Erosion and Sediment Control (ESC) Initiatives

- An organizational change from Design to Operation

Karuna Pujara, P.E.
Erosion and Sediment Control (ESC) Initiatives
- An organizational change from Design to Operation

What is Erosion and Sediment Control

1. Reduce potential for land to erode,
2. If erosion is inevitable, control the sediment on site.

Erosion can occur anytime during construction or operation. ESC requires programmatic attention and commitment.
Erosion and Sediment Control in Maryland

Erosion and Sediment Control

Law - Environment Article Title 4, §4-101-413
Regulation - COMAR Title 26.17.01

- 1961: Sediment Defined As A Pollutant
- 1970: Statewide Program Initiated
- 1983: Responsible Personnel Certification Required
- 1992: Agricultural Land Management Practices Become Subject To Sediment Pollution Law
Erosion and Sediment Control in Maryland

State Highway Administration (SHA)’s ESC Program

- Design and Plans as per Maryland Department of the Environment (MDE)’s Standards and Specifications
- Construction as per Plans and Modifications approval as necessary during the progress of work
- SHA – MDE Memorandum of Agreement for Self Inspection – Also known as Quality Assurance and Rating Program
Erosion and sediment control implementation has been a one way street.

- Owner’s Requirement
- Regulatory Hammer

SHA initiated efforts to improve collaborative efforts between the SHA and the contractors to achieve better results by addressing:

- Education
- Policy Development
- Research
- Regulation
Erosion and Sediment Control (ESC) Initiatives

1. Education and Anticipated Results
   - SHA ESC Certification Training Program
   - ESC Field Guide

2. Policy Development and Regulations
   - New Processes and Specification (Incentive/Liquidated Damages)
   - New Quality Assurance Inspection - Rating System

3. Research
   - Study of Flocculants
   - New Products Evaluation
Two Part Certification

1. For Inspectors & Contractors
   - Require SHA certification to work on SHA projects
   - Require recertification every three years
   - Day and Half training Launched training in cooperation with Maryland Highway Contractor’s Association
   - SHA staff as well as contractors must be certified

2. For Designers
   - Require SHA certification to work on SHA projects
   - Additional one day of training with Inspector training as a prerequisite
   - Training Being Developed and to be launched in 2006
ESC Training Outline for Inspectors/Contractors

Emphasize more practical considerations

- Introduction to
  - Environmental Stewardship
  - Objectives of E/S Control Program
  - SHA Initiatives and Expectation
- Review of Basic Hydrology and Hydraulics
- Review of Basic Erosion Mechanics
- Review of Basic Vegetative Stabilization
- Review of Basic Nutrient Management
- Highlights of Erosion and Sediment Control Devices
- Review of Basic Waterway Construction

Continued…
ESC Training Outline for Inspectors/Contractors

- Review of SHA’s Revised Specification for Erosion and Sediment Control
- Review and Exercise of Revised Quality Assurance Form and Inspection Checklist
- Protocols for Construction Compliance
- Importance of ESC Preconstruction Meeting
- Review of Closeout of Project Process
- Review of Design Build Process
- Review of Costs implications of Compliance Vs Noncompliance
- SHA Organization – Who to contact and When
- Competence testing required at the end of the training
Includes:

- Quality Assurance Rating System
- Details for All Standard Controls
- Inspection Troubleshooting Guidelines
ESC Quality Assurance (QA) Rating System

Previous Rating Form (Subjective)
Site Information – Status & condition
Recommended Action
Comments
Rating
New QA Rating System

Rating Section

Score Summary Section
New QA Rating System (Page 2)

**Scope Section**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
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<tbody>
<tr>
<td>Installation Section</td>
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| Maintenance Section | 

<table>
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<th>Table Section</th>
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<tbody>
<tr>
<td>Column 1</td>
</tr>
<tr>
<td>---------</td>
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<tr>
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...
### Stabilization Section

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<th>Form</th>
<th>4. IS STABILIZATION FOLLOWED ACCORDING WITH THE CONTRACT DOCUMENTS?</th>
<th>Y</th>
<th>N</th>
<th>Points Awarded</th>
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<tbody>
<tr>
<td>1</td>
<td>Yes, stabilizer is provided as specified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>No, stabilizer is not provided as specified.</td>
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</table>

### Bonus Points Section

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<th>Form</th>
<th>5. IS CORRECTIVE ACTION Timely?</th>
<th>Y</th>
<th>N</th>
<th>Points Awarded</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes, corrective action is timely.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>No, corrective action is not timely.</td>
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</table>

### Timely Corrective Action Section

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<thead>
<tr>
<th>Form</th>
<th>6. IS THE CONTRACTOR PROACTIVE?</th>
<th>Y</th>
<th>N</th>
<th>Points Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes, the contractor is proactive.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>No, the contractor is not proactive.</td>
<td></td>
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</tbody>
</table>
ESC – Incentives and Liquidated Damages

Apply incentive / Liquidated Damages to all projects that require formal plan approval from Maryland Department of the Environment.

Allow incentive / Liquidated Damages to be prorated throughout the project duration and provide an opportunity to earn incentive if the actions improve over the time (Quarterly and project completion incentive payment).

Base the incentive / Liquidated damages on objective parameters and hold contractor accountable.

When a ‘D’ or ‘F’ rating is given to a project, SHA will impose liquidated damages on the Contractor. “D” Rating will shut down the grading operation, “F” Rating will shut down complete project except ESC corrective measures.

When a project receives two ‘F’ ratings the ESC certification issued by SHA will be revoked from the project superintendent and the Erosion and Sediment Control Manager for a period of not less than six months and until successful completion of SHA ESC Certification Training or recertification.
“Sediment Trapping Ponds are efficient but not always effective...”
Erosion and Sediment Control (ESC)
Research Initiatives

Study for use of Flocculants

Methodology included:

- Literature Search
- Laboratory testing (Alum, Polymer)
- Design of delivery unit
- Initial trials
- Implementation
- Monitoring and evaluation
Study of Alum

- Good results over a range of storm events
- High intensity storm that exceeded hydraulic capacity of pond - 92% sediment removal, compared to similar storm without Alum for same pond - 10% sediment removal
Study of Polymer

- Efficiencies ranged between 90 - 99% reduction for ponds with good physical design
- Some concerns of its health effect on fish and others
- Study and evaluation continues..
Committing to Overall Environmental Stewardship

- Containment of concrete cleanout discharge
- Containment of machine fluids
- Proper disposal of construction debris and Implement effective Erosion and Sediment Control
- Proper disposal of garbage
- Develop a spill containment action plan
- Tree protection
- Habitat protection
True or False?
Erosion and Sediment Controls are needed during construction only.

Concludes..
SHA’s ESC Initiatives to achieve positive results.

Ms. Karuna Pujara, P.E.
Chief, Highway Hydraulics Division
Maryland State Highway Administration
410-545-8390
kpujara@sha.state.md.us