

BEST MANAGEMENT PRACTICE SUMMARY REPORT



MAINTENANCE PROGRAM

APRIL 2011

1.0 Introduction

Pursuant to 43 TAC, Part 1, Chapter 2, Subchapter A, § 218(b), the Texas Department of Transportation (TxDOT) Maintenance Division (MNT) undertook an environmental review of TxDOT's nine Maintenance Programs: 1) Bridge; 2) Customer Service; 3) Debris and Spills; 4) Drainage; 5) Ferries; 6) Enhancement; 7) Pavement; 8) Roadside Appurtenances; and 9) Traffic Pavements and Markings. The Maintenance Programs help TxDOT to provide a safe and functional roadway system, ensure clean and aesthetically pleasing highways and facilities, and improve the value and prolong the functional lifespan of TxDOT infrastructure.

Organizationally, TxDOT is comprised of 25 districts, 21 divisions, six offices and four regions. Each district is responsible for Maintenance Program activities conducted within its jurisdictional area. Generally speaking, maintenance needs vary from district to district. Needs and corresponding practices vary due to differing environments, traffic levels, and the availability of resources.

Part of the environmental review process involved the identification of Best Management Practices (BMPs) intended to reduce adverse environmental impacts associated with Maintenance Program activities. Several BMPs were identified during the environmental review process that when implemented avoid, minimize or compensate for any adverse environmental impacts resulting from TxDOT Maintenance Program activities.

This report is organized around a variety of environmental resources and identifies the BMPs that are applicable for reducing adverse impacts to each resource resulting from Maintenance Program activities. **Table 1-1** summarizes the BMPs by Maintenance Program so that maintenance personnel can quickly and easily identify BMPs that apply to the Maintenance Program activities that they may be conducting. As the BMPs continue to be implemented, adapted to site-specific conditions, evaluated for effectiveness, and refined TxDOT will continue to further reduce any adverse environmental effects associated with its Maintenance Programs.

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TABLE 1-1: BMPS AND ASSOCIATED MAINTENANCE PROGRAMS

Best Management Practice (BMP)	Maintenance Programs								
	Bridge	Customer Service	Debris and Spills	Drainage	Ferry	Maintenance Enhancement	Pavement Maintenance	Roadside Appurtenances	Traffic Pavement Markings
<ul style="list-style-type: none"> Deck Sweeping Joint & Bearing Cleaning Paint Removal & Application Debris Removal & Channel Clearing Power Washing & Sand Blasting Channel Stabilization Pest Control Structural & Other Repairs 	<ul style="list-style-type: none"> Driveway entrances within the ROW Sewer treatment plants & storm water systems at rest areas Rest & picnic areas Roadside parks Access to historical markers & sites Vehicle pull outs & parking areas Restrooms at ferry landings Adopt-a-Highway Program Providing traffic assistance 	<ul style="list-style-type: none"> Patrols for debris Conducts spot litter pick-up & disposal Removes & disposes of litter Conducts hand & street sweeping Sweeps ice rock Removes & disposes of illegal dumpsites Removes illegal signs on ROW Removes encroachments Manages hazardous material cleanup 	<ul style="list-style-type: none"> Maintains ditches Reshapes ditches Repairs or stabilizes slopes Maintains culverts & storm drains Maintains storm water pump stations Repair & installs riprap Maintains or implements storm water pollution protection plans (SW3P) 	<ul style="list-style-type: none"> Dredging Oil & fuel storage & repair Re-fueling Other chemical storage Grey water disposal Maintain public area Deck sweeping Minor routine ship maintenance Maintain facility equipment Contracted maintenance 	<ul style="list-style-type: none"> Adding a shoulder Adding handicap ramps Adding sidewalks after construction Adding turnouts Inspecting driveways Inspecting utilities Maintaining landscapes Maintaining boat ramps 	<ul style="list-style-type: none"> Maintains base and sub-grade of travel lanes & shoulders Maintains flexible (asphaltic) surfaces of travel lanes & shoulders Maintains rigid (concrete) pavement of travel lanes & shoulders Stores pavement materials Cleans up work site & maintenance equipment 	<ul style="list-style-type: none"> Barriers & concrete appurtenances Guardrails & end treatment systems Mailboxes Cattle guards Bridge rails Access controls Delineators Vehicle attenuators Small & large signs Flashing beacons Illumination system Coordinated & isolated traffic signals Traffic management systems Traffic control plans 	<ul style="list-style-type: none"> Paint & Bead Striping High Performance Striping Specialty Markings Raised & Reflective Pavement Markers Removal of Pavement Markers 	
Limit the operation of heavy machinery used for Maintenance Program activities to paved areas, areas free of native vegetation, and to areas with slopes that are less than 33 percent consisting of stable soils.	X	X	X	X	X	X	X	X	X
Avoid using machinery in wet and/or inundated areas to prevent rutting and/or turbidity.	X	X	X	X	X	X	X	X	X
Properly maintain all equipment used for Maintenance Program activities to optimize fuel and operating efficiency and to ensure worker safety. 	X	X	X	X	X	X	X	X	X
Coordinate with TxDOT biologists or local fish and wildlife experts for assistance in scheduling activities to avoid aquatic impacts.	X	X	X	X	X	X	X	X	X
When federally listed species or critical habitat is observed at or near a maintenance activity, coordinate with the District Environmental Coordinator to determine if further coordination with United States Fish and Wildlife Service (USFWS) or National Marine Fishery Services (NMFS) under the Endangered Species Act (ESA) is required.	X	X	X	X	X	X	X	X	X
Adhere to the TxDOT's Standard Plans and Specifications when work is scheduled.	X	X	X	X	X	X	X	X	X
 Periodically review the list of all eligible (historic) and non-eligible resources and provide in-house and contracted maintenance personnel responsible for implementing Maintenance Program activities with the list of eligible resources in their respective District so that proper methods are used. Resources can include bridges, historical markers, landscapes, buildings, rest and picnic areas, Depression-Era structures, etc.	X	X		X		X	X	X	
Inspect all historical markers within TxDOT right-of-way (ROW) once every year to determine if repairs or cleaning are needed.		X							
Replace damaged elements (bronze plaques, seals, wreaths, stars) or those missing from granite centennial markers with replacement parts ordered from Texas Historical Commission (THC). District environmental coordinators or ENV can provide maintenance personnel with the appropriate order forms.		X							

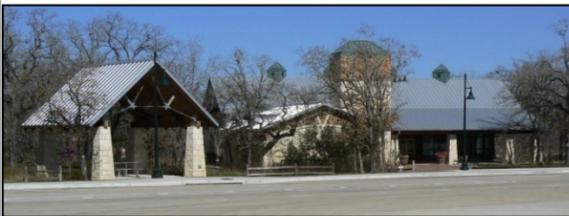
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	Use the least aggressive methods that prove effective for cleaning historic resources. Request guidance for appropriate methods for each type of resource from TxDOT's Environmental Affairs Division (ENV) (guidance sheets are available regarding aluminum state historical markers, older stone and concrete markers and stone and concrete picnic fixtures).								
Repair rather than remove historic features whenever possible.		X							
Follow rules set forth in the Memorandum of Understanding (MOU) with the Texas Parks and Wildlife Department (TPWD) Texas Administrative Code (TAC) 43(1)(2)(B)(22.2) and memoranda of agreements (MOAs).	X	X	X	X	X	X	X	X	X
Observe triggers of the MOU with TPWD. These include: <ul style="list-style-type: none"> More than 1.0 acre of new ROW within floodplains or creek drainages in rural or undeveloped urban areas; Channel modifications to streams, rivers or water bodies; Channel re-alignment requiring the creation of new drainage ways or other excavation impacting more than 1.0 acre of mature woody vegetation; Excavation (scraping, clearing, or other surface disturbance) of the existing channel outside of TxDOT's existing ROW, or of the channel inside the ROW which is not routinely maintained and exhibits native vegetation; Affects to mature woody vegetation or dense mature brush, including any significant remnant native vegetation (e.g., undisturbed native prairie or bottomland hardwood, etc.); Within the range and in suitable habitat of any state or federally listed threatened or endangered species; Mitigation plans or otherwise involve proposals to redress project impacts on fish, wildlife, or plant resources; Previous environmental clearance, i.e., three years have passed without major action(s) and/or TPWD review, but now meets any of the above listed criteria; or Three years passed since environmental clearance with major actions (i.e., the TPWD may have or may not have reviewed, but the project meets any of the above listed criteria). If a specific MNT activity involves any of the above listed criteria then coordination with TPWD per the MOU is required.	X	X	X	X	X	X	X	X	X

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Coordinate major rehabilitation efforts on historic resources with the district environmental personnel and ENV's Historical Studies Branch. When extensive repair and/or replacement are required, use similar materials and design elements to prevent the loss of the feature's integrity.	X	X		X		X			
Exercise caution when performing maintenance activities near historical markers, whether they are themselves are historic resources, or more recent commemorative markers.	X	X	X	X	X	X	X	X	X
 <p>Consult ENV staff for plans and guidance associated with Americans with Disabilities Act (ADA)-compliant alterations to historic picnic areas.</p>		X							
Do not close a historic picnic area due to economic or maintenance concerns without conferring with the district environmental coordinator and cultural resources staff in ENV. A six-step process including public involvement is required.		X							
Coordinate with the appropriate county historical commission chairperson and receive approval from THC before removing or relocating any historical markers in TxDOT ROW. Most marker relocations that retain a marker in close vicinity to its original location are approved.	X	X		X		X	X		
Cease work in the immediate area in the event that evidence of archeological deposits are encountered during Maintenance Program activities and notify the District environmental coordinator who can contact the appropriate individuals to initiate post-review discovery procedures under the provisions of the Programmatic Agreement (PA) and MOU.	X	X	X	X	X	X	X	X	
Train maintenance personnel to identify protected species and species of concern, cultural resources, and inform them of all applicable safety and legal requirements.	X	X	X	X	X	X	X	X	X
Confirm the presence of listed species at or near the project site through pre-maintenance surveys or assume they are present and implement appropriate protection measures.	X	X	X	X	X	X	X	X	X
Minimize impacts to listed species and their habitats by limiting grading or topsoil removal to areas where this activity is absolutely necessary for maintenance activities.	X	X	X	X	X	X	X	X	X
Schedule the most effective amount of personnel and equipment to complete maintenance activities to reduce the time of disturbance to listed species.	X	X	X	X	X	X	X	X	X

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Review temporary roadside material storage locations and notify contractors of the areas with potential to support habitat for rare, threatened, and endangered species and of the conservation need to avoid these areas.	X	X	X	X	X	X	X	X	X
Identify problematic ROWs that could benefit from alternative ecological approaches to maintenance activities to reduce erosion or other maintenance program impacts.	X	X	X	X	X	X	X	X	X
Prioritize projects occurring in designated critical habitat, other critical habitat, significant remnant native vegetation, and sensitive managed areas for invasive species removal/revegetation activities.	X	X	X	X	X	X	X	X	X
Before filling depressions at culvert inlets, check for native mussel species and notify TxDOT Environmental Affairs Division (ENV) before proceeding, if native mussels are found.				X					
Develop procedures for relocating mussels found stranded in these puddles back into flowing stream reaches, in accordance with TPWD Proclamation §57.157 regulating mussels and clams.				X					
Avoid use of the 145 non-native invasive plant species identified on http://www.texasinvasives.org/ , in addition to the Federal and State of Texas noxious weed species.	X	X		X		X			
Sterilize equipment for tree trimming between trees in areas affected by surface transferable bacterial, viral, and fungal diseases. Large cuts across roots and cut surfaces remaining on tree trunks or roots.		X				X			
Identify any sensitive habitat areas, including watercourses, streams, and lakes found within the work area prior to beginning Maintenance Program activities and take precautions to avoid impacts to such resources.	X	X	X	X	X	X	X	X	X
									
Do not disturb, destroy, or remove active nests during the nesting season.	X	X		X					
Avoid the removal of unoccupied, inactive nests, as practicable.	X	X		X		X	X		
Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures.	X	X		X		X			
Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.	X	X		X		X			
Limit the use of machinery in habitat that may support ground-nesting birds during the spring and early summer months.	X	X	X	X		X	X	X	X

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Schedule and conduct maintenance work during off-peak traffic hours when practicable.	X	X	X	X		X	X	X	X
Generate a list of all programmed maintenance work for the Fiscal year (FY) so that it can be reviewed and coordinated with the appropriate resource agencies.	X	X	X	X	X	X	X	X	X
 <p>Use non-attractive vegetation for plantings in the ROW.</p>	X	X		X		X			
Use prefabricated bridge elements and systems to reduce the amount of heavy equipment required and the amount of time required on-site for heavy equipment, causing less disruption to sensitive environments, increasing maintenance personnel safety, and reducing traffic delays.	X								
Avoid the removal of bird nests and casts attached to bridge structures during the nesting season.	X								
Avoid conducting Bridge Program Maintenance activities when nesting birds or bats are present.	X								
Modify timing of maintenance activities to protect bats in bridges, including postponing tree trimming and/or bridge maintenance work until outside of bat season.	X								
Schedule Bridge Maintenance Program activities to avoid egg incubation, juvenile rearing and downstream migration periods of fish.	X								
Properly collect, store, and dispose of all wastes generated during Bridge Program Maintenance activities in approved landfills.	X								
Contain all chemical substances used for bridge maintenance, including paints, sealants, lubricants and epoxies. Use collection mats, such as drop cloths, filter mats, and containment curtains to prevent chemical substances from entering the environment.	X								
Create an inventory of bridges that have lead or asbestos containing paints, so as to identify and ultimately abate these materials from TxDOT's infrastructure.	X								

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 <p>Take special care to ensure debris and dirt is not blown off of the bridge into watercourses, wetlands, floodplains or on to vehicular traffic when cleaning deck and bridge surfaces.</p>	<ul style="list-style-type: none"> Deck Sweeping Joint & Bearing Cleaning Paint Removal & Application Debris Removal & Channel Clearing Power Washing & Sand Blasting Channel Stabilization Pest Control Structural & Other Repairs 	<ul style="list-style-type: none"> Driveway entrances within the ROW Sewer treatment plants & storm water systems at rest areas Rest & picnic areas Roadside parks Access to historical markers & sites Vehicle pull outs & parking areas Restrooms at ferry landings Adopt-a-Highway Program Providing traffic assistance 	<ul style="list-style-type: none"> Patrols for debris Conducts spot litter pick-up & disposal Removes & disposes of litter Conducts hand & street sweeping Sweeps ice rock Removes & disposes of illegal dumpsites Removes illegal signs on ROW Removes encroachments Manages hazardous material cleanup 	<ul style="list-style-type: none"> Maintains ditches Reshapes ditches Repairs or stabilizes slopes Maintains culverts & storm drains Maintains storm water pump stations Repair & installs riprap Maintains or implements storm water pollution protection plans (SW3P) 	<ul style="list-style-type: none"> Dredging Oil & fuel storage & repair Re-fueling Other chemical storage Grey water disposal Maintain public area Deck sweeping Minor routine ship maintenance Maintain facility equipment Contracted maintenance 	<ul style="list-style-type: none"> Adding a shoulder Adding handicap ramps Adding sidewalks after construction Adding turnouts Inspecting driveways Inspecting utilities Maintaining landscapes Maintaining boat ramps 	<ul style="list-style-type: none"> Maintains base and sub-grade of travel lanes & shoulders Maintains flexible (asphaltic) surfaces of travel lanes & shoulders Maintains rigid (concrete) pavement of travel lanes & shoulders Stores pavement materials Cleans up work site & maintenance equipment 	<ul style="list-style-type: none"> Barriers & concrete appurtenances Guardrails & end treatment systems Mailboxes Cattle guards Bridge rails Access controls Delineators Vehicle attenuators Small & large signs Flashing beacons Illumination system Coordinated & isolated traffic signals Traffic management systems Traffic control plans 	<ul style="list-style-type: none"> Paint & Bead Striping High Performance Striping Specialty Markings Raised & Reflective Pavement Markers Removal of Pavement Markers
Filter runoff and rinse water prior to discharge when using high pressure water for cleaning.	X	X	X	X	X	X	X	X	X
Use cloth, netting or other materials to catch any debris (i.e. concrete, epoxy, grease, paints, etc.) generated during maintenance practices.	X	X		X		X	X		
Coordinate with ENV and the District Environmental Coordinators prior to grading and blading activities for wildfire management and control.		X							
Train maintenance crews on how to handle hazardous chemicals if used, and encourage them to use them sparingly and only when absolutely necessary.	X	X	X	X	X	X	X	X	X
Ventilate facilities and use fans to create a cross draft when paints, cleaners, etc. are being used.		X							
Wear personal protective equipment whenever handling a hazardous chemical to reduce exposure, which could cause acute or chronic effects.	X	X	X	X	X	X	X	X	X
Limit the use of bleaches and chemical cleaners and ensure toxic substances are not placed in toilets.	X	X	X	X	X	X	X	X	X
Minimize use of salt by reducing salt-to-sand ratio.			X						
Prioritize sand clean-up in areas without sediment collection systems.			X						
Store de-icing agents in covered areas on impermeable surfaces to prevent leaching of these agents into underlying soils and groundwater and to prevent agents from entering surface waters via runoff.			X						
Plow snow in areas that allow vegetation to filter and contain sand.			X						
Treat sand clean-up as part of the emergency: remove sand as a priority in order to remove sediments.			X						
Prioritize sand clean-up efforts to aquatic habitat areas to minimize impacts.			X						

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Contain all chemical substances used for customer service maintenance, including paints, sealants, cleaners, de-icing agents, and sand until such substances are needed.		X							
Remove the bulk of snow and ice prior to the application of de-icing agents, as it reduces the need for salt application.			X						
Develop a salt management plan to minimize salt usage and salt entry into the environment surrounding roads and maintenance facilities.			X						
Minimize the release of salty snowmelt waters from snow storage piles to soils and groundwater by directing runoff to areas less sensitive to impact.			X						
Recycle sweeping materials as practicable and appropriate.			X						
 <p>Undertake work at rest and picnic areas during periods of dry weather as this allows easier control of sediment, and is typically a less sensitive period for fish and wildlife. If the work must be performed during rain, sediment controls must be installed to prevent release of sediment or hazardous substances.</p>		X							
<p>Use only substances approved for use in or near aquatic environments when working near such environments. Consider the following when conducting product procurement for Customer Service Maintenance Program activities (i.e., cleaners for restroom facilities, graffiti removal chemicals, paints, etc.):</p> <ul style="list-style-type: none"> Minimizes exposure to concentrates No ozone depleting substances Recyclable packaging Recycled-content in packaging Reduced bioconcentration factor Reduced flammability Reduced or no added dyes, except when added for safety purposes Reduced or no added fragrances Reduced or no skin irritants Reduced or no volatile organic compounds (VOCs) Reduced packaging 		X							

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Best Management Practice (BMP)	<ul style="list-style-type: none"> Deck Sweeping Joint & Bearing Cleaning Paint Removal & Application Debris Removal & Channel Clearing Power Washing & Sand Blasting Channel Stabilization Pest Control Structural & Other Repairs 	<ul style="list-style-type: none"> Driveway entrances within the ROW Sewer treatment plants & storm water systems at rest areas Rest & picnic areas Roadside parks Access to historical markers & sites Vehicle pull outs & parking areas Restrooms at ferry landings Adopt-a-Highway Program Providing traffic assistance 	<ul style="list-style-type: none"> Patrols for debris Conducts spot litter pick-up & disposal Removes & disposes of litter Conducts hand & street sweeping Sweeps ice rock Removes & disposes of illegal dumpsites Removes illegal signs on ROW Removes encroachments Manages hazardous material cleanup 	<ul style="list-style-type: none"> Maintains ditches Reshapes ditches Repairs or stabilizes slopes Maintains culverts & storm drains Maintains storm water pump stations Repair & installs riprap Maintains or implements storm water pollution protection plans (SW3P) 	<ul style="list-style-type: none"> Dredging Oil & fuel storage & repair Re-fueling Other chemical storage Grey water disposal Maintain public area Deck sweeping Minor routine ship maintenance Maintain facility equipment Contracted maintenance 	<ul style="list-style-type: none"> Adding a shoulder Adding handicap ramps Adding sidewalks after construction Adding turnouts Inspecting driveways Inspecting utilities Maintaining landscapes Maintaining boat ramps 	<ul style="list-style-type: none"> Maintains base and sub-grade of travel lanes & shoulders Maintains flexible (asphaltic) surfaces of travel lanes & shoulders Maintains rigid (concrete) pavement of travel lanes & shoulders Stores pavement materials Cleans up work site & maintenance equipment 	<ul style="list-style-type: none"> Barriers & concrete appurtenances Guardrails & end treatment systems Mailboxes Cattle guards Bridge rails Access controls Delineators Vehicle attenuators Small & large signs Flashing beacons Illumination system Coordinated & isolated traffic signals Traffic management systems Traffic control plans 	<ul style="list-style-type: none"> Paint & Bead Striping High Performance Striping Specialty Markings Raised & Reflective Pavement Markers Removal of Pavement Markers
 <p>Ensure equipment is operating properly so salt is applied accurately to road surfaces and prevents over-spray.</p>			X						
Store/dispose of removal materials at an appropriate site in an appropriate manner as part of the local material disposal plan. Removed material may be temporarily stored in stable locations to prevent the material from entering wetlands or waterways.	X	X	X	X	X	X	X	X	
Where feasible, schedule sweeping during damp weather, to minimize dust production.			X						
Free clogged scuppers using a steel rod, then sweep material away. A scupper is an opening in the side walls or parapet of a bridge, for purposes of draining water. They are usually placed at or near ground level, and allow rain or liquids to flow off of the side of the bridge, instead of pooling on the deck.			X						
			X						
Use water (as needed) to reduce dust during sweeping.			X						
Sweep and vacuum to removing de-icing abrasives, material from small slides, litter and debris. Sweeping and vacuuming may be implemented anywhere sediment is tracked from off-road maintenance activity sites onto public or private paved roads typically at the points of egress.			X						
Compost sweeper loads full of fallen leaves and other organic materials rather than use classic waste disposal techniques when possible.			X						
Do not load hoppers with street sweepings beyond their capacity.			X						
Where feasible, coordinate crews to follow sweeping/flushing with bridge drainage cleaning.	X		X						

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 <p>Where appropriate and practical, place sediment barriers in site-specific locations along stream routes or direct drainage routes, route sweeping material away from watercourses.</p>			X						
Do not sweep up any unknown substance that may be potentially hazardous. If a substance is known to be hazardous, suspected of being hazardous or cannot be identified, notify the District Maintenance HazMat Manager immediately.			X						
Notify the immediate supervisor and the District Stormwater Coordinator if an illegally dumped substance within the TxDOT ROW has the potential of entering a municipal drain system so that the downstream municipality can be contacted.			X						
Adjust brooms to maximize the efficiency of sweeping operations.			X						
Dispose of waste to a landfill or approved site in accordance with local regulations and solid waste management best management practices. "Clean" materials should be reincorporated back into the program for future reuse.	X	X	X	X	X	X	X	X	
Where possible, recycle abrasives for use in roadside berms instead of putting them into landfills.			X						
Screen regular sweepings, disposing trash and litter only at Texas Commission on Environmental Quality (TCEQ)-permitted landfills.			X		X				
Store materials such that rainfall will not cause any runoff (contaminated runoff could impact other areas on site, wetlands, or surface waters.) Store sweepings to minimize the potential for site impacts from road waste contaminants. Storage on an impermeable surface with leachate collection and/or protection from rainfall is preferable. Tarps may be used for cover, or berms or retention ponds may be used to contain runoff.			X						
Collected and screen and size winter road sand for reuse. If sand washing is required to remove excess fines, minimize site impacts, collect the fine particles, and prevent runoff. (Pretreatment by settling or flocculation then permitted discharge to sanitary sewer is a sound practice).			X						

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Obtain a site-specific permit if composting over 25 tons per year.	X	X	X	X	X	X	X		
Determine if a state solid waste permit is required for storage, processing and reuse of materials other than road sand and clean fill.	X	X	X			X	X		
Screen materials collected from areas known to have low impacts from road waste contaminants for trash and reuse it as low grade fill in TxDOT-owned and controlled areas. During storage and processing, fines should not be allowed to become airborne.			X						
Sidecast minimally contaminated sweepings onto non-ditched shoulders if these roadsides are not adjacent to surface waters, wetlands, or stormwater management systems with discharge to surface waters, wetlands or the subsurface.			X						
Slow sweeper and broom speed, and change the angle of the broom to prevent sweepings from leaving the road shoulders and entering the stream if the road is parallel to a water body that is less than 25 feet from the fog line.			X						
Label all tanks and piping.			X		X				
 Secure valves on storage tanks in the closed position and/or lock dispensers when not in use.			X		X				
Post warning signs and/or operating instructions near storage tanks.			X		X				
Protect storage tanks from vehicle impact.			X		X				
Use overfill indicators and/or overfill protection on fuel tanks.			X		X				
Situate tanks on a foundation if site appropriate. It is recommended that tanks be placed on an impervious surface to minimize opportunity for subsurface contamination in the event of a spill.			X		X				
Provide secondary containment in areas where spills, leaks, or ruptures could enter nearby creeks or streams.			X		X				

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Store/dispose of removal materials at an appropriate site in an appropriate manner as part of the local material disposal plan. Removed material may be temporarily stored in stable locations to prevent the material from entering wetlands or waterways.	X	X	X	X	X	X	X		
 <p>Only perform maintenance ditch cleaning in areas where ditch function is impaired. The ditch length, width, and height should be dredged back to its original dimensions.</p>				X					
In general, clean, repair or replace culverts and ditches only during periods of low water flow and not during intense rainfall events.				X					
Conduct dredging during low water periods and during dry weather, avoiding rainfall events.				X	X				
Evaluate and modify, where feasible and appropriate, existing ditch slopes to trap sediments, and support development of vegetation.				X					
Use BMPs identified in the local Integrated Vegetation Management Plan.	X	X	X	X	X	X	X	X	
Retain existing vegetation when at all possible, especially along the ditch slopes to maintain stability.	X	X	X	X	X	X	X	X	X
Consider excavating only the first three quarters of the ditch and retaining vegetation in the remainder.				X					
Dispose of removed material above the bank line and not in any waterway or wetland. Recycle excavated material when feasible.	X	X	X	X	X	X	X	X	
Have adequate siltation control measures in place before dredging operations begin. Use erosion control devices such as check dams, silt fences, and other acceptable techniques when the potential exists to have sediment or other materials enter a Water of the State. Install check dams on steep slopes, as necessary, to slow water velocity reduce erosion and sedimentation. Consult with TxDOT ENV if silt devices are inadequate to filter water prior to draining to watercourses.				X	X				
Seed and mulch cleaned ditches at the end of each work day. Monitor daily for subsequent erosion until area is stable. Repair as necessary.				X					

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Remove temporary conveyances completely as soon as the surrounding drainage area has been stabilized or at the completion of construction.				X					
Inspect the measure after every storm and repair the dike, flow channel, and outlet, as necessary. Approximately once a week inspect the measure and make repairs if needed. Damages caused by construction traffic or other activity must be repaired before the end of each working day.				X					
Check the channel lining, embankments, and bed for erosion and accumulating debris and sediment buildup. Remove debris and repair linings and embankments as required.				X					
Employ energy dissipaters if channelized flow is too strong for the surrounding environment. If vegetation or rock lined ditches reduces the ditch flow capacity, the road may be endangered.				X					
 <p>When feasible, begin dredge at fixed flow elevation points (i.e., culvert inlets/outlets, catch basin inlets, etc.).</p>				X	X				
Develop native material curbs or berms using a grader. Vegetation of these berms will enhance the durability of these constructed features. Hardened curbs such as asphalt or concrete will require a construction crew and an engineer.				X					
Do not heel or pull the ditch with a grader, except when absolutely necessary. The softest approach to developing vegetated ditches is preferred.				X					
Create properly sized roadside ditches and have adequate relief drain spacing to carry runoff from moderate storms.				X					
Establish a ditch gradient between 2 and 8 percent slopes for better performance. Slopes greater than 8 percent provide runoff waters with too much momentum and erosive force and will require more ditch relief. Slopes of less than 2 percent drain water too slowly, or not at all.				X					
Avoid changes or increases in the material profile, whenever possible.	X	X	X	X	X	X	X	X	

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 <p>Place riprap within in-water work periods (seasonal habitat restrictions are complied with), in non-emergency situations.</p>	X			X	X				
Investigate and utilize natural materials (wood, brush, boulders, etc.) on submerged banks, abutments and creek beds when stabilizing or rehabilitating a waterway.				X					
Evaluate existing altered drainages and modify them, when feasible and appropriate, to simulate natural drainage features (e.g., step-slope cross-section instead of trapezoidal cross-section, meander paths instead of straight runs, natural creek bed surface instead of impermeable surface materials).				X					
Avoid the use of armor (gabion blankets and sacks, concrete riprap, and steel sheet pilings) in natural waterways, wherever feasible.				X					
When using armor, always incorporate a natural material cover, such as multiple layers of sod over soil and brush blankets to stabilize the shoreline and to reestablish a vegetated bank.				X					
Consider use of bioengineering solutions where practicable. Practicable use areas include areas not shaded by bridge elements, outside of the two-year floodplain where success is probable and safety of the structural elements is assured.	X			X					
Coordinate any erosion repair activities (response to and cleanup of erosion problems, not the erosive action itself), which cause significant changes in the topography or vegetation within the riparian management area with TxDOT ENV and/or other regulating agencies. Also, coordinate when placing riprap that is in addition to existing conditions and within the two-year floodplain of Waters of the State.	X	X		X	X	X	X		
Use erosion control methods in a timely manner, including seeding and mulching specific areas with non-invasive species, installing silt fences, and installing other devices as appropriate.	X	X		X	X	X	X	X	
Take precautionary measures on erodible areas (chicken wire, chain link, rock matting) where eroding areas are identified, and where precautionary measures can be successfully and safely applied.	X	X		X	X	X	X	X	

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<p>Inspect all culverts at least annually to assure proper functioning. Summary reports should be completed for each crossing evaluated. An annual report should be compiled for all stream crossings and submitted to the resource agencies. A less frequent reporting schedule may be agreed upon for proven stream crossings. Any stream crossing failures or deficiencies discovered should be reported in the annual cycle and corrected promptly addressed.</p>				X					
<p>Ensure timely inspection and removal of debris for culverts to continue to effectively move water, fish, sediment, and debris.</p> 			X	X					
<p>Avoid disturbing beaver dams, whenever feasible, particularly when the dam supports an offsite wetland or when the dam does not cause drainage or other issues that could create safety hazards or accelerate the deterioration of transportation infrastructure.</p>				X					
<p>Instead of replacing existing smaller culvert pipes with oversized types, consider other ways to discourage beaver colonization such as building a horseshoe shaped fence around the upstream side of the culvert to prevent the beaver from damming the culvert entrance, installing beaver baffles, Beaver Stop guards, or beaver pipes..</p>				X					
<p>When installing culverts, avoid creating a depression at the inlet. A depression that creates a "pond" at the culvert inlet may encourage beavers to expand that pond.</p>				X					
<p>Ensure TxDOT personnel and contractors use humane techniques to discourage beaver re-establishment of dams where roadway safety is an issue.</p>				X					
<p>Do not install multiple culvert pipes when installing larger pipes is required. Smaller pipes have a much greater probability of being plugged and this probability is not reduced with multiple pipes. In addition, debris collects and is trapped between multiple pipes, which may encourage beavers to expand on this debris and plug the culverts.</p>				X					
<p>After a culvert has been oversized, do not place a grate or guard in front of the culvert. This will only encourage beavers to plug the culvert's inlet. Once a culvert has been oversized, it should be observed periodically for signs of beaver plugging. If beavers attempt to plug an oversized culvert, consider integrating other techniques such as trapping, deepwater fencing, or water level control devices.</p>				X					

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Understand that altering stream characteristics is generally unrealistic for discouraging beaver presence along roadsides. Large-scale removal of vegetation may be a viable option in a limited number of situations such as where the ROW is large enough (state or interstate highways), but caution must be exercised when removing streamside vegetation because of possible detrimental effects to other wildlife species and the possibility that stream erosion may occur. If possible, regularly remove trees and shrubs preferred by the beaver to prevent vegetative regeneration.				X					
At all times, work cooperatively with landowners when resolving beaver damage problems. When working with landowners to secure permission for a trapper, the objectives for removing the beaver from the roadside area must be made very clear to the trapper. Trap at sites where beavers have a history of plugging very large culverts (inlet opening area >38 feet) or when oversizing is not an option.				X					
Trap established family groups of beavers for one or two years after oversizing a culvert to remove those with experience in culvert plugging.				X					
Make a commitment to continual maintenance in situations where a water level control device can be installed (and is desired).				X					
When impounded water from an upstream or downstream beaver dam is damaging a road, employ regulated trapping as the most efficient and cost-effective solution.				X					
 <p>At all times, observe state wildlife agency regulations concerning beaver trapping, installation of water level control devices, and beaver dam removal. Contact state wildlife offices for questions concerning conservation law.</p>				X					
Document the size of the culvert inlet, stream gradient, and percentage of open area. If money is allocated for proactive replacement of culvert pipes, rank sites based on the probability of beaver presence.				X					
When cleaning boat ramp surfaces, take special care to ensure debris and dirt is not blown off of the boat ramp into watercourses, wetlands, or floodplains.						X			

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<p>Establish adequate siltation control measures before maintenance begins. Use erosion control devices such as check dams, silt fences, and other acceptable techniques when the potential exists to have sediment or other materials enter a Water of the State. Install check dams on steep slopes, as necessary, to slow water velocity reduce erosion and sedimentation. Consult with TxDOT ENV if silt devices are inadequate to filter water prior to draining to watercourses.</p> 	X	X	X	X	X	X	X	X	
Contact environmental support staff before placing excess material to widen the shoulders or smooth out the slopes.						X	X	X	
Install check dams to protect sensitive resources, when appropriate.	X	X	X	X	X	X	X	X	
Avoid using machinery in wet and/or inundated areas to prevent rutting and/or turbidity.	X	X	X	X	X	X	X	X	X
 <p>Do not handle any unknown substance that may be potentially hazardous. If a substance is known to be hazardous, suspected of being hazardous or cannot be identified, notify the District Maintenance HazMat Manager immediately.</p>	X	X	X	X	X	X	X	X	X
Where appropriate and practical, place sediment barriers in site-specific locations along stream routes or direct drainage routes, prior to disturbing soil and route material away from watercourses.	X	X	X	X		X	X	X	
Prior to excavating soil besides the roadway, contact utility companies to avoid hitting any buried utilities within the ROW.	X	X	X	X		X	X		
Minimize adverse effects on plant and animal populations from dredging and dredged material disposal or placement by avoiding changes in water current and circulation patterns that would interfere with the movement of animals.				X	X				

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Comply with the requirements under the Texas Coastal Management Plan (CMP) when disposing of or relocating dredged material. The CMP requires that dredging and the disposal and placement of dredged material shall avoid and minimize adverse effects to coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches to the greatest extent practicable. Dredging and dredged material disposal and placement will not cause or contribute to violation of any applicable surface water quality standards established under the CMP.				X	X				
Comply with regulations governing water quality when performing Ferry Maintenance Program activities. 					X				
Minimize adverse effects on water quality from dredging and dredged material disposal and placement by controlling the location and dimensions of the activity; by complying with applicable standards for sediment toxicity; by controlling the manner in which material is dispersed; and by adapting technology to the needs of each site.				X	X				
Select sites or manage discharges to prevent or avoid creating habitat conducive to the development of undesirable predators or species that have a competitive edge ecologically over indigenous plants or animals to minimize adverse effects.	X	X	X	X	X	X	X	X	X
Time dredging and dredged material disposal or placement activities to avoid spawning or migration seasons and other biologically critical time periods to reduce potential impacts to animal populations.				X	X				
 Implement measures to achieve additional emission reductions. Examples of measures include, but are not limited to, operating practices and measures, including application of methods to reduce ferries main engine and barge pump engine idling time; modifications to the ferries engine and support equipment, including adjustments to engine timing, early integration of new marine diesel engines or the retrofit of existing marine diesel engines; early use of regulated fuels as they are made available; and/or other maintenance measures consistent with the ferry support operations.					X				

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Retain existing vegetation whenever possible.	X	X	X	X	X	X	X	X	X
Use general good housekeeping practices and do not leave waste behind on the job site.	X	X	X	X	X	X	X	X	X
Use care to avoid spills, leaks and drips of equipment and cleaning fluids when cleaning tools, servicing equipment or doing routine maintenance.	X	X	X	X	X	X	X	X	X
Consult with NMFS regarding potential impacts of actions on Essential Fish Habitat (EFH), if activities may adversely impact EFH. TxDOT should comply with all EFH regulations.	X	X	X	X	X	X	X	X	X
Use pervious concrete whenever practical and feasible.							X		
Do not wash out concrete trucks into storm drains, open ditches, streets or streams.							X		
Do not allow slurry residue to enter storm drains or watercourses; it should be vacuumed and disposed.							X		
 <p>Maintain the lowest possible temperature of asphalt during paving application.</p>							X		
Construct temporary concrete washout facilities with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.							X		
Use plastic lining material with a minimum of 10 mil polyethylene and make sure it is free of holes, tears or other defects that would compromise the impermeability of the material.							X		
Clean washout facilities or construct new facilities once the washout is 75% full.							X		
Contain liquid wastes in a controlled area, such as a holding pit, sediment basin, roll-off bin, or portable tank.							X		
Ensure that containment devices are structurally sound, , leak free and of sufficient quantity or volume to contain all liquid wastes.							X		

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Monitor asphalt mix temperature to ensure conformance with specifications.							X		
Minimize exposure to asphalt fumes for workers present but not directly involved with paving maintenance.							X		
Frequently check paver ventilation systems designed to remove asphalt fumes from the screed to ensure proper operation.							X		
Exhaust tail pipe and ventilation stacks above the height of the paver operator.							X		
Consider unfavorable weather conditions as a potential problem.	X	X	X	X	X	X	X	X	X
Consult with Regional Safety Representative regarding the need for personal protective equipment.	X	X	X	X	X	X	X	X	X
Evaluate safety conditions for workers with asphalt fume-related symptoms and, if necessary, contact the Regional Safety Representative regarding the need to modify operations.							X		
Use as little solvent as possible to lubricate, not clean, the surfaces and moving parts of the paver.							X		
Spray solvent on the equipment rather than pour it, during lubrication.							X		
Prevent solvent from puddling under the equipment. If puddles form, they could wash into a stream during a rainfall. Use absorbent pads to catch any excess during application.							X		
If absorbent pads are used, do not leave them on the ground beneath the paver. Allow the solvent to drip off, then pick up the pads and store them for future re-use and disposal.							X		
 <p>Carry a spill kit, Material Safety Data Sheets (MSDS) and emergency phone numbers for use in the event of a significant spill in vehicles carrying fuel and other maintenance fluids.</p>	X	X	X	X	X	X	X	X	X
Properly dispose of pads contaminated with a "listed hazardous waste solvent" as hazardous waste.							X		

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Store pads in closed containers between uses and before disposal.							X		
Train drivers of these vehicles in how to handle and report a spill.	X	X	X	X	X	X	X	X	X
At the end of the work shift, remove all the excess asphalt from the paver that you can, using pry bars and other hand tools.							X		
Execute the proper course of action with asphalt removed from the paver. Either incorporate it into the project, scarify and blend it into the stabilized shoulder if practical, or pick it up and haul it back to the plant.							X		
Do not dispose of asphalt over a hill, in a body of water, or other non-permitted disposal area.							X		
Park the paver in an area that is not near a stream or a wetland or a ditch that flows directly into a nearby stream or wetland. If you cannot park the paver away from these areas, use absorbent pads under the paver to catch drips of solvent.							X		
When cleaning tools, servicing equipment or doing routine maintenance, use care to avoid spills, leaks and drips of equipment and cleaning fluids.	X	X	X	X	X	X	X	X	X
Maintain equipment so as to prevent leaks of petroleum products.	X	X	X	X	X	X	X	X	X
Covered or clean up tack over-spray during construction.							X		
 <p>Schedule pavement marking activities for dry weather. Do not conduct painting or traffic marking activities during rain events.</p>							X		
Replace solvent-based alkyd traffic paints with waterborne paints that contain 80 percent less organic solvents and with epoxy paints that release no solvent vapors.									X

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Develop paint handling procedures for proper use, storage, and disposal of paints.									X
Transfer and load paint and hot thermoplastic away from storm drain inlets.									X
Provide drop cloths and drip pans in paint mixing areas.									X
Properly maintain application equipment.									X
Street sweep thermoplastic grindings. Yellow thermoplastic grindings may require special handling as they may contain lead.									X
Properly dispose of paints containing lead or tributyltin, which are considered a hazardous waste.									X
Use water based paints whenever possible. If using water based paints, clean the application equipment in a sink that is connected to the sanitary sewer.									X
Properly store leftover paints if they are to be kept for the next job, or dispose of properly.									X
Require all personnel to complete a safety training program that meets state requirements prior to removing yellow thermoplastic and yellow painted traffic stripe and pavement marking.									X
 <p>Immediately contained and collect all removed residue, including dust, where grinding or other approved methods are used to remove yellow thermoplastic and yellow painted traffic stripe and pavement marking. Sweeping equipment should not be used. Collection should be by a high efficiency particulate air (HEPA) filter equipped vacuum attachment operated concurrently with the removal operations or other equally effective approved methods.</p>									X
Store removed yellow thermoplastic and yellow painted traffic stripe and pavement marking residue in labeled covered containers, conforming to state provisions. The containers should be a type approved by the United States Dept of Transportation (DOT) for the transportation and temporary storage of the removed residue. The containers should be handled so that no spillage will occur. The containers should be stored in a secured enclosure at a location within the project limits until disposal.									X

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