A Day in the Life of a TxDOT Inspector

Ensuring Environmental Compliance on TxDOT Jobs

October 20, 2022

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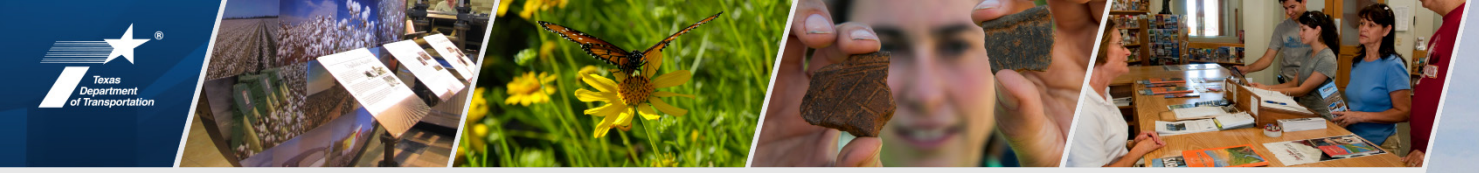


TxDOT Inspectors Wear Many Hats

Inspections can include:

- **Materials Testing**
- **Traffic Control**
- **Drainage Systems**
- **Safety**
- **Stormwater and Environmental Compliance**

Focus of this presentation is stormwater and environmental compliance

The Importance of Inspectors

Construction Inspectors are TxDOT's "boots on the ground" and the "eyes" of TxDOT

Stormwater runoff from construction sites can contain pollutants that can discharge into local water bodies. Inspectors minimize this risk and ensure compliance with the Construction General Permit (CGP) from TCEQ and in some cases the Municipal Separate Storm Sewer System (MS4)

Construction projects often have environmental permits, issues, and commitments (EPIC) that are included during the National Environmental Policy Act (NEPA) clearance process and design phase. Inspectors ensure compliance with these conditions as well.

Compliance Tools and Resources

Our inspectors use many tools to ensure environmental compliance

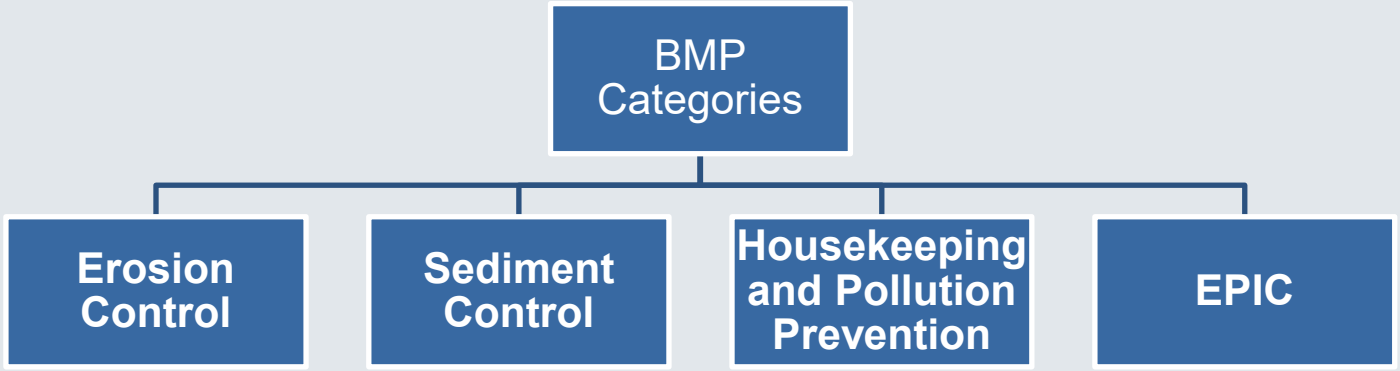
- Stormwater Pollution Prevention Plan Sheets
- EPIC Sheet
- Inspection and Maintenance Form (2118)
- Stage Gate Checklist (2448)
- TxDOT Specifications and Design Detail Sheets
- Approved Products List
- BMP Job Aids (new addition)
- Pre-Construction Meetings
- District Environmental Quality Coordinators (DEQC) and Subject Matter Experts (SME)

Best Management Practices

The CGP and EPIC conditions require that projects implement Best Management Practices (or BMPs) to ensure compliance

BMPs are practices or a combination of practices that are used to reduce impacts to water quality and other environmental resources

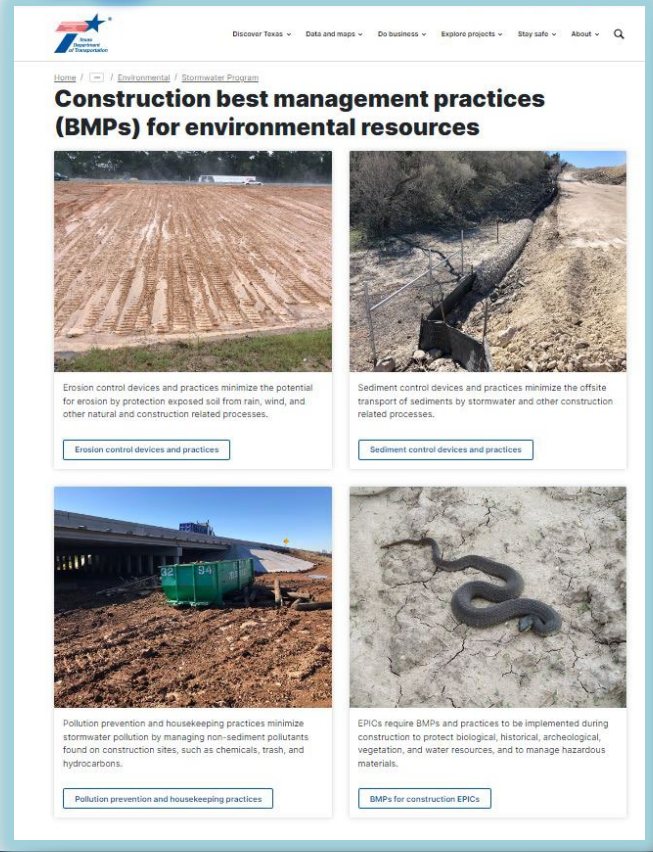
Best Management Practices



Important to note that there is overlap and some BMPs can be used in more than one category

Hot off the press!

BMP Job Aids



BMP Job Aid – Design and Inspection Sheets

BMP Section and Design
Sediment Control Fence

Construction stormwater Best Management Practice must be installed, maintained, and removed in accordance with specific manufacturer specifications, where applicable, and the Construction General Permit (TXR150000).

DESCRIPTION

A sediment control fence (or silt fence) (SCF) is a temporary barrier made of woven geo-textile fabric that filters sediments and temporarily retains runoff before the runoff discharges from the project.

TYPES

Temporary Sediment Control Fence – an SCF fence used in standard conditions

APPLICATION

SCF is used to treat overland, non-concentrated flows. General use includes:

- Along perimeter of project (if the roadway elevation is higher than the ROW elevation)
- Down-slope of exposed soil areas
- Along streams and channels
- Around temporary stockpiles
- Around areas of higher flow
- Below the toe of exposed and erodible slopes

Advantages

- Cost effective sediment control device
- Filters out sediment during rain events
- Slows down stormwater runoff

Disadvantages

- Localized flooding due to minor ponding at the upslope side of the sediment control fence
- Can fail structurally under heavy storm flows
- Must be removed and disposed of
- For projects using amphibian and reptile exclusion fence (AREF), contractors may confuse usage with silt fence.

DESIGN CRITERIA

1. SCF placement must be parallel to slope contours along a line of constant elevation.
2. Should not be used in areas of concentrated flow
3. A 2-year storm frequency may be used to calculate flow rate to be filtered
4. SCF should be sized to filter a maximum flow rate through rate of 100 gpm/ft^2
5. Not recommended to control erosion from a drainage larger than 2 acres. Additional controls may be needed.
6. Provide space for sediment removal activities and equipment between the SCF and other obstructions
7. SCF is primarily used as a perimeter control on the down slope side of disturbed areas.

REFERENCES

TXDOT Temporary Erosion, Sediment and Water Pollution Control Measures: Fence & Vertical Tracking: EC (1) – 16
TXDOT Temporary Erosion, Sedimentation, and Environmental Controls: Item 506 (Sections 2.9 & 4.4.8

Best Management Practice *Version 1*
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BMP Inspection Job Aid
Sediment Control Fence

This job aid is a tool to assist with the completion of Form 2118. All required corrective actions, comments, or discussions must be documented on the Form 2118.

INSTALLATION		Y, N, N/A
1.	Have the sediment control fence location(s) been documented in the SWP3 Layout Sheets?	
2.	Is the sediment control fence installed in accordance with the SW3P Layout Sheets?	
3.	Was the sediment control fence installed prior to construction/land disturbing activities?	
4.	Has the drainage area above the sediment control fence been evaluated for size, slope, concentrated flow, etc. to determine if SCF is the appropriate BMP for the location?	
5.	Is the welded wire mesh (WWM) or fabric properly connected to the posts (i.e. 6 consecutive hog rings for WWM, 4 evenly spaced staples or T-Clips)?	
6.	Have splices in fabric been overlapped at least 6"?	
7.	Are steel or wood posts at least 4' in height, embedded at least 6", spaced at 6" to 8", and angled at least 2" toward runoff slope?	
8.	Is the trench size a minimum of 6" x 6"?	
9.	Was it verified that 4" – 6" of fabric were placed against the trench side and 2" of fabric were placed across the trench bottom?	
10.	Has the trench been backfilled and tamped to prevent undercutting of the sediment control fence?	
INSPECTION		Y, N, N/A
1.	Is the BMP operating properly (e.g. sediment buildup)?	
2.	Has erosion occurred around or behind the sediment control fence?	
3.	Are sections of the sediment control fence damaged (e.g. run over, ripped, undercut)	
4.	Are posts still embedded at least 6"? Is the fabric still toed-in along the entire length of the fence?	
5.	Does the sediment control fence have adequate sediment holding capacity (e.g., sediment accumulation less than 1/3 barrier height)?	
7.	Has the filter fabric begun to photodegrade?	
MAINTENANCE		Y, N, N/A
1.	Is the sediment control fence maintained and in good condition?	
2.	Has sediment been removed to increase holding capacity?	
3.	Have splits, tears, slumping, or weathered fabric of the sediment control fence been repaired?	
4.	Were maintenance needs and/or additional BMPs recommended to the Contractor? If so, list the additional BMPs in Form 2118?	
5.	Has the contractor addressed all maintenance requirements (e.g. flooding, sediment buildup, etc.)?	

Comments/Notes:

Reference: TXDOT Temporary Erosion, Sediment and Water Pollution Control Measures: Fence & Vertical Tracking: EC (1) – 16
TXDOT Temporary Erosion, Sedimentation, and Environmental Controls: Item 506 (Sections 2.9 & 4.4.8)

Commonly Used BMPS to Prevent Erosion and Stormwater Discharge from Site (Erosion Control)

Erosion control BMPs reduce and prevent erosion of soil from rain drops, sheet flow, and wind. They are the first line of defense and prevent detachment of sediment in the first place

- **Erosion Control Log**
- **Rock Filter Dam**
- **Soil Stabilization**

Erosion Control Log

Key Points and Applications

- Erosion Control Logs (ECLs) are also commonly called filter socks or fiber logs
- Flexible logs made of mesh and containing biodegradable or recyclable material such as mulch or hay
- Designed to slow flow of stormwater and act as sediment barriers
- Applications include use on slopes as velocity dissipator devices, as sediment barriers, perimeter protection, stockpile controls, and curb and grade inlet protection
- Can be used on steep slopes
- Able to provide perimeter control where other BMPs are not suitable due to soil type or paved surfaces

Erosion Control Log

Installation and Common Deficiencies

- ECLs are easy to install
- ECLs must be filled with sufficient filter material to achieve the minimum compacted diameter as per the specifications
- Containment mesh must be biodegradable, photodegradable, or recyclable
- Logs must be secured by stakes, rebar, sandbags, or other anchorage
- Stakes must be installed on down slope side of log or on alternating sides of log
- Must be an overlap of 2 feet between logs
- Common issues include overfilled or underfilled log, staking through the center of the log, logs not properly secured, lack of maintenance, and no overlap of logs

Rock Filter Dam

Key Points and Applications

Rock Filter Dams (RFDs) are barriers consisting of various sized aggregate that are used to reduce the velocities of concentrated flows, provide a sediment barrier, and reduce erosion in channels, swales, dikes, or ditches

There are five types of RFDs (each type having certain applications) – differences have to do with the size of aggregate, height of dam, and the use of wire mesh

Applications include use at toe of slope, in channels, in stream flow, around inlets, and at sediment traps

Rock Filter Dam

Installation and Common Deficiencies

- Place RFDs near the toe of slopes where erosion is anticipated, upstream and downstream from drainage structures, and in roadway ditches and channels
- RFDs should be placed perpendicular to the flow of the stream or channel, unless otherwise directed
- Install proper RFD type based on location (Type 1 at toe of slope, Type 3 in stream, etc.)
- In high flow areas RFDs should be anchored to bank
- Improper maintenance is the common issue with RFDs. Maintenance is required when sediment has accumulated around the dams, when aggregate has been washed out of the dam, or when wire mesh has been damaged. This is a frequent issue after heavy or high velocity flows

More Applications of Rock Filter Dam

Soil Stabilization

Mulching

Erosion Control Blankets (Rolled Products)

Key Points, Applications, and Common Deficiencies

- Soil Stabilization practices reduce erosion by establishing vegetation, increasing soil cover, or increasing soil adhesion
- There are temporary and permanent forms of soil stabilization
- Types of stabilization include sodding, hydroseeding, mulching, erosion control blankets (rolled products), spray on products, and rock rip-rap
- Stabilization practices should be used for exposed soil, slopes, ditches, sediment traps, and adjacent to surface waters
- Common issues include not initiating stabilization BMPs on steep slopes, impacts to stabilized areas by construction equipment, and not commencing stabilization immediately following final soil disturbing activities or in areas where construction is temporarily ceasing for 14 days or more

Permanent Soil Stabilization

Rock Rip Rap

Sodding

Commonly Used BMPS to Prevent Sediment from Leaving the Site (Sediment Control)

Sediment control BMPs control sediment that has become displaced or shifted. They prevent the migration of sediment.

- **Silt/Sediment Fence**
- **Floating Turbidity Barrier**
- **Stabilized Construction Exit**

Silt/Sediment Fence

Key Points and Applications

A Silt or Sediment Control Fence (SCF) is a temporary barrier made of woven geotextile fabric that filters sediments and temporarily retains runoff before the runoff discharges from the project

It is a cost-effective sediment control device and one of the more frequently used devices

It can be used along the perimeter of a project, down slope of exposed soil areas, along streams and channels, terraced along a hillside, and around temporary stockpiles

It can be used in conjunction with other BMPs (chain)

Silt/Sediment Fence

Installation and Common Deficiencies

- An SCF must be installed prior to land disturbing activities
- It must be trenched in a minimum of 6 inches and backfilled to prevent undercutting during rain events
- Wire mesh and fabric must be attached to wood or steel posts at least 4 feet in height, and spaced at 6-8 feet apart
- The fabric side of the fence must face the bare soil area
- Silt fence should not be used in areas of concentrated or high flow
- The fabric can biodegrade over time and must be replaced
- Sediment build up adjacent to the silt fence must be maintained and should not be more than 50% of the height of the silt fence
- After stabilization, silt fence should be removed from the site

More Applications of Silt/Sediment Fence

Protection Barrier

Bank of Waterway

Inlet Protection

Floating Turbidity Barrier

Key Points

- A Floating Turbidity Barrier (FTB) is a geotextile or PVC curtain that is designed to control sediment within a body of water
- Used to protect wetlands and water bodies from sediment
- The barrier typically consists of floats, curtain, ballast, and anchor lines
- Barriers come rated for different water body types (calm water, rivers, and tidal conditions)
- Curtain lengths vary based on water depth
- Multiple barriers can be used in tidal areas or areas of heavy flow
- Wildlife friendly barriers (a requirement in areas of endangered species) are made of material which does not entangle wildlife

Installation and Common Deficiencies

- The proper FTB must be selected based on water body conditions
- The barrier must be secured by lines or other anchors
- The curtain should not be so long that it drags on the bottom
- The FTB should be visible to any boat traffic on the water body (may require lighting), and should be installed in a manner that allows for the passage of wildlife
- Common deficiencies include utilizing a barrier with an improper curtain length, not securely anchoring the barrier, utilizing the wrong barrier type for water body conditions, not using wildlife friendly barriers in certain locations, and not properly maintaining the barrier

Stabilized Construction Exit

Key Points

Stabilized Construction Exits (SCEs) are designated points of entrance/exit to a construction site that are stabilized to reduce tracking of sediment onto public roadways by construction vehicles

SCEs can be stabilized with rock aggregate, timber, or manufactured products such as FODS

FODS are a more expensive option but can be moved from site to site

Stabilized Construction Exit

Installation and Common Deficiencies

- Rock aggregate and timber construction exits must extend a minimum of 50 feet
- Exit width should be a minimum of 14 foot for one-way traffic and 20 foot for two-way traffic
- Sediment on the construction exit must be cleaned out as needed
- Rock aggregate exits break down over time and need to be maintained routinely
- Street sweepers may still be needed if sediment has been tracked onto the roadway

Commonly Used Housekeeping/Pollution Prevention BMPs

- Sanitary Waste Management
- Dumpsters
- Concrete Washout Area
- Street Sweeping
- Chemical Management
- Watering Truck

Sanitary Waste Management

Key Points, Installation, and Deficiencies

- Sanitary Waste Management must be implemented on all projects with the need for sanitary facilities
- Locate portable toilets a minimum of 50 feet from storm drains and surface waters; if not possible, then locate at least 20 feet away and provide secondary containment
- Sanitary facilities shall be fully enclosed and designed in a manner that minimizes the exposure of sanitary waste to precipitation and stormwater, as well as be anchored for wind. They should also be placed on flat ground to the extent possible
- Only licensed waste haulers should be used for disposal of waste

Dumpsters

Key Points

Dumpsters should contain waste materials on construction sites so the materials are not left lying around

The CGP requires dumpsters to be lidded or covered to minimize exposure of the waste to precipitation. This also protects the contents from a wind event

Dumpsters should be cleaned out routinely

Hazardous materials should be disposed of properly and not placed in a construction site dumpster

Concrete Washout Area

Key Points, Installation, and Common Deficiencies

- Concrete Washouts are implemented to prevent discharge of concrete waste materials from entering storm drains and water bodies
- Concrete in its liquid form can alter the pH of soils and water bodies causing issues for plants and wildlife

- Concrete washouts should be placed in easily accessible locations with solid approaches (rock or gravel), a minimum of 50 feet from storm drains and water bodies
- Washouts can be built into the ground, stored in metal containers, or even cardboard containers

- If constructed in the ground, the washout area should be lined with plastic and surrounded by a BMP such as silt fence
- Washout areas must be routinely emptied and maintained to prevent leaks and spills

Street Sweeping

Key Points

- Street Sweeping is the practice of removing tracked sediment from construction sites and from public roads
- Removal of sediment from roads will prevent it from entering storm drains and water bodies
- Removal of sediment from roads also alleviates vehicular safety hazards
- A Street Sweeper can be considered a sediment BMP in addition to a housekeeping BMP
- Often used in conjunction with another BMP - the stabilized construction exit
- Types of street sweepers include mechanical sweeper and vacuum–assisted sweeper
- Other applications for street sweepers include debris removal and sand removal from roadways

Chemical Management

Key Points

- Chemical Management addresses the potential for stormwater to be polluted with chemical materials and wastes that are stored on a construction site
- Common chemicals found on construction sites include greases, concrete curing compound, paints, cutting oils, and fertilizers
- Chemicals should be stored in lidded containers and/or covered areas to prevent exposure to precipitation and stormwater
- Chemicals should not be stored directly on the ground
- Chemicals should be stored with secondary containment in place in the case of a spill or leak
- Spill kits should be available on-site

Watering Truck

Key Points

- Watering Trucks are used on a construction site to prevent dust
- Dust is one of the most common complaints received and a hazard to motorists
- These trucks can also be considered an erosion control BMP as they prevent the erosion of airborne dust particles

Environmental Issues, Permits, and Commitments (EPIC) BMPs

- Vegetation Preservation
- Tree Protection
- Reptile and Amphibian Exclusion Fence
- Cultural Resource Protection
- Wetlands Protection

Preservation of Vegetation

Key Points

- Preservation of Vegetation provides erosion and sediment control, natural habitat protection, water resource protection, natural biofiltration, and aesthetics for the project area.
- It is an inexpensive erosion control measure which requires less resources for final stabilization
- Typical areas designated for preservation are slopes, forested areas, and natural water features
- It is a standard Texas Parks and Wildlife Department water quality BMP for aquatic species protection
- Areas of Vegetation Preservation must be clearly marked on site plans and delineated onsite prior to the start of clearing and grubbing activities

Tree Protection

Key Points and Common Deficiencies

- Tree Protection within the construction area is used to minimize erosion by protecting tree roots to allow for continued growth. Tree health and canopy density prevents splash erosion and the tree roots provide natural soil stabilization
- It is an inexpensive form of erosion control
- Some municipalities have tree protection ordinances that protect certain trees. Endangered and threatened trees should also be protected
- Orange construction fencing, wooden barricades, and chain-link fencing are all forms of tree protection
- Tree protection devices should be placed at the dripline of the tree to prevent compaction of soil by heavy equipment, excavation of roots, stockpiling of fill above the root system, and damage to overhanging branches

Amphibian and Reptile Exclusion Fence

Key Points, Installation, and Common Deficiencies

- The Amphibian and Reptile Exclusion Fence (AREF) is a barrier structure designed for construction projects to keep amphibians and reptiles from entering the construction site. It is used on projects with threatened and endangered species
- Fence should be installed along the perimeter of the project and as the outer-most BMP
- It should also be installed around culverts extending into the project area, along streams and channels, at driveways and connecting roadways, and around materials storage areas
- Filter fabric faces away from construction and net reinforcement towards construction
- Exclusion fence used for toads requires specific inspection and training requirements
- If not installed and maintained properly (this includes properly trenching in the silt fence), animals can still enter the project area

Cultural Resource Protection

Key Points

- Cultural Resources include historic buildings, historical markers, historic bridges, historic districts, cemeteries, and archaeological sites
- Resources to be protected should be clearly delineated on the construction plans and in the field prior to the start of construction - orange construction fencing, chain-link fence, and barricades are common protection barriers
- Archaeological surveys may be required prior to the start of construction or cultural resource commitments may require an archaeologist to be present during excavation in certain areas
- Projects in historic districts, adjacent to historic buildings, or adjacent to historic brick streets may have standard protection notes for removal of pavement, curb or sidewalk construction, or placement of new pavement

Wetlands Protection

Key Points and Common Deficiencies

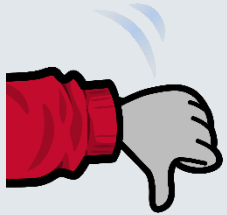
- Wetland Protection can be a requirement of an Army Corps. of Engineers Permit, a BMP for a listed species, and/or a local requirement
- Wetland preserve areas should be clearly delineated on the plans and in the field prior to the start of construction
- Some form of barrier should be used to demarcate the wetland protection areas and help prevent impacts during construction activities – this can be silt fence, orange construction fencing or chain-link fence
- Wetland preserve signage is helpful in emphasizing the boundaries of the protected areas
- Wetland protection areas should also be protected from sediment discharges
- Dewatering into a wetland is generally not authorized

WHAT'S WRONG WITH THIS PICTURE?!?

THE GOOD, THE BAD, AND THE UGLY

Housekeeping/Pollution Prevention BMP

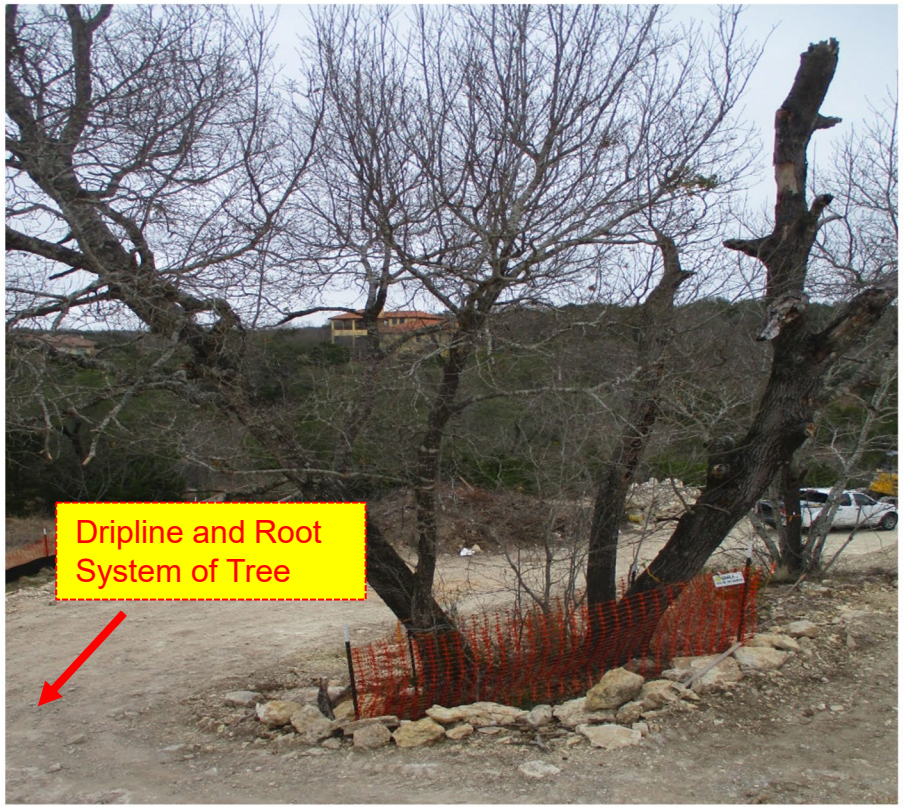
Housekeeping/Pollution Prevention BMP – Sanitary Waste Management

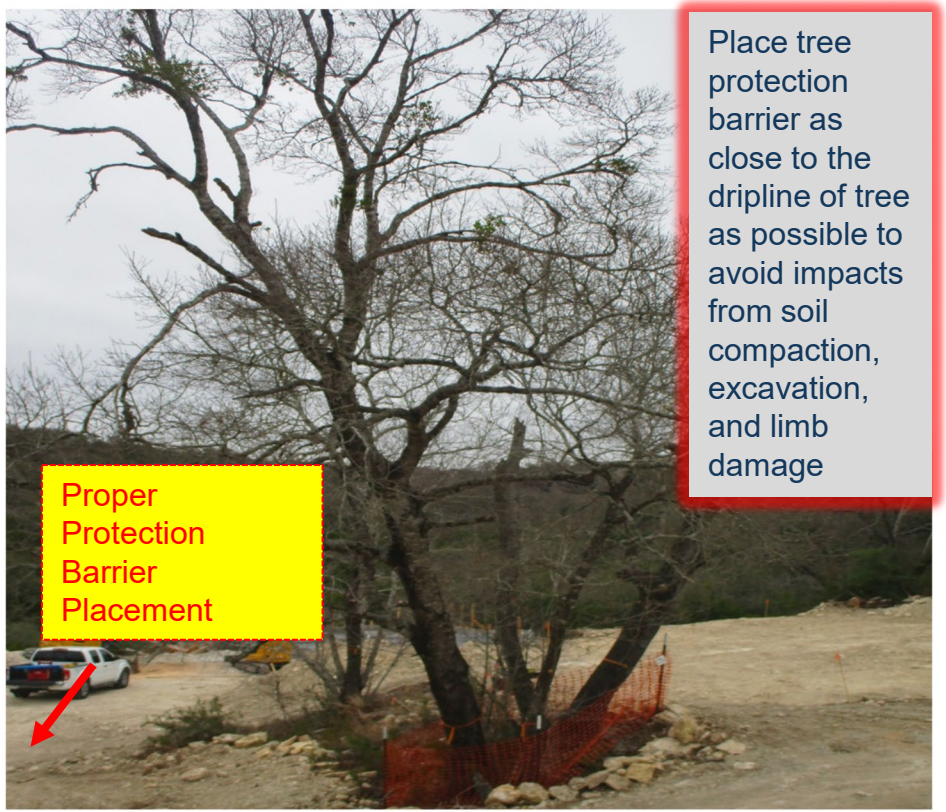


- Move portable toilet to location at least 50 feet away from storm drains and water bodies. If not possible, move 20 feet away and provide secondary containment
- Anchor the portable toilet

EPIC BMP

EPIC BMP – Tree Protection

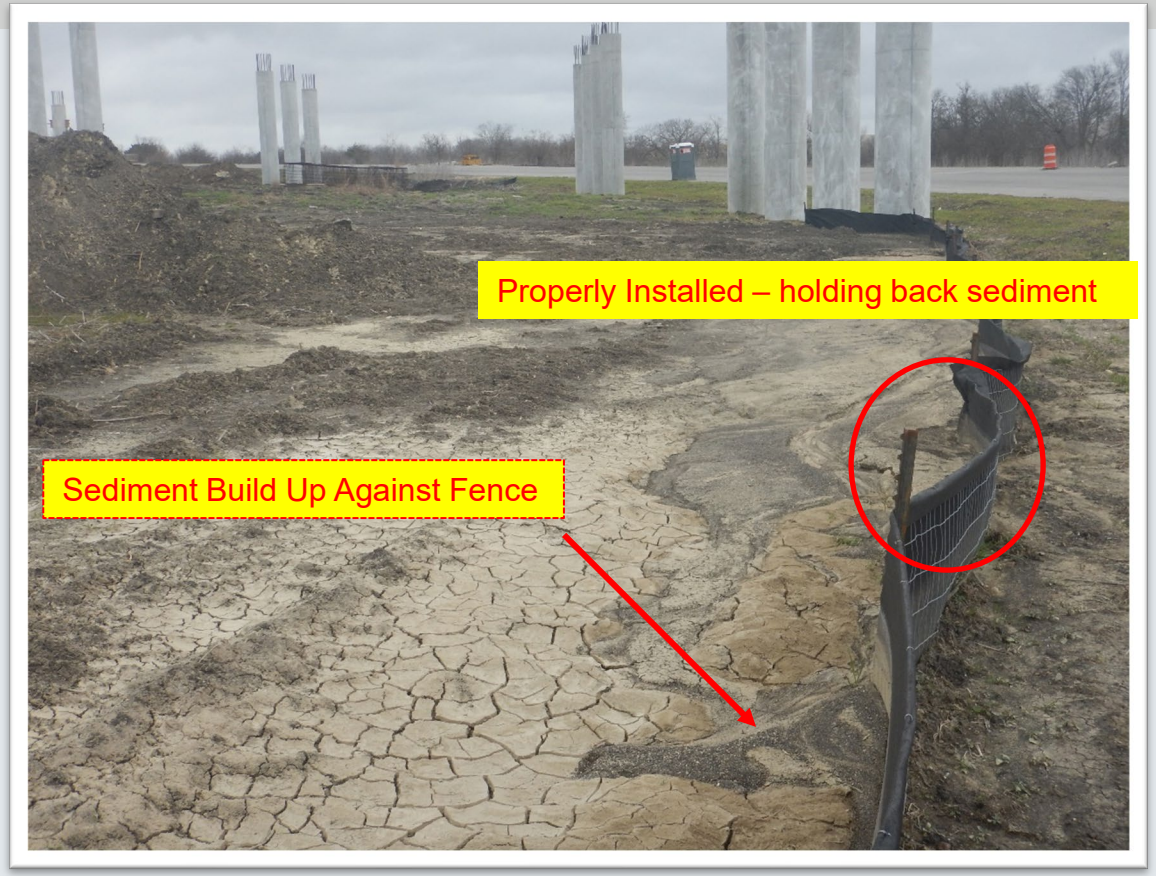




Place tree protection barrier as close to the dripline of tree as possible to avoid impacts from soil compaction, excavation, and limb damage

Sediment Control BMP

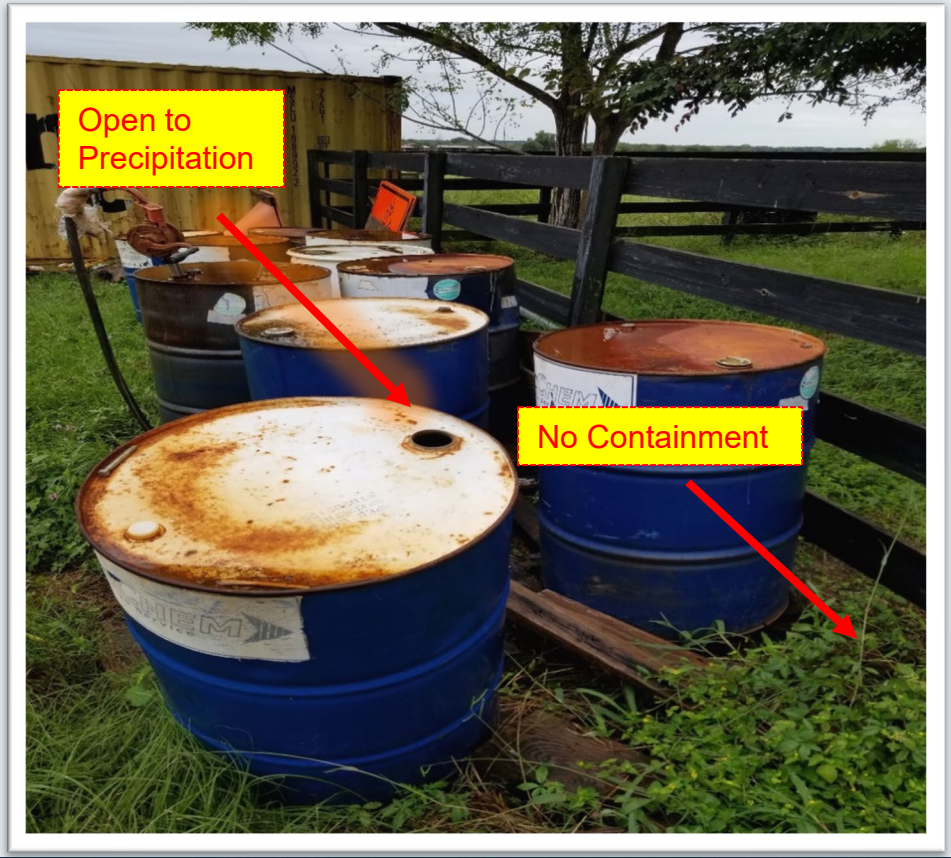
Sediment Control BMP – Silt Fence



- Maintenance is required when sediment build up is more than 50% of height of fence
- This silt fence does demonstrate the effectiveness of a properly installed BMP – note that despite needing maintenance the fence is holding back the sediment

Housekeeping BMP

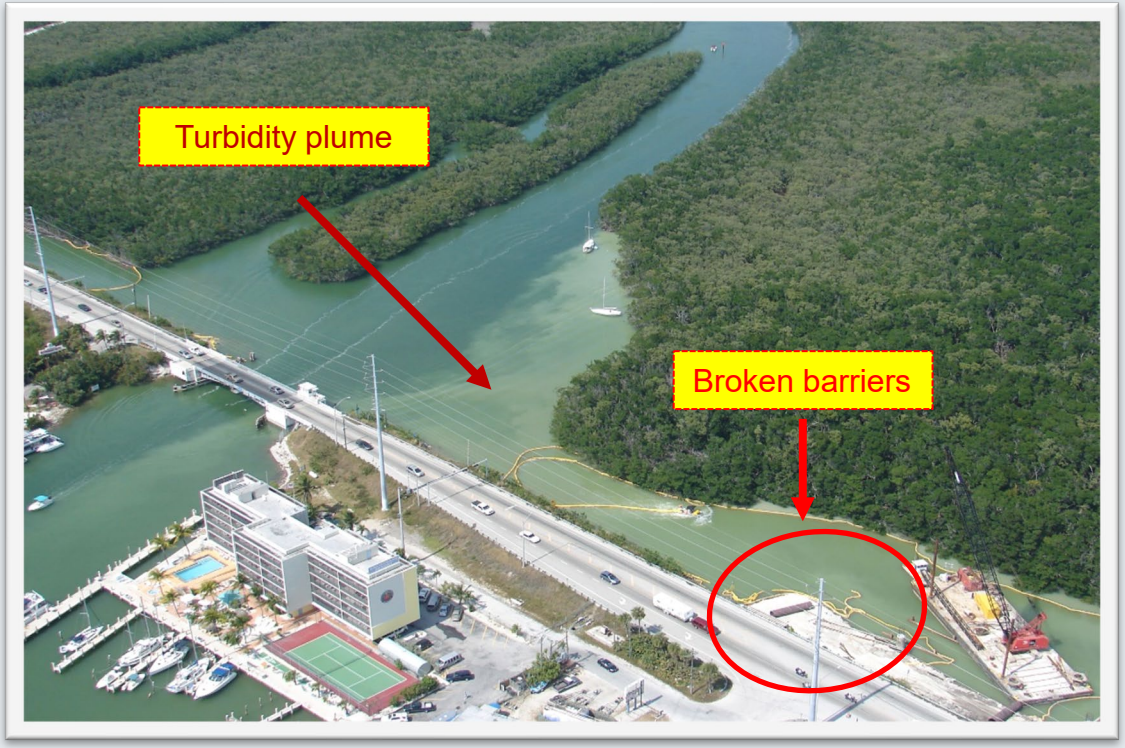
Housekeeping/Pollution Prevention BMP – Chemical Management



- Store chemicals with lids and/or in a covered location
- Store chemicals off the ground such as on a palette
- Provide containment around chemicals in case of spill

Sediment Control BMP

Sediment Control BMP – Floating Turbidity Barrier



Sediment is escaping past the turbidity barriers and getting into surrounding waters and adjacent mangrove wetlands

- Barriers have come loose in some locations – maintenance needed
- Curtain may not be anchored or may not be proper size
- May not be proper FTB for tidal conditions
- Contractor may need to stop work in water during outgoing tide

Sediment Control BMP

Sediment Control BMP – Silt Fence at Inlet

- Remove sediment build up
- Replace BMP with one designed for more concentrated flow
- Take measures to prevent erosion of sediments before they get to the storm drain inlet

Erosion Control BMP

Erosion Control BMP – Erosion Control Log

Stakes and stuffing at bottom of ditch

No overlap

- ECLs must be overlapped a minimum of 2 feet
- Some of the material the log is stuffed with has come loose and is lying in the ditch below next to a wetland – maintenance needed
- Log diameter does not appear to be consistent
- Logs may need to be better anchored as some old stakes are located in the ditch below

Sediment Control BMP

Sediment Control BMP – (Missing) Silt Fence

Nothing to prevent sediment from discharging offsite to the adjacent property – no remaining barriers in place

Housekeeping/Pollution Prevention BMP

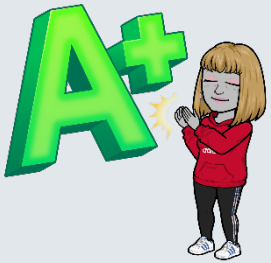
Housekeeping/Pollution Prevention BMP – Construction Dumpster

- Construction General Permit requires dumpsters to be protected from precipitation by lidding or covering
- Covering also prevents wind from dispersing trash and debris
- Dumpster needs to be emptied

Erosion Control BMP

Erosion Control BMP – Rock Filter Dam

This RFD (type 2) appears to be well-maintained and functioning as designed.



Housekeeping/Pollution Prevention BMP

Housekeeping/Pollution Prevention BMP – Concrete Washout

No containment for concrete washout

- Concrete washout must be contained
- Containment areas for the washout should not be located within 50 feet of a waterbody

Adjacent waterbody

Sediment Control and Housekeeping BMPs

Sediment Control BMP – Stabilized Construction Exit and Street Sweeper

Sediment tracking on roadway is a hazard and must be addressed by providing an SCE and using a Street Sweeper

EPIC BMP

EPIC BMP – Wetlands Protection

Dewatering directly into a Wetland Preserve is an unauthorized discharge as it discharges sediments and other pollutants into the wetland

Wetlands Protection Line is not well-delineated and miscommunication has resulted in contractor clearing wetlands

Questions or Comments?

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