Construction to Maintenance Handoff
December 5th, 2019
Center for Environmental Excellence

• Promotes environmental stewardship and encourages innovative ways to streamline the transportation project delivery process.

• Provides technical assistance, training, information exchange, partnership-building opportunities, and quick and easy access to environmental tools.

• Provides a variety of products and services to assist transportation agencies in achieving environmental excellence including:
  • Peer Exchanges
  • Practitioner’s Handbooks
  • Communities of Practices
  • Webinars
  • Databases

https://environment.transportation.org
AASHTO and FHWA

Melissa Savage
AASHTO Center for Environmental Excellence

Oscar Bermudez
AASHTO Center for Environmental Excellence

Susan Jones, PE
Federal Highway Administration
Community of Practice Presenters

Pete Riegelhuth
California Department of Transportation

Jennifer Callahan
Vermont Department of Transportation

Heather Voisin
Vermont Department of Transportation

Scott McGowen (Moderator)
Michael Backer International
Community of Practice Forum Overview

I. 90% Walkthrough Construction to Maintenance Handoff
   • Pete Riegelhuth, California Department of Transportation

II. The Flow of Stormwater on Vtrans Projects An Evolving Process
    • Jennifer Callahan, Vermont Department of Transportation
    • Heather Voisin, Vermont Department of Transportation

III. Community of Practice Forum
    • Scott McGowen, Michael Baker International

IV. Closing
90% Walkthrough Construction to Maintenance Handoff

Pete Riegelhuth
D-5 NPDES Coordinator
California Department of Transportation
90% Walkthrough
Construction to Maintenance Handoff

Presentation by: Pete Riegelhuth
Construction Policy Bulletin 13-1

- Effective July 27, 2013
- Due to projects ending with… “elements such as structural treatment best management practices (BMPs), drainage systems, and permanent erosion and sediment controls that were not functional or maintainable.”
Maintenance Reviews Sec 5-006

- Requires a project field review with Maintenance at approximately 90% completion.

- To identify items necessary to comply with the NPDES Permit and the Construction General Permit.
Final Inspection and Contract Acceptance Sec 3-523

- Resident Engineer schedules a final inspection review with Maintenance and other Caltrans divisions.
• During the 90 percent field review meeting, the resident engineer and district maintenance stormwater coordinator will complete Form MTCE-0023, “Construction to Maintenance 90% BMP Completion Walkthrough.”
1. List the New, Removed, and Modified Treatment BMPs Within the Project Limits. If none, select “NONE” in the TBMP Type field and delete the remaining rows. (Note: Final approval includes receipt of an O&M manual if applicable)

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<th>Begin PM</th>
<th>End PM</th>
<th>Begin Latitude</th>
<th>End Latitude</th>
<th>CCQ Filed?</th>
<th>State Any Corrective Actions Needed on the Treatment BMP</th>
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2. Drainage System. ONLY identify locations where additional work is needed prior to acceptance. If none is needed enter “NONE” in the Additional work needed field and delete the remaining rows.

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Walkthrough Topics

- Post Construction Runoff Control TBMPs
- Drainage System
- Illegal Connection/Illlicit Discharge IC/ID
- Temporary Construction Site BMPs
- Permanent Erosion Control (Slope Stability)
- Plant Establishment
- Offsite Contractor Facility Cleanup
Where is the Bioswale?
How about this bioswale?
Current Day
Current Day

Resident Engineer

Maintenance SWC

Construction SWC
Identify Deficiencies
Go over maintenance requirements with field staff.
<table>
<thead>
<tr>
<th>Maintenance Indicator</th>
<th>Inspection Frequency</th>
<th>Maintenance Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of significant channeling, erosion, seeps, or ponding</td>
<td>Annually in late wet season</td>
<td>Correct channelized, eroded, seeped, or ponded areas using additional fill and vegetation depending on coverage and/or by removing accumulated sediment. Complete prior to next wet season.</td>
</tr>
<tr>
<td>Average vegetation height exceeds 12 inches, emergence of trees, or woody vegetation</td>
<td>Semi-Annually, once during wet season</td>
<td>Cut vegetation to a minimum height of 6 inches; cuttings may be removed at discretion of District Maintenance.</td>
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<tr>
<td>Less than 70 percent background coverage in swale invert and swale side slope</td>
<td>Semi-Annually, once late wet season and once late dry season</td>
<td>Assess quantity needed and reseed/revegetate barren spots by November. Contact environmental or landscape architect for appropriate seed mix. Scarify area to be restored, to a depth of 2- inches. Restore side slope coverage with hydoseed mixture. If growth is unsuccessful after 2 applications (2 seasons) of reseeding/revegetating, consult with District Landscape Architect for potential solutions. Maintain shrubs and trees that were installed in the original design</td>
</tr>
<tr>
<td>Debris/trash present</td>
<td>Inspect during routine trash collection. Minimum twice per year during inspections.</td>
<td>Remove litter, and debris per routine District schedule.</td>
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</table>
| Sediment at or near vegetation height, channeling of flow within swale and energy dissipaters, inhibited flow due to change in slope | Annually in the dry season                | - Remove sediment. If flow is channeled, determine cause and take corrective action. If sediment becomes deep enough to change the flow gradient, remove sediment during dry season, characterize and properly dispose of sediment, and revegetate. Refer to Activity Cut-Sheet Page B-72.  
- Notify engineer or District Maintenance Storm Water Coordinator to determine if regrading is necessary.  
- If regrading is necessary, regrade to design specification and revegetate swale/strip. Regrading should start in May. Revegetate strip/swale by June.  
- Invert and revegetate swale/strip every five years.  
- Sediment should be removed using a specialized excavator. Sediment may be placed in a designated area on the site.  
- Sediment should be removed during the dry season.  
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- Sediment should be removed during the dry season.  
- Sediment should be removed using a specialized excavator. Sediment may be place...
Common Issues

• Infiltration Areas-Vegetated or non-vegetated and Compaction

• Bio-swales/strips use vegetation and infiltration to remove pollutants from runoff. (70% Vegetative Cover Requirement)

• Maintaining the vegetation in the bio-strip/swale is the key to success.

• It is important to maintain the bio-strips/swales as originally designed. (width & side slopes)

• Walk staff through the parts of Detention/Infiltration Basins.

• Trash
Pesticide Use - No No No No
Vegetation Control

- DO NOT use herbicide to kill the grasses.
- DO NOT use court referral labor to remove the grasses.

It’s okay if the grass looks dead. Leave it as is.

- Per Maintenance Staff Guide
San Luis Obispo - NB-101 Shoulder
San Luis Obispo - NB-101 LOVR to Prado Road

Pick up trash - All TBMPs
San Luis Obispo - NB-101 LOVR to Prado Road

Pick up trash -
All TBMPs

70% Cover
Seasonally mow
Temporary Construction Site BMPs
Temporary Construction Site BMPs

No Plastic Allowed
Learn from mistakes - Mulch vs...
Native grass sod
If the bioswale has irrigation, make sure it works properly.
Talk about how they work - the parts
Maintain the Orifice
Maintain the Orifice

Not the Orifice
Maintain the Orifice
Look at Slope Stabilization
Look for scour problems
Look for conflicts
Access Points
Do they drain properly
TBMP Markers

TREATMENT BEST MANAGEMENT PRACTICE (TBMP) MARKER

NOTES:
1. The marker header shall be green (non-reflective) background with white (non-reflective) Series C letters.
2. The marker body shall be white (non-reflective) target plate with black Series C numbers and letters.
3. "BEGIN" or "END" shall apply as directed by the Engineer.
4. TBMP abbreviations shall be Series D letters up to a maximum of 2’ tall, to fit within the available maximum space of 14.5”.
5. See Project Plans for TBMP abbreviations.
Finalize TBMP Inventory
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</table>
Maintenance needs mapping
They need the details
**Structural TBMP-STBMP Form**

**IMMS**
Enter TBMPs into Database

- Distinct, county, lwy, position, and direction
- Type of STBMP
- Maintenance cost center responsible for monthly inspections, any required clean up or repair, and IMMS reporting.
Questions?
The Flow of Stormwater on Vtrans Projects
An Evolving Process

Jennifer Callahan
Stormwater Technician
Vermont Department of Transportation

Heather Voisin
Green Infrastructure Engineer
Vermont Department of Transportation
The Flow of Stormwater on VTrans Projects
An Evolving Process

Jennifer Callahan & Heather Voisin
How VTrans gets from construction...
...to maintenance
• ACT 64 – VERMONT’S CLEAN WATER ACT

• A BROAD SUITE OF PROGRAMS AND REGULATIONS TO ADDRESS WATER QUALITY INCLUDING:

• TRANSPORTATION SEPARATE STORM SEWER GENERAL PERMIT (TS4)
  • MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
  • MULTI-SECTOR INDUSTRIAL GENERAL PERMIT (MSGP)
  • STATE OPERATIONAL STORMWATER DISCHARGES (STATE OSW)
  • TOTAL MAXIMUM DAILY LOAD (TMDL)

• CONSTRUCTION STORMWATER DISCHARGES (NOT PART OF TS4)
STATE OPERATIONAL PERMIT

- STATEWIDE PROGRAM REQUIRED ON PROJECTS THAT CREATE AN ACRE OR MORE OF IMPERVIOUS SURFACE.
  - THIS THRESHOLD WILL BE LOWERED TO ½ ACRE IN 2021.
- AVERAGE FOR VTRANS IS 10 PROJECTS PER YEAR OBTAIN UNDER THIS PROGRAM
  - EXPECTING THAT TO AT LEAST DOUBLE WITH THE THRESHOLD LOWERING
- CURRENTLY 86 PROJECTS CONSTRUCTED AND BEING MAINTAINED (AND GROWING).
- ANOTHER 54 PROJECTS UNDER DESIGN DEVELOPMENT, PERMITTING OR CONSTRUCTION.

TMDL IMPLEMENTATION

- REQUIRES THE CONSTRUCTION OF STORMWATER TREATMENT ON NEW AND EXISTING IMPERVIOUS SURFACES.
- IDENTIFY AND IMPLEMENT SW RETROFITS TO ADDRESS TMDLS/WQRRP
  - LAKE CHAMPLAIN PHOSPHORUS
  - STORMWATER IMPAIRED WATERSHEDS
  - OTHERS....
- ABOUT 60 PRACTICES PLANNED FOR SW-IMPAIRED WATERSHEDS, EXPECTING MANY MORE FOR LCTMDL
  - CURRENTLY HAVE 17 CONSTRUCTED, 20 DESIGNED AND PLANNED FOR CONSTRUCTION NEXT SEASON
CONSTRUCTION GENERAL PERMIT

• STATEWIDE PROGRAM REQUIRED ON PROJECTS THAT HAVE AN ACRE OR MORE OF EARTH DISTURBANCE.

• TIERED PROGRAM BASED ON ASSESSMENT “RISK”
  • LOW RISK GENERAL PERMIT
  • MODERATE RISK GENERAL PERMIT
  • INDIVIDUAL PERMIT

• ON AVERAGE 30 VTRANS PROJECTS PER YEAR NEED THIS PERMIT
VTRANS IS……

- STRENGTHENING ITS STORMWATER PROGRAMS
- BUILDING PARTNERSHIPS TO IMPROVE WATER QUALITY THROUGHOUT THE STATE
- MAKING WATER QUALITY PROTECTION FUNDAMENTAL TO THE AGENCY’S WAY OF DOING BUSINESS

2003
The Beginning!
Stormwater Engineer

2003
Construction
Environmental Engineer

2007
Maintenance
Stormwater Coordinator

2012
Maintenance
Stormwater Technician

2014
2nd
Maintenance
Stormwater Technician

2015
3rd
Maintenance
Stormwater Technician

2017
4th and 5th
Maintenance
Stormwater Technician

2018
2nd
Stormwater Engineer

The Beginning!
Highway Division

- Stormwater Staffing

Design
- scoping, design development, permitting

Construction
- monitor construction for compliance

Maintenance
- post construction maintenance and compliance
Online Shared Reviews
Preliminary Plans – Constructability Meeting
Final Plans – PS & E Pre-contract Meeting
Contract Review for Environmental Commitments & Permit Conditions

Kick-off Meeting & Preconstruction Conference
Conduct Pre-construction Meeting for Projects with Individual Construction Stormwater Permits
Construction

FIELD VISITS
Conduct Pre-final Site Visit
Follow Up Visits, As Needed
CONSULTATION DURING THE DESIGN PROCESS

PRE-FINAL MEETING WITH CONSTRUCTION

CREATE MAINTENANCE PLAN

MEET WITH DISTRICT STAFF

ANNUAL INSPECTIONS

RENEWALS EVERY 5 YEARS

MAINTENANCE AS NEEDED
CHALLENGES

• TIME OF YEAR
CHALLENGES

• TIME OF YEAR
CHALLENGES

• TIME OF YEAR
CHALLENGES

• DIFFERING SITE CONDITIONS
CHALLENGES

• “TOO LATE TO FIX IT”
BRIGHT SPOTS AND SUCCESSES!

• Enhanced Communication And Coordination Between Highway Division Stormwater Staff
  • Regular Check-Ins on Projects
BRIGHT SPOTS AND SUCCESSES!

- Enhanced Communication And Coordination Between Highway Division Stormwater Staff
  - Regular Check-Ins on Projects
  - Conducting Pre-final Inspection
BRIGHT SPOTS AND SUCCESSES!

• Enhanced Communication And Coordination Between Highway Division Stormwater Staff
  • Regular Check-Ins on Projects
  • Conducting Pre-final Inspection
  • Monthly Meetings For All Highway Division Stormwater Staff
BRIGHT SPOTS AND SUCCESSES!

- Enhanced Communication And Coordination Between Highway Division Stormwater Staff
  - Regular Check-Ins on Projects
  - Conducting Pre-final Inspection
  - Monthly Meetings For All Highway Division Stormwater Staff
  - Participating In Shared Reviews During Design
QUESTIONS???
CoP Questions/Discussion

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A recording of this webinar will be available on the Center for Environmental Excellence by AASHTO Website.

http://environment.transporation.org

Products & Programs → Communities of Practice → Stormwater Management
Thank You for Attending