SPECIFICATION 150
STORMWATER MANAGEMENT POLICY

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SCOPE: This specification is for the design and construction of stormwater conveyance and management facilities within Amtrak's Right-of-Way and on property adjacent to Amtrak's Right-of-Way that has the potential to impact drainage within Amtrak's Right-of-Way. Adherence is required for the safety of high-speed rail passenger service.

NATIONAL RAILROAD PASSENGER CORPORATION

STORMWATER MANAGEMENT POLICY

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NATIONAL RAILROAD PASSENGER CORPORATION

STORMWATER MANAGEMENT POLICY

1. Introduction

a. This specification outlines the National Railroad Passenger Corporation's (Amtrak) policies, criteria, and methodologies regarding the hydrologic and hydraulic design of proposed developments and improvements. Covering both development adjacent to Amtrak right-of-way (ROW) or on Amtrak's ROW, this specification ensures the safety of Amtrak's customers, employees, and infrastructure from the detrimental effects of storm water runoff.

b. All projects proposing any new or modified work on adjacent property to Amtrak ROW that have the potential create changes to storm-water flow, either negatively or positively impacting Amtrak, shall conform to this specification.

c. City, State, County, and Federal permits, and approvals for construction work do not constitute Amtrak's approval.

d. The design must conform to and comply with all applicable engineering codes, standards, and practices including those of the various Federal, State, and local jurisdictions. In case of a conflict between codes, standards and practices, the more stringent requirements shall apply.

e. Relief from the requirements listed in this specification may only be made with a formal Design Exception Request (DER) approved and signed by the Chief Engineer of the appropriate discipline prior to final design approval. It is the responsibility of the Engineer of Record (EOR) to submit DERs for Approval.

    i. DERs must provide justification including key site-specific constraints and demonstration that all reasonable engineering design alternatives were explored and found to be impossible or infeasible.

    ii. DERs are to be granted for specific and unique design locations. Blanket approval may not be requested.

    iii. DER approval does not grant precedent for similar exceptions in the design.

    iv. Previously approved DERs must be resubmitted and reapproved should either the constraints or proposed final condition change.

    v. Locations of design elements with proposed or approved DERs must be identified on proposed plans.

    vi. A summary list of DERs and their approval status must be included with each submission.

2. Design Principles and Guidelines

a. Stormwater Drainage and Discharge From Adjacent Property Onto Amtrak Right-of-Way

i. All proposed development adjacent to Amtrak shall include a storm drainage system that will intercept existing and proposed flows and discharge the system in accordance with Amtrak criteria.

ii. A pre- and post-development drainage analysis must be submitted to Amtrak when runoff from the proposed development is directed toward the Amtrak property.

iii. No increase in the peak flow rates in the post-developed condition is permitted onto Amtrak ROW.

iv. Any increase in post-development runoff volume up to the 100-year storm must be managed before discharging onto Amtrak's ROW.

v. Use of existing Stormwater Management Practices (SMPs) owned and maintained by Amtrak, such as detention basins, by private applicants is not allowed.

vi. Use of existing Amtrak drainage facilities (culverts) may be permitted with an

agreement in accordance with Amtrak Engineering Practice EP3005 Pipeline Occupancy. This applies whether the connection is direct or indirect.

vii. All SMPs must be located a minimum of 20 feet outside of Amtrak property.

viii. Development of SMPs downstream of railroad facilities must be adequately sized so that the hydraulic operation of upstream drainage systems for the railroad is not negatively impacted.

ix. Existing and proposed stormwater management facilities within Amtrak's ROW must remain in compliance with all design analysis and criteria requirements as outlined in Specification 150 in the post-construction condition resulting from development from adjacent property.

x. Proposed SMPs that are situated adjacent to or drain onto Amtrak's ROW that meet the definition of a dam in accordance with the Dam Safety Act of 2006, shall obtain a written determination and approval, as applicable, from the appropriate State agency of this facility and potential hazard classification, and shall be designed in accordance with all applicable standards.

xi. Emergency spillways and breach routing plans directing flow onto Amtrak will not be allowed. The emergency spillway must discharge flow away from Amtrak or into an adequate channel where flow will not impact railroad operations.

xii. All proposed SMPs that drain towards Amtrak ROW must be designed with a minimum of 1 foot of freeboard above the 100-year storage elevation before overtopping.

xiii. Erosion and Sediment Control (ESC) Plans must be submitted to Amtrak for approval demonstrating that adequate measures are put into place to ensure sedimentation build up does not occur during construction.

xiv. All proposed stormwater management facilities that drain toward Amtrak ROW shall be adequately inspected and maintained.

1. Design plans must include a note indicating Inspection and Maintenance logs for stormwater facilities directly upstream of Amtrak's ROW shall be made available to Amtrak upon request.

b. Stormwater Drainage and Discharge For Development Within Amtrak's Right-of-Way

i. Water surface elevations for the 100-year design storm must not exceed an elevation of 1 inch below the bottom of the railroad tie elevation. The elevation of the bottom of a railroad tie is 1.5 feet below the top of rail.

ii. All proposed drainage structures should cause a ponding level, hydraulic grade line elevation, or backwater elevation no greater than the allowable water surface elevation.

iii. Peak flow rates and total volume of stormwater directed towards the tracks are not to be increased in the post development condition.

iv. Existing drainage areas upstream of Amtrak should be considered impervious for the design of Amtrak drainage facilities in anticipation of future development.

v. Any development adjacent to an Amtrak facility must ensure that an existing flooding problem on the Amtrak facility will not be worsened as a result of the proposed development.

vi. For reconstruction of existing structures that result in lowering the upstream water surface elevation due to a significant loss of upstream storage and attenuation, the engineer must analyze the changes in flows and verify that there are no adverse impacts further downstream.

vii. For new drainage which ties into existing roadway systems, demonstrate that: •

the existing drainage system has adequate capacity and is inspected and cleaned to ensure it is free of siltation or blockages.

3. Submittal Requirements

a. Requirements

The following material (if appropriate) shall be submitted and in compliance with Sections §3.b and §3.c for hydrologic/hydraulic review by Amtrak:

i. Stormwater Management Report
ii. A set of the design plans including:
    a. Existing conditions plan
    b. Post-development site plans (including but not limited to stormwater plans, grading plans, and utility plans)
    c. Drainage sections and profiles
    d. Relevant notes and details.
iii. Pre- and Post- Development Drainage Plans
iv. Stormwater Management Approvals, exemptions, and/or relevant correspondence from the approving regulatory agencies and municipalities.

b. Submissions and Schedule

i. Submissions must be made to Amtrak at the stages of design listed below. The submissions must contain the listed material at a minimum, with all items in compliance with Section §3c.
    a. 30% Design / Conceptual
        i. A conceptual drainage plan must be provided with this submission.
        ii. An Existing Conditions Plan, prepared under the direct supervision of a Professional Land Surveyor, duly licensed in the State in which the property is located. Signed and sealed.
        iii. Design plans
    b. 60% Design
        i. Stormwater Report
        ii. Geotechnical Report
        iii. Design plans
        iv. Drainage sections and profiles
    c. 90% Design
        i. Stormwater Report
        ii. Geotechnical Report
        iii. Design plans
        iv. Drainage sections and profiles
    d. Construction Documents
        i. Stormwater Report
        ii. Geotechnical Report
        iii. Design plans
        iv. Drainage sections and profiles
        v. Stormwater Management Approvals
ii. All survey and existing conditions plans must be prepared under the direct supervision of a Professional Land Surveyor duly licensed in the State in which the project is located.

iii. Any submissions beyond 30% design requires the signature and seal of a Registered Professional for the applicable state.

iv. Amtrak must be provided a minimum of twenty (20) business days to review a submission before requiring comments. Failure to respond within twenty (20) business days does not constitute approval from Amtrak.

v. A letter of transmittal with all included submitted items listed is required with each submission.

c. Plan and Report Checklists

i. General Plan Sheet Requirements

1. Signature and seal of Registered Professional
2. Plan scale including measurable scale bar
3. Legend that clearly shows all symbols, line types, and hatchings used in the plan set
4. A note indicating the plan's vertical datum must be included
5. Maximum scale of 1"=200' (excluding maps and location plans)

ii. Existing Conditions Plan Requirements

1. Location map including site location within watershed(s)
2. Property lines, all metes, bounds, boundaries, dimensions, building lines, and setbacks
3. Street lines, street names, lot names, easements, other land divisions, and their purposes and confirmed locations
4. Location and boundaries of all existing rights-of-way, easements, cartway widths for all streets and private roads, and drainage rights-of-way
5. Location and size of all existing site features and impervious areas within 50 feet of Amtrak's ROW.
6. Identification of the nearest watercourses/water bodies (within 500 feet)
7. Existing topography of site (contours, sub-basins, etc.) in one-foot contour intervals (minimum) on-site and on adjacent lands within 50 feet of the property line and any disturbance.
8. Location of all existing active and abandoned utilities (water, sewer, stormwater), including stormwater management practices above and below ground within 50 feet of the limit of disturbance
9. Identification of any special features of the site (natural depressions, natural berms, flood plains, etc.)
10. Location and boundaries of proposed demolition, including all structures and pavement to be removed and all utilities to be capped or plugged
11. Location of any existing on-site disposal systems (septic tanks) and drain fields
12. Identification of the type and extent of vegetation, and the location and species identification of any trees that measure greater than six inches diameter at breast height (DBH).

iii. Proposed Conditions Plan Requirements

1. Proposed topography of site (distinguish between existing and proposed contours) in one-foot contour intervals (minimum)
2. Identification of all proposed site improvements, such as buildings, basements, parking lots, driveways, landscaping, SMPs, drainage, etc., that should be distinguished from any existing features to remain
3. Proposed building plumbing and water discharge locations.

4. Delineation of impervious surfaces
5. Location of vegetation identified for preservation and planned landscape areas
6. Extent and boundaries of 100-year floodplain in relation to the project
7. Depiction of post-development hydrology of the site with flow lines and/or drainage areas including discharge points from property and type of discharge (diffused, concentrated, piped, etc.)
8. Location of any proposed on-site disposal systems (septic tanks) and drain fields
9. Location of all proposed erosion and sediment control measures, including, but not limited to, inlet protection, silt fence and/or compost filter sock, rock filter outlet, rock construction entrance, pumped water filter bag, concrete washout station, and stockpiles, which must be surrounded by silt fencing
10. Geotextile or filter stone for erosion protection of soil beneath any proposed riprap

iv. Stormwater / Pre- and Post- Development Drainage Plan Requirements

1. Predevelopment and post-development drainage areas (including any off-site area)
2. Location of point(s) of analysis identified in the stormwater report Pertinent existing stormwater infrastructure necessary to define existing drainage conditions.
3. Predevelopment and post-development inlet drainage area delineations (including any roof leaders)'
4. Calculated areas of drainage and time of concentration to each inlet'
5. Impervious and pervious cover and runoff coefficients within each drainage area.

v. Stormwater Report Requirements

1. Stormwater Calculations
    a. Project Summary
    b. Stormwater Analysis Summary
        i. Proposed Stormwater management practice
    c. Existing site and drainage conditions summary
    d. Applicable local, state, and federal regulatory/permit requirements
    e. Soil survey map and hydrologic soil group summary
    f. Rainfall Depths and Distribution
    g. Runoff estimation method
    h. Flow and storage routing methods
    i. Static Storage calculations
    j. Pre-development and post-development Tc calculations
    k. Pre-development and post-development hydrologic modeling
        i. Model routing
        ii. Input parameters
        iii. Hydrograph summaries
        iv. Pond summaries
    l. Pipe capacity calculations

vi. Geotechnical Report Requirements

1. Signed and sealed by a Professional Engineer
2. Detailed description of testing procedure and materials/apparatus used.

3. Weather information at time of testing and previous 24 hours (temperature, rainfall, etc.)
4. Engineer's analysis and summary of all results including soil classification (in accordance with ASTM D2488) and site evaluation.
5. Engineer's affirmative or negative recommendation on feasibility of infiltration, with justification
6. Infiltration Testing and Soil Characterization Plan (including, but not limited to, topographic/existing features of the site showing location of test pits/borings and infiltration tests)
7. Field boring/test pit logs for soil profiling
8. Infiltration Testing Log
9. Sieve analysis results per ASTM D422-63, down to No. 200 sieve, and USCS classification per ASTM D2487 of each sample.
10. Photographs of testing.

4. Stormwater Calculations and Methodology

a. Runoff Estimation

i. The entire watershed to the point of investigation is to be included in the hydrologic computations.

ii. Pre- and post- development flood analysis must be performed for the 2, 5, 10, 25, and 100 year design storms.

iii. Complete runoff, flow routing, and culvert analyses must be performed for the 100-year design storm.

iv. The "United States Soil Conservation Service Hydrograph Method", utilizing either the TR-55 Tabular Hydrograph Method or the TR-20 program, shall be used for determining the discharges for design and analysis of culverts, SWM facilities, and open channels.
    1. The Graphical Peak Discharge Method may be used only when development is within a homogeneous watershed (watershed subdivision not required), and reservoir routing is not required.

v. All calculations require using design rainfall depths distributed in a NRCS Type II 24-hour dimensionless rainfall distribution.

vi. The NRCS Curve Number Method is to be used to estimate site stormwater runoff from a given storm.

vii. Acceptable Infiltration Loss Model methods for calculating runoff are: Constant Loss, Green-Ampt, Horton.

viii. Design precipitation depths must be sourced from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Version 3 Data (2010 or latest).

ix. Time of concentration
    1. The applicant shall determine a representative time of concentration based upon land use, slopes, and soil groups.
    2. All flow paths shall be indicated on the drainage area maps and supported by backup computations.
    3. Time of concentration paths must be shown from the hydraulically most distant point of each drainage area to a point of interest within the drainage area, and the path must be perpendicular to each area's contours.
    4. The post-development Tc will be less than or equal to the predevelopment Tc values, unless the site is specifically altered to increase this path.
    5. Total post-development Tc for any path must be no less than six minutes.

x. Void storage within ballast should not be considered for storage or routing purposes.

b. Flow Routing

i. Sheet Flow and Shallow Concentrated Flow
   1. Sheet flow should only be considered for the first 100 feet. After sheet flow, overland flow is considered shallow concentrated flow over paved or unpaved surface.
   2. Acceptable Mathematical Mode of Computation
      a. Simplified Manning kinematic solution for sheet flow paths under 100 feet.
      b. Shallow concentrated/NRCS empirical curve
      c. Kinematic Wave
   3. Acceptable Computational Software
      a. TR-20, TR-55, EPA SWMM, HEC-HMS

ii. Channel Flow
   1. Acceptable Mathematical Mode of Computation
      a. Manning's equations may be used to estimate flows in free-flowing swales with uniform flow without a tailwater condition.
      b. St. Venant equations
   2. Acceptable Computational Software
      a. TR-55, TR-20, EPA SWMM, HEC-HMS, HEC-RAS

iii. Storage Routing
   1. A maximum time step of 0.01 hours is required for any hydrologic software computations.
   2. Acceptable Mathematical Mode of Computation
      a. Simple mass balance
      b. Modified Puls/storage-indication
   3. Acceptable Computational Software
      a. USACE STORM, TR-55, TR-20, HEC-HMS

iv. The post-development headwater pool elevations shall be determined taking into consideration the following:
   1. Storage at the inlet of the culvert.
   2. Overflow into or from an adjacent drainage basin.
   3. Tailwater elevations from downstream drainage, headwater pools, floodplains, and storm-water management facilities.
   4. Extension of the culvert to accommodate railroad embankment widening.

v. Should the outlet of the river be influenced by tidal fluctuations, the maximum predicted high tide, including wind-wave set up, is taken as the starting elevation.

c. Culvert Analysis

i. Culvert Analysis to be performed in accordance with AREMA Volume 1 Chapter 2 Part 4.9 Hydraulics of Culverts requirements.

ii. As a minimum, it is recommended that the culvert shall be designed to discharge:
   a. a 25-year flood without static head at entrance, and
   b. a 100-year flood using the available head at entrance, the head to 2 feet below base of rail, or the head to a depth of 1.5 times the culvert diameter/rise, whichever is less.

d. Rational Method

i. The Rational Method may be used when designing storm sewers. The Rational Method shall be used for determining the discharges for design and analysis of

closed drainage systems (those consisting of pipes and similar structures). The Rational Method may also be used for areas of 20 acres or less. The Rational Method is defined by the following equation:

$$Q=CiA$$ Where :

Q - peak flow (cfs).

C - dimensionless runoff coefficient.

i - rainfall intensity (in/hr).

A - catchment area (acres).

ii. A runoff coefficient value of 0.35 must be used for pervious areas.

iii. A runoff coefficient value of 0.95 must be used for impervious areas.

iv. Precipitation intensity must be sourced from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Version 3 Data (2010 or latest) for the Intensity Duration Frequency (IDF).

v. For use with Manning's Equation for calculating full channel flow, a Manning's n value of 0.013 must be used for RCP, VCP, and CIP, and a value of 0.011 must be used for PVC and HDPE.

e. Alternative Methods

i. Alternative methods that may be required by local governing or regulating authorities, provided they are more restrictive then the above and use the 100-year design storm event as the design standard.

5. Stormwater Management Practice Design Criteria

All requirements in the section herein must be met and supported by calculations in adherence to Section 4 Stormwater Calculations and Methodology

a. Open Channels

i. The minimum depth of all open channels is 2 feet below finished subgrade at the shoulder of the roadbed.

ii. The maximum side slope for all drainage ditches is 2:1.

iii. The minimum slope for all drainage ditches is .25%.

iv. The minimum bottom width is 3 feet.

v. Width as required to accommodate hydraulics.

vi. The water surface elevations for new open channels for a 100-year design storm shall be at least 1 in. below the bottom of the railroad tie elevation.

vii. Open channels shall be checked for velocity, depth of flow and type of lining for the design storm including locations in the channel where:

1. Other swales and ditches outlet into the channel.
2. The typical section of the channel changes significantly
3. The grade of the channel changes (either flattens or steepens).

viii. All channels must have linings, which will not erode at design velocities.

ix. Channels with a velocity under 3 ft/sec may be unlined.

x. Tributary channels shall be designed to intersect the railroad side ditch at an angle of between 30° and 60°.

xi. Ditches must not change percent of grade in close proximity to headwalls or end sections. Changes in slopes at these locations may cause undermining or clogging of the structure, due to changes in velocity, and are therefore not allowed.

xii. Supercritical flow should be avoided in the trackside ditch design.

b. Closed Networks, Culverts, and Underdrains

i. General design requirements for designing pipes within the Amtrak ROW are found in Amtrak's Engineering Practice EP 3005 "Pipeline Occupancy Specification 02081A."
ii. The minimum slope for all culverts is 2% (1/4 inch per foot).
iii. The minimum slope for underdrains is 0.2%.
iv. The maximum slope for all culverts is 15% (1.5 inch per foot).
v. The following materials are acceptable for proposed culverts and underdrains:
    1. Reinforced concrete pipe – ASTM C76, Class V. Wall C
    2. Ductile Iron Pipe – ANSI A21.51, Class 56
    3. Corrugated Metal Pipe – AREMA Manual, Chapter 1, Part 4.
    4. Cast Iron Pipe – for culverts and gravity sewers – ASTM A-716 Extra Heavy.
    5. Steel Pipe – ASTM A53, Type E or S, Grade A or B
vi. The minimum cover for a proposed culvert below the railroad is 5.5' below the bottom of railroad tie.
vii. Proposed culverts below the railroad must act as pipe crossings running perpendicular to the tracks at a 90 angle.
viii. Pipes may not run parallel underneath the tracks.
ix. Perforated underdrains may not be used for conveyance.
x. Perforated pipes are prohibited for pipes crossing underneath railroad tracks.
xi. Perforated underdrains must be wrapped in geotextile, surrounded by a 6" layer of 2A stone on all sides, and wrapped in a layer of geotextile.
xii. Perforations, unless otherwise specified, shall be arranged in two groups of longitudinal rows placed symmetrically on each side of an unperforated segment corresponding to the flow line of the pipe. The longitudinal rows within each group shall be spaced on approximately 1-1/2 inches centers in annularly corrugated pipe and on approximately 1-inch centers on helically corrugated pipe. The perforations shall have a diameter of approximately 3/8 inch and shall be located on the inside crests, or on the neutral axis, of all corrugations except that perforations are not required within 6 inches of each pipe or in the crests of corrugations where seams are located.
xiii. Pipe profiles must be provided and include all existing and proposed utilities.
xiv. All storm sewer pipes must be designed to have adequate capacity to safely convey the 100-year design storm without surcharging the crown of the pipe.
xv. Hydraulic gradient computations must be provided for the 100-year design storm. This must be plotted on the pipe profiles and be below the top of grate or manhole cover.
xvi. Culverts must have a minimum inside diameter of 24-inches.
xvii. Perforated underdrains must have a minimum inside diameter of 6 inches.
xviii. Manholes for culverts must be spaced no more than 300 feet apart.
    1. Handholes and cleanouts are not acceptable manhole alternatives for culverts.
xix. Cleanouts for perforated underdrains must be spaced no more than 200 feet apart.
xx. Perforated underdrains must be proposed below the frost line.

c. Inlet Controls

i. Inlet controls shall be sized based on the size of the contributing drainage area, the amount of sediment expected from the discharging waters, the size and

frequency of runoff events, and the amount of maintenance expected, recognizing that an undersized system will required more frequent maintenance.

ii. Catch basins must have a sump of at least 2.5 feet.

iii. All inlets and catch basins must be designed with an inlet grate with no opening larger than 1-5/8 inches.

iv. Trash racks must be provided for all orifices draining surface basins.

v. Headwalls and Wingwalls

   a. The headwall should have adequate integral strength and should be proportioned to prevent sliding or overturning from excessive soil pressures. The headwall is expected to carry normal retaining wall forces applied by the soil slope as well as forces applied by the culvert along any cut edges or skewed alignments. The headwall should be self-supporting, and every effort should be made to generate a design that has tolerable differential settlement.

   b. Wingwalls, if skewed, are not to change the stream direction or encourage turbulence during periods of heavy runoff.

d. Structural SMPs

i. Structures proposing infiltration must be located a minimum distance of 50-feet from tracks and structures and outside the limits of interlockings.

ii. Design of such structures must place the drywell bottom no less than 5-feet in elevation above the observed mean high groundwater elevation as observed by testing at the proposed drywell location.

e. Outfall Protection

i. A method of energy dissipation must be designed at the outlet of every culvert and/or drainage facility to prevent scour. The following methods are to be used for scour protection at outfalls:

   a. Riprap (In conformance with HEC 11 and 14)

   b. Energy Dissipaters: (In conformance with HEC 14)

   c. Flexible Linings (In conformance with HEC 15)

   d. Drop Structures

ii. Flexible lining or filter fabric is acceptable in situations where the calculated design velocity of the pipe outfall is less than < 5 ft/sec, and the pipe diameter is less than or equal to <= 24 in (or round equivalent)

iii. Riprap is to be used in situations where the calculated design velocity at the pipe outfall is between 5 ft/sec to 17 ft/sec or the pipe size is greater than > 24 in (round equivalent).

iv. Riprap basins, drop structures, or energy dissipaters are to be used used in situations where calculated design flow at the pipe outfall is > 14 ft/sec.

v. Outfalls must not be directed directly in the direction of the tracks. An alignment of 45 degrees or more perpendicular from the tracks is required.

vi. Outfalls should be oriented so that the discharge enters the receiving channel at less than 90 degrees to the channel flow direction. In no case should the discharge enter the channel at an angle greater than 90 degrees to the channel flow direction.

6. Erosion and Sediment Control

a. Inspection and maintenance of all erosion and sediment control best management practices shall occur on a weekly basis, before any anticipated precipitation events, and after all precipitation events.
b. Filter fabric fence should be installed at level grade. Both ends of each fence section should be extended at least 8 feet upslope at 45 degrees to the main barrier alignment. Support stakes shall be spaced at a maximum of 8 feet. Sediment must be removed when accumulations reach ½ the above ground height of the filter fence.
c. Any fence section which has been undermined or topped must be immediately replaced with a rock filter outlet. Sediment must be removed when accumulations reach 1/3 the height of the outlet.
d. Erosion control blanketing shall be installed on all slopes 3H:1V or steeper upstream of any existing or proposed stormwater feature and on all other disturbed areas specified on the plan maps and/or detail sheets.
e. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to minimize the potential for erosion and sediment pollution and notify Amtrak.
f. Until the site is stabilized, all E&S Best Management Practices (BMPs) shall be maintained properly. Maintenance shall include inspections of all E&S BMPs prior to any anticipated storm event, after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching, and renetting, must be performed immediately. If the E&S BMPs fail to perform as expected, replacement BMPs, or modifications of those installed, will be required.
g. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems.
h. All earthen fills shall be placed in compacted layers not to exceed nine inches in thickness.
i. Fill shall not be placed on saturated or frozen surfaces.
j. Seeps or springs encountered during construction shall be handled in accordance with the standard and specification for subsurface drain or other approved method.

7. Post Construction Operations and Maintenance

a. Open Channels

i. Inspect erosion control until soil settlement and vegetative establishment of contributing areas has occurred.
ii. Inspect inlet controls, outlet structural, and storage areas for trash and sediment accumulation.
iii. Remove litter and debris regularly.
iv. Remove sediment when the sediment zone is ¾ full.

b. Closed Networks

i. Remove litter and debris regularly.
ii. Inspect inlet controls, outlet structural, and storage areas for trash and sediment accumulation.

c. Structural SMPs

i. Evaluate the drain down time of the SMP after a storm of at least one inch.
ii. Remove litter and debris regularly.
iii. Inspect inlet controls, outlet structural, and storage areas for trash and sediment accumulation.

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STORMWATER MANAGEMENT POLICY

Abbreviations

- **BMP: Best Management Practice**
- **DBH: Diameter at Breast Height**
- **DER: Design Exception Request**
- **EOR: Engineer of Record**
- **ESC: Erosion and Sediment Control**
- **SMP: Stormwater Management Practice**
- **ROW: Right-of-Way**

Related Documents

Other specifications or engineering practices in effect for design to adhere to (the latest version available):

- Amtrak Track Specification 63 Track Design
- Amtrak Structures Engineering Practice 3016 Storm Water Drainage and Discharge from adjacent property onto Amtrak ROW. (Applicable for basis of design and policy)
- Amtrak Structures Engineering Practice 3005 Pipeline Occupancy Requirements and Specifications. (Applicable for construction methods and materials)
- AREMA Manual for Railway Engineering
- Amtrak Land Surveying Standards and Procedures Manual