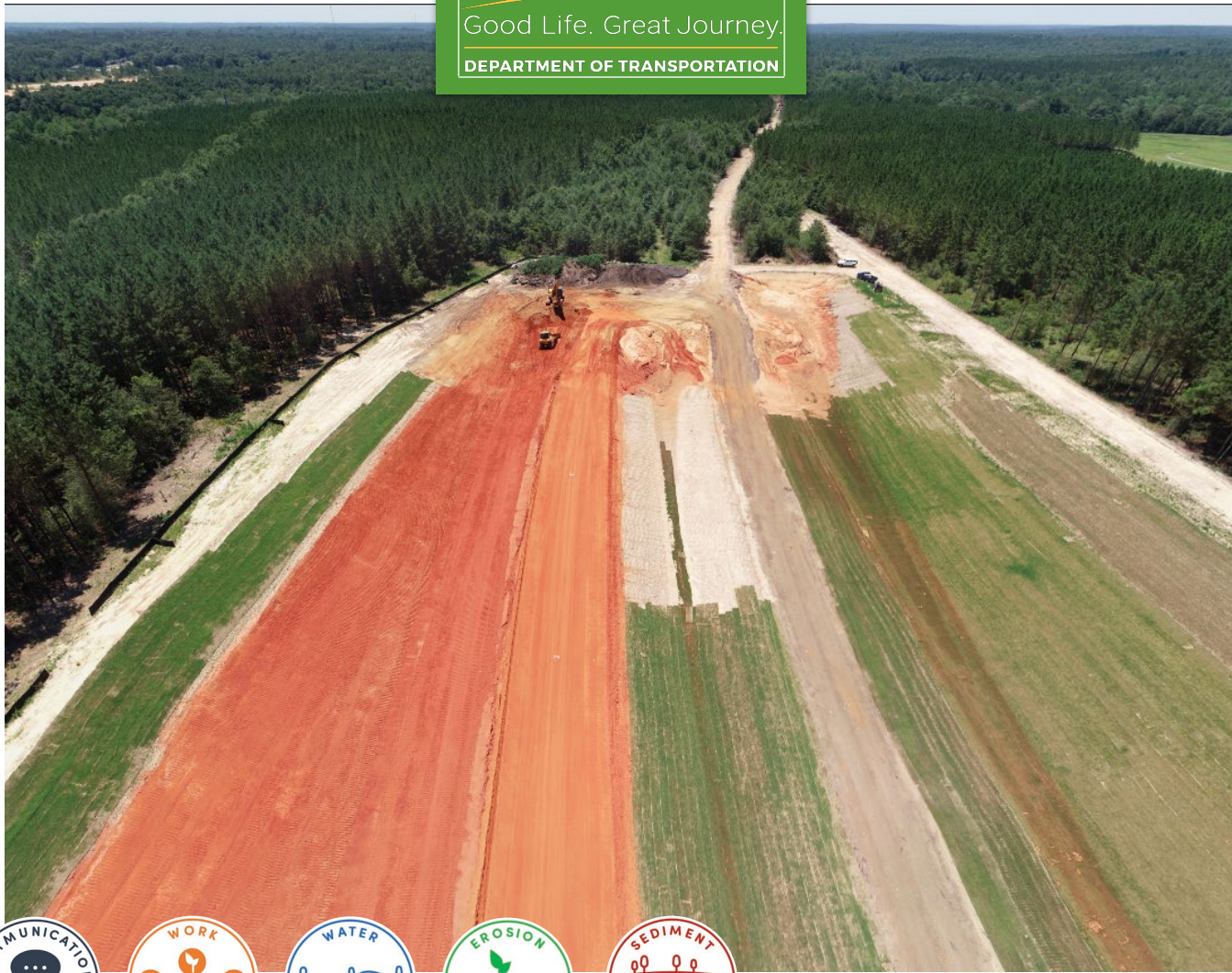


NEBRASKA

Good Life. Great Journey.

DEPARTMENT OF TRANSPORTATION



# THE FIVE PILLARS OF CONSTRUCTION STORMWATER MANAGEMENT

**FAGAN**  
FAGAN CONSULTING LLC



When we put  
off doing right  
things...

...sooner or later  
regulators come  
along and make  
us do it their way.

# STORMWATER IS RISKY

## Ala. DOT Fined for Polluting Mobile's Drinking Water

Mobile County's health officer says fine too small

**Source** Associated Press and the Press-Register

Jan. 4, 2008

The Alabama Department of Transportation (ALDOT) may face a **\$75,000 fine** for letting mud run off a U.S. 98 construction site and flow into Mobile's drinking water, but Mobile County's health officer says the fine is too small, the *Associated Press* reported.

The fine proposed by the Alabama Department of Environmental Management (ADEM) constitutes **less than two-tenths of 1% of the \$42 million cost** of building the highway section.

ADEM could have proposed a steeper fine, up to \$250,000, but compromised to "resolve the matter amicably," according to state documents reported Jan. 3 by the *Press-Register*.



# STORMWATER IS RISKY

## ALDOT lawsuit filed

### Ala. DOT Fined for Polluting Mobile's Drinking

Mobile County's health officer says fine too small

Source Associated Press and the Press-Register

Mobile Baykeeper settles 'Muddy 98' lawsuit with Alabama transportation department

Jan. 7, 2015  
A \$250,000 fine for letting  
... site and flow into Mobile's drinking wa  
... Mobile  
County's health officer says the fine is too small, the *Associated Press* reports.

The fine proposed by the Alabama Department of Environmental Management (ADEM) constitutes less than two-tenths of 1% of the \$42 million cost of building the highway section.

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ALDOT fights state lawsuit over U.S. 98



# STORMWATER IS RISKY

## More mud

Published: Nov. 08, 2007, 8:32 p.m.

## Mobile is given ALDOT apology

Published: Nov. 08, 2007, 8:46 p.m.

By [Ben Raines](#) | [braines@al.com](mailto:braines@al.com)

D. O. T  
Please stop the  
water & mud from  
coming through  
this depression &  
into our yard.  
Thanks

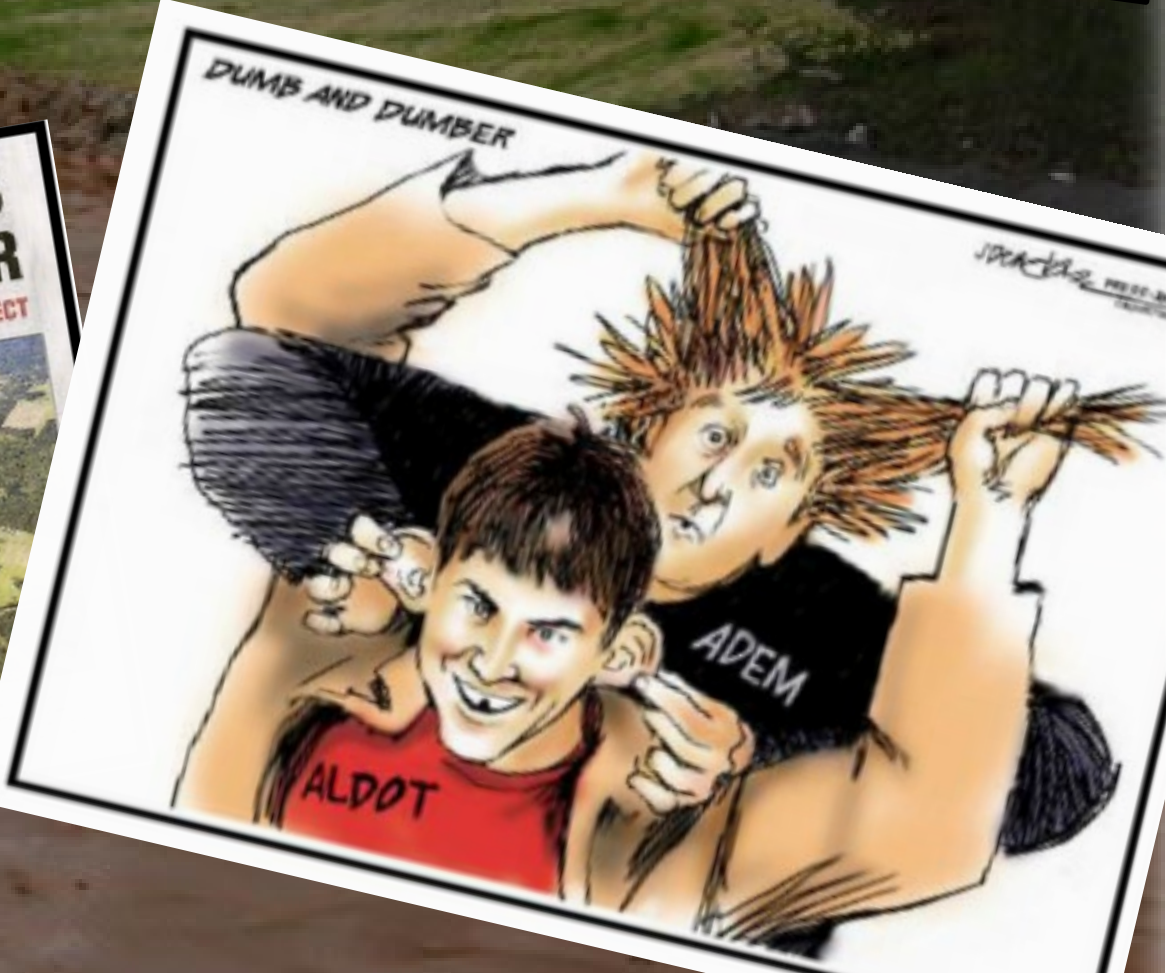


## MUD INFILTRATES BIG CREEK WATER

SEDIMENT APPARENTLY TIED TO ROAD PROJECT



A muddy stream visible in Big Creek Lake appears to originate from the mouth of Long Creek, that enters the lake from the U.S. 90 bridge. The stream is expected to flow through a treatment plant station, which are not visible in the image. Long Creek, along with other creeks, discharges into the Alabama Government of Transportation's U.S. 90 bridge. A heavy flow of sediment since the road work began.



# STORMWATER IS RISKY



UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
CRIMINAL INVESTIGATION DIVISION

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# STORMWATER IS RISKY

- ▼ Regulatory
- ▼ Environmental
- ▼ Community Expectations
- ▼ Legal Expectations
- ▼ Operation and Maintenance
- ▼ Contractual





# The Knowing vs Doing Gap

- a professional  
challenge



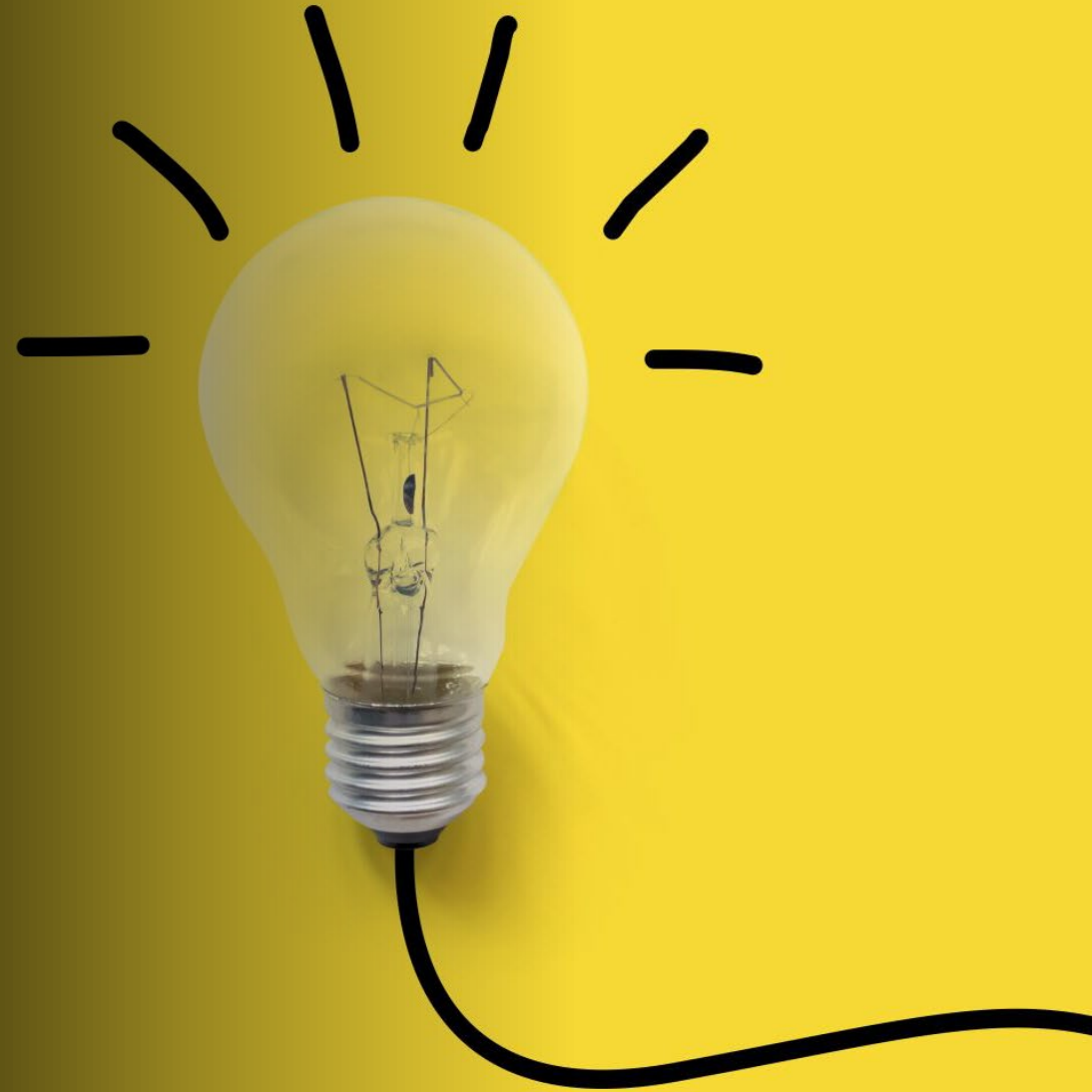
- an organizational challenge:

---

Think.

Do things in order  
of importance.

- John Maxwell

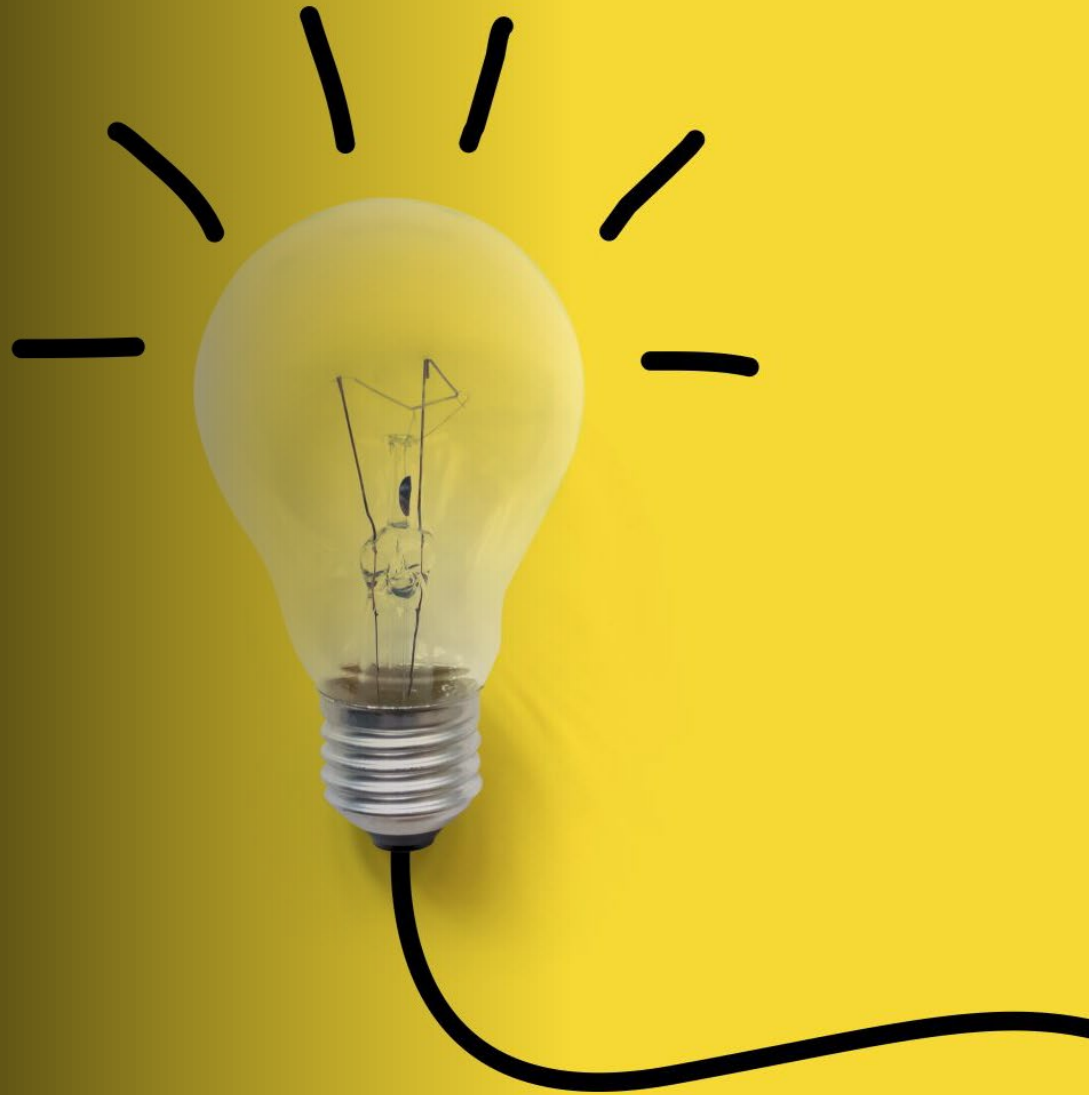
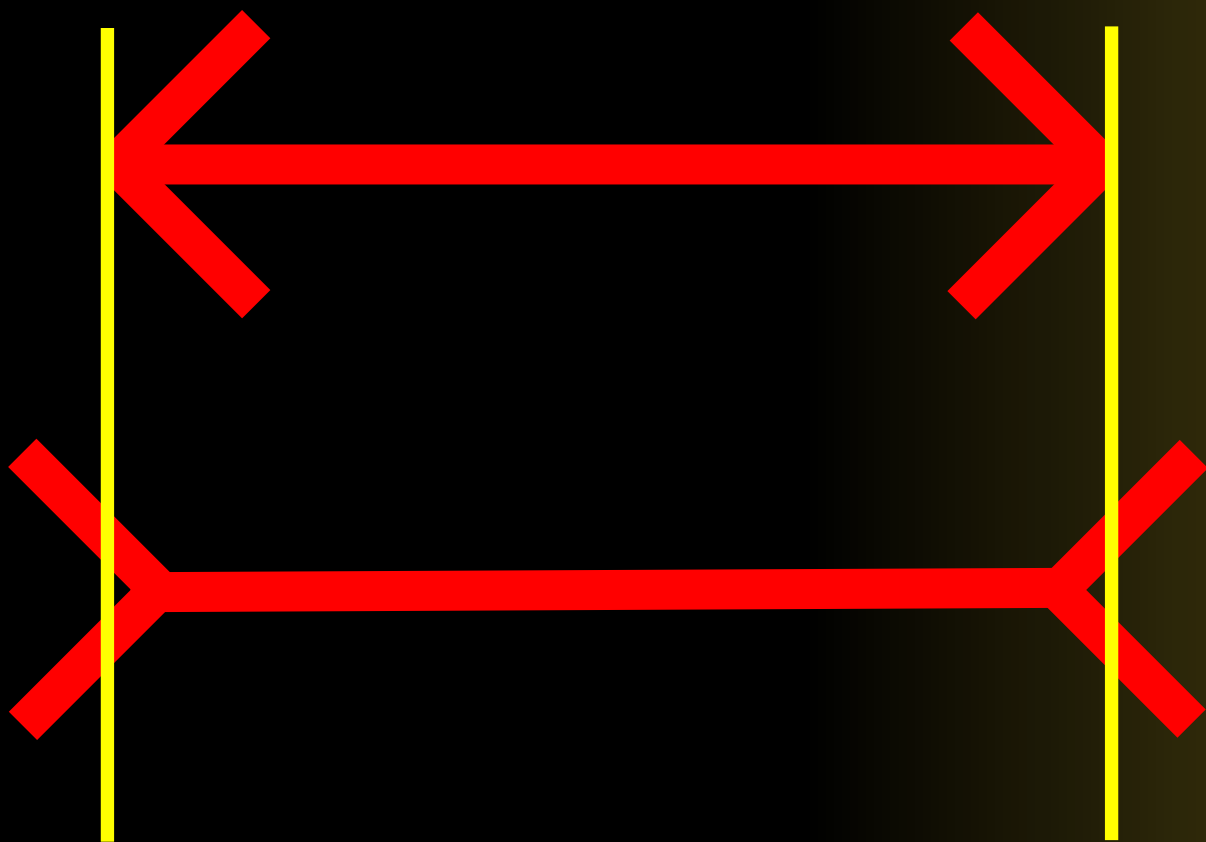


think.



—  
We often respond rationally to a world we understand and recognize, but no longer exists.

---



Why our organization exists.

Mission

To provide  
a transportation system...

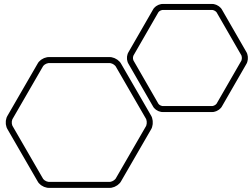
A DOT's  
Mission

mission

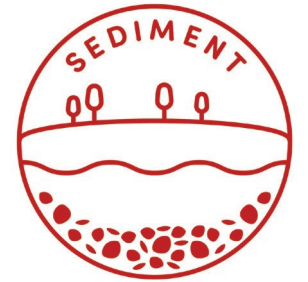
*environmental*  
responsibilities

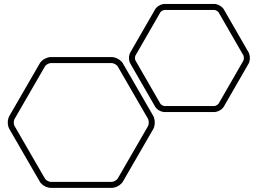
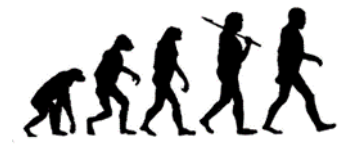
*potential*





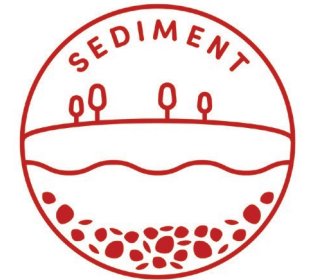
# The **Five Pillars** of Construction Stormwater Management



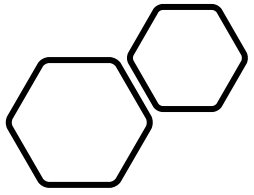


# The **Five Pillars** of Construction Stormwater Management

1. **Manage Communication**
2. **Manage Work**
3. **Manage Water**
4. **Manage Erosion**
5. **Manage Sediment**



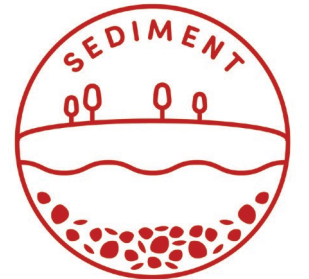




# The **Five Pillars** of Construction Stormwater Management

## 1. **Managing Communication**

includes all efforts to convey information among project stakeholders to increase effectiveness in project planning, design, and implementation.





# Managing Communication.

---



- ▼ Policy, Procedures, and Documentation
- ▼ Construction Stormwater Permit Coverage
- ▼ Compliance Verification and Reporting
- ▼ Environmental Commitment Awareness



# Managing Communication.

---

- ▼ Policy, Procedures, and Documentation
  - Contract Documents
  - Design and Construction Guidance
  - Design Review Coordination
- ▼ Construction Stormwater Permit Coverage
  - Stormwater Permit Application and Notices
  - Stormwater Pollution Prevention Plan
- ▼ Compliance Verification and Reporting
  - Stormwater Commitment Tracking
  - Environmental Inspections
  - Environmental Oversight Inspections
- ▼ Environmental Commitment Awareness
  - Environmental Submittals
  - Preconstruction Meetings
  - Environmental Training and Credentialing

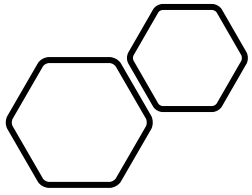




# Managing Communication.

---

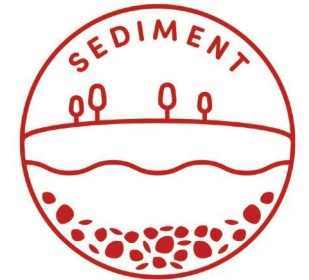




# The **Five Pillars** of Construction Stormwater Management

## 2. **Managing Work**

includes all operational efforts to ensure that work proceeds in a manner that is protective of the owner's interests and their environmental responsibilities.



# Managing Work.

- ▼ Contract Administration
  - ...
- ▼ Construction Operation Sequencing
  - ...
- ▼ Vegetated Buffer Preservation & Establishment
  - ...
- ▼ Topsoil Conservation
  - ...
- ▼ Water Resource and Buffer Encroachment Limitation
  - ...
- ▼ Good Housekeeping
  - ...



# Managing Work.

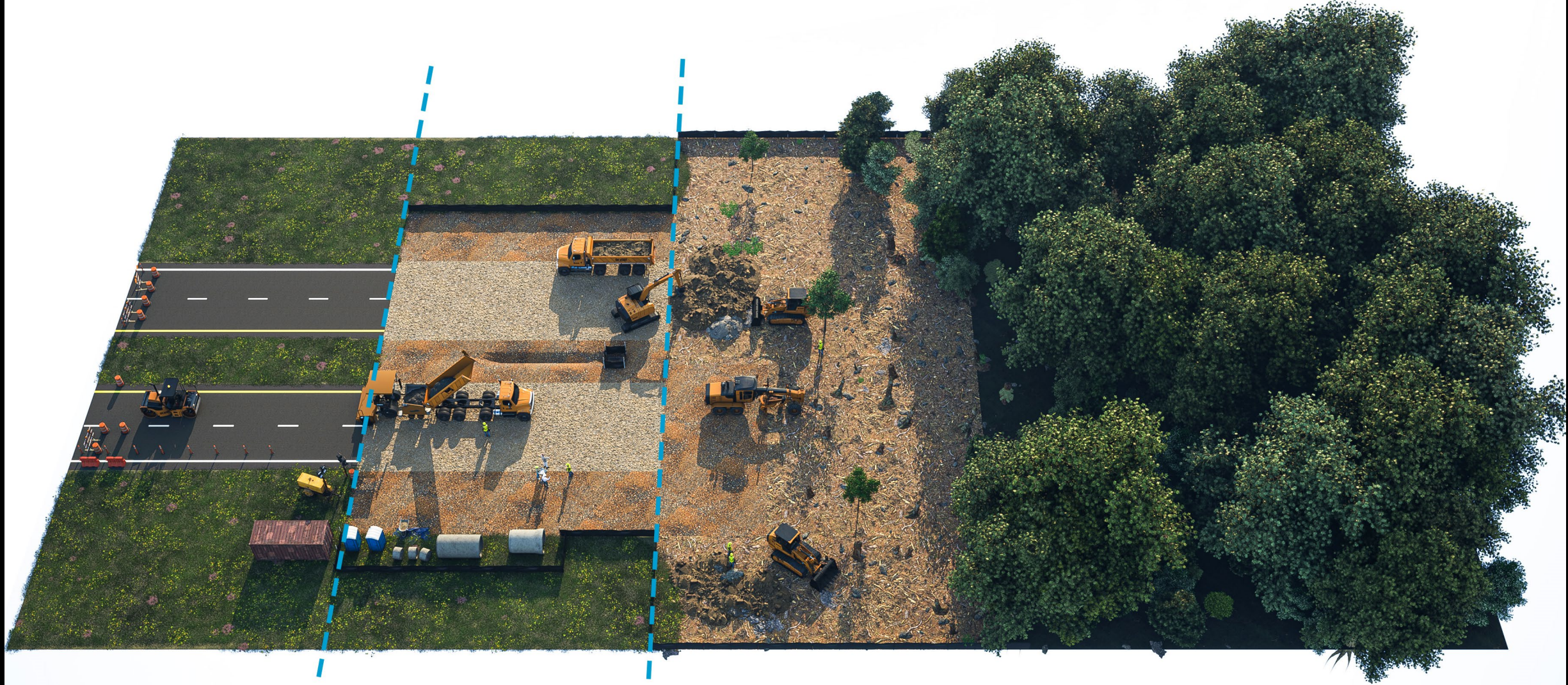
- ▼ Contract Administration
  - ...
- ▼ Construction Operation Sequencing
  - Delay and Limitation of Soil Disturbance
  - Timely Installation of Control Measures
  - Early Installation of Cross-Drains
- ▼ Vegetated Buffer Preservation & Establishment
  - ...
- ▼ Topsoil Conservation
  - ...
- ▼ Water Resource and Buffer Encroachment Limitation
  - ...
- ▼ Good Housekeeping
  - ...





Delay and Limitation  
of Soil Disturbance





$A = R K L S C P$



$A =$  average annual soil loss  
(tons/acre/year)



Delay and Limitation  
of Soil Disturbance



Delay and Limitation of Soil Disturbance



# Managing Work.

Delay and Limitation of Soil Disturbance





# Managing Work.

---

Delay and Limitation  
of Soil Disturbance





# Managing Work.

Delay and Limitation of Soil Disturbance





# Managing Work.



Construction Operation  
Sequencing



## Early Installation of Cross-Drains



# Managing Work.

Construction Operation  
Sequencing



## Early Installation of Cross-Drains





# Managing Water.

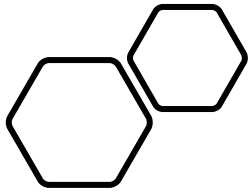
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Clean water in,



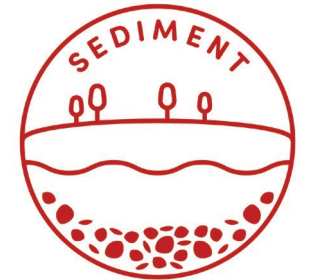
clean water out.



# The **Five Pillars** of Construction Stormwater Management

## 3. **Managing Water**

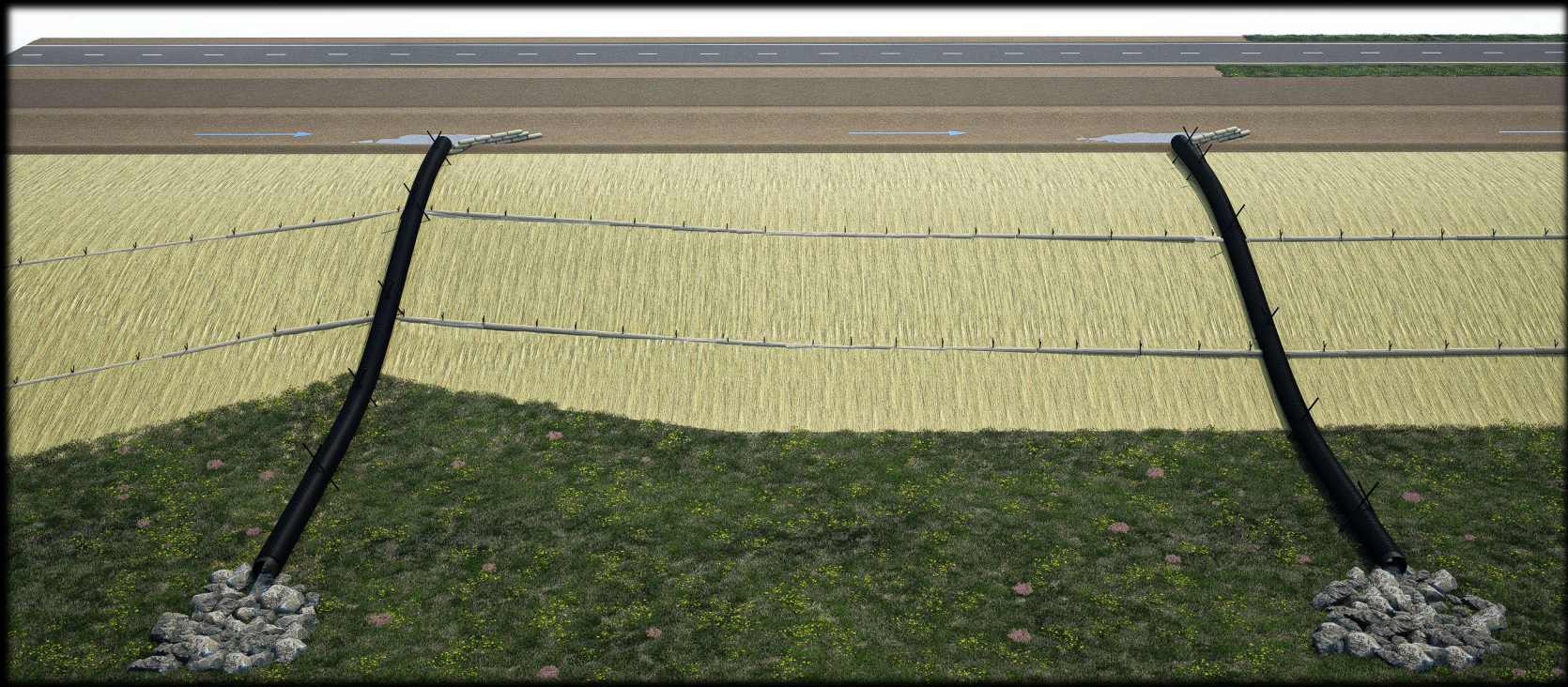
includes all efforts that address the flow of waters through the project to protect the work area and minimize the work of managing erosion and sediment.





# Managing Water.

Run-on  
Flow-Through  
Dewatering  
Run-off



Water is dumb.



Run-on  
Flow-Through  
Dewatering  
Run-off

# Managing Water.

---

- ▼ Temporary Conveyance
  - Diversion Berm
  - Diversion Swale
  - Temporary Slope Drain
  - Temporary Pipe
- ▼ Surface Interruption
  - ...
- ▼ Dewatering
  - ...



# Water Bars.



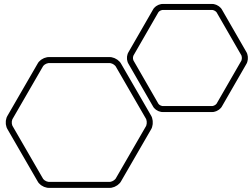


**ALDOT**  
Alabama Department of Transportation

“ALDOT has institutionalized stewardship. It’s the way they do business.”

- Dr. Eve Brantley, Dec 2019

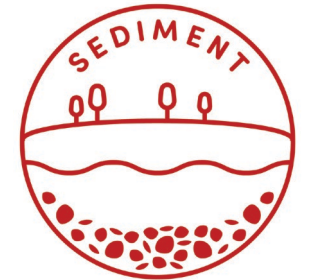
Rusty Goff(1976 - 2022)



# The **Five Pillars** of Construction Stormwater Management

## 4. Managing Erosion

includes all efforts to minimize the displacement of soil particles by splash, sheet, rill, and channel erosion to minimize negative project impacts and reduce the work of managing sediment.



# Managing Erosion.

## Managing Erosion - **Temporary**

- ▼ Temporary Cover
  - Temporary Vegetation
  - Temporary Mulch
  - Temporary Sheeting

## Managing Erosion - **Permanent**

- ▼ Vegetated Slope and Channel Stabilization
  - Permanent Seeding with Mulch
  - Slope Protection
  - Sodding
- ▼ Erosion Control Product
  - Rolled Erosion Control Product (RECP)
  - Hydraulic Erosion Control Product (HECP)
- ▼ Flexible Hard Armor Channel Stabilization
  - Riprap Channel Lining
  - Gabion Channel Lining
  - Articulated Concrete Block Channel Lining
  - Transition Mat Channel Lining







## Managing Erosion - Permanent

- ▼ Cover it up with something appropriate...now.  
(appropriate for the application - raindrop impact, shear forces, future use, traffic, maintenance, aesthetics, economy)

## Managing Erosion - Temporary

- ▼ Cover it up...with anything...now  
(assuming you can't get to permanent stabilization)

# Managing Erosion.



# Managing Erosion.

---

1. sodding/crushed aggregate
2. permanent seeding and mulching
3. temporary mulching only
4. temporary seeding and mulching
5. Polyethylene sheeting





Managing  
Erosion.



# The Basics - soils



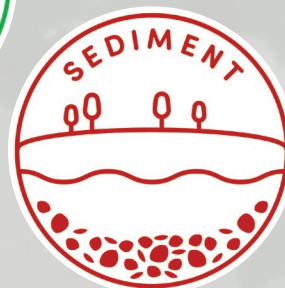
- ▼ Consider potential for erosion and suspension
  - Sands are easily erodible.
  - Clays are easily suspended.
  - Silts simply suck.

# The Basics - water

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- ▼ Fast water carries more sediment than slow water.
- ▼ Fast water is more erosive than slow water.

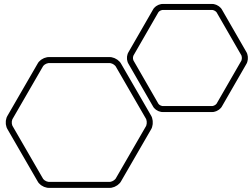
To reduce erosive energy and sediment-carrying capacity of runoff, slow it down.





Ditch Checks –  
Managing Erosion or  
Managing Sediment?

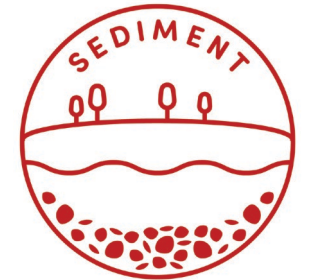
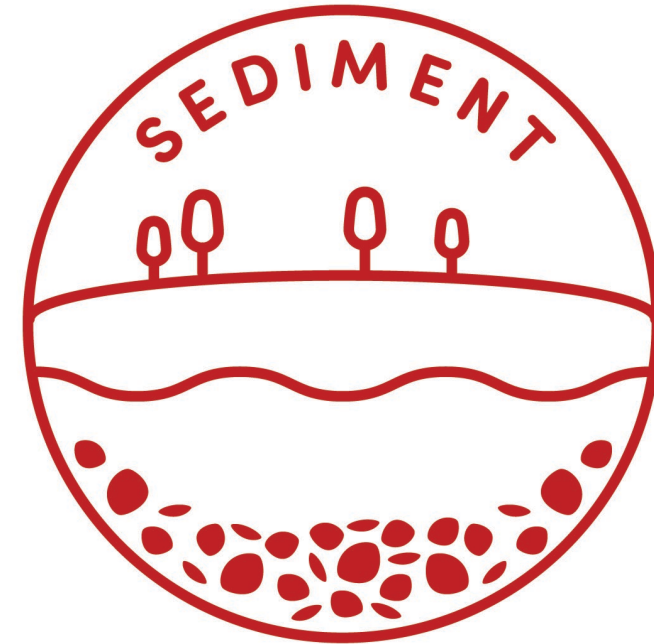




# The **Five Pillars** of Construction Stormwater Management

## 5. **Managing Sediment**

includes all efforts to influence the transport and deposition of suspended soil particles displaced by erosion.





# Managing Sediment.

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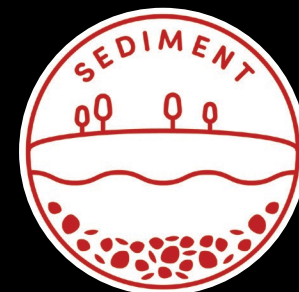
# Managing Sediment.

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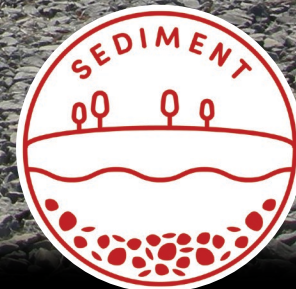
# Managing Sediment.





# Managing Sediment.

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# Managing Sediment.

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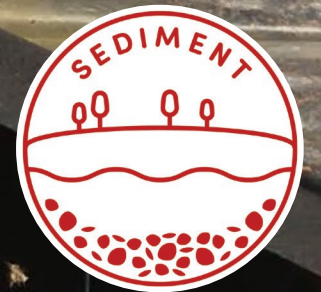


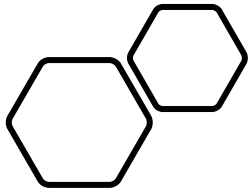
Sediment.

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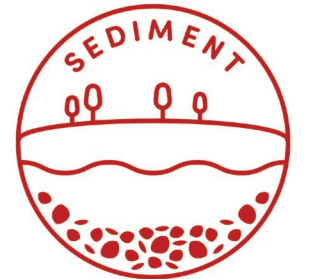




# The **Five Pillars** of Construction Stormwater Management

**Decreasing effectiveness**

**Increasing cost of implementation**



...think, and do things in order of importance... -

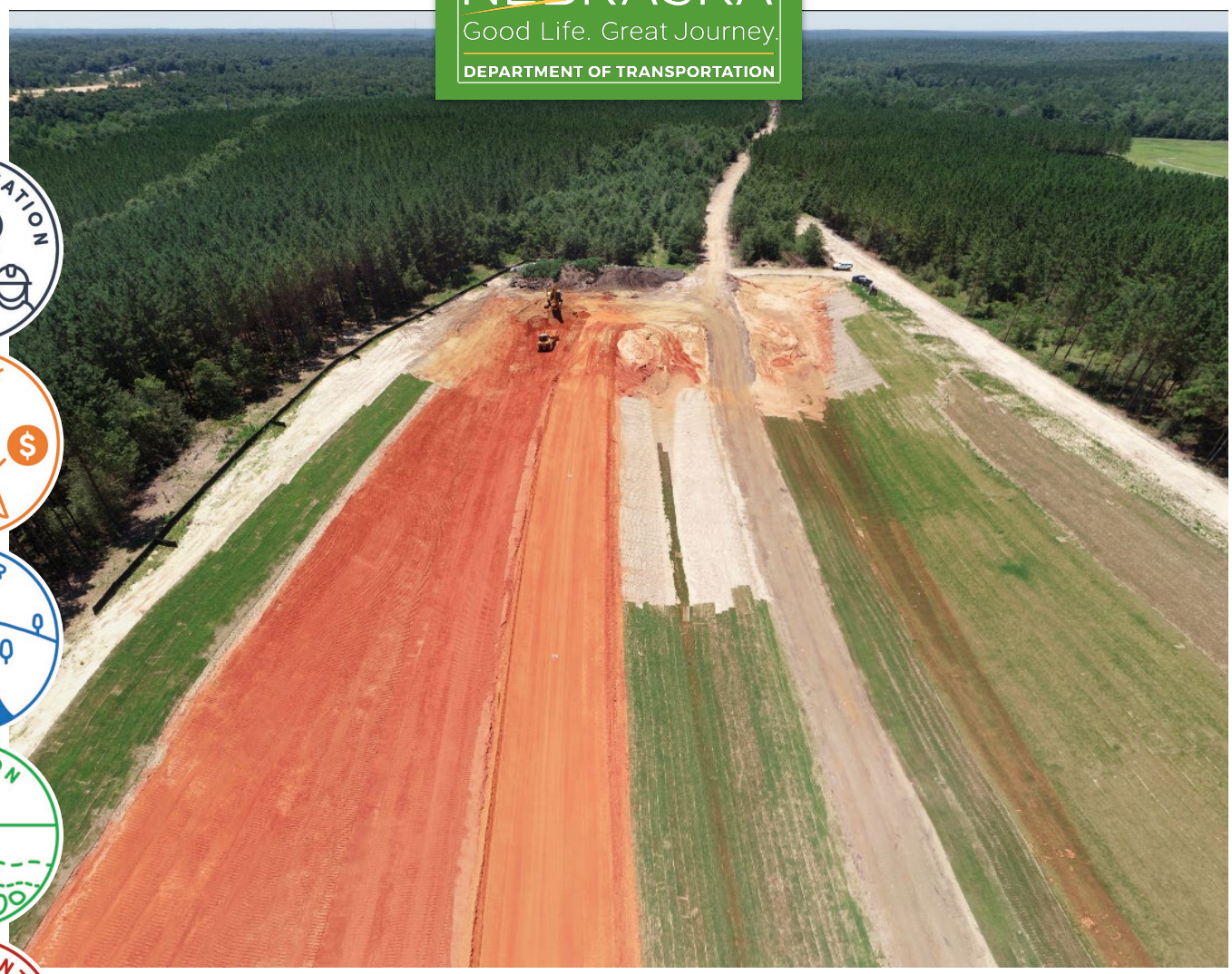
John Maxwell



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