

THE LOWER RIO GRANDE VALLEY TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) STORMWATER TASK FORCE PROJECT



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**THE LOWER RIO GRANDE VALLEY
TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM
STORMWATER TASK FORCE PROJECT
(Founded 1999)**

The LRGV TPDES Stormwater Task Force. In 1999, facilitated by Texas A&M University–Kingsville (TAMUK), a coalition of seventeen (17) Lower Rio Grande Valley (LRGV) local governments joined to form the LRGV TPDES (Texas Pollutant Discharge Elimination System) Stormwater Task Force (LTSTF) in a joint effort to develop a proactive regional approach to comply with the TPDES) Phase II Municipal Separate Stormwater Sewer System (MS4) rules. TAMUK and the LTSTF developed a regional stormwater management plan (SWMP) adopted by the membership. The SWMP includes Best Management Practices (BMPs) that are required as part of the six (6) Minimum Control Measures (MCMs) of the State’s TPDES program.

Organization and Mission of the LRGV TPDES Stormwater Task Force. The LTSTF project idea was born from a 1999 local stormwater brainstorming round table held in La Feria, Texas. Several preliminary meetings continued at various cities until the coalition was formally organized. Local government officials and qualified professionals representing various communities in the LRGV region attended these meetings. The group agreed to develop a way to achieve a regional SWMP to comply with the TPDES regulations. The group formalized the organization by contractually empowering TAMUK to facilitate the group and by developing a system of by-laws that included election of board members and officers.

The LTSTF uses a unique, collaborative regional approach to involve various levels of government, including the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA), in developing cost-effective solutions that will achieve compliance with the TPDES rules. The LTSTF project embodies the spirit of the mutually beneficial relationships between local governments and embellishes this relationship with academia and regulators. After ten (10) years, although the impact of this organization has translated into a regional collaboration movement not seen anywhere else in the State, the overall impact of this organization has yet to be fully realized.

The primary goal of the LTSTF project in 2000 was to develop and implement a regional SWMP to comply with Phase II regulations. In 2006, the LTSTF modified its mission to include stormwater quality management approaches to address broader water quality and watershed issues, particularly those associated with the Arroyo Colorado Watershed Partnership (ACWP), a local Total Maximum Daily Load (TMDL)-related organization. The LTSTF project has already enjoyed side benefits of increased communication and cooperation, and created a collaborative process for discussing water quality issues in the LRGV’s four-county region. In addition, this collaboration and others like it, has enabled the participating communities and TAMUK to successfully secure many grant funding opportunities since the Task Force’s inception. The LTSTF membership is detailed in Appendix A.

In 2000, LTSTF participants began entering into local government interlocal agreements with TAMUK, which outlined the desire to address stormwater quality issues on a regional basis and named TAMUK as its facilitator. In executing these interlocal agreements, emphasis was placed on developing programs that study existing successful programs, addressing community goals, providing technical assistance and training, and promoting regional approaches.

In addition to the local governments listed in Appendix A, the following organizations and individuals have been involved in LTSTF project planning and training: the cities of Laredo, Corpus Christi and San Antonio, the ACWP, TCEQ Water Quality Division and Small Business Group, EPA Region 6 Non Point Source (NPS) Division and Border 2012 Group, South Texas Environmental Institute, Texas Department of Transportation (TxDOT), Texas Sea Grant, Valley Nature Center, Texas Water Resources Institute, Texas Transportation Institute (TTI), LRGV Development Council (LRGVDC), International Boundary and Water Commission (IBWC), Texas State Soil and Water Conservation Board (TSSSWB), South Texas College, University of Texas-Brownsville (UTB), University of Texas-Pan American (UTPA), Texas Parks and Wildlife (TPWD), and dozens of local ISDs (Independent School Districts).

TAMUK is providing facilitation and management assistance for the LTSTF project, initiating this effort through a National Science Foundation (NSF) grant, other grants, and from annual membership fees collected from the member-local-governments. The funds provide resources for staff to facilitate the group's efforts in formulating LTSTF project goals and developing LTSTF programs. Funds, in part, are also used to host workshops, expert panel discussions, conferences, seminars and training sessions.

During a Task Force meeting held in Mission, TX, the organization formed several committees: ordinance, grant, scholarship, outreach, training, housekeeping, construction, and others. TAMUK worked closely with the committees in developing the SWMPs by responding to recommendations and suggestions posed by these committees. Recently, these committees have been replaced with work groups which now work with TAMUK in facilitating the organization and implementing the SWMPs.

New Paradigm. The new stormwater paradigm presents many questions to local governments in the LRGV. What is a stormwater management program, what will it cost, who will fund the program, is it needed, and how much will it cost? The LTSTF realizes a regional program is a key part of a successful regional storm water program. But, regulators and academia do not have a firm grasp of the costs associated with developing and implementing such a program. Although the average citizen often takes for granted the services municipalities provide, the stormwater services are nonetheless expected. The region now requires that local governments provide a stormwater runoff pollution protection service. This new paradigm requires the development of infrastructure and funding strategies to support providing this service.

Storm Water Quality is Now a Municipal Responsibility. This is not the first time local governments have been confronted with environmental water quality regulations that affect the manner that cities allocate funds. TMDL regulations recently started developing new performance measures for local governments, and LRGV communities have become very familiar with the Arroyo Colorado TMDL studies. Based on these studies, the drafters of the

Arroyo Colorado Watershed Protection Plan (ACWPP), which included members of the Task Force and TAMUK, concluded that urban stormwater runoff is contributing to the impairment of the Arroyo Colorado. Thus, the timing of the formation of the Task Force could not have been better. Local governments typically tend to procrastinate when it comes to addressing non-mandated environmental issues, usually because of lack of resources and lack of expertise and understanding rather than due to a non-proactive attitude. Still, finding funds to implement a regional SWMP program is a huge responsibility for any local government. Cost effectiveness and revenue potential were major considerations for our local governments when developing this Task Force.

A Regional Approach to Stormwater Management. Local governments are no strangers to the concept of regionalization, and sharing the costs to comply with environmental mandates was received favorably. During LTSTF meetings it was evident that the primary role of local governments in TPDES stormwater management is to address local problems and needs, and at the same time comply with state and federal regulations in the most cost-effective manner. Creating a regional task force responsible for assisting cities with TPDES storm water management was viewed as a proactive idea because the collaboration promotes cooperation and dissemination of ideas. A coordinated, regionalized program can also produce economies of scale, resulting in significant cost benefits. For example, in a similar effort in Kentucky, a stormwater district that oversees thirty-three (33) municipal storm water systems conducted a study that compared the cost of developing a SWMP on a municipality-by-municipality basis with the cost associated with a regional effort. The study showed a cost two (2) to five (5) times more if each municipality prepared its own SMWP versus having a regional entity oversee the task. Moreover, a regional entity, with a facilitator like TAMUK, can objectively address the cause of a stormwater concern rather than just the symptoms of the problem, which often happens in the regions like the LRGV where political boundaries drive decision-making and funding allocation.

Regionalization also means that developers, engineers, and others will be less likely to violate stormwater-related policies if they know that a well-managed regional entity, rather than a small municipality, is responsible for the programs. Moreover, regionalization minimizes varying interpretations of the regulations and thus provides for consistent policies from city to city. LRGV municipalities recognize that TPDES stormwater management must become a top priority, but they demand innovative and cost-effective programs. The LTSTF realizes that an innovative funding approach for stormwater management will save money.

Development of BMPs and the SWMP. The BMP programs developed for the LTSTF project were based on the following criteria:

- Consistent with TPDES Phase II regulations, all programs provided training, outreach and education needed to comply with state guidance for the six (6) MCMs.
- The BMP programs were developed based on the strengths of BMPs used in successful existing Phase I MS4 programs.
- Jurisdictional issues relating to land-use control, development policies, and jurisdictional authority were considered when developing the BMPs to allow for flexibility within existing jurisdictional oversight.

- All LTSTF participants agreed on preliminary BMPs developed for the LTSTF MS4 SWMP plan.

When identifying and selecting BMPs for inclusion in the SWMP, the following components for each of the MCMs were considered:

- *Plan Perspective*: a statement of BMP goals as developed through a needs assessment.
- *Regulatory Compliance*: requirements listed in the TCEQ General Permit TX040000, published in August 2007.
- *Community Standards*: developed from LTSTF consensus after implementing five years of technical outreach and educational programs.
- *Local and National Existing Resources*: list of existing exemplary programs in watershed and stormwater management.
- *Shared, Common, and/or Individual Programs*: BMPs selected based on criteria listed above.
- *Coordination/Responsible Agencies*: description of where BMPs and staff resource will reside and description of which entity is responsible for what BMP.
- *Annual Report*: outlines possible annual report elements.
- *Target Date and Measurable Goals*: list of activities and BMP elements to be completed in each of the five (5) SWMP permit years.

The intent of the BMPs developed for the SWMP is to reduce stormwater pollution, protect the natural environment and benefit the community. The SWMP BMPs were developed to address LTSTF goals and community standards. In addition, BMPs were identified that will mitigate the impacts of urbanization on the quantity and quality of storm runoff. This includes the BMPs that address sediment loading, illicit discharges, and erosion. The selected BMPs focus on prevention rather than treatment, and were chosen to be easily implemented, enforceable, and be cost effective.

Cost Effectiveness of a Regional Approach. The community leaders of the LTSTF membership determined that the most cost effective and efficient approach for addressing local TPDES storm water management issues was to develop and implement a regional task force approach under the guidance of a single entity. This approach has been formalized through the development and execution of Interlocal Agreements between TAMUK and the LTSTF members. Although, the LRGV region has not conducted a study to determine the cost effectiveness of a regional program, TAMUK found that the Kentucky study supported the need for a regional approach to address National Pollutant Discharge Elimination System (NPDES) Phase II rules. This document provides the details of a program that was developed for thirty-three (33) cities and three counties to comply with the federal Storm Water Phase II regulations. Estimates calculated by this study suggest that, by using a regional approach, the communities could achieve a cost savings of between 30 % to 70 % over the next five years. Similarly, in his report *Estimating Costs for Phase II Stormwater Management Program* (2000), Andrew Reese documents that a regional approach can reduce the costs of developing brochures, ordinances, billboards, web sites, and bulk PR materials.

In the LRGV, the communities share similar demographics and similar environmental concerns. Most residents live in low- or fixed-income households and cannot afford to pay fees to support the environmental-related requirements. Thus, there is a strong case for any type of collaboration that would keep costs down. In the LRGV, each community is contiguous to other communities, with some cities bordered by four (4) other cities. Thus, the LRGV appears as one urbanized metropolitan region. Although all these communities experience similar TPDES stormwater problems, none had in place a TPDES stormwater program or related ordinance. Since the creation of the LTSTF, stormwater tasks were generally viewed as “add-on” responsibilities for departments and staff that have other primary responsibilities. To varying degrees, with the exception of McAllen and Brownsville, the communities had existing staff (such as sanitary sewer, code enforcement, or road department personnel) handling stormwater operations, maintenance, regulation and enforcement. None of the communities could maintain a person, much less a department, to handle stormwater administration, planning, design, and engineering; water quality planning and monitoring; and capital improvements and expenditures. The regional approach taken by the LTSTF allows the LRGV communities to share these responsibilities, which results in a much more cost-effective program for addressing stormwater issues. Also realized in time, the LTSTF network provides a vitally important link to these small communities when new employees take on storm water related duties after key employee turnover.

Highlights of the LTSTF project. The LTSTF project will recognize its tenth year of existence in 2011, and the organization is determined to continue evolving and to continue strengthening its partnership in the future. Over the last decade, the LTSTF has established an extensive resume of accomplishments. The LTSTF’s main mission is the development of programs to meet the Phase II MS4 stormwater regulations. The regulations call for the implementation of six MCMs to address the impact of stormwater runoff on water quality and stream health. These MCMs include: 1) public education and outreach, 2) public participation and involvement, 3) illicit discharge detection and elimination, 4) construction site stormwater runoff control, 5) post-construction stormwater management, and 6) pollution prevention and good housekeeping for municipal operations.

The LTSTF is an innovative, collaborative approach to address stormwater quality issues in the LRGV. The project emphasizes cost effectiveness by using existing programs and developing new programs that can be applied throughout the region.

Community water quality goals and BMPs were developed using a series of panel discussions and presentations with and from experts, respectively, in the field of stormwater and watershed management provided by TAMUK during a series of seminars, workshops and conferences. These goals are the basis of the LTSTF project and address mitigating the impacts of urbanization on the quantity and quality of stormwater runoff. Programs focus on pollution prevention (rather than treatment), ease of implementation and enforcement, and cost effectiveness. Jurisdictional issues relating to land-use control, development policies, and jurisdictional authority were considered when developing BMPs.

Task Force Accomplishments to Date. From 2001 through 2010, the LTSTF participants have completed numerous tasks, some of the work products are as follows:

- A Mission Statement was developed that outlines the goals and objectives for the LTSTF Project (see Appendix B).
- Interlocal agreements were entered into between LTSTF members and TAMUK (see Appendix C).
- Organization by-laws were developed that govern the LTSTF's procedures (see Appendix D).
- A regional MS4 SWMP was developed that was customized to the individual municipalities to achieve compliance with the MS4 SWMP requirement. Each member local government obtained its MS4 permit in 2007. See Appendix E for a typical permit.
- The LTSTF participants developed public outreach and educational seminars and numerous educational outreach events were, funded, hosted, and implemented, including conferences in the LRGV, Coastal Bend area, Laredo, City of Monterrey, Mexico and San Antonio.
- Other accomplishments include programs for local school districts, scholarship opportunities, development of a stormwater professional training program, development of a website, development of public service announcements (PSAs), development and adoption of various ordinances and policies.
- Some of the LTSTF's more significant accomplishments include assisting member cities with the development of City stormwater departments, adoption of TPDES related ordinances and policies, and obtaining over \$3 million in grant funding for its stormwater management programs.

The activities and programs established and accomplished within the last decade by the LTSTF are too numerous to mention in this document. Some of the important accomplishments are detailed in the following sections.

Formation of Stormwater Departments and hiring of staff. The importance of the LTSTF mission has encouraged local governments in the LRGV to establish new departments and hire professional staff to confront the compliance and regulatory issues associated with the State's TPDES program. As of 2011, the Cities of Brownsville, Harlingen, Alamo, Weslaco, and Pharr have created stormwater and/or environmental departments that oversee their MS4 TPDES programs. Several of the members are too small in size to pursue such endeavors, but these smaller cities seek assistance from their larger neighbors and the LTSTF emphasizes these type of partnerships. A recent job description developed by the LTSTF used by local governments in seeking personnel is included in Appendix F.

LTSTF Scholarship program. In 2008, the LTSTF established the LRGV TPDES Stormwater Task Force Scholarship Program. The LTSTF and TAMUK formed a Scholarship workgroup in an effort to promote environmental and civil engineering in the region. TAMUK on behalf of the LTSTF offers up to eight (8) 4-year engineering scholarships annually to local students who attend school districts located within the Cities represented in the LTSTF.

The workgroup in collaboration with TAMUK developed the award-criteria for this scholarship and is included in Appendix G. Documents depicting the first recipient of this scholarship is also

included in Appendix G. TAMUK currently has three (3) scholarship recipients enrolled in the environmental engineering undergraduate program.

The ISD Storm Water Runoff Pollution Prevention Awareness Program. The ISD Storm Water Runoff Pollution Prevention Awareness program developed by the LTSTF is a project facilitated by TAMUK. One of the BMPs identified in the LTSTF SWMPs requires each local government to outreach their respective communities using classroom presentations at local ISDs. In order for the cities to comply with the SWMPs, TAMUK assisted the members by developing partnerships with local organizations like school districts. Polluted storm water runoff is polluting our local waterways like the Arroyo Colorado and the Laguna Madre. Both are listed as impaired waterways by the TCEQ and EPA. Educating our community, and our children, about storm water runoff will provide a valuable means of minimizing the polluting of our waterways. The program emphasizes that if our region is not successful in accomplishing the goals of the SWMP, urban runoff pollution will eventually detrimentally impact our potable water, recreational water activities, and operating costs of municipal wastewater treatment plants.

The classroom presentation BMP includes a series of presentations that are aligned with ISD school curriculums. The SWMP is a five (5) year plan. During the first year, the BMP was developed, evaluated and modified. TAMUK staff and City officials worked with school specialists to assure the presentations met school requirements. This program was developed throughout Valley school districts. The City and TAMUK started these presentations in 2008 and conduct dozens of these visits each year. To date, this program has outreached over 5,000 students since its inception.

This program has demonstrated a mutually beneficial instrument that highlights science, engineering, environmental and physical science, and mathematics. Each presentation attempts to "seed" the desire to become a science professional, a much needed profession. The school district is not mandated to partner with the City, but a school district needs to realize the importance of minimizing storm water runoff pollution. Urban runoff pollution causes flooding, impacts water quality of our recreational and drinking water, and costs the city significantly to address. It impacts everyone. Outreach and education is one important tool that can minimize the adverse effects of this pollution. Local ISD TV Channels provide us with another tool that allows us to successfully and effectively outreach our communities. TAMUK and the LTSTF use local ISD TV Channels to promote stormwater pollution prevention awareness through announcements, advertisements, and PSAs.

This coming school year, LRGV Cities and TAMUK will continue developing the classroom environmental outreach/recruiting programs in the local school districts. This year we have added more topics/lessons, in part, developed by the teachers who participated in our summer research program. Many local teachers take part in a very successful annual program funded in part by the National Science Foundation. This program is detailed in a later section. The presentation topics/lessons include wastewater treatment plant operations, desalinization, composting, landfill operations, watersheds, storm water, engineering, tire recycling, household hazardous waste and much more. Many of these activities require the classroom to follow-up with a site visit to a related facility, to a business or to an environmental event. Several of the powerpoint presentations used during this program are included in Appendix H.

Soil Erosion Pollution Awareness (SEPA). TAMUK's Institute of Sustainable Energy and the Environment (ISEE) in association with the LTSTF developed the Soil Erosion Pollution Awareness (SEPA) training program. SEPA is a training program initially funded in part by the IBWC and the Texas Clean Rivers Program that provides training to local stormwater professionals. The SEPA program currently offers two (2) training courses ("How to inspect and enforce a TPDES program at construction sites" and "Developing and Implementing a Soil Erosion Management Plan at Construction Sites"), and will ultimately consist of several courses that range in topics from soil erosion management, inspection and enforcement policy, to Low Impact Development strategies and stormwater best management practices. ISEE and the TTI located in College Station have partnered and developed this program.

ISEE is currently working on a project to offer its menu of courses via a website, and is also working with local governments and state-elected officials in developing a certification program that will hopefully be adopted by the region and by the State by 2012.

Course 1 – Developing and Implementing a Soil Erosion Management Plan at Construction Sites

This course assists construction professionals develop and implement a soil erosion management plan for a construction site. The course introduces the Clean Water Act (CWA) and other regulations and laws that can impact construction activities. Local government laws and ordinances are discussed including permitting requirements and mitigation strategies. Local watershed, water quality and environmental sensitive issues are presented and explained. Moreover, the student learns how to develop, implement and supervise a comprehensive soil erosion management plan specific to a construction site. The students become soil erosion competent professionals. This course benefits project managers, site superintendents, estimators and general construction personnel. The program solicits home builders, general contractors, developers and utility contractors. This course has been offered three (3) times successfully.

Course 2 – How to inspect and enforce a TPDES program at construction sites

This course benefits construction professionals including local government regulators, planners and inspectors. The student receives instruction on developing a regulatory program within their affiliated entity whether it is a privately owned business or a local government type of organization. The elements of Course 1 are reviewed and presented, but an additional component consisting of inspection and enforcement will be added and emphasized. This course benefits municipal governments, engineering inspectors, construction inspectors and planners. This course has been offered one (1) time successfully.

Course 3 – Selection of, Installation of and Operation and Maintenance of Conventional and Innovative Soil Erosion Prevention Best Management Practices at Construction Sites - future course

This course will assist the construction professional by defining and explaining structural and non-structural BMPs, by providing information on how best to select site BMPS from innovative and conventional types, and by providing instruction on Operation and Maintenance requirements for an effective soil erosion management plan. This course will benefit engineers, planners and project managers.

Course 4 – Low Impact Development Strategy and how to incorporate into Stormwater Management Programs - future course

This course will provide a thorough overview of the LID objectives, economic/ environmental benefits, design principles and management practices. The course will introduce the innovative LID paradigms for protection and restoration of watershed hydrology, stormwater management, protection of receiving waters, and nonpoint pollution control. The course will cover rain harvesting, permeable surfacing, green roofs, constructed wetlands, rain gardens, and bioswales. Attendees will be introduced to a new perspective in urban stormwater management and will gain a practical understanding of how to apply this powerful new technological solution for watershed and water resources protection. This new technology involves multiple disciplines and has far reaching impacts in urban stormwater management, land use planning, water resources protection, site planning/design, best management practices, building requirements and construction and maintenance of stormwater infrastructure. LID will be of interest to local, state and federal government administrators and regulators; developers, builders, contractors; land use/development planners, civil/environmental engineers, landscape architects.

Course 5 – Home instruction Course and a Website Course - future course

This project will develop a home instruction course and a website course curriculum where the classroom classes will also be available via mail and on line. Professionals will be able to receive instruction at the convenience of their schedule.

The home instruction course will be mailed to the student upon request. The course will include the same material used in the classroom, but will vary to accommodate self learning techniques. A sealed test will be provided, and must be returned to the sponsor by a certain date. The website course will be similar, but be available on line. All materials will be available in pdf format.

The classroom type courses are offered annually at a facility owned by one of the coalition members. The courses are instructed by a qualified instructor from the Texas A&M University System. Instruction responsibilities are coordinated and handled by TAMUK. The courses consists of a comprehensive manual, guidance documents, power point presentation, videos, discussion of case studies, and a hands-on activity, possibly construction site visits. The curriculum is designed to be dynamic in such a way that the course may be taken annually and one can expect varying material and content.

The program is designed to promote feedback surveys and encourages comments from the students. This information is used to improve the program. All students who successfully complete the courses will be given a certificate authenticating completion of the course.

The program uses a marketing program that attempts to maximize interest and try to accommodate students. This consists of brochures, public television ads, and advertisements. Several municipalities own and/or operate public access channels aired in various viewing areas.

SEPA provides an educational component that utilizes NPS pollution control outreach to assist the Rio Grande River Basin stakeholders in achieving the goals of the Texas Clean Rivers Program and the goals of the TCEQ's NPS program.

Goal 1: SEPA enhances expertise of stakeholders and the general public by providing local cost effective training opportunities.

Goal 2: SEPA concentrates on NPS pollution caused by construction site soil erosion. The course curriculum reviews watershed-based water quality issues, identify and describe water quality issues, identify potential threats and known impacts to water quality from construction sites and review other known impacts to water quality, and instruct students on pollution prevention measures.

Goal 3: SEPA facilitates cooperation between local planning agencies, local governments, regulated entities and the public. The designers of the courses obtain input from stakeholders, and design the course curriculum to assure water quality issues and watershed concerns are prioritized.

Goal 4: SEPA communicates information to stakeholders during the design and planning stages and continues to accomplish this through instruction, outreach and promotion. The website course will be used to disseminate information and to promote the mission of this program.

Goal 5: SEPA receives support from the coalition of cities in various ways. Representatives from the LTSTF and TAMUK staff work together in building the training program.

Goal 6: SEPA is dynamic and adapts to emerging water quality issues by reviewing new environmental regulations, participating in existing water quality related organizations and reducing local data and information.

The SEPA project seeks to elucidate the connections between land use and water quality in the LRGV, and demonstrate practices and policies that sustain and improve water quality and thus the natural resource base of the Valley. SEPA provides assistance to local officials in how to plan for sustainable growth in the Valley, particularly in how to develop compact urban forms that increase quality of life and thus attractiveness for future growth, while at the same time preserving and enhancing the local resource base that is the key to regional water quality. In addition to assistance on developing sustainable urban forms for the LRGV, SEPA demonstrates additional practices that reduce the overall impact or environmental footprint of urban development: low impact development practices associated with constructed wetlands, compost, green roofs, and sustainable, water smart landscaping. The value of having this unified, approach under one banner is that it will enable a more focused educational message linking land use to water quality.

The SEPA Program consists of four (4) distinct components. The course design comprises the main aspect of the program and is the first component. The second component comprises of marketing and outreach planning which, along with the first component, includes workshops, training, meetings and use of other educational tools. The third component consists of producing classroom manuals, guidance documents, surveys, marketing literature and similar items. This component also includes a media campaign. PSAs promote NPS issues and training opportunities. The fourth component consists of classroom and website instruction.

The main overall mission of this project is to improve the water quality entering the Rio Grande River Basin by reducing NPS pollution runoff from urban construction sites and areas. The LRGV is unique in that regional efforts are limited due to lack of cooperation between municipalities and other “turf war” issues. SEPA is a regional effort by numerous LRGV cities that highlights cooperation and a pro-active approach. Besides instructing conventional theory, the SEPA promotes NPS campaigns, water smart landscapes, and low impact development (LID) strategies. LID features include rain gardens, open space design (green buffers), infiltration and detention features, and curbless streets. SEPA instructs students on projects that reduce the runoff of pollutants into area waterways and specifically the Rio Grande River, such as water smart landscapes, constructed wetlands, and infiltration gardens. SEPA promotes “Smart Growth” techniques which such as supporting denser urban developments in association with open space conservation. SEPA educators work closely with TCEQ TMDL officials, EPA NPS Region 6 representatives, Arroyo Colorado stakeholders, Rio Grande River basin stakeholders, the Clean Rivers program, local governments and the general public. By supporting the efforts of the regulatory community, SEPA assists in convincing stakeholders that the water quality concerns in the LRGV is real.

SEPA reduces sediment loading to waterways by promoting BMP techniques. Municipalities and the construction industry are educated on BMPs for water quality improvement and given the tools (model ordinances or regulatory language, design templates, checklists, and guidance manuals) to make it easier (provide incentives) for developers to install BMPs. The desired outcome of SEPA project will increase awareness of the effects of construction site soil erosion. Please find an example of the powerpoint modules and other documents used in the SEPA program in Appendix I, and please find included with this document a typical manual used during delivery of the courses.

Conferences.

Since 1999, the LTSTF and TAMUK sponsors a series of conferences in the Coastal Bend area and the LRGV. Starting with the Coastal Bend Environmental Conference Series (CBEC), the LTSTF used this forum to attract local and statewide municipalities, regulators and other professionals to share mutually beneficial experiences and knowledge with the representatives from the LRGV. Topics ranged from stormwater, groundwater, reverse osmosis to forming stormwater utilities, GIS Systems and runoff pollution. See Appendix J for documents on conferences planned and hosted by the LTSTF and TAMUK.

The Rio Grande/Rio Bravo Conference (REC) series brings together the local governmental communities, regulators like the TCEQ, and consultants. The panel of speakers at these conferences include officials from the Cities of Laredo, San Antonio and Corpus Christi, regulators from the EPA, TCEQ, and TxDOT, and other guest speakers from Texas A&M University, UTPA, UT-B and the private sector. The success of the conferences culminated with an attendance of 600 individuals during the 5th annual REC event in 2005, an accomplishment that assures that the mission of the LTSTF through the dissemination of information is succeeding. TAMUK and LTSTF held their 11th annual stormwater conference in San Antonio in 2010.

The LTSTF representatives comprised of Public Works Directors, City Engineers, City Managers, and other city officials attend these conferences and are exposed to various manners of addressing the MS4 regulations from the TCEQ. The ability to network with experts and regulators allows for a stronger relationship between city and regulatory agency. The LTSTF also had the opportunity to travel to Laredo, Texas and plan and attend a Southwest Consortium for Environmental research & policy (SCERP) Conference. The City of Laredo hosted the event and invited the Task Force representatives to attend and to share the idea of the LTSTF with attendees. LTSTF attendees listened to NadBANK share ideas of funding, to the City of Nuevo Laredo officials on how they addressed several wastewater treatment problems, and to City of Laredo officials on how they fund their stormwater department. The success of this conference encouraged the LTSTF to plan and attend events outside of the Valley.

In 2005, the Task Force co-hosted the Emerging Technologies for a Sustainable Conference held at South Padre Island. The conference dedicated an entire track to the TPDES stormwater rules. Further, training was provided to the LTSTF members by Texas A&M's TEEX program funded by a Border 2012 grant.

In November 2006, in partnership with the EPA, Monterey Tech, and NaDBank, the LTSTF co-sponsored an international conference where our coalition introduced the idea of a stormwater program to our Mexican neighbors. It was amazing how similar obstacles and issues were presented by both sides of the border. The EPA Border 2012 group from Region 6 in Dallas, TX who assisted in planning and attended the conference provided much needed validity to the efforts of the LTSTF and to our overall initiative to share ideas.

In 2010, TAMUK's ISEE and the LTSTF, in association with Forester Media of California, held its 11th annual Stormwater Conference in San Antonio, TX, August 1-5, 2010. For the first time, the annual TAMUK conference was planned in conjunction with a major national conference. The event was a great success. StormCon is the premier annual event that brings together over 1,000 stormwater and environmental services professionals at the nation's leading forum for surface water quality. In addition to serving municipal and government professionals, StormCon offers sessions on sediment and erosion control practices for contractors, and techniques for special sites, such as airports and ports. StormCon offers non-technical stormwater sessions that will benefit those completely new to stormwater, as well as advanced sessions for seasoned professionals.

With TAMUK's participation StormCon offered an academia and research related theme for the first time. TAMUK involvement attracted academic professionals and researchers from various parts of the country and the world. The San Antonio event attracted over 1,200 attendees. The Environmental Engineering Department of TAMUK and the LTSTF were able to provide an important real world academic experience for many of its undergraduate and graduate students, as well as for some of its faculty. The College of Engineering Dean of Students, Dr. Steve Nix, P.E., delivered a keynote address during one of the event's luncheons, and with the assistance from our Alumni Affairs Department, the event hosted a unique TAMUK engineering alumni evening dinner attended by many San Antonio and local area alumni, and by the president of TAMUK Dr. Steve Tallant. The alumni event was sponsored by the LTSTF.

Dr. Kim Jones, P.E., environmental engineering department chairperson, represented TAMUK with dignity and professionalism as a keynote panelist during a roundtable discussion of stormwater experts during the main luncheon of the conference. StormCon presented TAMUK's environmental engineering department with the opportunity to showcase its commitment to educating the next generation of environmental engineers and stormwater professionals.

Workshops, seminars, webcasts, webinars. The LTSTF mission also involves coordinating and conducting workshops and sponsoring events that allow representatives to discuss topics of interest and to obtain vital information to understand environmental regulations and concerns.

The following is a list of some of the workshops conducted by the LTSTF and TAMUK:

“Construction Permit Requirements” – Ms. Elda Espinoza of TCEQ – La Feria, Texas
“Construction Permit requirements” - Ms. Elda Espinoza of TCEQ – Weslaco, Texas
“Status of Arroyo Colorado” – Laura De La Garza – Texas Sea Grant – Palmhurst, Texas
“Small Business Assistance Program” – Neftali Buenrostro of TCEQ – Donna, Texas
“Stormwater Utility Program” – Ed Latimer of AMEC – Brownsville, Texas
“Stormwater Utility Program – LG Engineering Consultants – Mission, Texas
“Outreach Funding” – Marcie Oveido of LRGVDC – Mission, Texas
“Construction Permit Requirements – Ann Marie Callery of TCEQ – Harlingen, Texas
“Brownfield Program” – Dr. S.J. Sethi of UTPA – Donna, Texas
“No La Riegues Campaign” – Laura Sierra of Interlex and Dr. Jacob of TAMU – La Joya, TX
“No La Riegues Campaign” – Laura Sierra of Interlex and Dr. Jacob of TAMU – Santa Rosa, TX
“No La Riegues Campaign” – Laura Sierra of Interlex and Dr. Jacob of TAMU – Donna, TX
“MS4 permit” – Javier Guerrero of TAMUK – San Juan, Texas
“MS4 permit” – Javier Guerrero of TAMUK – Harlingen, Texas
“MS4 permit” – Javier Guerrero of TAMUK – Mission, Texas
“Decentralized Wastewater Treatment Systems” – Eric Ellman of the Rensselaerville Inst. – Mission, TX
“MS4 permit” – Javier Guerrero of TAMUK – Alton, Texas
“Wastewater Treatment Plant Subsurface Treatment Strategy” – Jim W. Pounds, Jr., P.E. PMCM Intern.
“Privatization of Wastewater and Water Treatment Plants”, OMI Consultants
“TPDES regulated sites using innovative BMPs”, City of Alamo City Hall, Alamo, Texas
“TPDES how it affects homebuilders, contractors, developers and engineers” – City of Weslaco City Hall
Gulf Coast Border 2012 Task Force meeting, City of Brownsville
“Lower Rio Grande Basin Advisory Committee Meeting” – International Boundary and Water Commission, McAllen, Texas;
“Arroyo Colorado Municipal Wastewater Steering Committee Meetings” – Various locations
“Arroyo Colorado Agriculture Steering Committee Meetings” – Various locations
“Border 2012 Seminar” – Harlingen, TX

“Rainwater Harvesting”- Weslaco Texas
“APWA Stormwater Professional Certification Course” – Alton, TX
“APWA Stormwater Professional Certification Course” – Weslaco, TX
“APWA Stormwater Professional Certification Course” – Harlingen, TX
“Low Impact Development” – Weslaco, TX
“Permeable Surfacing” – Weslaco, TX

The workshops are conducted either at regular meetings, regional locations, or scheduled to accommodate the speaker. Each workshop provided LTSTF members opportunities to learn specific items affecting our community and to adopt proven outreach programs. See Appendix K for typical program announcements.

Earth Day and Other Environmental Programs. Every year to fulfill some of the public participation components of the SWMP, local governments coordinate Earth Day activities with stormwater runoff pollution prevention awareness. Moreover, throughout the year, the LTSTF and TAMUK coordinate and provide environmental programs and activities. During its first Earth Day program, the LTSTF utilized a local grant to install more than 1,200 stormwater inlet markers during one weekend. Photographs of the markers are found in Appendix M. Each LTSTF partnered with its local school district, trained students and allowed students to install these markers in their respective cities. This event occurred simultaneously across dozens of sites throughout the LRGV. Some of the sites are as follows:

- City of San Benito and Girl Scout Troops installed markers at the San Benito Municipal Building, 401 N. Sam Houston
- City of La Joya and La Joya High School science class installed markers at the La Joya Municipal Park on Coyote Boulevard.
- During the City of Weslaco’s “Green Family Festival” at the City Hall, 255 South Kansas Ave, volunteers installed storm water markers and planted flowers. There was live entertainment, food and refreshments.
- City of San Juan and Pharr-San Juan-Alamo High School National Honor Society students at City Hall installed markers. The target area was between Business 83 and Hall Acres Road and between Wyoming Street and San Antonio Street.
- City of Harlingen and Harlingen Independent School District students at the City’s new Centennial Park kicked-off the marker installation. The City had stormwater-related-vehicles on display from Public Works, Harlingen Water Works, the Fire Department, and Police Department. Information on recycling, water conservation, native plants, composting, and other green living ideas was provided by Harlingen Proud, Valley Proud Environmental Council, Texas Water Development Board, and Harlingen Park and Recreation. Texas A&M University-Kingsville’s Javelina Express Mobile Go Center, a 42-foot trailer that provides outreach to prospective students, staffed by the A&M-Kingsville College of Engineering faculty, students and staff, was present at the event.
- City of Alton and Alton Junior High School students installed markers on the Alton Junior High campus, 521 S. Los Ebanos Blvd.
- the city of Mission and volunteers installed storm drain markers and picked up trash at various locations

The City of Pharr in an effort to develop a community friendly program, created a mascot, “The Green Ranger.” The Green Ranger is a LRGV favorite and can be seen at numerous Earth Day and other environmental events throughout the region. Recently, the Green Ranger visited the San Benito ISD and mingled with dozens of students during “Greyhound Chat”, a television program that airs locally on Channel 17. Greyhound Chat is an annual program that is used by the LTSTF to promote its mission. The LTSTF and TAMUK provide speakers every year (since 2007) to engage local students. This year Moe Yarrito of the TCEQ and Grace Segovia of the City of Pharr presented topics, respectively, on the flooding that occurred last year in the LRGV and recycling.

The LTSTF also partners with the TPWD annually and sponsors the “Dragonfly Festival” at the Estero Lillano Grande State Park in Weslaco, TX and on several occasions partnered with the ACWP for cleanup activities along the Arroyo Colorado.

The LTSTF is partnering with the ACWP in a sign-installation program. The City of Weslaco is producing traffic signs that are being installed throughout the region that identify the Arroyo Colorado Watershed boundary, Arroyo Colorado bridge crossings, and Arroyo Colorado outfalls. This joint effort is another effort that demonstrates the collaboration between cities and environmental groups. A map of installations and a copy of the TxDOT permit allowing use of State Right-of-Ways is included in Appendix L. Renditions of typical signs are also included in Appendix L.

TAMUK participates in many of these environmental related activities by providing speakers, recruiters, and other similar resources. One of the resources TAMUK uses is the “Javelina Express”, a 42-foot trailer that houses laptops, satellite internet access, and is manned by university personnel. The Javelina Express is used year-round and is also becoming a LRGV favorite. The LTSTF has conducted dozens of environmental activities annually. See Appendix M for some photographs and flyers of some of these events.

Ordinances. Developing the SWMP was a simple task in comparison to the task of enforcing some of the BMPs associated with it. The most difficult task of the LTSTF has been the development, adoption and enforcement of TPDES related ordinances. Three (3) ordinances have been respectively adopted by several members of the LTSTF with the remaining members poised to adopt these documents in 2011. The three (3) ordinances are: Soil Erosion Control Ordinance, Illicit Discharge Detection and Elimination Ordinance and a General Water Pollution Prevention Ordinance. The LTSTF is developing two (2) additional ordinances in 2011 (Post Construction Ordinance and Stormwater Pollution Prevention Plan Ordinance).

Erosion Control Ordinance

The LTSTF developed an Erosion Control Ordinance for various activities to comply with TPDES requirements. The LTSTF is empowered to develop the ordinance, to accept input from public and municipal committees, and to work with local partnerships in evaluating and implementing this ordinance. The ordinance includes engineering, construction and post-construction requirements that focus on erosion control. Furthermore, the ordinance regulates construction site stormwater runoff controls that reduce pollutants in stormwater runoff.

Moreover, the ordinance stipulates sanctions to ensure compliance, to the extent allowable under Federal, State or local law. The ordinance regulates construction activities that result in land disturbance of greater than or equal to one (1) acre pursuant to the TPDES regulations. Reduction of pollutants in stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development that would disturb one (1) acre or more. This includes a construction site on a lot that measures one-quarter (1/4) acre that exists within a ten (10) acre forty (40) lot subdivision development.

Illicit Discharge Elimination Ordinance

The LTSTF developed an Illicit Discharge Elimination Ordinance for various activities to comply with the TPDES requirements. The purpose of this ordinance is to provide for the health, safety, and general welfare of the citizens of local jurisdictions through the regulation of non-storm water discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the TPDES and the NPDES permit process. The objectives of this ordinance are:

- (1) To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user;
- (2) To prohibit Illicit Connections and Discharges to the municipal separate storm sewer system;
- (3) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance.

General Water Pollution Prevention Ordinance

The purpose of this Ordinance is to control pollution and prevent polluted water discharge into the Municipal Separate Storm Sewer System (MS4) and/or water bodies from residential, business, and commercial establishments, and to preserve the natural flow of water and waterways within local jurisdictions. The provisions in this Ordinance are intended to provide a natural environment, to control non-storm water runoff to the MS4 at its source, to minimize the adverse effects of water pollution and to preserve our drinking water supplies. It is also the purpose of this Ordinance to prevent and eliminate the wrongful discharge of waste water and to prevent wash water discharges into the MS4. The resulting discharges pollute storm water flows in ditches, streams, and other waterways, and thereby create an unhealthy situation, degrade water quality, cause loss of aquatic life and pose a threat to public health and safety.

Post-Construction Ordinance (future ordinance)

The management of stormwater runoff from sites after the construction phase is vital to controlling the impacts of development on urban water quality. The increase in impervious surfaces such as rooftops, roads, parking lots, and sidewalks due to land development can have a detrimental effect on aquatic systems. Increased areas of impervious cover have been associated with stream warming and loss of aquatic biodiversity in urban areas. Runoff from impervious areas can also contain a variety of pollutants that are detrimental to water quality, including sediment, nutrients, road salts, heavy metals, pathogenic bacteria, and petroleum hydrocarbons.

The main goal of the post-construction ordinance for existing development is to limit surface runoff volumes and reduce water runoff pollution loadings. There are other ideas that can be included in an ordinance to improve its ability to control stormwater runoff. The ordinance could include what nonstructural and structural stormwater practices are allowed within the community. Communities may also wish to add language regarding on-site stormwater requirements and whether off-site treatment is an option. The City will review examples of existing ordinances including language dealing with each of the issues above. The City will examine each ordinance for the language that is appropriate for the stormwater program.

Storm Water Pollution Prevention Plan (SWP3) (future ordinance)

The development of a MCM for municipal construction activities is an optional measure and is an alternative to the MS4 operator seeking coverage under TPDES general permit TXR150000. The objective of MCM #7 is to exempt the permittee from having to use TPDES GCP TXR150000 for each construction site owned by the permittee. The implementation of this option will save the local governments a considerable amount of capital. Contractors working for the permittee will not be required to obtain a separate authorization and can use MCM #7 for authorization to discharge stormwater runoff into the MS4. The LTSTF will develop a comprehensive SWP3 to meet the requirements of this MCM.

The LTSTF will develop a general SWP3 to meet the requirements of MCM #7. The SWP3 will include the following:

- A site or project description.
- A description of the BMPs that will be used to minimize pollution in runoff that must identify the general timing or sequence for implementation.
- A description of permanent storm water controls.
- Other required controls and BMPs.
- Documentation of compliance with approved state and local plans.
- Maintenance requirements.
- Inspections of controls.
- Identification and implementation plan for appropriate pollution prevention measures for all eligible non-storm water components of the discharge, as listed in Part II.A.3 of General Construction Permit (GCP) TXR150000.
- The information required in Part III.B of GCP TXR150000.

The SWP3 will include:

- (1) a description of how construction activities will generally be conducted by the permittee so as to take into consideration local conditions of weather, soils, and other site specific considerations;
- (2) a description of the area that this MCM will address and where the permittee's construction activities are covered;
- (3) either a description of how the permittee will supervise or maintain oversight over contractor activities to ensure that the SWP3 requirements are properly implemented at the construction site; or how the permittee will make certain that contractors have a separate authorization for storm water discharges.

See Appendix N for an example of these Ordinances and some outreach documents.

Grants. Some of the strengths of the LTSTF are its political clout, but more important to the group, is its ability to combine fiscal resources in efforts to obtain grant funding from various sources. The LTSTF has obtained numerous grants ranging from several hundreds of dollars to the latest award, a \$1.5 million award from the TCEQ's Clean Water Act Chapter 319 program. The LTSTF has received the following key grant awards:

IBWC Grant Program - \$5K – SEPA Training Program Development

Border 2012 Program – Various awards for Stormwater training, household hazardous waste programs, recycling programs and air quality research.

NaDBank – \$10K, Conference Planning, Monterey, Mexico

LRGVDC - \$15K, Stormwater Outreach, Nolarigues Campaign

Clean Water Act Chapter 319 Program (TCEQ) – Constructed Wetlands at La Feria, San Benito and San Juan

Clean Water Act Chapter 319 Program (TCEQ) – Research: Wastewater Treatment Plant study

Clean Water Act Chapter 319 Program (TCEQ) – \$1.5M Research: LID Demonstration Project

Clean Water Act Chapter 319 Program (TCEQ) – \$1.1M Research: LID Demonstration Project

Clean Water Act Chapter 319 Program (TCEQ) – \$0.5M Research: Regional Stormwater Detention Facility Demonstration Project

Clean Water Act Chapter 319 Program (TSSSWB) – Research: Groundwater Seepage Study

City of Mission, Edinburg and Harlingen – \$75K Research: Regional Composting Feasibility Study

City of Harlingen – \$20K Research: Landfill Siting Study

Lower Rio Grande Valley Low-Impact Development Implementation and Education Program. Urban NPS pollution is a problem that is growing along with population in the Arroyo Colorado watershed, which is located in one of the fastest growing metropolitan areas in the U.S. Watershed model simulations performed during the TMDL study by TCEQ showed that urban NPS is second to agricultural NPS in percent loading of BOD and suspended solids in the Arroyo Colorado. The LTSTF has been working for several years on the development of a system of stormwater BMPs to manage and improve NPS pollution flows within the region to mitigate flooding concerns, and drainage issues; however these BMPs also hold potential to improve water quality in the tributaries and streams running to the Arroyo Colorado.

The integration of BMPs, such as treatment constructed wetlands, pervious surface structures, biofiltration swales, aggressive outreach, training and education, and other methods, within the LRGV may prove to be cost effective approaches for urban stormwater runoff pollution control and water quality enhancement. However, a major challenge still exists in developing and implementing proven innovative LID BMPs, and convincing the regulated communities that LID concepts work. The LRGV LID program needs pro-active strategies through the use of research studies, science based justification, and investment. TAMUK, in collaboration with the LTSTF, and ACWP are partnering in developing a comprehensive regional LID program funded in part by the TCEQ Chapter 319 Clean Water Act NPS grant program. The LTSTF was awarded \$1.5M and a \$1.1M grants for fiscal years 2010 and 2011 to develop this program. Forty (40) percent of the program's budget is coming from the local governments.

General Project Description.

The main theme of the LRGV's LID program is to develop numerous LID projects throughout the region and attempt to institutionalize this concept into municipal planning, stormwater infrastructure design, and private sector development. Each partnering entity is developing at least one (1) LID project theme in their jurisdiction. In particular, the LID projects being developed in this grant funded program highlight green roofs, rain harvesting and pervious surface structure BMPs.

LID is an emerging science, and the first studies on the potential use of LID for water resource protection were conducted less than fifteen (15) years ago in Prince George's County, Maryland. The first published research and guidance documents on LID are less than ten (10) years old. The science of LID has also evolved from the use of Integrated Management Practices (IMPs), or small source control BMPs to site design and comprehensive watershed and environmental planning strategies. Most of the research and implementation in the United States has occurred in coastal and estuarine environments along the East Coast and in the Northwest. There is a limited amount of research, implementation projects, and guidance documents that focus on the arid and semi-arid regions like the LRGV region. The recent acceptance and integration of LID into MS4 permits in California has generated a number of new LID pilot projects and regulations. This has generated a subsequent demand for information on cost, effectiveness, benefits, maintenance, institutional issues, and other guidance information that is required for integration of LID into local and regional programs. LID has changed the NPS pollution management "landscape" because it is an approach which applies integrated natural system function into NPS pollution strategies that have typically been focused on end of pipe storage/treatment systems. Many of the LID solutions have promise in meeting multiple planning, community development, environmental and economic goals, in addition to being capable of meeting the regulatory requirements that TPDES and other regulations have established in the past 10 years.

LID has a number of advantages over conventional NPS pollution management practices. LID can reduce or eliminate the need for larger detention ponds and flood controls. It also reduces pollutant loading to receiving waters as well as stream bank erosion associated with peak flows. LID also can provide a visual amenity in developments and allow more flexible site layouts. Finally, LID can cost less than conventional techniques.

LRGV LID Program.

The partnering entities will develop LID projects as part of this program and TAMUK will use faculty, staff and graduate students to fulfill the role of obtaining data from these demonstration projects, develop findings on the effectiveness of these BMPs in the LRGV region and provide outreach and reporting to the partners on these findings. Other local partners will also provide recommendations on use of these LID concepts, planning strategies and cost analyses. It is important to mention that institutionalizing LID strategies in the LRGV requires a substantial effort by the local governments and other stakeholders to convince the local community to incorporate LID concepts into everyday life, traditional development, and storm water management strategies. This can only be accomplished by continual investment of resources from local, state and federal funding sources to support research, demonstration projects, and outreach and education programs.

TAMUK will work with its partners in designing, constructing and studying the LID demonstrations projects. The LID projects will be designed in such a manner that will promote acquisition of data that will be used to evaluate water quality and load reductions within the region, to determine NPS pollution treatment potential, to provide an economic analysis, and to evaluate the overall effectiveness of the LID applications within the three regions of the LRGV and/or within each municipal and/or county jurisdiction. Each characteristic and/or application of the LID demonstration projects will be contrasted and compared to each other within the boundaries of the site specific project, and/or will be contrasted and compared to LID projects and their site specific characteristics and applications in neighboring geographical regions or jurisdictions.

The following BMPS are key components of the LRGV LID Program and are being actively designed, and will be constructed during 2011 by the listed partners:

- Green roofs
 - City of Brownsville
 - City of San Juan
 - City of Weslaco
 - City of Harlingen (Harlingen Water Works Systems)
 - City of Alton
 - City of La Joya
- Permeable surfacing parking lots
 - City of Brownsville
 - City of Harlingen
 - City of Weslaco
 - City of Pharr
 - City of La Joya
 - City of Alton
- Rain gardens
 - City of Brownsville
 - City of Harlingen
 - City of San Juan
 - City of Alton
- Stormwater constructed wetlands
 - City of Weslaco
 - City of Harlingen
 - City of McAllen (previous grant, 2009)

See Appendix O for project abstracts and other documentation.

PSAs, collaboration with Channel 12 and 17. TAMUK's ISEE in partnership with the Weslaco ISD (WISD) Channel 17 department and the LTSTF is developing a series of PSAs program and recruiting segments that began to air in the Lower Rio Grande Valley in 2010. The PSAs are funded by the College of Engineering, the Environmental Engineering Department and the LTSTF. The project will produce 2-30 sec PSAs targeting stormwater pollution prevention, 1-12 min documentary highlighting stormwater non point source pollution, the Arroyo Colorado

and the TPDES program, and 1-30 sec recruiting video that will promote the Environmental Engineering Department. This project is a unique partnership between a major university system, a local school district and numerous local governments.

The first PSA began airing in Time Warner Channel 17 in the Weslaco Viewing area in both English and Spanish. A CD copy of the PSAs is included with this document. This project is unique in that solely educators and students developed the footage, the editing and the narration. WISD staff used their studio to record numerous local government officials, TAMUK and UTB faculty, staff and students, and are featured in the PSAs.

The documentary and the recruiting clip are not complete, but the raw footage to be used in these programs was completed in December 2010. The documentary is expected to air during the summer of 2011 and the recruiting clip will air by April 2011.

Research Education for Teachers (RET). From 2006 to 2010, TAMUK in partnership with the LTSTF and the National Science Foundation, provides opportunities during summers to teachers from local ISDs to enhance the teachers' personal and professional skills. The RET program encourages teachers to increase laboratory or field based learning in their classrooms, and give them insight into the skills needed to work as college students, graduate students, and university faculty.

This program is loosely based upon the premise that providing teachers with research experience and skills in environmental engineering research laboratories would lead to an improvement in their high school students' understanding of environmental engineering principles, and introduce them to scientific research methods.

Another objective of this program is to bring engineering principles and new technologies to the local high schools, many of which are largely minority serving and economically disadvantaged. Increasing community participation in research and emerging technologies could not only lead to an emergence of interest in engineering science as a vision for the future, but also provide encouragement for minority youth to actively pursue a college education.

Teachers funded by the LTSTF are required to accomplish the following:

- develop the lesson plan, align it with the school's curriculum (TEKS, etc.), 15-20 slide power point, an in class activity.
- Each teacher will contact assigned ISDs and work with the liaison of that ISD in developing the topics, schedule, and identifying the schools to be engaged.
- Target students are GT, pre-AP, AP, college bound.
- A speaker will be assigned to each topic, teacher will be asked to assist in identifying speakers. The topics will be selected by TAMUK. Topic/presentation must be appropriate for elementary thru high school students, or a variation thereof must be developed for each grade level.
- TAMUK will also assign the ISDs each teacher will work with in developing schedules, etc.

- Teacher will do a literature review, regulatory review and any pertinent research of the topic.
- Each teacher will also be asked to develop a 2 slide outreach segment/infomercial that ties to the lesson plan to be aired on ISD Channel 17's through out the LRGV.

Final work will be used throughout the Lower Rio Grande Valley ISDs during the Storm Water Runoff Pollution Prevention Awareness program. The desalinization powerpoint presentation in Appendix H was developed by a teacher funded through this program. A copy of the RET program solicitation is attached in Appendix P.

Brochures, videos, flyers, outreach in general. As part of its outreach program, the LTSTF has developed brochures, flyers, announcements, posters and other items that disseminate information to the region. Several examples are included in Appendix M.

Website (www.stormwater.stei.org). The LTSTF developed and maintains a website that is available to each member of the organization for use. Several members do not have a website and this serves as a good opportunity for disseminating information.