the responsibility of the buyer to return the defective part to ECO Green. If the part is found to be defective the part will be replaced or repaired and the buyer will be reimbursed for the freight.

ECO Green Equipment will not be responsible for any damage or losses incurred in shipment from the factory.

ECO Green Equipment will not be responsible for damage or losses incurred during operation of our machinery arising from Buyer's disregard or neglect of safety precautions necessary to insure safe operation of our equipment.

ECO Green Equipment reserves the right under its product improvement policy to change construction or design details and furnish equipment when so altered without reference to illustrations or specifications used herein.

ECO Green Equipment shall in no event be liable for consequential damages or contingent liabilities arising out of failure under this or any other warranty expressed, implied or statutory.

ECO Green Equipment agrees to replace or repair the defective article, part, or machine thereof provided notice of such defect is provided in writing prior to expiration of the "WARRANTY TIME PERIOD" as described herein, and provided said article is made available for inspection by ECO Green Equipment. The extent of this warranty is limited to the correction of the condition, or, at ECO Green Equipment's option, to a refund of the purchase price and return of the used machinery components to ECO Green Equipment, provided notice of such defect is received in writing prior to this warranty expiring, and provided article is available for inspection by ECO Green Equipment.

ECO Green Equipment will not be responsible for labor costs incurred in the removal or reinstatement of defective articles or parts thereof. If the Buyer grants a warranty on such articles or conditions of greater scope than indicated above, the Buyer will assume the burden of such greater warranty and shall hold ECO Green Equipment harmless from any and all claims of third parties based upon such extended warranties.

ECO Green Equipment does not warrant wear items, capacities of units, throughput rates of units, or product sizing unless specifically stated in writing by ECO Green Equipment.

No representative of ECO Green Equipment has the authority to change this warranty in any manner, and no attempt to repair or promise to repair the equipment by any such representative shall alter or extend this warranty.

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Thank you for the opportunity to provide you a quote and we look forward for working with you. Please feel free to contact us with any questions.

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ATTACHMENT 32
Scrap tire wire purchase prices in the Mexican side of the Texas-Mexico Border Region

Table 1. Mean of scrap tire wire prices in the municipality of Reynosa, Tamaulipas, Mexico			
Business data	**Scrap wire price (Mexican pesos/ Kilogram)**	**Municipality**	**Date of quotation**
GARCIA LOZANO JOSE LUIS PRL RIO PURIFICACION 3005 , LUIS DONALDO COLOSIO TEL: (899)955-1443	$3.00	Reynosa, Tamaulipas, Mexico.	25/06/2012
EL ROL LAZARO CARDENAS 133 , LA PRESA , C.P 88750 , REYNOSA , TAMS TEL: (899)926-0004	$2.60	Reynosa, Tamaulipas, Mexico.	25/06/2012
FYMER INDUSTRIAL ZARAGOZA 933 , LONGORIA , C.P 88660 , REYNOSA , TAMS TEL: (899)924-2841	$3.20	Reynosa, Tamaulipas, Mexico.	25/06/2012
Geometric mean	**$2.92**		

Note: The prices for Reynosa are presented on a separated table due to the fact that in that municipality the highest price per kilogram of tire wire is paid. The mean obtained from purchase prices in this municipality was used as the reference price of purchase of tire wire for the Mexican Scope's area.

Table 2. Scrap tire wire prices obtained in most populated municipalities of the Mexican side of the Texas-Mexico border			
Business data	**Scrap wire price (Mexican pesos/ Kilogram)**	**Municipality**	**Date**
RECICLAJE Y RECUPERACION DE MATERIALES SA DE CV CARR PANAMERICANA 2651 , RINCON DEL SOLAR , C.P 32674 , CIUDAD JUAREZ , CHIH TEL: (656)683-8210	$2.50	Juarez, Chihuahua, Mexico.	25/06/2012
MARTINEZ RAMIREZ MA GUADALU CLL VALLE VERDE 105 , BENITO JUAREZ TEL: (868)111-2687	$1.50	Matamoros, Tamaulipas, Mexico.	26/06/2012
MARTINEZ VAZQUEZ MA SN JUANA CLL HEROE DE NACATAZ 7018 , BUENOS AIRES TEL: (867)749-0413	Ecology authorities forbade the purchase of tire wire	Nuevo Laredo, Tamaulipas, Mexico.	26/06/2012
MARTINEZ VAZQUEZ MA SN JUANA PRL MONTERREY 5202 , FRACC LOS ENCINOS TEL: (867)718-6942	They don't buy it any more	Nuevo Laredo, Tamaulipas, Mexico.	26/06/2012
MARTINEZ VAZQUEZ MA SN JUANA AND 4 4 1 , JUAREZ TEL: (867)710-0266	They don't buy it any more	Nuevo Laredo, Tamaulipas, Mexico.	26/06/2012
GARCIA LOZANO JOSE LUIS PRL RIO PURIFICACION 3005 , LUIS DONALDO COLOSIO TEL: (899)955-1443	$3.00	Reynosa, Tamaulipas, Mexico.	25/06/2012
EL ROL LAZARO CARDENAS 133 , LA PRESA , C.P 88750 , REYNOSA , TAMS TEL: (899)926-0004	$2.60	Reynosa, Tamaulipas, Mexico.	25/06/2012
FYMER INDUSTRIAL ZARAGOZA 933 , LONGORIA , C.P 88660 , REYNOSA , TAMS TEL: (899)924-2841	$3.20	Reynosa, Tamaulipas, Mexico.	25/06/2012
Geometric mean	**$2.48**		

ATTACHMENT 33
Legislations in the Mexican side of the Texas-Mexico Border regarding the burning of tires in open areas

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Legal restrictions and regulations on the burning of tires in the Mexican scope area

Federal

Official Mexican Standard NOM-040-ECOL-2002, regarding environmental protection- fabrication of hydraulic cement- Maximum permissible emissions to the atmosphere levels.

State of Tamaulipas

Environmental protection Law for the sustainable development of the State of Tamaulipas

Article 115. Secretary or City halls, within their jurisdiction, establish mechanisms to prevent or prohibit:

c).- Burning of wastes and any solid or liquid residue, including among others, domestic trash, straw, dried grass, agricultural wastes, used tires, plastics, lubricants and used solvents, and well as burnings clearing or weeding purposes, except those which are subject to compliance with applicable regulations.

Municipality of Matamoros, Tamaulipas

Regulation for the environmental equilibrium and protection of Matamoros, Tamaulipas.

Article 67. It is forbidden to emit pollutants which alter the atmosphere or may degrade or bother human health, flora, fauna and ecosystems.

Article 68. For the effects of this rulebook, will be considered as sources of atmospheric pollution:

C) Several, as the incineration, deposits or burning on open air of solid wastes…

Municipality of Rio Bravo, Tamaulipas

Regulation for the environmental equilibrium and protection of Rio Bravo, Tamaulipas,

Article 50. It is forbidden the burning of trash, toxic materials, hospital wastes, fuel and tires on open air. In case it is necessary, it must be made under the authorization and supervision of the corresponding authorities, in the terms of article 59 of this regulation.

Municipality of Reynosa, Tamaulipas

Regulation for the environmental equilibrium and protection of Reynosa, Tamaulipas

Article 78. It is forbidden to burn in open air any material, solid waste…

Municipality of Miguel Aleman, Tamaulipas

Regulation for the public cleaning service and sanitation of Miguel Aleman, Tamaulipas,

Article 60. …it is forbidden the use of the public way to:

V. burn or incinerate solid wastes…

Municipality of Guerrero, Tamaulipas

Public cleaning Regulation of Nueva Ciudad Guerrero,

Article 21. It is strictly forbidden:

d) To burn any type of waste or trash in private properties or the public way.

Municipality of Nuevo Laredo, Tamaulipas

Scrap metal businesses during deskwork activities reported buying tire scrap metal was not allowed by the municipal ecology authorities, no specific law or regulation was found, yet the following regulation was:

Regulation for the environmental protection and sustainable development of the municipality of Nuevo Laredo, Tamaulipas,

Article 397. It is considered a serious offence, besides the ones determined by the authority in the corresponding procedures, the following:

I. Combustion of tires, waste or materials that cause dangerous emissions in any amount or periodicity.

State of Nuevo Leon

Environmental Law of the State of Nuevo Leon

Article 181-Bis. In the case of rims and tires new or previously used by motor vehicles or other kind, will seek their reuse, in whole or in part, in industrial or production processes, as well as applications that do not involve a risk to the environment, thus preventing their use by incineration methods, favoring reuse or recycling by cutting mechanical systems or the like.

Municipality of Anahuac, Nuevo Leon

Civil Guard Regulation

Article 42. It is an obligation of the owners, tenants or users of barren areas of inhabited or uninhabited, within the population centers of the municipality, to maintain yards free of ignitable materials such as dry weeds or grass, wood, tires, solvents and garbage among others.

State of Coahuila

Environmental equilibrium and environmental protection law of the state of Coahuila de Zaragoza

Article 113. Burning solid municipal wastes is forbidden… Only if the burning doesn't seriously impact air quality and is justified by social or agriculture reasons.

Article 114. Incineration, by controlled methods, of any waste considered as non hazardous will be subject to the emissions dispositions signaled in this law.

Municipality of Acuña, Coahuila

Ecological Regulation of the Municipality of Acuña, Coahuila

Article 163. It is the obligation of neighbors, habitants and visitors of the municipality, to observe the dispositions previously described in this Chapter, in addition to the following determinations:

IX. Avoid open-fire burning of tires, plastics, leaves and in general, any solid waste which combustion pollutes the environment.

Municipality of Piedras Negras, Coahuila

Regulation of Ecology and Environmental Protection of the Municipality of Piedras Negras, Coahuila.

Article 169. It is the obligation of neighbors, habitants and visitors of the municipality, to observe the dispositions previously described in this Chapter, in addition to the following determinations:

IX.- Avoid open-fire burning of tires, plastics, leaves and in general, any solid waste which combustion pollutes the environment.

Municipality of Nava, Coahuila

Regulation of cleaning, use and collection of garbage of the municipality of Nava, Coahuila.

Article 44. It's forbidden to:

IV. Burn in non authorized places any type of solid wastes.

State of Chihuahua

Law of Ecological Equilibrium and Environmental Protection of the State of Chihuahua

Article 98. In the field of air pollution and in accordance with provisions of this law, the State and the municipalities, within their respective jurisdictions, will make the following:

X. They will issue the provisions and shall establish measures to prevent the burning of any type of solid or liquid waste, including domestic trash, litter, dried herb, agricultural esquilines, tires, plastics, lubricants, solvents and others, as well as burnings for the purpose of land clearing or weeding.

Municipality of Juarez, Chihuahua

Municipal Regulation of Ecology and Environmental Protection of the Municipality of Juarez, Chihuahua

Article 11. It is the responsibility of the direction to carry out actions to prevent and control the pollution of the atmosphere in municipal competition sources being able to:

VIII. Issue agreements in coordination with the federal authorities or the State, according to its competition, to prevent the unauthorized burning of any type of solid or liquid waste, including domestic trash, litter, dried herb, agricultural esquiline, tires, plastics, lubricants, solvents as well as burning of agricultural fields or urban lands for the purpose of clearing or weeding.

Municipality of Ojinaga, Chihuahua

Regulation of the public cleaning service for the municipality of Ojinaga,

Article 37. The incineration of non-hazardous solid wastes can only be performed in equipment designed for this end use.

Note: No specific legislation was found on municipalities not mentioned.

ATTACHMENT 34
Potential of Tire Derived Geocell (TDGC) market as road base strengthening to remediate border tire piles

TDGC market ability to consume existing tire piles using TDGC as road base reinforcement

The following table displays the amount of road base area that could be reinforced using tire derived geo cylinders (TDGC) manufactured from tires identified in each tire pile.

Table 1.
Potential reinforced road base area using TDGC manufactured from tires accumulated on the identified tire piles in the Texas-Mexico border area

General Data				Number of waste tires accumulated[1]	Potential base area reinforced[2]	
Id #	Municipality	State	Type of site		(Square meters, m^2)	(Square feet, ft^2)
1	Matamoros	Tamaulipas	Municipal Waste Tires Collection Center	**2,250,000**	1,104,089	11,884,317
2	Rio Bravo	Tamaulipas	Municipal Landfill and waste tires storage center	**32,000**	15,703	169,021
3	Reynosa	Tamaulipas	"Las Anacuas" City open-air dump.	**550,000**	269,888	2,905,055
4	Reynosa	Tamaulipas	Open air dump "Las Calabazas"	**50,000**	24,535	264,096
7	Reynosa	Tamaulipas	"Las Colmenas" Landfill	**1,000**	491	5,282
8	Reynosa	Tamaulipas	"Alto Bonito" Landfill	**100,000**	49,071	528,192
11	Camargo	Tamaulipas	Municipal Waste Tires Collection Center	**800**	393	4,226
12	Miguel Aleman	Tamaulipas	Provisional Municipal Waste Tires Collection Center	**3,000**	1,472	15,846
13	Guerrero	Tamaulipas	Municipal open-air dump	**200**	98	1,056
14	Nuevo Laredo	Tamaulipas	Storage center	**remediated**	NA	NA
15	Anahuac	Nuevo Leon	Municipal Landfill	**13,000**	6,379	68,665
19	Cerralvo*	Nuevo Leon*	Unknown*	**1,500**	736	7,923
20	Sabinas Hidalgo*	Nuevo Leon*	Unknown*	**8,000**	3,926	42,255
31	Acuña	Coahuila	Municipal Landfill	**200,000**	98,141	1,056,384
32	Piedras negras	Coahuila	Private landfill.	**115,500**	56,677	610,062
33	Nava	Coahuila	Storage center	**1,000**	491	5,282
34	Ojinaga	Chihuahua	Storage center	**50,000**	24,535	264,096
35	Juarez	Chihuahua	Storage center	**2,500,000**	1,226,766	13,204,797
36	Matamoros	Tamaulipas	Municipal landfill waste tire storage center	**400,000**	196,283	2,112,767
				Total reinforced base area:	**3,079,673**	**33,149,322**

*** Means data was not confirmed with a key stakeholder, it is presented as it was obtained from previous tire pile inventories as described.**
[1] The number of waste tires accumulated on this attachment was obtained through remote interviews with the key stakeholders mentioned on Attachment 1.
[2] Estimation based on a two way , one lane for each direction, street with a width of 7 meters (23 feet) as stated in the Standards Manual, Geometrical Road Design Manual, Volume IV *(TOMO IV, Manual de Diseño Geométrico de Vialidades) issued by the* Urban Development and Territorial Management Subministry *(Subsecretaria de desarrollo urbano y ordenación del territorio)* in the Technical Assisstance Program on Urban Transport for Medium size Mexican Cities (Programa de asistencia técnica en transporte urbano para las ciudades medias mexicanas). Based on a setting of 2.04 passenger tires geo cylinders per square meter. (0.19 TDGC per square foot) based on reports by REAGCO stating a 1 mile long 12 ft wide road consumes 12,000 TDGCs.
Numbers colored in red mean that even though the site accumulated less than 500 tires, since it is active it is likely to reach this number eventually if actual management practices continue.
NA= not applicable

As a reference the municipality of Reynosa alone plans on paving during the 2011-2013 administration 1.5 million square meters[1] (16'145,865.6 square feet). If the base of said paved area were reinforced using TDGC it could consume the currently accumulated tires in the municipalities of:

- ✓ Matamoros,
- ✓ Rio Bravo,
- ✓ Reynosa,
- ✓ Camargo,
- ✓ Miguel Aleman and
- ✓ Guerrero

(Piles with Id. numbers 1,2,3,4,7, 8, 11, 12 and 13) which would potentially remediate all identified tire piles in the Texas-Tamaulipas border area and consume over 30% of the accumulated waste tires.

Additionally the municipality of Reynosa would reduce the maintenance annual costs of said newly paved areas and if applied properly potholes and rut problems would be practically eliminated as well as obtaining other benefits.

Municipal Developments plans of the largest Mexican cities in the border area such as Matamoros, Juarez and Nuevo Laredo also report paving plans and needs.

[1] Data obtained from the 2011-2013 Municipal Development Plan for the municipality of Reynosa unanimously approved on March 22, 2011 in extraordinary session of the town hall, act number 6.

ATTACHMENT 35
Draft of the general specification for the construction of mechanical concrete geocylinder confinement systems for roadway base or shoulders, gravity retaining walls or Mechanically Stabilized Earth (MSE) walls, load bearing walls, abutments or load bearing pier foundations

Printed on 100% recycled fiber paper using solid ink

REINFORCED AGGREGATES COMPANY
P.O. Box 199 Morgantown, WV 26507 703.975.3450 sam@reagco.com
www.mechanicalconcrete.com U.S.Patent 7,470,092 B2

DRAFT

Proposed West Virginia Division of Highways Draft
General Specification for the Construction of
Mechanical Concrete® Geocylinder Confinement Systems
For Roadway Base or Shoulders,
Gravity Retaining Walls or Mechanically Stabilized Earth (MSE) Walls,
Load Bearing Walls, Abutments or Load Bearing Pier Foundations.

General Description: This work shall consist of furnishing and installing geocylindrical base reinforcement in accordance with these specifications and in reasonable close conformity with the lines, grades and dimensions shown on the plans or established by the Engineer. Design details for Mechanical Concrete® geocylinder base reinforcement, base aggregate minimum thickness, asphalt thickness and associated details shall be shown on the plans.

Using accepted civil engineering design techniques and processes and traditional construction techniques, Mechanical Concrete® geocylinders may be designed and constructed to function as a foundation, road base, gravity or mechanically stabilized earth (MSE) retaining walls or load bearing walls, bridge abutment or pier beam support.

The technique consists of confining stone or other suitable aggregate materials within a structural geocylinder. The geocylinders are thin-walled circular, cylindrical segments. The geocylinders are filled with stone aggregates, sand, or other granular soil materials. The structural geocylinders function as lateral reinforcing by confining the aggregates and resisting the lateral pressure generated within the aggregates from its dead weight and from any the superimposed dead and live loads

General Execution of the Work: The Contractor shall be responsible for obtaining the geocylinder reinforcement materials and associated components that meet all requirements of the Specification. For the purpose of this specification geocylinders are tire-derived-geo-cylinders, TDGC, made from a waste auto tire by removing both sidewalls.

The geocylinders and the aggregate fill shall be accurately placed on the subgrade soil in flat single rows creating a web covering the area to be stabilized. The subgrade soil shall be of suitable bearing strength and graded or leveled to the design elevations. If specified, a layer of separation fabric or geosynthetic mesh shall be placed on top of the subgrade soil. The geocylinders shall be arranged according to the drawings. They shall be laid out, circular to the eye, in contact with each other in rows. Each edge cylinder shall contact two or three other cylinders. Interior cylinders shall contact three or four other cylinders. They may be stacked and filled depending on the designed use and as indicated on the drawings. In roadway base and foundation uses, before filling with stone, to preserve their arrangement and geometry each geocylinder shall be nailed with a nail gun to the immediately adjacent cylinders with a nail of sufficient length to fully penetrate the cylinder wall thicknesses of both cylinders or otherwise attached with a screw, string or wire. Then each horizontal layer of geocylinders shall be filled with the specified aggregate material.

When the application specifies additional reinforcement on top of or between layers of geocylinders, as shown on the drawings geo-synthetic mesh material the width of the geocylinder area to be covered is placed on the top of the stone filled geocylindrical segments. This material is intended to further integrate the cylindrical elements into a relatively uniform structural mass suitable for sustaining its own weight and further distributing the weight of superimposed loads.

The Mechanical Concrete® geocylinders when designed to function as the facing wall of a mechanically stabilized earth (MSE) retaining wall system; the MSE geo-synthetic mesh reinforcing layers shall be anchored by extending the MSE grid layer on top of the filled stone surface the full width of the diameter of the geocylindrical element overhanging the external face of the cylinder.

Multiple wythe walls designed and constructed as gravity retaining walls or as load bearing walls and as temporary bridge abutments, use the same basic bearing and retaining wall design and construction procedures. For load bearing walls the height shall not exceed six (6) times the wall thickness without additional wall stiffening measures being designed.

Materials

Certification of Materials and Submittals:

Specification Compliance Certification: Prior to construction the Contractor shall submit to the Engineer a certification that the geocylinder has been evaluated in full compliance with this Specification. The Contractor's submittal package shall include; but not be limited to; the Supplier's written certification that all tire-derived-geo-cylinders used to produce the Mechanical Concrete® were made from waste auto tires that were sold in the commerce of the United States of America and met all the original tire specifications and requirements for use on over the road automobiles or trucks.

Base Course Reinforcement Tire-Derived-Geo-Cylinders: The geocylindrical reinforcing shall be a thin walled, circular, cylindrical segment of a material suitable for absorbing the circumferential tensile stresses resulting from the lateral pressure generated by the weight of the stone and any superimposed dead and live loads.

For the purpose of this specification the geocylindrical reinforcing element is a used automotive vehicle tire with both the sidewalls removed. The tire-derived-geo-cylinders, TDGC, shall be of uniform diameter and tread width and have no internal steel for fiber belts exposed in the tread surface. When functioning as a tire, the tire-derived-geo-cylinder shall have had a maximum operating air pressure of at least 44psi.

Earth Retention Reinforcement Tire-Derived-Geo-Cylinders: For wall segments using stacked tire-derived-geo-cylinders: the overall 'inflated diameter' dimension of passenger car and light truck tires shall be within plus or minus one-half inch and the 'loaded section width' dimension shall be within plus or minus one half inch; the overall 'inflated diameter' dimension of 'medium' (large semi and dump) truck tires shall be within plus or minus one inch and the 'loaded section width' dimension shall be within plus or minus one inch. Passenger and light trucks tires shall have sidewalls removed to within one inch of the surface of the tread to a tolerance of plus three-quarters of an inch (one and

three quarters inches) and minus of zero. Medium truck tires shall have sidewalls removed to within two inches of the surface of the tread to a tolerance of plus three quarters of an inch (two and three quarter inches) and minus of zero inches. All tire cylinders so prepared and used as Mechanical Concrete® geocylinders shall have sufficient circumferential tensile strength to withstand the lateral stress generated by the weight of stone aggregates and the superimposed loads based on standard hoop stress calculations. The maximum Mechanical Concrete® internal pressure on the inside of the tire-derived-geo-cylinder shall not exceed 25 psi for auto and light truck tires and 50 psi for medium truck tires when experiencing a standard AASHTO Truck Wheel Load.

Stone: For structural applications and foundations the stone aggregate placed inside the geocylinders shall be limestone or other suitable virgin or recycled stone, recycled asphalt pavement, industrial slag or stone aggregate with a comparable compressive strength. In remote areas, local river gravel may be used. For highway use the size of the stone shall conform to AASHTO coarse aggregate size number 57 or number 3 or another selected relatively uniform sized stone particle gradation approved by the engineer. The engineer may specify the use of sand, indigenous granular soil materials or the recycling of existing roadway or shoulder stone base be placed in the geocylinders if the material is suitable and without excessive clay fines. Roadway shoulders shall be surfaced on top of the geocylinders with 4 inches of optimally compacted one-and-one half inch crusher run stone.

Stone Leveling Course: The site subgrade shall be prepared to receive the Mechanical Concrete® geocylinders by removing all topsoil and organic materials and generally graded to the specified elevation down to an undisturbed soil with a suitable bearing capacity to sustain the loads generated by the structure to be built.

For structures such as abutments, piers or walls and other multiple-course vertical applications, to receive the first course of Mechanical Concrete® geocylinders at the appropriate elevation, a minimum four inch leveling course of three-quarter inch crusher run limestone or equivalent material shall be placed and compacted to ninety percent of standard Procter density. This leveling course shall be six inches wider than the diameter of the geocylinders and shall be level to within plus or minus one half inch vertical in thirty six inches horizontal.

When soft subgrades such as soft clays and sands are encountered with allowable bearing pressures equal to or less than one ton per square foot; for roadway base stabilization, shoulder stabilization, site stabilization, and other horizontal applications; a minimum of one layer of woven separation fabric shall be first placed to cover such soils where Mechanical Concrete® geocylinders are to be placed.

Method of Construction: All work shall commence from the elevation of the leveling course or separation fabric and as shown on the drawings. Geocylindrical segments shall be placed, circular to the eye, one by one so that each is in contact with the next and those geocylinders around it. For dozer / machine aggregate filling each cylindrical element shall be attached to the next element with a nail, string or wire or other acceptable

exterior use device to temporarily preserve the arrangement and geometry of the geocylinders during the stone filling process.

The geocylinders shall be laid relatively plumb and level to the line and grade shown on the drawings. The vertical face of these elements in a single wythe wall shall be not laid steeper than a slope of one horizontal to six vertical.

Each layer of geocylindrical cell elements shall be placed on top of the previous layer and attached together in the same manner to preserve their geometrical relationship during the construction process. These vertical geocylindrical elements shall be laid at the batter slope shown on the drawings but not steeper than one horizontal to six vertical. As the each row is filled with stone, adequate and appropriate care, by means of a plumb line or other leveling device, shall be taken to see that the line and grade geometry shown on the drawings is preserved.

When the design calls for the insertion of a layer of geo-synthetic mesh, the fabric shall be placed between the geocylindrical segments and laid the full width of the geocylinder and extend to overhang its face as a friction anchorage for the geo-synthetic mesh. Intermediate layers of cylinders shall then be laid. When a next level of geo-synthetic mesh is called for by the design it shall be placed in a similar manner.

The work shall proceed in this manner until the Mechanical Concrete® structure or site is completed.

Multiple Wythe Walls: For structural bearing walls such as bridge abutments, piers or gravity retaining walls, the plans may call for multiple wythe walls of Mechanical Concrete® geocylinders. The geocylinders in the second wythe shall be nested at the interface of the cylinders in the adjacent wythe. Each cylinder in the second wythe shall be nail attached otherwise attached to the cylinders in the adjacent wythe at each contact point. In addition to this attachment a layer of geo-synthetic mesh shall be laid covering both wythes at every other course. If three or more wythes are called for by the plans they shall be constructed in a like manner. Multiple wythe bearing walls shall be constructed vertically plumb and shall be made of geocylinders of equal original diameters with a tolerance of plus or minus one quarter of an inch and original widths of plus or minus one quarter of an inch. In all other respects multiple wythe walls shall be constructed in accordance with these specifications.

Roadway Bases and Site Stabilization: Mechanical Concrete® geocylinders for use in a confined roadway base or in construction site stabilization requires topsoil and cover to be excavated to the level of the subgrade for the desired road cross section width. Where soft subgrade soils remain, with allowable bearing pressures equal to or less than one ton per square foot, and/or if positive drainage is desired; as a minimum requirement one layer of woven stabilization geotextile fabric shall be placed covering the exposed subgrade extending into and covering the ditch section.

The geocylinders are first laid out on the subgrade, circular to the eye, to outline the area boundary to be covered and then the bounded area is filled in relatively parallel rows. Each geocylinder will contact the adjacent geocylinder and those in the next row at one point. When interior geocylinders are in place they shall be in contact with adjacent geocylinders at a minimum of three points. This shall proceed until the entire

width of the roadway area is covered. In roadway base uses, before filling with stone, to preserve their arrangement and geometry each cylinder shall be nailed with a nail gun to the immediately adjacent cylinder with a nail of sufficient length to fully penetrate the cylinder wall thicknesses of both cylinders or otherwise attached with string or wire. An interior cylinder shall be attached a minimum of three locations with adjacent cylinders. Geocylinders shall be hand adjusted upward during nailing so that the top surface is relatively flat.

The appropriate specified aggregate is then placed inside the geocylinder. It shall achieve an optimum density based on gradation characteristics or by means of further compaction. Unless otherwise specified the size of the stone shall conform to AASHTO coarse aggregate size number 57. A minimum four , (4"), wearing course of compacted, one-and-one-half inch, crusher run, stone aggregates shall then be placed on top of the Mechanical Concrete® prior to paving or other surfacing. Ditches shall extend four to six inches (4" to 6") below the subgrade soil elevation and be filled to the upper surface of the Mechanical Concrete® with 3 to 4 inch 'gabion' stone to the elevation of the top of the geocylinders.

Mechanical Concrete® road bases can support any type of wearing surface. If hydraulic concrete, asphalt concrete, or resin impregnated or compacted stone surfaces are used they shall be designed and constructed to meet the wheel loading duty requirements and drainage requirements of the roadway and standard state highway specifications. For compacted stone surfaces a minimum crown or side slope of one-half-inch per foot is herewith specified.

Single Pier Foundations: Mechanical Concrete® for use as a pier foundation generally requires topsoil and cover to be excavated to a frost free subgrade depth suitable to the geographic locale. This use assumes that the engineer, contractor or owner has established through tests or other acceptable engineering methods that the subgrade soil or geologic material is suitable to support the required superimposed foundation loads and that the superimposed loads do not exceed 12 tons per square foot. For a single diameter geocylinder pier foundation the subgrade is leveled and covered with a suitable layer of vinyl or non-woven geotextile. The first cylinder is then placed and filled with an appropriate stone as called for in these specifications. Additional cylinders are placed on top of each other until the desired height is reached. In no case shall a single cylinder pier height exceed four (4) times the diameter of the cylinder. A leveling layer of number 8's or hydraulic cement mortar shall be applied to the top cylinder stone prior to placing the structural beam or column elements.

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REV4.2012

ATTACHMENT 36
Questionnaire applied to Samuel G. Bonasso

P.E. Reinforced Aggregates Company Inc.

REINFORCED AGGREGATES COMPANY
P.O. Box 199 Morgantown, WV 26507 703.975.3450 sam@reagco.com
www.mechanicalconcrete.com U.S.Patent 7,470,092 B2

June 15, 2012

Questions about Mechanical Concrete™ technology application in the United States from Integrated Environmental Management Services, 4000 ISLAND BLVD., SUITE 2302, AVENTURA, FL 33160

General

Mechanical Concrete® is a US patent protected construction technology with rights to license owned by Reinforced Aggregates Company, REAGCO. Among the patent licenses offered to organizations are licenses to manufacture and construct with the technology. Several options are available, such as the limited license offer on our website which is to use a specific quantity of Mechanical Concrete®. The cost of a patent license depends on the size of the project and the size of area and population being served.

1. What would a, city or county, Public Works department should do to be able to build using mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. There are several ways a public entity can access Mechanical Concrete® construction technology. They can use a contractor who is licensed to install Mechanical Concrete®. The can also purchase tire-derived-geo-cylinders from a licensed manufacturer and install them with their own forces. They can become a licensee and manufacture and install themselves. Each option has its advantages and disadvantages. For example, the WV Division of Highways has a license to convert the waste tires it generates into tire-derived-geo-cylinders and use them to construct Mechanical Concrete® applications.

2. What would a, city or county, should do to be able to manufacture and commercialize mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. Contact REAGCO. The principal commercialization activity is to manufacture tire-derived-geo-cylinders by removing the sidewalls from scrap tires and then selling these tire-derived-geo-cylinders directly to users in the construction industry. This involves a territorial patent license the cost of which depends on the size of the area and population being served. See also answer to question #1.

3. What should a common citizen do to be able to build using mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. Contact REAGCO. A private citizen or for profit legal entity can purchase tire-derived-geo-cylinders from a manufacturing licensee and then use the cylinders to build a project. They can also use a contractor who is licensed to install Mechanical Concrete® to build a project. Costs of licenses are based on project size and area of the populations being served.

4. What should a common citizen do to be able to manufacture and commercialize mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. Contact REAGCO. A private citizen or for profit legal entity can also become a manufacturing or project licensee. Costs of licenses are based on the size and area of the populations being served.

5. What should a commercial entity do to be able to build using mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. Contact REAGCO. Commercial licenses are available to project owners and construction companies to build using Mechanical Concrete® based on projects, geographic boundaries, fields of use, etc. Costs of licenses are based on project size and area of the populations being served.

6. What should a commercial entity do to be able to manufacture and commercialize mechanical concrete technology? (licenses, costs, legal requirements, supply, etc)

A. Contact REAGCO. A for-profit business organization can become a Mechanical Concrete® manufacturing licensee. Costs of licenses are based on the size and area of the populations being served

7. Are there any legal, standard or code requirements that have to be passed by any Federal, State or local authority in order to make Mechanical Concrete an accepted technical solution for engineering projects? (licenses, costs, legal requirements, supply, etc)

A. No new laws or regulations are required to use Mechanical Concrete®. The US EPA and state departments of environmental protection all promote viable and appropriate civil engineering uses for waste tires. Since Mechanical Concrete® is similar in behavior and applications to geocell technology, there are no special legal or code requirements necessary. Any competent professional civil engineer with a geo-technical background can demonstrate that Mechanical Concrete® meets standard building code requirements.

8. Recommended market price for a TDC?

A. Currently in quantities, less than 1000, tire-derived-geo-cylinders are being sold for $ 3.00 each F.O.B. In large quantities, over 20,000, they can be purchased for around $2.00 each. This includes royalties but does not include freight and delivery costs which are usually between $0.05 to $0.10 per tire-derived-geo-cylinder depending on quantity and distance. This $3 material cost is a square foot cost of approximately $0.50 per SF.

9. List of references to discuss this technology with someone who has used it.

The following 12 people have built with, used and are otherwise familiar with Mechanical Concrete® in a variety of capacities.

- Greg Clark
  Project Manager
  Jgclark@sundt.com
  Sundt Construction
  Tempe, AZ
  (602) 908-5517

- Tom Laurita
  Heavy and Highway Contractor Owner & Licensee
  Laurita, Inc
  tom@laurita.com
  Morgantown, WV
  304-692-3000

- Dennis Chambers, P.E.
  Geotechnical Engineer and Retaining wall Owner
  dchambers57@frontier.com
  Morgantown, WV
  (304) 292-1900

- Onas Aliff, P.E.
  Geotechnical Engineer and Retaining Wall Builder
  Morgantown, WV
  (304) 692-8630

- Garld E. Blanton, Construction Supervisor
  Installed Mechanical Concrete®
  geblanton@sundt.com
  Sundt Construction
  Tempe, AZ
  480 305 4118

- Professor Roger H. L. Chang. PhD
  Researched and Tested Mechanical Concrete®
  hchen@wvu.edu
  Department of Civil and Environmental Engineering
  West Virginia University
  Morgantown, WV
  (304) 685-4065

- Robert Adams, Engineering Technician
  Installed Mechanical Concrete®
  radams@ctleng.com
  CTL Consulting Engineers
  Morgantown, WV
  304 216-0064

- Shane Cook, Construction Supervisor
  Installed Mechanical Concrete®
  shanecook@comcast.net
  River LLC Excavating

Morgantown, WV
304 216 9535

- Bryan Jones, General Manager
  Industrial Road Construction Installed Mechanical Concrete®
  bjones@libertytire.com
  Liberty Tire Recycling
  Minerva, OH
  330 205 6413

- Jerry Swartz, Fuels Manager
  Industrial Road Owner Maintains a Mechanical Concrete® stone surfaced road
  jerryswartz@mepcoinc.com
  MEPCO Mining
  Morgantown, WV
  304 288 6269

- Josh S. Bunting, Project Supervisor
  Road Construction Installed Mechanical Concrete®
  jsbunting@sundt.com
  Sundt Construction
  Tempe, AZ
  602 723 4280

- Chuck Richards
  Construction Supervisor Installed Mechanical Concrete®
  Chuck.B.Richards@wv.gov
  WV Division of Highways District 4
  Bridgeport, WV
  304-612-1221

ATTACHMENT 37
Mechanical Concrete approval letter issued by the West Virginia Department of Transportation (WVDOT) Materials Control, Soils and Test Division (MCSTD)

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • 304/558-3505

Joe Manchin III
Governor

October 9, 2008

Mr. Samuel G. Bonasso, P.E.
The Reinforced Aggregates
208 Wagner Road
Morgantown, West Virginia 26501

Dear Mr. Bonasso:

The West Virginia Department of Transportation, Division of Highways, (WVDOT/WVDOH) Materials Control, Soils and Testing Division has evaluated your submittal of Mechanical Concrete per Materials Procedure (MP) 106.00.02. The material used to fill the used tires was listed as AASHTO #57. This material should always be inspected and approved prior to use on any Highways project. With the use of an approved aggregate and the use of used tires, MCS&T would approve the product for material acceptance on a per project basis. In order to get your product to be continuously incorporated into Highways projects, you will need to promote your product to our various Divisions. I have emailed you a copy of contact listings for our ten Districts. These contact individuals will be most helpful to determine if a project using your product would be suitable for our needs. The more often your product gets incorporated into Highway's projects, the more likelihood there is that a specification will be written to address the use. Please feel free to use this materials approval for your promotional needs.

Thank you in your interest in providing the WVDOH/WVDOH with new technology/product. If you have any further questions, please contact Mr. John Taylor of this Division at (304)558-9876.

Very truly yours,

Aaron C. Gillispie, P.E.
Director
Materials Control, Soils and Testing Division

ACG:Fjtm

ATTACHMENT 38
Quotations of regular Geocell mats in Mexico

COTIZACION

INDUSTRIAS DE TUBERIAS FLEXIBLES S DE R.L DE C.V

REF.	REQUISICION DE COTIZACION No.:	VIA CORREO ELECTRONICO	COTIZACION	FECHA DE EMISION	REVISION:
	CONTRATO No.:		No.: GTX18612	18/06/2012	00

CLIENTE:

ESTEBAN IBARRA LOPEZ
-INGENIERIA-
CAMINO REAL DE CARRETAS No. 393 PISO 2, OFICINA 7, MILENIO III
QUERETARO QRO., C.P. 76060

RFC:

CONTACTO

ING. ESTEBAN IBARRA LOPEZ
estebani@iems-mex.com
www.iems-mex.com <http://www.iems-mex.com/>

OBRA:	SUMINISTRO DE GEOCELDA EGA-30-200
ORDEN DE TRABAJO No.:	

PARTIDA LISTA DE PRECIOS	DESCRIPCION	UNIDAD	CANTIDAD	PRECIO UNITARIO (USD)	IMPORTE TOTAL (USD)
05	SUMINISTRO DE GEOCELDA TIPO EGA-30-200	M2	700.00	$ 14.04	$ 9,826.92

IMPORTE:	$ 9,826.92

SON: NUEVE MIL OCHOCIENTOS VEINTISEIS DOLLARES 92/100

PARA MAYORES INFORMES

INDUSTRIAS DE TUBERIAS FLEXIBLES, S. DE R.L. DE C.V.

CALLE PRINCIPAL S/N; ANACLETO CANABAL 1a. SECCION

MUNICIPIO CENTRO TABASCO, C.P. 86280 TELEFONO: 01.993.339.1557

ATENTAMENTE

ING. H. GERARDO GONZALEZ AGUIRRE
COORDINACION DE INSTALACIONES

COTIZACION

INDUSTRIAS DE TUBERIAS FLEXIBLES S DE R.L DE C.V

REF.	REQUISICION DE COTIZACION No.:	VIA CORREO ELECTRONICO	COTIZACION	FECHA DE EMISION	REVISION: 00
	CONTRATO No.:		No.: GTX18612	18/06/2012	

A	LUGAR DE ENTREGA	SU OBRA EN CD. REYNOSA TAMAULIPAS.
B	TIEMPO DE ENTREGA	INMEDIATO.
C	TIPO DE MONEDA	DOLARES AMERICANOS
D	TIPO DE GEOCELDA	EGA-30-200
E	GEOTEXTIL	N/A
F	GEOMEMBRANA	N/A
G	DE LA INSTALACION	N/A
H	TRABAJOS REGULARES, ESPECIALES, COMPLEMENTARIOS, ASI COMO GRUA PARA DESCARGA.	POR CUENTA DE LA EMPRESA
I	TERMINOS DE PAGO	EL 50 % DE ANTICIPO CON LA ORDEN Y EL 50 % RESTANTE AL MOMENTO DEL EMBARQUE.
	CUMPLE CON:	
J	NORMA ASTM	ASTM D 1505 - STÁNDAD TEST METHOD FOR DENSITY OF PLASTICS BY THE DENSITY-GRADIENT TECHNIQUE.
K	NORMA ASTM	ASTM D 1603 - STÁNDAD TEST METHOD FOR CARBON BLACK IN OLEFIN PLASTICS.
L	NORMA ASTM	ASTM D 5394 - STÁNDAD TEST METHOD FOR ENVIROMENTAL STRESS-CRACKING OF ETHYLENE PLASTICS.
M	NORMA ASTM	ASTM D 5199 - STANDARD TEST METHOD FOR MEASURING THE NOMINAL THICKNESS OF GEOSINTEHETICS.
N	CERTIFICADO	US ARMY CORPS OF ENGINEERS (USACE) TECHNICAL REPORT GL-86-19, APPENDIX A.
O	CERTIFICADO	ISO-9001-2008
P	VIGENCIA COTIZACION	30 DIAS NATURALES
Q	IMPUESTOS	SE AGREGARA EL 16% IMPUESTO AL VALOR AGREGADO EN CADA PAGO AL MOMENTO DE FACTURAR

PARA MAYORES INFORMES

INDUSTRIAS DE TUBERIAS FLEXIBLES, S. DE R.L. DE C.V.

CALLE PRINCIPAL S/N; ANACLETO CANABAL 1a. SECCION

MUNICIPIO CENTRO TABASCO, C.P. 86280 TELEFONO: 01.993.339.1557

ATENTAMENTE

ING. H. GERARDO GONZALEZ AGUIRRE

COORDINACION DE INSTALACIONES

MEMBRANAS® ECOLOGICAS DE MEXICO S. A. DE C. V.

GEOMEMBRANAS: Reforzamiento de Suelos, Control de Erosión, Descarga de Hidrocarburos, Impermeabilización de Suelos, Productos para el Medio Ambiente.

VILLAHERMOSA, TABASCO A 19 DE JUNIO DE 2012.

INTEGRATED ENVIRONMENTAL MANAGEMENT SERVICES, S.A. DE C.V.
C. ING. ESTEBAN IBARRA.
P R E S E N T E

AGRADECIENDO SU AMABLE SOLICITUD DE COTIZACION, POR ESTE CONDUCTO ME PERMITO PRESENTAR A SU APRECIABLE CONSIDERACION NUESTRO PRESUPUESTO PARA LOS MATERIALES QUE SE DESCRIBEN A CONTINUACION:

DESCRIPCIÓN	CANT.	UNIDAD	PRECIO UNIT.	IMPORTE **M.N.**
SUMINISTRO DE **GEOCELDAS** EN MEDIDAS DE (5 X 12) 60 M^2 CADA CELDA. 8CM DEL ALTO PERALTE.	720	M^2	$70.00	$ 50,400

- COTIZACION EN **MONEDA NACIONAL.**
- ESTA COTIZACION **NO INCLUYE IVA.**
- L.A.B. **NUESTRO ALMACEN.**
- TIEMPO DE ENTREGA: **INMEDIATA.**

CONDICIONES COMERCIALES:

- LIQUIDACIÓN PARA FABRICACIÓN DE MATERIAL
- ESTE PRECIO ES CONSIDERADO POR EL MATERIAL COMPLETO
- ESTA COTIZACION PUEDE VARIAR SIN PREVIO AVISO
- ABONO A NUESTRA CUENTA **BANCOMER 00101126954 MONEDA NACIONAL,**
- CLABE INTERBANCARIA **BANCOMER 012790001011269548 MONEDA NACIONAL.**
- A NOMBRE DE: **MEMBRANAS ECOLÓGICAS DE MÉXICO, S.A. DE C.V.**

EN ESPERA DE PODER SERVIRLES, QUEDAMOS A SUS APRECIABLES ORDES

ATENTAMENTE.

LIC. JULIO MARTINEZ DE LOS SANTOS.
DIRECTOR COMERCIAL.

ATTACHMENT 39
Estimated cut tread length per passenger tire rim size

Printed on 100% recycled fiber paper using solid ink

Table 1. U.S.-Mexico most popular tire sizes theoretical cut tread length			
Section width (millimeters, mm)	**Sidewall aspect ratio (percentage, %)**	**Tire and wheel diameter (inches, in)**	**Cut tread length (m)**
155	80	13	1.285
165	80	13	1.301
175	70	13	1.282
185	70	13	1.296
175	70	14	1.362
185	70	14	1.376
195	70	14	1.390
205	70	14	1.404
195	65	15	1.450
195	60	15	1.431
205	65	15	1.463
235	75	15	1.549
205	65	16	1.543
205	55	16	1.502
215	60	16	1.535
215	60	16	1.535
215	65	16	1.556
215	85	16	1.642
225	60	16	1.547
225	60	16	1.547
225	75	16	1.614
225	75	16	1.614
235	70	16	1.606
235	85	16	1.676
245	75	16	1.644
245	75	16	1.644
265	75	16	1.674
285	75	16	1.704
215	55	17	1.593
225	50	17	1.582
235	65	17	1.662
235	80	17	1.733
245	70	17	1.700
245	75	17	1.724
245	70	17	1.700
245	75	17	1.724
265	70	17	1.728
265	70	17	1.728
265	70	17	1.728

Table 1. U.S.-Mexico most popular tire sizes theoretical cut tread length			
Section width (millimeters, mm)	**Sidewall aspect ratio (percentage, %)**	**Tire and wheel diameter (inches, in)**	**Cut tread length (m)**
265	70	17	1.728
285	70	17	1.756
265	60	18	1.754
265	70	18	1.807
275	65	18	1.794
275	70	18	1.821
275	65	18	1.794
275	65	20	1.953
Geometric mean			**1.592**
Source of USA most common tire sizes: 2011 Estimates, 2012 RMA Preliminary Factbook.			
Mexico's most common tire sizes are 13, 14 and 15 inches reason for which 4 different models for each of these sizes were considered for this estimation.			
Note: tire size 31x10.50R15LT wasn't included in the estimation			

Table 2. Estimated mean cut tread length per rim size	
Rim size (in)	**Cut tread mean length (m)**
13	1.29
14	1.38
15	1.47
16	1.60
17	1.70
18	1.79
20	1.95
Geometric mean	**1.58**

ATTACHMENT 40
Livestock fences comparison with tire tread fences

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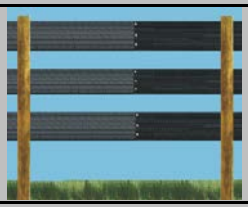
The purpose of this attachment is to predict how well would a tread fence would perform compared with other livestock fencing technologies, it was prepared based on available literature.

Table 1.
Livestock fences comparison table

Reference image				**NA**
Source of image	http://www.harrisonfence.net/gallery-of-fences/ranc-fences/	http://yoderfence.com/hightensile.htm	Diagram by IEMS	**NA**
Fence characteristics	**Pressure treated wood**	**high tensile wire**	**Type A cut tire tread**	**Ideal livestock fence**
Breaking strength (KN)	High (85[4])	Low (8[3])	N/A[5] (20[2])	**High**
Height	Any[3]	Any[3]	Any[3]	**Any**
Visibility	High[3]	Low[5]	High[5]	**High**
Easiness to construct	Low[3]	High[3]	Low[5]	**High**
Elasticity	Low[3]	High[3]	High[5]	**High**
Investment	High[3]	Low[3]	Low[3]	**Low**
Maintenance	Low[3]	Medium[3]	Low[5]	**Low**
Durability	High[3]	High[3]	High[5]	**High**
Keep livestock in	High[3]	Medium[1]	N/A	**High**
Distance between posts (feet)	Low (8[3])	Medium (40-50[3])	Low[5]	**High**
Visually attractive	High[3]	Low[3]	Medium[5]	**High**
Safe for animals	High[3]	Low[3]	High[5]	**High**
Fire resistance	Low[3]	High[3]	Low[3]	**High**

[1] High-tensile wire fences should be used with electricity to improve animal-holding capability and predator control. (Michael J. Buschermohle)

[2] Obtained from the publication "Application of scrap tires as earth reinforcement for repair of tropical residual soil slope" (Bujang B. K. Huat, 2008).

[3] Based or obtained from the University of Tennessee publication "Planning and building fences on the farm" (Michael J. Buschermohle).

[4] Estimation for a 1 by 3 inch pressure treated lumber board with strength of 6,410psi (Klyosov, 2007)

[5] Rating performed by IEMS based on the available data presented in this table. Construction easiness, distance between posts and required maintenance for tread fences were assumed to be similar to pressure treated wood fences.

KN: Kilonewtons

N/A: No information is available

ATTACHMENT 41
Equipment electrical demand and CO_2 emissions per Passenger Tire Equivalent (PTE) for each tire derived product

Printed on 100% recycled fiber paper using solid ink

Table 1.
Matrix of required electrical power demand in order to process one passenger tire equivalent (PTE) and related greenhouse emissions

Equipment / Cost (US dollars)	Automatic passenger tire sidewall remover[1]	Automatic truck tire sidewalls remover[1]	Automatic Sidewall debeader[1]	Automatic passenger tire tread cutter[1]	Grinding equipment for nominal 1 inch shreds[2]	Grinding equipment for Type A TDA[2]	Grinding equipment for Type B TDA only [2]	Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[3,7]	Minimum electrical power demand per PTE	Equivalent CO_2 emissions per PTE[5]
Motor (HP)	**1**	**2**	**1.5**	**1.5**	**250**	**250**	**150**	**598.5**		
tires per hour (PTE/hour)	**180**	**60**	**360**	**180**	**480**	**480**	**480**	**734.8742397**		
Electrical power demand (kWh/PTE)[6]	**0.004**	**0.025**	**0.003**	**0.006**	**0.389**	**0.389**	**0.233**	**0.608**	**electric power (kWh/PTE)**	**Kg $CO_{2\ equivalent}$ /PTE**
Passenger tire sidewalls (bulk).	1								**0.004**	**0.003**
Tire-derived-geo-cylinders, (TDGC)	1								**0.004**	**0.003**
Steel belted rubber for rammed-earth encased walls.	1								**0.004**	**0.003**
Tire treads (bulk).	1								**0.004**	**0.003**
De-beaded passenger sidewalls (bulk).	1		1						**0.007**	**0.005**
Passenger tire sidewalls' bead wire (bulk).	1		1						**0.007**	**0.005**
Tree edging	1		1	1					**0.013**	**0.009**
Landscaping edging	1		1	1					**0.013**	**0.009**
Tread cattle fence railing.	1		1	1					**0.013**	**0.009**

Table 1.
Matrix of required electrical power demand in order to process one passenger tire equivalent (PTE) and related greenhouse emissions

Equipment / Cost (US dollars)	Automatic passenger tire sidewall remover[1]	Automatic truck tire sidewalls remover[1]	Automatic Sidewall debeader[1]	Automatic passenger tire tread cutter[1]	Grinding equipment for nominal 1 inch shreds[2]	Grinding equipment for Type A TDA[2]	Grinding equipment for Type B TDA only [2]	Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[3,7]	Minimum electrical power demand per PTE	Equivalent CO_2 emissions per PTE[5]
Motor (HP)	**1**	**2**	**1.5**	**1.5**	**250**	**250**	**150**	**598.5**		
tires per hour (PTE/hour)	**180**	**60**	**360**	**180**	**480**	**480**	**480**	**734.8742397**		
Electrical power demand (kWh/PTE)[6]	**0.004**	**0.025**	**0.003**	**0.006**	**0.389**	**0.389**	**0.233**	**0.608**	**electric power (kWh/PTE)**	**Kg $CO_{2\ equivalent}$ /PTE**
Tread hog fencing	1		1	1					**0.013**	**0.009**
~~Tread intruder control fencing~~	1		1	1					**0.013**	**0.009**
Type B tire derived aggregate (TDA)							1		**0.233**	**0.152**
Type A tire derived aggregate (TDA)						1			**0.389**	**0.254**
Ground rubber for Rubberized Asphalt (RA)								1	**0.608**	**0.397**
Ground rubber for Athletic and recreational surfaces (bulk).	1		1					1	**0.615**	**0.402**
Rubber mulch (bulk).	1		1					1	**0.615**	**0.402**

Table 1.
Matrix of required electrical power demand in order to process one passenger tire equivalent (PTE) and related greenhouse emissions

Equipment / Cost (US dollars)	Automatic passenger tire sidewall remover[1]	Automatic truck tire sidewalls remover[1]	Automatic Sidewall debeader[1]	Automatic passenger tire tread cutter[1]	Grinding equipment for nominal 1 inch shreds[2]	Grinding equipment for Type A TDA[2]	Grinding equipment for Type B TDA only [2]	Grinding equipment to produce crumb rubber up to 20 mesh and rubber mulch[3,7]	Minimum electrical power demand per PTE	Equivalent CO_2 emissions per PTE[5]
Motor (HP)	**1**	**2**	**1.5**	**1.5**	**250**	**250**	**150**	**598.5**		
tires per hour (PTE/hour)	**180**	**60**	**360**	**180**	**480**	**480**	**480**	**734.8742397**		
Electrical power demand (kWh/PTE)[6]	**0.004**	**0.025**	**0.003**	**0.006**	**0.389**	**0.389**	**0.233**	**0.608**	**electric power (kWh/PTE)**	**Kg $CO_{2\ equivalent}$ /PTE**
Ground rubber for molded and extruded products (bulk).	1		1					1	**0.615**	**0.402**
Ground rubber for extruded products (bulk). [4]	1		1					1	**0.615**	**0.402**

[1] Motor power and processing capacity for these equipments were obtained from the webpage http://eaeco.com/Products.html consulted on June 29, 2012.

[2] Power and processing capacity obtained from the *Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico* published on December 2012 by the Environmental protection Agency of the USA. Prices include only equipment and its installation, facilities or alternative equipment are not considered.

[3] Power and processing capacity of these equipments were obtained from their quotations presented on **Attachment 31**.

[4] The investment on this facility is larger than the one reported since additional granulators or grinding equipment is necessary.

[5] Based on an emission per KWh of 0.6539 Kilograms of equivalent CO_2 (ATPAE, 2003) multiplied times the minimum electric demand per PTE.

[6] Estimated by multiplying motor power(HP) x 746 (Watts/HP) / [1000 (watts/KW) x tires per hour (tires/hour)]

[7] The following uses are considered to separate tires' sidewalls, de bead them and then process the de beaded tire sidewalls to be used on: Ground rubber for athletic and recreational surfaces, molded and extruded products, and rubber chips for colored rubber mulch. And then grind the treads using the same machinery for ground products which accept magnetically separated materials with same mesh requirements such as RA or others.

Note: to remove sidewalls of passenger tires a linoleum knife may be employed to manually perform the work not consuming electrical power.

ATTACHMENT 42
Estimated transportation costs per tire per mile in Texas

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Table 1.
Estimated transportation costs per tire per mile in Texas*

Vehicle: Pickup truck			Vehicle: Pickup with trailer		
Item	**Basis**	**Cost/mile**	Item	**Basis**	**Cost/mile**
Labor ($/hr)	$10/hour, 30 miles/hour	$0.33	Labor ($/hr)	$10/hour, 30 miles/hour	$0.33
Fuel ($/mile)	$4.00/gallon[1], 15 miles/ gallon	$0.27	Fuel ($/mile)	$4.00/gallon, 12 miles/ gallon	$0.33
Maintenance($/mile)	$1000/yr, 30,000 miles/yr	$0.03	Maintenance($/mile)	$2000/yr, 30,000 miles/yr	$0.07
	Subtotal-Variable Cost	$0.63		Subtotal-Variable Cost	$0.73
Insurance	$1000/yr, 30,000 miles/yr	$0.03	Insurance	$1000/yr, 30,000 miles/yr	$0.03
Depreciation	$2500/yr, 30,000 miles/yr	$0.08	Depreciation	$2500/yr, 30,000 miles/yr	$0.08
ROI	$15,000x20%= $3,000/yr	$0.10	ROI	$18000x20%= $3600/yr	$0.12
	Subtotal-Fixed Cost	$0.22		Subtotal-Fixed Cost	$0.24
Total costs	Total costs	$0.85	Total costs	Total costs	$0.97
Whole tires/load		**50**	**Whole tires/load**		**250**
Cost/mile/whole tire	**for 1 mile**	**$0.02**	**Cost/mile/whole tire**	**for 1 mile**	**$0.004**
	for 25 miles	$0.43		for 25 miles	$0.10
	for 100 miles	$1.70		for 100 miles	$0.39
	for 200 miles	$3.40		for 200 miles	$0.78
	for 500 miles	$8.50		for 500 miles	$1.94
Cut tires/load[2]		**85**	**Cut tires/load[3]**		**350**
Cost/mile/cut tire	**for 1 mile**	**$0.01**	**Cost/mile/cut tire**	**for 1 mile**	**$0.003**
	for 25 miles	$0.25		for 25 miles	$0.07
	for 100 miles	$1.00		for 100 miles	$0.28
	for 200 miles	$2.00		for 200 miles	$0.55
	for 500 miles	$5.00		for 500 miles	$1.39

Table 1.
Estimated transportation costs per tire per mile in Texas*

Vehicle: Box truck			Vehicle: Tractor with 48 foot trailer		
Item	**Basis**	**Cost/mile**	Item	**Basis**	**Cost/mile**
Labor ($/hr)	$12/hour, 30 miles/hour	$0.40	Labor ($/hr)	$15/hour, 30 miles/hour	$0.50
Fuel ($/mile)	$4.00/gallon, 8 miles/ gallon	$0.50	Fuel ($/mile)	$4.00/gallon[1], 6 miles/gallon	$0.67
Maintenance($/mile)	$2500/yr, 30,000 miles/yr	$0.08	Maintenance($/mile)	$3500/yr, 30,000 miles/yr	$0.12
	Subtotal-Variable Cost	$0.98		Subtotal-Variable Cost	$1.28
Insurance	$2000/yr, 30,000 miles/yr	$0.07	Insurance	$3000/yr, 30,000 miles/yr	$0.10
Depreciation	$3500/yr, 30,000 miles/yr	$0.12	Depreciation	$10000/yr, 30,000 miles/yr	$0.33
ROI	$25000x20%= $5000/yr	$0.17	ROI	$80000x20%, 30,000miles/yr	$0.53
	Subtotal-Fixed Cost	$0.35		Subtotal-Fixed Cost	$0.97
Total costs	Total costs	$1.33	Total costs	Total costs	$2.25
Whole tires/load		**400**	**Whole tires/load**		**1400**
Cost/mile/whole tire	**for 1 mile**	**$0.003**	**Cost/mile/whole tire**	**for 1 mile**	**$0.002**
	for 25 miles	$0.08		for 25 miles	$0.04
	for 100 miles	$0.33		for 100 miles	$0.16
	for 200 miles	$0.67		for 200 miles	$0.32
	for 500 miles	$1.67		for 500 miles	$0.80
Cut tires/load[4]		**550**	**Cut tires/load[5]**		**2250**
Cost/mile/cut tire	**for 1 mile**	**$0.002**	**Cost/mile/cut tire**	**for 1 mile**	**$0.001**
	for 25 miles	$0.06		for 25 miles	$0.03
	for 100 miles	$0.24		for 100 miles	$0.10
	for 200 miles	$0.48		for 200 miles	$0.20
	for 500 miles	$1.21		for 500 miles	$0.50

Cut tire transport costs are estimations based on common payload capacities of commercial trucks and trailers. Real capacities should be calculated in real life based on the vehicle to be employed specs.

ROI = Return of investment
* Estimation procedure based on Appendix F of the Scrap Tires: Handbook on recycling applications and management for the U.S. and Mexico (EPA, 2010).
[1] $3.9587 USD/Gallon is the result of calculating the geometric mean of the Monthly U.S. No 2 Diesel Retail Prices (Dollars per Gallon) from January 2012 to June 2012 reported by the United States Energy Information Administration (US EIA) on its web page http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_nus_dpg&f=m consulted on 13/July/2012 for this reason it was considered reasonable to estimate transportation costs based on a 4 USD/gallon fuel price.
[2] Amount estimated based on the maximum cargo weight of a Ford F150, model 2012, Regular cab, 4x2, 3.7L, V6, (1,700 lbs) divided by the weight of a PTE (20 lbs). Source of maximum cargo weight: http://www.ford.com/trucks/f150/specifications/payload/ consulted on 17/July/2012.
[3] Amount estimated based on a maximum payload of 7,000 lbs (for a 5,200 lb axle trailer) divided by the weight of a PTE (20 lbs). Source of maximum cargo weight: http://www.trailershowroom.com/reardoorl.htm consulted on 17/July/2012
[4] Amount estimated based on a maximum payload of 11,000 lbs (for a 24'–26' Box Truck) divided by the weight of a PTE (20 lbs). Source of maximum cargo weight: http://www.enterprisetrucks.com/24x26-box-truck.html consulted on 17/July/2012
[5] Amount estimated based on the maximum cargo weight of 48' trailers (45,000 lbs)divided by the weight of a PTE (20 lbs). Source of maximum cargo weight: http://www.bandztrucking.com/dryvan.html consulted on 16/July/2012.

Estimation methodology description

Transportation costs in Texas presented on **Table 1** of this attachment were estimated based on the methodology employed by Mr. Terry Gray of T.A.G Resource Recovery and Dr. Dana Humphrey of the University of Maine in the following publication:

- Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (EPA, 2010)

To illustrate the differences, capital and operating costs associated with collecting and hauling tires about 30,000 miles a year were calculated for each major type of equipment. Since all of these costs vary significantly with time and location, this information should be used only for comparison or as a basis for recalculation using local economic conditions. The example assumes the purchase of used equipment in good condition with estimated labor, maintenance, and fuel costs based on some areas in the United States. Estimated insurance, depreciation, and a 20-percent annual return on investment have been included in the fixed cost calculations, but interest was not included for any funds borrowed.

The capital and operating costs were estimated for a pickup truck, a pickup with a caged trailer, a box truck, and a diesel tractor with a 48-foot trailer. For simplicity, it was assumed that the vehicle averages 48.28 km/hour (30 mph), travel time will consider the loading and unloading times of the tires. The costs were calculated on a cost/km basis, and then reduced to cost/km/tire to more accurately reflect volume economics.

These calculations also assume that the vehicle is filled up during the trip. The cost/tire will increase if it is not filled, so a smaller vehicle may be better in these cases. In some cases, it may be most efficient to establish a collection point in a town or area where tires can be accumulated and then be hauled in larger vehicles to regional processing facilities or markets. (EPA, 2010)

Common waste tire transportation equipment data

Pickup Truck

Pickup trucks are a common vehicle capable of hauling many materials, including scrap tires. Carrying capacity for full-size pickups ranges from about 450 to 900 kg (1,000 to 2,000 pounds), depending on model and condition. The bed can hold the equivalent of up to 50 passenger tires (10 medium truck tires) if properly laced or stacked. These tires weigh approximately 1,000 pounds, the normal carrying capacity of basic half-ton (sometimes called 150-class) pickups in good condition.

A metal cage can be added to increase the containment volume if the pickup has sufficient load carrying capacity. Some 0.7 metric ton and 0.9 metric ton (called 250- and 350-Class) pickups can carry 900 kg (2,000 pounds) or more.

Pickup with trailer

A caged trailer can be used to optimize hauling capacity because most pickups can tow more weight than they can carry within the truck itself. Towing capacity generally ranges from 2,250 to 4,550 kg (5,000 to 10,000 pounds), representing 250 to 500 passenger tires. Since most manageable trailers cannot hold that number of tires, trailer volume generally controls towing capacity.

Box Truck

Box trucks are commonly used for local waste tire collections. They can hold up to 400 passenger tires if tightly laced.

Tractor Trailer

Traditional tractor trailer rigs are commonly used for collection and transport of large volumes of tires. Capacity for whole tires is limited by volume and depends on the trailer size, tire types, loading methods, and contamination. It ranges from 500 to 750 tires in a 27-foot tandem trailer to more than 1,500 stacked in laced fashion in a 52-foot trailer.

Processing reduces the tire volume by a factor of two to five, so processed tire loads are normally limited by maximum weight allowances, and not volume. Normal payload limits are 22 to 26 U.S. tons (2,200 to 2,600 passenger tire equivalents) in the United States, based on total weight limits minus the weight of the tractor and empty trailer. Tandem trailers further increase tire capacity for long hauls when local regulations allow them. (EPA, 2010).

ATTACHMENT 43
Estimated number of car tires to be buried per reclaimed cubic meter of mine space

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Table 1. Estimated number of car tires to be buried per reclaimed cubic meter of mine space			
Item	**Amount**	**Units**	**Source or formula to estimate it**
Volume to be reclaimed	1	m^3	
Percentage of volume to be occupied by tire pieces	50 %	%	(Texas Commission on Environmental Quality, TCEQ, 2012)
Maximum weight of a passenger tire	20	pounds / car tire	(Texas Natural Resource Conservation Commission, TNRCC, 1999):
Car tires volume	10	car tires/ cubic yard	(Texas Natural Resource Conservation Commission, TNRCC, 1999):
Mean estimated volume reduction when removing the sidewalls of a passenger tire and tightly packing the resulting pieces together	77 %	%	Attachment 16 of this report
Estimated cut car tires volume (cubic yards, yd^3)	43.48	cut car tires/ yd^3	Car tires volume / (1- Mean estimated volume reduction when removing the sidewalls of a passenger tire and tightly packing the resulting pieces together)
Estimated cut car tires volume (cubic meters, m^3)	56.87	cut car tires/ m^3	Estimated cut car tires volume in cubic yards / 0.764555
Estimated number of car tires to be buried per reclaimed cubic meter of mine space	**28**	**car tires/ m^3** reclaimed volume	Estimated cut car tires volume / Percentage of volume to be ocuppied by tire pieces
Estimated weight of car tires to be buried per reclaimed cubic meter of mine space	**560**	**pounds / m^3** reclaimed volume	Estimated number of car tires to be used as reclaim volume * Maximum weight of a passenger tire
This Attachment presents, in blue cells, the estimated amount of car tires that can be disposed of in Land Reclamation Projects Using Tires (LRPUT) for every cubic meter of mine reclaimed.			

ATTACHMENT 44
List of appropriate tire disposal alternatives identified in Texas

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The following table displays information regarding appropriate waste tire disposal sites in the Texas side of the Texas-Mexico border area. It is relevant to note that disposing of cut tires is in average 75% more economic than disposing of whole tires. IEMS recommends all generators to cut or shred their waste tires prior to disposal.

Passenger tires' sidewalls may be easily removed using a linoleum knife or an automatic sidewall removing machine.

Commercial truck tires' sidewalls may only be removed with a removing machine.

Table 1.
List of appropriate tire disposal alternatives identified in the Texas side of the Texas-Mexico border area and disposal fees charged at the time this study was written

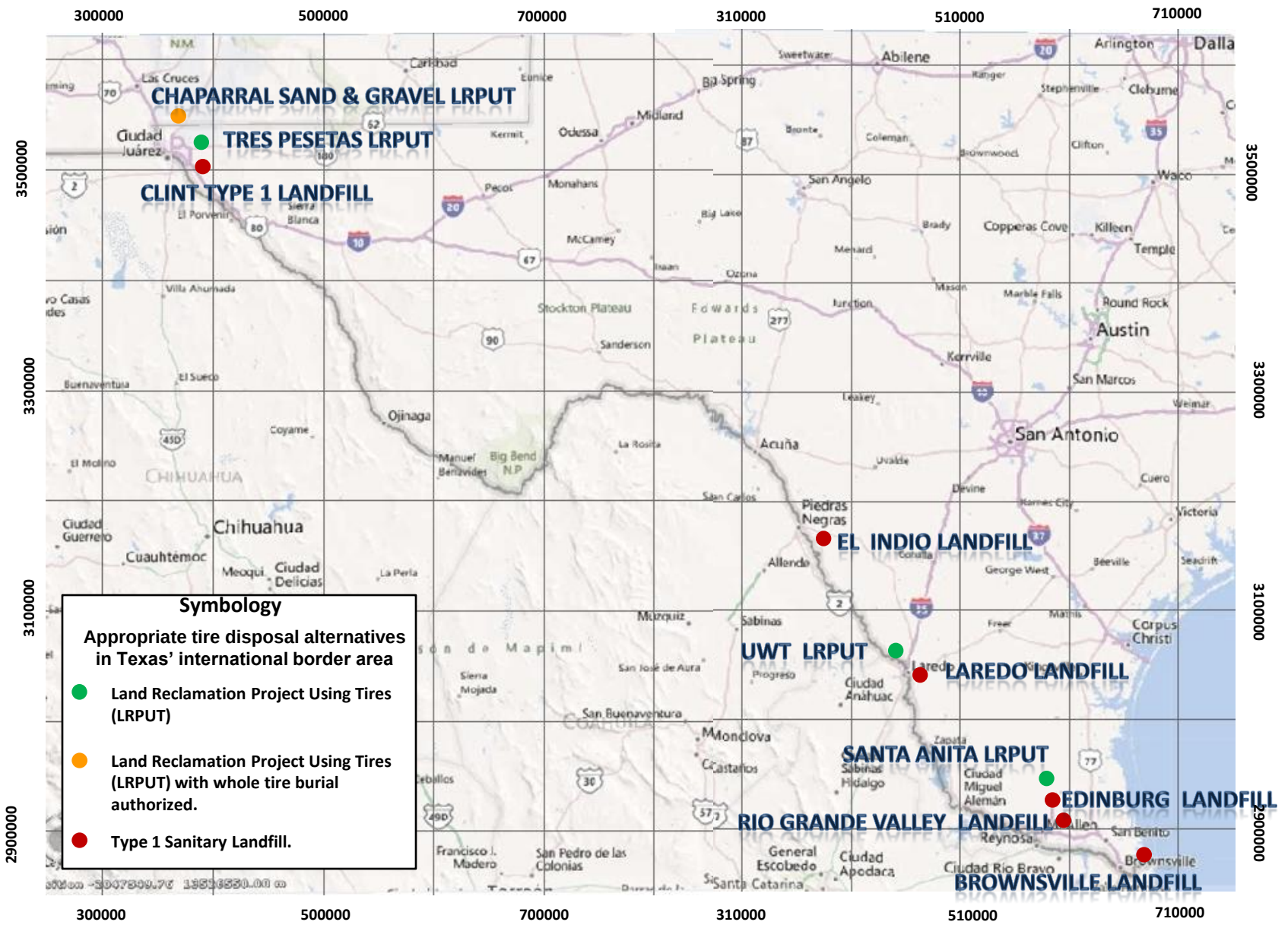
County[1]	Permit No. or TCEQ ID	Facility Name	Type	Disposal fee per tire (USD/PTE)*		Additional information
				Whole tires	Cut or shred tires	
El Paso	2284	Clint Municipal Landfill	Type 1 landfill	$3.00	$0.26	$3.00 for each tire with a diameter 19.5 inches or less (small or medium tires). $10.00 for each tire with a diameter greater than 19.5 inches (large tires). Cut or shredded tires are charged $26/ton, with a minimum charge of $16. Based on the disposal price per US ton of cut tires and PTE weight of 20 pounds, the estimated disposal fee per cut or shredded passenger tire would be $0.26 USD/tire[3].
Maverick	2316	Maverick County El Indio MSW Landfill	Type 1 landfill	$4.00	$0.40	Passenger tires are charged $4 USD/ tire; commercial truck tires are charged $12USD/tire. Cut or shredded tires would be charged $0.02USD per pound. Considering a PTE each cut passenger tire would be charged $0.4 USD/tire[6].
Webb	1693	City of Laredo Sanitary Landfill	Type 1 landfill	$2.00	$0.32	They shred and then landfill waste tires. Passenger tires of commercial accounts are charged $2 USD per tire. Trailer tires are charged $6USD per tire. Special size tires are charged $100 USD per ton. Cut or shredded waste tires generated in Laredo city would pay a disposal fee of $31.5 per ton, generated in Webb county $66.5 USD/ton and generated outside of Webb county pay $201.5 USD/ton[7]. Based on the disposal price per US ton of cut tires and PTE weight, the estimated disposal fee per cut or shredded passenger tire would be $0.32USD/tire.

Table 1.
List of appropriate tire disposal alternatives identified in the Texas side of the Texas-Mexico border area and disposal fees charged at the time this study was written

County[1]	Permit No. or TCEQ ID	Facility Name	Type	Disposal fee per tire (USD/PTE)*		Additional information
Hidalgo	956	Edinburg Regional Sanitary Landfill	Type 1 landfill	$5.00	$0.64	Whole used or scrap tires only if they are split and quartered or shredded and they do not come from a tire disposer/recycler who is reimbursed from the state Waste Tire Recycling Fund. Tires-rims must be removed; maximum size must not exceed 11.0 X 22 inches. To dispose of cut or shredded tires a class II waste profile would have to be submitted, disposed tires manifested and the requirements set by the landfill special waste plan executed. The fee for disposing cut or shredded tires would be $21 USD/ cubic yard[8]. Based on a volume of 1 cubic yard for 33 single passed shredded passenger tires[9], assuming a similar volume for cut and packed waste tires the disposal fee for cut or shredded passenger tires would be of $0.64 USD/ tire.
Hidalgo	1948	BFI-Rio Grande Valley Landfill	Type 1 landfill	$8.40	$0.46	Disposal fees of $8.4 USD per small tire, $13.8 USD per large tire and $45.5 per ton of cut tires are charged. This is a private landfill[10]. Considering a PTE the disposal cost per cut passenger tire equivalent is $0.46 dollars.
Cameron	1273	Brownsville MSW Landfill	Type 1 landfill	$1.00	$0.36	The city landfill charges $36 USD per ton of cut tires, $1 USD per whole passenger tire, $5 USD per truck tire, $10USD per tractor tire and $23USD per heavy equipment tire [11]. Considering a PTE the disposal cost per cut passenger tire equivalent is $0.36 dollars. Whole tires are shredded or bailed and then landfilled[12].
Webb	6200005	UTW Tire Collection Services	LRPUT	$1.00	NA	A fee of $1USD per passenger tire and $5USD per semi truck tire is charged. Cut tires are not commonly received[2]
El Paso	6200248	Tres Pesetas Inc	LRPUT	$1.50	$0.75	Depending on commercial agreements generators are charged from $1.5 to $3 USD for each whole tire. For each cut tire $0.75 USD are charged[3].
Hidalgo	6200592	Santa Anita Reclamation LLC	LRPUT	$1.00	$1.00	A fee of $0.05 USD/ pound is charged for whole tires, considering PTE the fee charged would be of 1USD/tire[4]. No fee for cut tires is available.
Doña Ana, New Mexico	27034	Chaparral Sand & Gravel[5]	LRPUT	$0.95	$0.95	A fee of $95USD/ton is charged for disposal. Considering a PTE and a US ton the fee per cut or whole tire is $0.95 per tire[6].
Average disposal fee charged				**$2.07**	**$0.51**	Estimated applying the geometric mean of all prices available on each column.
Mean saving, when tires are cut or shredded, compared to disposing of whole tires:				**75%**		Formula applied: = ((mean whole tire disposal fee- mean cut tire disposal fee) / mean whole tire disposal fee) x 100%

*** Discounts or exception from payment, for disposing a limited number of tires per year, given to the area residents are not contemplated in this table or estimations here presented.**
Note: Disposal fees presented in this table should be confirmed, prices and policy may change and disposal fees in landfills may vary if the person disposing is not a local resident, yet they are presented for illustrative and evaluation purposes.
Type I landfills are authorized to accept municipal solid wastes. Source:http://www.tceq.texas.gov/assets/public/permitting/waste/msw/msw_lfs_Sep2011.pdf consulted on 11/July/2012.
PTE = passenger tire equivalent, which weighs 20 pounds (9.07 kg) Source: Scrap tire cleanup guidebook (EPA, 2006)
[1] Only Texan counties bordering Mexico are considered, data base updated on September 2010. Source:http://www.tceq.texas.gov/assets/public/permitting/waste/msw/msw_lfs_Sep2011.pdf consulted on 11/July/2012.
[2] Fort Bliss landfill doesn't receive waste from outside the fort. Source: Telephonic statement from Lilia Lenhart on 16/07/2012, no signed confirmation format was provided.
[3] Source: http://www.elpasotexas.gov/environmental_services/landfills.asp consulted on 11/July/2012.
[4] Source: http://tx-delrio2.civicplus.com/index.aspx?nid=441 consulted on 12/July/2012.
[5] Data obtained via telephone from Mr. Dharrell G. Campbell landfill coordinator of the City of Del Rio on 12/ July/2012, no signed confirmation format was provided.
[6] Source: telephonic quotation from Maverick-County Solid Waste Authority, Inc. 16179 Fm 1021, Eagle Pass, TX 78852 (830) 757-8191 contacted on 12/July/2012, no signed confirmation format was provided.
[7] Source of disposal fees: http://www.laredosolidwaste.com/index.php/es/servicios/relleno-sanitario consulted on 11/July/2012
[8] Sources: http://www.cityofedinburg.com/regionalI.php consulted on 11/July/2012. Fees and requirements on disposing cut tires obtained via telephone on 11/July/2012 and e-mail exchange with Elizabeth Munoz from the City of Edinburg Solid Waste Management on 12/July/2012.
[9] Source: TNRCC INFORMATION, September 1999, Composition of a Tire, Waste Tire Recycling Program, Office of Permitting.
[10] Source: Prices obtained through a telephonic call with Alicia Cabral on 16/July/2012. Private landfill managed by Republic services, Inc. no signed confirmation format was provided. Prices are independent of where waste tires were generated.
[11] Source: http://publicworks.cob.us/business consulted on 12/July/2012.
[12] Source: Face to face interview with Mr. Santiago Navarro Assistant Director of the City of Brownsville Public Works Office on 2/September/2011, no signed confirmation format was provided.

ATTACHMENT 45
Display map of appropriate tire disposal alternatives identified in Texas



Note: Sites colored according to social and/or environmental performance, being green the most recommended, and red the least recommended alternative .Although all are considered appropriate tire disposal alternatives by this study.

ATTACHMENT 46
Environmental assessment regarding a LRPUT

Land Reclamation Projects Using Tires can be conducted because it is unlikely that scrap tires are biologically harmful to the environment (Liu, Mead, & Stacer, 1998) and the environmental impact associated with the use of tire depends on the presence of a release mechanism of chemicals present in tires (Birkholz, Belton, & Guidotti, 2003). Much of the research evaluating the potential for rubber tires to contaminate the environment tested which contaminants could be leached from whole or shredded tires by water as release mechanism. EPA's Toxicity Characteristics Leaching Procedure has been used for various types of tires under different scrap tire processing scenarios and all results reported were below EPA's regulatory levels (Park, Kim, & Edil, 1996).

As explained before, tires do not cause any significant environmental impact when used for land reclamation. Furthermore, shredded tires have been found to absorb volatile organic compounds (VOCs) up to 1 to 6% more than granular activated carbon and it has been proposed to use as a substitute for leachate collection system medium for removing VOCs in landfill leachate (Shin, Kyu-Seon, & Park, 1999); this makes waste tires suitable to be buried due to its good absorption capabilities. Ground tires were also used as a soil bed conditioner to remove odor and prevent the deterioration of soil due to short circuiting during the rainy season and cold winter. Tires also showed to be an efficient sorbent material for mercury, cadmium (II) and lead (II).

The composition of tire rubber differs according to the brand and use of the tire and is a complex mix of many different components. In addition to natural rubber, a number of synthetic rubbers also are used for the production of tires (Sullivan, 2006). Metals exist within automobile tires, but also that not all tires possess the same levels of metals; cadmium concentrations in the tires ranged from 0 to 2 mg/kg. Lead concentrations ranged from 8.1 to 22.3 mg/kg. Zinc concentrations ranged from 2524 to 6012 mg/kg. The lead and cadmium concentrations in the tires were similar to those found in uncontaminated soils, but the zinc concentrations were much greater than that normally found in soils.

According with Birkholz, Belton, & Guidotti (2003) metals from tires can be leached at low pH and organic compounds can be leached at high pH, conclude that unbound shredded tires should be used in environments where the soil and groundwater are at a fairly neutral pH. Zinc was considered the major toxicant; nevertheless, it was showed that, although a significant fraction of Zinc is released from the rubber matrix within 1 year, the parallel increase in soil pH limits the mobilization of Zinc in soil (Smolders & Degryse, 2002).

Chemicals leaching from relatively fresh tire may present a moderate toxic threat to aquatic species if the runoff is not diluted (Humpherey & Katz, 2000). However, this toxic activity is quickly degraded by natural processes, presumably by conversion of the chemicals responsible to nontoxic products and conditions likely to produce runoff, such as rain and snowmelt, are also likely to dilute the runoff in receiving sewers, bodies of water, and groundwater by considerable volumes.

ATTACHMENT 47
Environmental impacts and proposed mitigation activities regarding a sanitary landfill lifecycle

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Landfills are engineered areas where waste is placed into the land. On type 1 landfills the waste buried is commonly municipal solid waste (MSW) which contains a high water and organic matter content which releases a potentially contaminant leachate and nauseating scents. Once a landfill is filled up it must be closed but continuously monitored for decades. If waste tires are disposed of in a landfill they will occupy space which could have been employed for MSW disposal.

When a landfill is near to end its intended lifecycle new sites are evaluated for the preparation and construction of a new one in order to continue the disposal of MSW. Since waste tire disposal in landfills would accelerate the filling process it could be concluded that it promotes the construction of new landfills reason for which in order to evaluate the environmental impacts caused by the preparation, construction, operation and closure of a landfill in the Texas-Mexico border area; one environmental impact assessments (EIA) prepared for said purpose and area was consulted. This document is the following:

- Environmental Impact Assessment of the construction of the City of Ascension, Chihuahua sanitary landfill. (Santal Estudios y Proyectos S.A. de C.V., SEPSA, 2006)

The following table presents an extract from the document above. It encompasses a landfill life cycle anticipated environmental impacts and necessary mitigation activities required to mitigate them. It is presented to illustrate the stakeholder on the environmental consequences expected from disposing of waste tires in a sanitary landfill which although is considered appropriate for safely receiving them will reduce its life expectancy and therefore accelerate the construction of other ones.

Table 1.
Environmental impacts and proposed mitigation activities during a sanitary landfill lifecycle

Impact	Mitigation activities
Site Preparation and Construction	
Particle emission, fragments and dust	Carry out activities of: cleaning, dismantle cutting, excavation, preparation of the support soil and those activities that generate that kind of impact in wet phase. And the use of treated water for this purpose. Transport the materials for the construction of the complementary works in closed trucks or covered with tarps. Dust generation could be minimized keeping the access road wet as often as necessary. At the material's bank, perform the extraction in wet phases, as well transporting in trucks closed or covered with tarps.

Table 1. Environmental impacts and proposed mitigation activities during a sanitary landfill lifecycle	
Impact	**Mitigation activities**
Particle emission, smoke and gases caused by the operation of machinery and equipment: diesel (sulfur dioxide, unburned hydrocarbons, nitrogen and carbon oxides and particles) and gasoline (carbon monoxide, unburned hydrocarbons and nitrogen oxides).	Verify that the collection trucks are in optimal operating conditions, to keep them from exceeding permitted levels of contaminant emissions. Check that machinery and equipment is in optimal conditions to operate and periodically refine trucks, machinery and equipment. These actions must be followed by dependencies responsible for: the transport of the waste to the place of disposal and, by the company responsible for the building and operations of the landfill.
Increased levels sound (noise).	Vehicles traveling on the site, the machinery and equipment; must have silencers to reduce noise generation. This action must be followed by the units responsible for the transport, construction and operation of the site.
Generation of pathogens by the practice of outdoor defecation; affecting soil, water and air.	Must avoid the practice of defecation outdoors for this, the Department of Public Works of the municipality must install sanitary facilities (portable toilets) in the workspace and keep them operating properly
Alteration of hydrologic pattern, in both groundwater as surface water	In the landfill project must be integrated the design of the necessary hydraulic works (masonry channel for the peripheral drainage and the channels for the temporary drainage) in order to channel the runoffs of the area.
Incorporation of fats, oils, lubricants, diesel, gasoline and additives in soil and water, both groundwater and surface.	Provide adequate maintenance to the collection units, as well as to the machinery and equipment, to avoid the leakage of the indicated contaminants Allocate an appropriate site for the maintenance activities of the equipment as well as a site for store fuels, lubricants, etc.
Incorporation of residues coming from the manufacture of asphalt, concrete and, other debris, in the water and soil.	Assign a specific site for the preparation of material blends required for construction of the complementary works, taking care of polluting the least possible, soil and groundwater.
Health effects of construction personnel by dust emissions, noise, handling of equipment and machinery etc.	It is necessary that all the construction personnel use a safety equipment (boots, overalls, gloves, belt, covers mouths, etc..) in order to avoid the risk of acquiring one respiratory tract infection, gastrointestinal disease, injuries, etc.. It is also important to conduct periodic medical reviews to the staff.
Alteration of the landscape elements.	Place a tree perimeter fence within the boundaries of the terrain assigned to the construction works, in a called: buffer zone

Table 1. Environmental impacts and proposed mitigation activities during a sanitary landfill lifecycle	
Impact	**Mitigation activities**
Operation	
Increase of vehicular traffic on access roads to work.	Controlling the entrance and exit of all the vehicles to the site of disposal. Placing road signs and keep in good condition the access road.
Generation of particles, dust, odors and fumes.	Perform the activities of: soil movement and construction of cells in wet phase. Minimize dust by moistening the access roads, often as necessary. The daily coverage of cells will reduce the spread of odors, possible fires and minimize fumes. Odors associated with the leachate recirculation can be minimized by reducing the irrigation during periods in which, the winds circulate with excessive speed. Odors caused by stagnation of leachate can be minimized by providing aeration to the evaporation pond.
Emissions of particles, dusts, fumes and gases from trucks that travel on the site, as well as machinery.	Verify that the collection trucks are in optimal operating conditions, to keep them from exceeding permitted levels of contaminant emissions. Check that machinery and equipment is in optimal conditions to operate. Periodically refine trucks, machinery and equipment. These actions must be followed by dependencies responsible for: the transport of the waste to the place of disposal and, by the company responsible for the building and operations of the landfill.
Scattering of light debris by the wind.	Ensure that the waste trucks (collection) are closed trucks, or covered by tarps in the case that particulars be authorized to transport their own waste to the landfill. The waste deposited in the cell, must be covered daily, and also a provisional fence must be placed to prevent the spread of waste.
Generation of biogas, which affects: air quality, soil, water resources as well as the health of operating personnel.	Place chimneys at suitable sites to evacuate the gases produced by the decomposition of trash. At the end of each chimney, a device will be placed for burning gases.

Table 1. Environmental impacts and proposed mitigation activities during a sanitary landfill lifecycle	
Impact	**Mitigation activities**
Generation of pathogens by the practice of defecation outdoors which affects soil, water and air.	It shall be supervised that all the staff of the landfill uses the portable toilets in the workspace, further than that, takes place an adequate maintenance program for the toilets
Incorporation of fats, oils, lubricants, diesel, additives and gasoline in soil and both groundwater and surface waters.	Provide the adequate maintenance to the collection units, as well as the machinery and equipment in order to prevent leakage of the indicated contaminants.
Leachate generation and infiltration which affects the quality of soil and groundwater.	Installation of the natural system of waterproofing, using the material collected during excavation for site preparation. This material has a clay-sandy texture. The coating with clay material must completely prevent the infiltration of rain into the body of the landfill. It is planned to install a leachate collection system to minimize the risk of leachate infiltration into the groundwater. Should be performed a regular sampling of nearest water well in order to control the quality of the irrigation water extracted from it.
Increased noise levels	Creating a tree barrier on both sides of the road is a measure to mitigate the impact of the noise caused by machinery used to operate the landfill. Vehicles traveling on the site, the machinery and equipment to use must have silencers to reduce noise generation. This measure must be attended by the dependencies responsible for transport, construction and operation of the work.
Impact on health of operating personnel by emissions of dust, noise, odors, gases, fumes, noise, handling of equipment and machinery, etc.	Monitor that all the operating personnel use properly the safety equipment (boots, overalls, gloves, belt, face masks, hearing protection, etc.), in order to avoid possible infection in respiratory, gastrointestinal, injuries, etc. It is also important to perform frequently medical examinations to the staff. It is important that the staff that operates the equipment and working machinery is adequately trained for its proper operation.
Affect on landscape	In order to reduce the impact of the landfill on the surrounding population, should be placed a line of trees with the aim of prevents or reduce the visibility of the landfill in the vicinity of the adjacent road.
Proliferation of harmful fauna	After the construction of each cell it should be covered daily with the clay material obtained from the excavation of the site.

Table 1. Environmental impacts and proposed mitigation activities during a sanitary landfill lifecycle	
Impact	**Mitigation activities**
Closing	
Leachate generation and infiltration that affects the quality of soil and groundwater.	It is recommended place a clay coating in order to totally prevent the infiltration of rain on the body of the landfill. Periodic sampling should be performed in the nearest water well, in order to control the quality of the water that is extracted from it.
Generation of particles and dust, at the moment to carry out reforestation.	Make the final coating with soil in wet phase. The final cover will reduce the spread of odors and possible fires.
Generation of odors by the biogas which affects air quality and may cause fires.	Monitor that the burners installed in the chimneys to biogas output are in the best conditions of operation and there are no leaks. During the closing there will be a monitoring of the gases issued by the landfill in order to keep track of possible migration of biogas from landfill. It is recommended to study the biogas generation in the area and research in what kind of process would it be desirable to use it.
Affect on landscape	The surface of the landfill will be reforested and / or covered with stone to control and minimize the erosion of the final cover of soil placed.

Source: SEPSA studies.

ATTACHMENT 48
Approximate driving distances from scope cities to appropriate tire final disposal sites in Texas

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Table 1.
Approximate driving distances from scope cities to appropriate tire final disposal sites in Texas[1]

County			El Paso	Maverick	Webb	Hidalgo	Hidalgo	Cameron	Webb	El Paso	Hidalgo	Doña Ana, NM
	City	Texas scope population percentage[2]	Clint Municipal Landfill	Maverick County El Indio MSW Landfill	City of Laredo Sanitary Landfill	Edinburg Regional Sanitary Landfill	BFI-Rio Grande Valley Landfill	Brownsville MSW Landfill	UTW Tire Collection Services LRPUT	Tres Pesetas Inc LRPUT	Santa Anita Reclamation LLC LRPUT	Chaparral Sand & Gravel LRPUT
El Paso	El Paso	47.4%	25	500	2	774	792	831	609	24	766	24
Webb	Laredo	17.3%	614	112	7	150	160	205	18	639	142	635
Cameron	Brownsville	12.8%	807	316	203	71	51	8	221	832	75	847
Hidalgo	McAllen	9.5%	769	256	145	19	17	62	162	794	33	808
Hidalgo	Pharr	5.1%	765	260	157	15	14	59	165	790	29	804
Valverde	Del Rio	2.6%	402	72	185	324	339	384	181	427	316	441
Maverick	Eagle Pass	1.9%	457	16	130	269	284	329	127	482	261	497
Starr	Rio Grande City	1.0%	717	215	105	59	57	101	121	742	72	756
Starr	Roma	0.7%	705	203	93	71	69	114	109	730	85	744
El Paso	Fabens	0.6%	10	471	585	746	764	803	581	30	738	49
Hidalgo	Progreso	0.4%	783	278	176	33	14	41	184	809	48	823
Hidalgo	La Joya	0.3%	740	239	128	34	33	78	145	766	49	780
Presidio	Presidio	0.3%	232	362	475	614	629	744	471	269	606	271
Total scope population		100.0%										

[1] Distances presented are based on the shortest driving time routes existing in July 2012, availability of roads should be confirmed as well as new routes prior to make a disposal decision. Source: Google® maps.

[2] Source: Texas state library and archives commission, 2010 Census: Population of Texas Cities Arranged in Alphabetical Order Consulted in https://www.tsl.state.tx.us/ref/abouttx/popcity12010.html on 16/July/2012.

Each row in table 1 is assigned to a different city, by simply selecting a row it is possible to read the driving distances to all appropriate disposal alternatives which are assigned one to each column. Cities are ordered from most populated on the top to less populated cities on the bottom. Rows and columns also present counties in order to facilitate the search of sites in specific regions.

Authorized tire transporters and processors which finally dispose of waste tires in these alternatives or other TCEQ authorized alternatives located further north should also be considered appropriate. They are not included in this table since this study focus was specifically on final tire disposal alternatives, not including intermediaries.

ATTACHMENT 49
List of appropriate tire disposal alternatives identified in the Mexican side of the Texas-Mexico Border Area and disposal fees charged

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The following table displays information regarding appropriate waste tire disposal sites in the Mexican side of the Texas-Mexico border area. It is relevant to note that disposing of cut tires is in average 30% more economic than disposing of whole tires. IEMS recommends all generators to cut or shred their waste tires prior to disposal.

Passenger tires' sidewalls may be easily removed using a linoleum knife or an automatic sidewall removing machine.

Commercial truck tires' sidewalls may only be removed with a removing machine.

Table 1.
List of appropriate tire disposal sites identified in the Mexican side of the Texas-Mexico border area and disposal fees charged at the time this study was written

State	Municipality	Facility name	Type	Disposal fee per tire (Mexican pesos / PTE)		Additional information
				Whole tires	Cut or shred tires	
Coahuila	Acuña	PASA Acuña	Landfill	$10.00	$2.45	A disposal fee per tire of $10 pesos is charged for whole tires. A waste disposal fee of $270 pesos is charged for every metric tonne disposed, cut tires disposal fee was estimated based on a PTE weight of 9.07kg (20 pounds)[1].
Coahuila	Piedras Negras	PASA Piedras Negras	Landfill	$9.62	$9.62	A disposal fee of $1,061 per metric tonne of whole waste tires is charged, cut tires would be received at the same price. Waste tires are currently being accumulated until shredding equipment arrives to the site.[2]
Nuevo Leon	Monterrey	Pro ambiente S.A. De C.V. (Cemex)	Cement kiln	$1.36	$1.36	They receive passenger and truck whole tires with a maximum rims size of 25", shredded tires with a particle diameter less than 1" and tires with sidewalls slit on the shoulders. Tires must be free of garbage and vectors. They do not receive heavy equipment tires; they must be passenger or truck ones, always without rims, clean, free of water, garbage or vectors. No solid tires such as the ones used on forklifts are received. A disposal fee of $150 pesos per metric tonne of tires is charged regardless if they are cut, shred or whole[3].

Table 1. List of appropriate tire disposal sites identified in the Mexican side of the Texas-Mexico border area and disposal fees charged at the time this study was written						
State	**Municipality**	**Facility name**	**Type**	**Disposal fee per tire (Mexican pesos / PTE)**		**Additional information**
Nuevo Leon	Hidalgo	Pro ambiente S.A. De C.V. (Cemex)	Cement kiln	$1.36	$1.36	They receive passenger and truck whole tires with a maximum rims size of 25", shredded tires with a particle diameter less than 1" and tires with sidewalls slit on the shoulders. Tires must be free of garbage and vectors. They do not receive heavy equipment tires; they must be passenger or truck ones, always without rims, clean, free of water, garbage or vectors. No solid tires such as the ones used on forklifts are received. A disposal fee of $150 pesos per metric tonne of tires is charged regardless if they are cut, shred or whole[3]. The Hidalgo, Nuevo Leon plant is currently on technical stop but it's reported to receive waste tires when operating. Data provided by phone by unidentified plant worker[4].
Coahuila de Zaragoza	Ramos Arizpe	Ecoltec S.A. De C.V. (Holcim Apasco)	Cement kiln	No fee	No fee	They receive passenger and bicycle tires. In all but one plants they require tires to be shredded in order to process them; they can even provide the equipment to grind the tires in tire piles sites. The particle size must be less than 10 cm. They can also receive tires with sidewalls slit on the shoulders. Tires with rims are not accepted, nor machinery or forklift tires. No large tires such as for subway, mining or agriculture are accepted unless they are cut in four parts. Tires received mustn't be mixed of transported with other materials. If tires are delivered directly to their cement plants the operator must be insured by the Mexican Social Security Institute (Instituto Mexicano del Seguro Social, IMSS) and be dressed in a specific way[5].
Chihuahua	Juarez	GCC Samalayuca	Cement kiln	$2.27	NA	GCC charges $250 pesos per metric tonne of whole waste tires. They can process shredded tires in 4" X 4" chips or smaller. Whole tires they can receive must have a maximum dimension of tread of 11" and 43" of diameter. Price may be negotiated if tires are already shred[6].

Table 1. List of appropriate tire disposal sites identified in the Mexican side of the Texas-Mexico border area and disposal fees charged at the time this study was written						
State	**Municipality**	**Facility name**	**Type**	**Disposal fee per tire (Mexican pesos / PTE)**		**Additional information**
Chihuahua	Chihuahua	GCC Chihuahua	Cement kiln	$2.27	NA	GCC charges $250 pesos per metric tonne of whole waste tires. They can process shredded tires in 4" X 4" chips or smaller. Whole tires they can receive must have a maximum dimension of tread of 11" and 43" of diameter. Price may be negotiated if tires are already shred.[6]
Average disposal fee charged				**$3.65**	**$2.57**	Estimated applying the geometric mean of all prices available on each column.
Mean saving, when tires are cut or shredded, compared to disposing of whole tires:				**30%**		Formula applied: = ((mean whole tire disposal fee- mean cut tire disposal fee) / mean whole tire disposal fee) x 100%
Note: Of the private landfills in the Mexican side of the border, only PASA's Acuña and Piedras Negras landfills currently receive waste tires. Theoretically any landfill complying with Official Mexican Standard NOM-083-SEMARNAT-2003 may receive tires.						
PASA= Promotora Ambiental S.A. de C.V.						
GCC = Grupo Cementos de Chihuahua S.A.B. De C.V.						
NA= Information was not available.						
[1] Source: Data provided by PASA Acuña landfill worker Isabel Morales during a telephonic quotation request on 2012.						
[2] Source: Data provided by PASA Piedras Negras landfill worker on a telephonic quotation request on 2012.						
[3] Source: Data obtained through a recyclers questionnaire answered by Mr. Americo Montemayor, production coordinator of Pro ambiente S.A. De C.V. on November 2011.						
[4] Source: Data provided by an unidentified facility worker through telephone on August 30, 2012.						
[5] Source: Data obtained through a recyclers questionnaire answered by Viviana Cordoba Benavides, Communications and marketing coordinator of Ecoltec S.A. de C.V. on June, 2012.						
[6] Source: Data obtained through e-mail exchange with Mr. Raul H. Villalba, clinker cement unit of GCC on July 6, 2012.						

ATTACHMENT 50
Environmental performance of TDF use by cement kilns in U.S. and Mexico

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In order to understand the environmental impact of employing waste tires as Tire Derived Fuel in Cement Kilns the following documents were consulted:

- Official Mexican Standard NOM-040-ECOL-2002, regarding environmental protection- fabrication of hydraulic cement- Maximum permissible emissions to the atmosphere levels. (SEMARNAT, 2002)

- Scrap Tires: Handbook on Recycling Applications and Management for the U.S. and Mexico (EPA, 2010)

Mexico's environmental experience using tires as cement kiln fuel

According to national and international experience this technology allows the environmentally safe use of the caloric power of wastes introduced into a kiln as fuel, such as worn- out lubricating oils and grease, textiles impregnated with them, non chlorinated solvents and tires, among others, being this a recycling or using method of said wastes.

The recovery of energy from wastes doesn't substantially modify the emissions of the hydraulic cement industry with respect to those generated by conventional fuels, currently and from the beginning of the 90's, the Mexican cement industry has broadened this practice, having for this the respective approvals of the Mexican Environment and Natural Resources Ministry (*Secretaria de Medio Ambiente y Recursos Naturales, SEMARNAT*) (SEMARNAT, 2002)

USA environmental experience using tires as cement kiln fuel

The use of tires as TDF amounts to simply burning tires in a controlled environment and can be a viable option under the correct conditions, as demonstrated by diligent monitoring of existing operations. Air pollution control regulations vary from U.S. state to state; however, analysis of emissions data demonstrates that facilities remain within permissible limits. Compliance and performance monitoring are integral parts to any state pollution control program. The following factors encourage use of tires as a supplemental energy resource in cement kilns, but the application also must be environmentally acceptable and not pose unnecessary risks to health or the environment. Several additional factors that affect environmental performance warrant discussion:

• Rigorous Combustion Conditions

A unique combination of high temperature, long residence time, and turbulent air flow promotes complete combustion of organic compounds in cement kiln systems. Although tires are not hazardous wastes, the combustion conditions in cement kilns exceed the strict requirements for combustion of hazardous wastes in the United States. Combustion conditions for tires generally exceed 1,450oC (2,000oF) with air residence times in excess of 2 seconds.

• SOx Control

Limestone is commonly used to absorb SOx in air pollution control systems. It is also a major component in the cement raw mix. As a result, SOx in combustion gases is captured by the limestone in the raw mix as the gases pass through the kiln system, thereby providing an effective SOx control mechanism.

• Ash Utilization

Ash resulting from tire combustion becomes an integral component of the cement product, thereby eliminating the need to dispose of any ash from TDF combustion. These factors support use of scrap tires as a supplemental fuel in kilns. However, historical performance is a critical consideration in evaluating environmental acceptability of this application.

Cement kilns have collectively used more waste tires than any other single application in the United States and this application is among the largest in Europe and Japan. Furthermore, kilns are an important component of waste tire management in most U.S. states. Some cement companies in Mexico have used, or are using, scrap tires as a supplemental energy resource. Cement companies in northern Mexico have cooperated with Mexican governmental departments to constructively use tires removed from border stockpiles under economic conditions that were attractive to both government and industry. Cement kilns provide an important opportunity for using waste tire resources constructively. Any state or local government that is not fully utilizing its waste tire resource may want to objectively evaluate the environmental and economic merits of using scrap tires as an energy resource in cement kilns. (EPA, 2010)

ATTACHMENT 51
Approximate driving distances from scope municipalities to appropriate tire final disposal sites in the Mexican side of the Texas-Mexico Border Area

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Each row in Table 1 is assigned to a different tire pile site or municipality, by simply selecting a row it is possible to read the approximated driving distances to all appropriate disposal alternatives identified which are assigned one to each column. Municipalities are ordered from west on top of the list to east on the bottom.

Table 1.
Approximate driving distances from scope cities to appropriate tire final disposal sites in the Mexican side of the Texas-Mexico Border Area (Km)[1]

Id #	State	Municipality / disposal site	Monterrey, Nuevo Leon	Ramos Arizpe, Coahuila	Chihuahua, Chihuahua	Acuña, Coahuila	Piedras Negras, Coahuila	Juarez, Chihuahua (Samalayuca)	Hidalgo, Nuevo Leon
			CEMEX cement kiln	APASCO cement kiln	GCC cement kiln	PASA landfill	PASA landfill	GCC cement kiln	CEMEX cement kiln
35	Chihuahua	Juarez	1159	1096	344	1505	1452	23	1172
34	Chihuahua	Ojinaga	909	846	222	1261	1203	548	931
31	Coahuila	Acuña	491	493	1163	0	100	1488	501
32	Coahuila	Piedras Negras	406	459	1105	100	0	1431	417
33	Coahuila	Nava	420	385	1054	137	58	1380	360
15	Nuevo Leon	Anahuac	200	253	1012	308	219	1337	197
NA	Tamaulipas	Nuevo Laredo	200	253	1011	304	216	1347	211
NA	Tamaulipas	Guerrero	175	194	994	401	313	1329	194
12	Tamaulipas	Miguel Aleman	170	231	990	433	346	1315	189
11	Tamaulipas	Camargo	198	260	1018	461	374	1343	218
NA	Tamaulipas	Gustavo Diaz Ordaz	216	287	1046	490	401	1382	245
3	Tamaulipas	Reynosa	223	296	1054	540	451	1380	283
4	Tamaulipas	Reynosa	222	294	1052	523	438	1378	251

Table 1.
Approximate driving distances from scope cities to appropriate tire final disposal sites in the Mexican side of the Texas-Mexico Border Area (Km)[1]

Id #	State	Municipality / disposal site	Monterrey, Nuevo Leon	Ramos Arizpe, Coahuila	Chihuahua, Chihuahua	Acuña, Coahuila	Piedras Negras, Coahuila	Juarez, Chihuahua (Samalayuca)	Hidalgo, Nuevo Leon
			CEMEX cement kiln	APASCO cement kiln	GCC cement kiln	PASA landfill	PASA landfill	GCC cement kiln	CEMEX cement kiln
8	Tamaulipas	Reynosa	220	292	1050	524	437	1376	249
7	Tamaulipas	Reynosa	220	292	1050	524	437	1376	249
2	Tamaulipas	Rio Bravo	253	325	1083	565	476	1414	283
1	Tamaulipas	Matamoros	298	370	1128	609	524	1456	327
36	Tamaulipas	Matamoros	329	400	1159	640	551	1484	358

NA = Not applicable

APASCO = Holcim Apasco

CEMEX= CEMEX S.A.B. De C.V.

GCC= Grupo Cementos de Chihuahua S.A.B. De C.V.

PASA= Promotora Ambiental S.A. De C.V.

[1] Distances presented are based on the shortest driving time routes existing in August 2012, availability of roads should be confirmed as well as new routes and security issues prior to make a disposal decision. Source: Google® maps.

ATTACHMENT 52
Transportations costs to cement kilns available from cities on the Mexican side of the Texas-Mexico Border Area

Table 1.
Transportations costs to cement kilns per city per whole, cut or shredded tire (USD/tire)

ORIGINS		EQUIP.	DESTINATIONS								
			PLANT	GCC	CEMEX	APASCO	CEMEX	CEMEX	MOCTEZUMA	CEMEX	CEMEX
			STATE	Chihuahua	Coahuila	Coahuila	Nuevo León	Nuevo León	San Luis Potosí	San Luis Potosí	San Luis Potosí
STATE	CITY		CITY	Chihuahua	Torreon	Ramos Arizpe	Monterrey	Hidalgo	Cerritos	Valles	Tamuin
Tamaulipas	Matamoros	Truck	whole			$0.65	$0.55	$0.60	$0.85	$0.83	$0.83
		Train	whole			$0.70	$0.60	$0.63	$1.16	$1.34	$1.37
		Truck	cut			$0.41	$0.35	$0.38	$0.53	$0.52	$0.52
		Train	shred			$0.22	$0.19	$0.20	$0.37	$0.43	$0.44
Tamaulipas	Río Bravo	Truck	whole								
		Train	whole			$0.63	$0.54	$0.57	$1.11	$1.29	$1.34
		Truck	cut								
		Train	shred			$0.20	$0.17	$0.18	$0.35	$0.41	$0.43
Tamaulipas	Reynosa	Truck	whole			$0.50	$0.23	$0.43	$0.73	$0.60	$0.57
		Train	whole			$0.61	$0.51	$0.55	$1.08	$1.26	$1.34
		Truck	cut			$0.31	$0.15	$0.27	$0.46	$0.38	$0.35
		Train	shred			$0.20	$0.16	$0.18	$0.35	$0.40	$0.43
Tamaulipas	Gustavo Diaz Ordaz	Truck	whole								
		Train	whole			$0.54	$0.48	$0.51	$1.06	$1.25	$1.30
		Truck	cut								
		Train	shred			$0.17	$0.15	$0.16	$0.34	$0.40	$0.41

Table 1. Transportations costs to cement kilns per city per whole, cut or shredded tire (USD/tire)											
ORIGINS		EQUIP.	DESTINATIONS								
			PLANT	GCC	CEMEX	APASCO	CEMEX	CEMEX	MOCTEZUMA	CEMEX	CEMEX
			STATE	Chihuahua	Coahuila	Coahuila	Nuevo León	Nuevo León	San Luis Potosí	San Luis Potosí	San Luis Potosí
STATE	CITY		CITY	Chihuahua	Torreon	Ramos Arizpe	Monterrey	Hidalgo	Cerritos	Valles	Tamuin
Tamaulipas	Camargo	Truck	whole								
		Train	whole			$0.54	$0.45	$0.48	$1.00	$1.25	$1.25
		Truck	cut								
		Train	shred			$0.17	$0.14	$0.15	$0.32	$0.40	$0.40
Tamaulipas	Miguel Aleman	Truck	whole								
		Train	whole			$0.54	$0.45	$0.48	$1.00	$1.25	$1.25
		Truck	cut								
		Train	shred			$0.17	$0.14	$0.15	$0.32	$0.40	$0.40
Tamaulipas	Guerrero	Truck	whole								
		Train	whole			$0.63	$0.55	$0.59	$1.11	$1.27	$1.32
		Truck	cut								
		Train	shred			$0.20	$0.18	$0.19	$0.36	$0.41	$0.42
Tamaulipas	Nuevo Laredo	Truck	whole			$0.35	$0.24	$0.17			
		Train	whole			$0.63	$0.55	$0.59	$1.11	$1.27	$1.32
		Truck	cut			$0.22	$0.15	$0.10			
		Train	shred			$0.20	$0.18	$0.19	$0.36	$0.41	$0.42

Table 1.
Transportations costs to cement kilns per city per whole, cut or shredded tire (USD/tire)

ORIGINS		EQUIP.	DESTINATIONS								
			PLANT	GCC	CEMEX	APASCO	CEMEX	CEMEX	MOCTEZUMA	CEMEX	CEMEX
			STATE	Chihuahua	Coahuila	Coahuila	Nuevo León	Nuevo León	San Luis Potosí	San Luis Potosí	San Luis Potosí
STATE	CITY		CITY	Chihuahua	Torreon	Ramos Arizpe	Monterrey	Hidalgo	Cerritos	Valles	Tamuin
Nuevo León	Anahuac	Truck	whole								
		Train	whole			$0.57	$0.47	$0.50	$0.95	$1.25	$1.30
		Truck	cut								
		Train	shred			$0.18	$0.15	$0.16	$0.30	$0.40	$0.42
Nuevo León	Cerralvo	Truck	whole								
		Train	whole			$0.48	$0.39	$0.42	$0.97	$1.14	$1.20
		Truck	cut								
		Train	shred			$0.15	$0.12	$0.13	$0.31	$0.37	$0.39
Nuevo León	Sabinas Hidalgo	Truck	whole								
		Train	whole			$0.46	$0.37	$0.40	$0.95	$1.15	$1.18
		Truck	cut								
		Train	shred			$0.15	$0.12	$0.13	$0.30	$0.37	$0.38
Nuevo León	Los Aldamas	Truck	whole								
		Train	whole			$0.50	$0.41	$0.45	$0.99	$1.20	$1.23
		Truck	cut								
		Train	shred			$0.16	$0.13	$0.14	$0.32	$0.38	$0.39

Table 1.
Transportations costs to cement kilns per city per whole, cut or shredded tire (USD/tire)

ORIGINS		EQUIP.	DESTINATIONS								
			PLANT	GCC	CEMEX	APASCO	CEMEX	CEMEX	MOCTEZUMA	CEMEX	CEMEX
			STATE	Chihuahua	Coahuila	Coahuila	Nuevo León	Nuevo León	San Luis Potosí	San Luis Potosí	San Luis Potosí
STATE	CITY		CITY	Chihuahua	Torreon	Ramos Arizpe	Monterrey	Hidalgo	Cerritos	Valles	Tamuin
Nuevo León	General Bravo	Truck	whole								
		Train	whole			$0.50	$0.41	$0.45	$0.99	$1.20	$1.23
		Truck	cut								
		Train	shred			$0.16	$0.13	$0.14	$0.32	$0.38	$0.39
Nuevo León	Vallecillo	Truck	whole								
		Train	whole			$0.52	$0.42	$0.46	$0.99	$1.20	$1.25
		Truck	cut								
		Train	shred			$0.17	$0.14	$0.15	$0.32	$0.38	$0.40
Coahuila	Acuña	Truck	whole	$0.98	$0.50	$0.43	$0.45	$0.43			
		Train	whole								
		Truck	cut	$0.61	$0.31	$0.27	$0.28	$0.27			
		Train	shred								
Coahuila	Piedras Negras	Truck	whole	$0.93	$0.45	$0.38	$0.40	$0.38			
		Train	whole	$3.01	$2.71	$2.27	$2.13	$2.13			
		Truck	cut	$0.58	$0.28	$0.24	$0.25	$0.24			
		Train	shred	$1.08	$0.97	$0.82	$0.77	$0.77			

Table 1. Transportations costs to cement kilns per city per whole, cut or shredded tire (USD/tire)										
ORIGINS		EQUIP.	DESTINATIONS							
			PLANT	GCC	CEMEX	APASCO	CEMEX	CEMEX	MOCTEZUMA	CEMEX	CEMEX
			STATE	Chihuahua	Coahuila	Coahuila	Nuevo León	Nuevo León	San Luis Potosí	San Luis Potosí	San Luis Potosí
STATE	CITY		CITY	Chihuahua	Torreon	Ramos Arizpe	Monterrey	Hidalgo	Cerritos	Valles	Tamuin
Coahuila	Nava	Truck	whole	$0.93	$0.45	$0.38	$0.40	$0.38			
		Train	whole	$3.01	$2.71	$2.27	$2.13	$2.13			
		Truck	cut	$0.58	$0.28	$0.24	$0.25	$0.24			
		Train	shred	$1.08	$0.97	$0.82	$0.77	$0.77			
Chihuahua	Ojinaga	Truck	whole	$1.86	$1.38	$1.31	$1.33	$1.31			
		Train	whole								
		Truck	cut	$1.16	$0.86	$0.82	$0.83	$0.82			
		Train	shred								
Chihuahua	Juarez	Truck	whole	$0.33							
		Train	whole	$1.87							
		Truck	cut	$0.21							
		Train	shred	$0.67							

- Estimations regarding volume reduction of whole tires stacked in laced fashion compared to cut tires are not available. For this reason transportation by train where volume is the limiting factor, even if tires are shred, is taken as a reference as to the estimated amount of PTE that could be transported.

- Train transportation costs do not include loading and unloading operations, nor transportation from the tire pile to the rail station or transportation from the destiny rail station to the kiln.

- Truck transportation costs do not include loading and unloading operations.

- Source data used to create the table is shown in the Table 2.

- Truck companies who provided quotations are described in Table 3.

Table 2.
Transportation source data

53 foot trailer.	Amount	Units	Source	Comment
Max Weight =	48,000	lb	Quotations	
Max Volume =	108.5	m3	Quotations	
Max Whole Tire per Truck (Vol) =	1,500	tires	(EPA, 2010)	Stacked in laced fashion
Max Whole Tire density (Vol) =	13.82	tires/m^3	Mx Whole Tire per Truck / Max Volume	
Max Cut Tire per Truck (Wt) =	2,400	tires	Max weight / 20 lb	PTE=20lb (9.071847 kg)
Max Shredded Tire per Truck (Wt) =	2,400	tires	Max weight / 20 lb	PTE=20lb (9.071847 kg)

Table 2. Transportation source data				
KCSM FSC 50' Train Wagons	**Amount**	**Units**	**Source:**	**Comment:**
Max Weight =	99,790	kg	KCSM	
Max Volume =	179.53	m3	KCSM	
Max Whole Tire per Wagon (Vol) =	2,482	tires	Max Whole Tire density in 53' trucks x 50' wagon Max Volume	Stacked in laced fashion
Max Shredded Tires per Wagon (Vol) =	7,749	tires	Max volume in cubic yards / Shredded tires volume	Volume is the limiting factor when transporting cut or shred tires in 50' wagons by train.
Ferromex 60' Train Wagons	**Amount**	**Units**	**Source:**	**Comment:**
Max Weight =	75,000	kg	FERROMEX	http://www.ferromex.com.mx/servi/flota.html consulted on May 15, 2012
Max Volume =	215.15	m3	FERROMEX	
Max Whole Tire per Wagon (Vol) =	2,974	tires	53' trailer Max Whole Tire density x 60' Wagon Max Volume	Stacked in laced fashion
Max Shredded Tire per Wagon (Wt) =	8,267	tires	Max Weight / 9.07	PTE=20lb (9.071847 kg)

Table 2. Transportation source data
Train Prices Considerations
Currency considered for the exchange rate of the first half of May 2012 (1 USD = 13.2678 MXN)
Truck transportation prices are considering a 53' trailer.
Prices of trains in red are subject to KCSM FSC
Prices of trains in red don't include VAT and are for each 50' wagon (46 Tons)
Miguel Aleman train prices are considering Camargo city as origin station.
Guerrero train prices are considering Nuevo Laredo city as origin station.
Cerralvo train prices are considering Herreras city as origin station.
Sabinas train prices are considering Villaldama city as origin station.
Los Aldamas train prices are considering Aldamas city as origin station.
General Bravo train prices are considering Aldamas city as origin station.
Vallecillo train prices are considering Lampazos city as origin station.
Prices of trains in blue are subject to negotiations with Ferromex
Prices of trains in blue don't include VAT and are for each 60' wagon (75 Tons)
Nava train prices are considering Piedras Negras city as origin station.
Vol= means the limiting cargo factor is volume.
Wt= means limiting cargo factor is weight.
PTE = Passenger tire equivalent.
KCSM FSC = Kansas City Southern de Mexico rail company fuel surcharge.

Table 3. Truck companies which provided quotations	
Company	**Origins**
Transportes 1ro de Mayo	Piedras Negras
	Ciudad Acuña
	Nava
Auto Expres Saldivar	Matamoros
Transporte Quintanilla	Nuevo Laredo
Super Transporte Internacional	Nuevo Laredo
Transportes Benitez	Reynosa
Autotransportes Chamizal	Juarez

ATTACHMENT 53
Display map of appropriate tire disposal alternatives identified in the Mexican side of the Texas-Mexico Border Area

Printed on 100% recycled fiber paper using solid ink


110°0'0"W
105°0'0"W
100°0'0"W
32°0'0"N
30°0'0"N
28°0'0"N
26°0'0"N
24°0'0"N
Mesa
Alamogordo
Las Cruces
Carlsbad
Abilene
Garland
Dallas
Fort Worth
Tucson
El Paso
Odessa
TEXAS
Douglas
San Angelo
Waco
GCC PLANTA SAMALAYUCA
Austin
Houston
SONORA
San Antonio
Del Rio
ACUÑA MUNICIPAL LANDFILL
Hermosillo
Victoria
Chihuahua
PIEDRAS NEGRAS PRIVATE LANDFILL
GCC PLANTA CHIHUAHUA
CHIHUAHUA
COAHUILA
Corpus Christi
Laredo
McAllen
CEMEX PLANTA HIDALGO
Monterrey
Brownsville
SINALOA
APASCO- PLANTA RAMOS ARIZPE
APASCO
CEMEX PLANTA MONTERREY
Saltillo
NUEVO LEÓN
Culiacan
DURANGO
MEXICO
Durango
Ciudad Victoria
La Paz