Guidelines for Preparing an Operation and Maintenance Plan for Post-Construction Controls

Overview

Boulder County requires that an Operation and Maintenance (O&M) Site Plan (Plan) be submitted for all local projects including a permanent post construction control measure. The Plan shall consist of a single sheet, 22”x34” that includes all the necessary information for long-term maintenance of the site, and shall generally conform to the guidelines that follow. Graphical elements included on the sheet are to reflect as-built Record Drawing information associated with the completed project.

Contents of Maintenance Site Plan

The following outline shall be used to guide the development of the Maintenance Site Plan. Some items may not apply to all projects, and any unique features may warrant inclusion of additional information if pertinent to the anticipated maintenance of the site.

Section 1 - Project Information- can be listed in drawing title

1.0 General Information
   A. Property Owner - Including contact number
   B. Design Engineer- Including contact number
   C. Project Completion Date
   D. County Approval Block

1.1 Hydraulic Information
   A. Flow Rates- All applicable flow rates should be listed, e.g. base flow, design flow, any storm flows that were evaluated, etc. Detention facilities should include inflow and outflow rates.
   B. Facility Description- Include additional design information for the facility, including volumes, water surface elevations, and surface types for forebays and micropools.
   C. Outlet Type
   D. WQCV Drain Time

1.2 Miscellaneous Information
   A. Project Survey Information- Include survey control information and at least one on-site "Maintenance Control Point" established during construction for use during maintenance activities.
   B. Seed Mix
C. Mow Area- Include area in acres and description of mow limits.

D. Long Term Monitoring Requirements- If applicable, list monitoring requirements such as 404 Permit Reports or any other required monitoring.

Section 2 - Project Notes

2.0 General Facility Description- Include function, flow source, flow pattern through project, any special features, and any additional information that may be helpful in understanding the basic workings of the facility.

2.1 Maintenance Notes
   A. Maintenance Frequency
   B. Equipment and Special Tools Required
   C. Power Source (if applicable)

2.2 Maintenance Procedure
   A. Dewatering
   B. Sediment Removal
   C. Debris Removal
   D. Site Inspection- List all general features and equipment that should be inspected to ascertain additional maintenance needs. See attached examples.
   E. Materials Testing- List any contaminant testing requirements for sediment removed from the pond.
   F. Post-Maintenance Considerations- Any additional maintenance-related tasks should be listed here. These may include restoring flow patterns, replacing or removing stoplogs, or additional cleanup requirements.

Section 3 – Site Plan

3.0 Vicinity Map

3.1 Plan View- All major features of the facility should be labeled, including the following:
   - Trickle Channel
   - Forebay, longest reach distance required from access road
   - Micropool, longest reach distance required from access road
   - Entrance Structure
   - Outlet Structure

In addition, special maintenance-related information should be identified:
   - Maintenance Control Pont location and elevation
• Maintenance entrance / access road / gates / turnarounds. List applicable information such as road material, width, maximum grade, etc.
• Power source
• Weight-restricted areas
• Wetland or natural areas to avoid

3.2 Hydraulic Profile
• Major features
• Permanent pool elevations
• Other applicable water surface elevations
• Flow direction
• Shading identifying forebay and micropool sediment removal zones

Section 4 – Details (relevant to the BMP on site- Rain Garden/PLD, EDB, Sand Filter Basin, etc)

4.0 Trickle Channel Section
4.1 Maintenance Road/Access
4.2 Inlet Structure(s)
4.3 Forebay Release Structure
4.4 Outlet Structure

**Submittal Requirements**

The Engineer shall submit one 22"x34" Maintenance Site Plan with the project's post-construction submittal package that is required for applicable development sites that disturb an acre or greater within the County’s urbanized area. Any comments shall be addressed by the Engineer until approval has been granted by the County. Once approval has been granted, the final submittal shall include:

• One Electronic PDF of an 22"x34" Maintenance Site Plan (P.E., stamped)
• CAD Files
Project Information - Pond A

1.0 General Information

A. Property Owner

B. Design Engineer

C. Project Completion Date
   Phase 1 completed 2005 (included detention ponds)
   Phase 2 completed December-2019

1.1 Hydraulic Information

A. Flow Rates

   CONTROL INFLOW (CFS)  RELEASE (CFS)
   WQCV N/A  40-hour
   10-YEAR  20.78  3.14
   100-YEAR  54.04  21.50

B. Pond Description
   Extended Detention Basin, earthen with concrete outlet structure and buried Rip Rap emergency overflow. There is no forbay or Micropool.

C. Outlet Specifications

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>VOLUME (AF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSEL</td>
<td>INVERT</td>
<td>0</td>
</tr>
<tr>
<td>WQCV</td>
<td>REC. ORIFICE</td>
<td>0.156</td>
</tr>
<tr>
<td>10-YEAR</td>
<td>REC. ORIFICE</td>
<td>0.173</td>
</tr>
<tr>
<td>100-YEAR</td>
<td>WEIR</td>
<td>0.324</td>
</tr>
</tbody>
</table>

1.2 Miscellaneous Information

A. Project Survey Information
   Survey control information shown on drawing.

B. Seed Mix
   Boulder County, Plains Seed Mix, for specifications see:

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Species Name</th>
<th>Variety</th>
<th>% of Mix</th>
<th>lb/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Oats</td>
<td>Grama Bouteloua</td>
<td>Vaughn</td>
<td>15%</td>
<td>2.74</td>
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<tr>
<td>Blue Grama</td>
<td>Bouteloua gracilis</td>
<td>Native, Alma, or Hachita</td>
<td>20%</td>
<td>0.84</td>
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<tr>
<td>Buffalograss</td>
<td>Buchloe dactyloides</td>
<td>Native</td>
<td>15%</td>
<td>9.33</td>
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<tr>
<td>Western Wheatgrass</td>
<td>Pascopyrum smithii</td>
<td>Arriba</td>
<td>12.5%</td>
<td>3.96</td>
</tr>
<tr>
<td>Western Wheatgrass</td>
<td>Pascopyrum smithii</td>
<td>Native</td>
<td>12.5%</td>
<td>3.96</td>
</tr>
<tr>
<td>Little Bluestem</td>
<td>Schizachyrium scoparium</td>
<td>Cimarron, or Pastura</td>
<td>13%</td>
<td>1.74</td>
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<tr>
<td>Green Needlegrass</td>
<td>Stipa viridula</td>
<td>Lodorm, or Native</td>
<td>12%</td>
<td>2.31</td>
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<tr>
<td>Totals:</td>
<td></td>
<td></td>
<td>100%</td>
<td>24.88</td>
</tr>
</tbody>
</table>

C. Mow Area = 0.2 acres

Section 2 - Project Notes

2.0 General Facility Description
   Runoff generated from a portion of the subdivision is routed to roadside ditches and storm culverts to the pond. The water quality ponds and outlet structures are designed to detain a water quality volume, 10-year flood control volume and 100-year flood control volume. The ponds will have release rates for the WQCV, and the 10-year and 100-year rates controlled by an outlet structure.

2.1 Maintenance Notes

A. Maintenance Frequency
   Routine Maintenance typically consists of regularly scheduled mowing and trash and debris pickups for during the growing season. This includes items such as the removal of debris that may be clogging the outlet structure and screens and trash racks. These activities normally will be performed numerous times during the year and following significant rainfall events.

B. Equipment and Special Tools Required (Routine Maintenance)
   Rake or Broom
   Mower
   Weed eater
   Shovel

2.2 Maintenance Procedure

A. Dewatering
   Should not be required at this facility.

B. Sediment Removal
   Major sediment removal (if required) consists of removal of large quantities of sediment or removal of major sedimentation features from segments of the pond. The removal of sediment occurs when the pond is at the maximum design volume and grades. The removed sediment shall be transported and disposed of.

C. Debris Removal
   Debris and other materials can clog the outlet work’s well screen, orifice plate(s) and trash rack. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

D. Site Inspection
   The facility should be inspected on an annual basis to evaluate the need for additional maintenance such as sediment removal, erosion control, riprap maintenance and structural repairs.

E. Post Maintenance Considerations
   After sediment removal or repairs, the disturbed area may require re-vegetation.

F. Access to detention ponds shall be from the Niwot Hills Drive, across open space, onto Carbon Creek, and down the 4:1 slope of the pond. No access roads are provided directly to the pond. Access shall be by the least disruptive method available for required inspection or maintenance.

G. This plan is to be site-specific - contact designer only

EXAMPLE O&M PLAN FOR REFERENCE ONLY