

**PRIVATE DETENTION BASIN /  
STORMWATER QUALITY BEST MANAGEMENT PRACTICE  
MAINTENANCE AGREEMENT AND EASEMENT**

This PRIVATE DETENTION BASIN / STORMWATER QUALITY BEST MANAGEMENT PRACTICE MAINTENANCE AGREEMENT AND EASEMENT (Agreement) is made by and between EL PASO COUNTY by and through THE BOARD OF COUNTY COMMISSIONERS OF EL PASO COUNTY, COLORADO (Board or County) and NEW BREED RANCH INC. (Developer) and NEW BREED RANCH ASSOCIATION, INC. (Homeowners Association or Association), a Colorado nonprofit corporation. The above may occasionally be referred to herein singularly as “Party” and collectively as “Parties.”

Recitals

A. WHEREAS, Developer is the owner of certain real estate (the Property or Subdivision) in El Paso County, Colorado, which Property is legally described in Exhibit A attached hereto and incorporated herein by this reference; and

B. WHEREAS, Developer desires to plat and develop on the Property a subdivision to be known as NEW BREED RANCH FILING THREE; and

C. WHEREAS, the development of this Property will substantially increase the volume of water runoff and will decrease the quality of the stormwater runoff from the Property, and, therefore, it is in the best interest of public health, safety and welfare for the County to condition approval of this subdivision on Developer’s promise to construct adequate drainage, water runoff control facilities, and stormwater quality structural Best Management Practices (“BMPs”) for the subdivision; and

D. WHEREAS, Chapter 8, Section 8.4.5 of the El Paso County Land Development Code, as periodically amended, promulgated pursuant to Section 30-28-133(1), Colorado Revised Statutes (C.R.S.), requires the County to condition approval of all subdivisions on a developer’s promise to so construct adequate drainage, water runoff control facilities, and BMPs in subdivisions; and

E. WHEREAS, the Drainage Criteria Manual, Volume 2, as amended by Appendix I of the El Paso County Engineering Criteria Manual (ECM), as each may be periodically amended, promulgated pursuant to the County’s Colorado Discharge Permit System General Permit (MS4 Permit) as required by Phase II of the National Pollutant Discharge Elimination System (NPDES), which MS4 Permit requires that the County take measures to protect the quality of stormwater from sediment and other contaminants, requires subdividers, developers, landowners, and owners of facilities located in the County’s rights-of-way or easements to provide adequate permanent stormwater quality BMPs with new development or significant redevelopment; and

F. WHEREAS, Section 2.9 of the El Paso County Drainage Criteria Manual provides for a developer’s promise to maintain a subdivision’s drainage facilities in the event the County does not assume such responsibility; and

G. WHEREAS, developers in El Paso County have historically chosen water runoff detention basins as a means to provide adequate drainage and water runoff control in subdivisions, which basins,

while effective, are less expensive for developers to construct than other methods of providing drainage and water runoff control; and

H. WHEREAS, Developer desires to construct for the subdivision one rain garden as a stormwater quality BMP(s) (“detention basin/BMP(s)”) as the means for providing adequate drainage and stormwater runoff control and to meet requirements of the County’s MS4 Permit, and to provide for operating, cleaning, maintaining and repairing such detention basin/BMP(s); and

I. WHEREAS, Developer desires to construct the detention basin/BMP(s) on property that will be platted as Lot 1, New Breed Ranch Filing Three, and as set forth on Exhibit B attached hereto; and

J. WHEREAS, Developer shall be charged with the duty of constructing the detention basin/BMP(s) and the Association shall be charged in the Subdivision’s Covenants with the duties of operating, maintaining and repairing all common areas and common structures within the Subdivision, including the detention basin/BMP(s) on the Property described in Exhibit B; and

K. WHEREAS, it is the County’s experience that subdivision developers and homeowners’ associations historically have not properly cleaned and otherwise not properly maintained and repaired these detention basins/BMPs, and that these detention basins/BMPs, when not so properly cleaned, maintained, and repaired, threaten the public health, safety and welfare; and

L. WHEREAS, the County, in order to protect the public health, safety and welfare, has historically expended valuable and limited public resources to so properly clean, maintain, and repair these detention basins/BMPs when developers and homeowners’ associations have failed in their responsibilities, and therefore, the County desires the means to recover its costs incurred in the event the burden falls on the County to so clean, maintain and repair the detention basin/BMP(s) serving this Subdivision due to the Developer’s or the Association’s failure to meet its obligations to do the same; and

M. WHEREAS, the County conditions approval of this Subdivision on the Developer’s promise to so construct the detention basin/BMP(s), and further conditions approval on the Association’s promise to reimburse the County in the event the burden falls upon the County to so clean, maintain and/or repair the detention basin/BMP(s) serving this Subdivision; and

N. WHEREAS, the County could condition subdivision approval on the Developer’s promise to construct a different and more expensive drainage, water runoff control system and BMPs than those proposed herein, which more expensive system would not create the possibility of the burden of cleaning, maintenance and repair expenses falling on the County; however, the County is willing to forego such right upon the performance of Developer’s and the Association’s promises contained herein; and

O. WHEREAS, the County, in order to secure performance of the promises contained herein, conditions approval of this Subdivision upon the Developer’s grant herein of a perpetual Easement over a portion of the Property for the purpose of allowing the County to periodically access, inspect, and, when so necessary, to clean, maintain and/or repair the detention basin/BMP(s); and

P. WHEREAS, given that the Association could potentially avoid liability hereunder by dissolving and reforming as a different entity, and given the difficulties inherent in collecting an unsecured promise, the County, in order to secure performance of the promises contained herein, conditions approval

of this Subdivision upon the Developer's creation, by and through this Agreement, of a covenant running with the land upon each and every lot in the Subdivision.

### Agreement

NOW, THEREFORE, in consideration of the mutual Promises contained herein, the sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Incorporation of Recitals: The Parties incorporate the Recitals above into this Agreement.
2. Covenants Running with the Land and Pro Rata Liability upon Individual Lot Owners: Developer and the Association agree that this entire Agreement and the performance thereof shall become a covenant running with the land, which land is legally described in Exhibit A attached hereto, and that this entire Agreement and the performance thereof shall be binding upon themselves, their respective successors and assigns, including individual lot owners within the Subdivision.

However, any liability imposed under this Agreement against an individual lot owner shall not be joint and several with the Developer and the Association, but shall be pro rated on a per-lot basis as determined by the following formula and illustration: each individual lot owner(s) shall be liable for no more than the total monetary amount of liability multiplied by a fraction in which the numerator is the number of lots in the Subdivision owned by a particular lot owner, and the denominator is the total number of lots in the Subdivision. As to any lot(s) owned by more than one person or entity, the liability among co-owners shall be joint and several for the pro rata obligation of that lot. The application of this Paragraph is best illustrated by the following example. Assume the following parameters: total liability is \$10,000; total number of lots in the Subdivision is 100; Lot 1 is owned by persons A and B; person B also owns Lot 2. Liability is as follows: the Developer, \$10,000; the Association, \$10,000; Lot 1 is \$100.00, joint and several as to A and B, Lot 2 is \$100.00 owed solely by B. Thus, person A's total liability is \$100.00 and person B's is \$200.00. Applying the principle that the County cannot collect more than it is owed, and assuming that the County cannot collect anything from the Developer and the Association, if the County collected the whole \$200.00 from B, then it could not collect the \$100.00 from A. Likewise, if the County collected the \$100.00 from A, then it could only collect \$100.00 from B.

3. Construction: Developer shall construct on that portion of the Property described in Exhibit B attached hereto and incorporated herein by this reference, one detention basin/BMP(s) and two rain gardens. Developer shall not commence construction of the detention basin/BMP(s) until the El Paso County Planning and Community Development Department (PCD) has approved in writing the plans and specifications for the detention basin/BMP(s) and this Agreement has been signed by all Parties and returned to the PCD. Developer shall complete construction of the detention basin/BMP(s) in substantial compliance with the County-approved plans and specifications for the detention basin/BMP(s). Failure to meet these requirements shall be a material breach of this Agreement and shall entitle the County to pursue any remedies available to it at law or in equity to enforce the same. Construction of the detention basin/BMP(s) shall be substantially completed within one (1) year (defined as 365 days), which one year period will commence to run on the date the approved plat of this Subdivision is recorded in the records of the El Paso County Clerk and Recorder. Rough grading of the detention basin/BMP(s) must be completed and inspected by the El Paso County Planning and Community Development Department prior to commencing road construction.

In the event construction is not substantially completed within the one (1) year period, then the County may exercise its discretion to complete the project and shall have the right to seek reimbursement from the Developer and the Association and their respective successors and assigns, including individual lot owners in the Subdivision, for its actual costs and expenses incurred in the process of completing construction. The term actual costs and expenses shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tool and equipment costs, supply costs, and engineering and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the Provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same. The scope of liability therefor of the Developer, the Association, and the individual lot owners shall be as set forth in Paragraph Two (2) above.

4. Maintenance: The Developer and the Association agree for themselves, their respective successors and assigns, including individual lot owners within the Subdivision, that they will regularly and routinely inspect, clean and maintain the detention basin/BMP(s), and otherwise keep the same in good repair, all at their own cost and expense. No trees or shrubs that will impair the structural integrity of the detention basin/BMP(s) shall be planted or allowed to grow on the detention basin/BMP(s).

5. Creation of Easement: Developer and the Association hereby grant the County a non-exclusive perpetual easement upon and across that portion of the Property described in Exhibit B. The purpose of the easement is to allow the County to access, inspect, clean, repair and maintain the detention basin/BMP(s); however, the creation of the easement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

6. County's Rights and Obligations: Any time the County determines, in the sole exercise of its discretion, that the detention basin/BMP(s) is not properly cleaned, maintained and/or otherwise kept in good repair, the County shall give reasonable notice to the Developer, the Association and their respective successors and assigns, including the individual lot owners within the Subdivision, that the detention basin/BMP(s) needs to be cleaned, maintained and/or otherwise repaired. The notice shall provide a reasonable time to correct the problem(s). Should the responsible parties fail to correct the specified problem(s), the County may enter upon the Property to so correct the specified problem(s). Notice shall be effective to the above by the County's deposit of the same into the regular United States mail, postage pre-paid. Notwithstanding the foregoing, this Agreement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

7. Reimbursement of County's Costs: The Developer and the Association agree and covenant, for themselves, their respective successors and assigns, including individual lot owners within the Subdivision, that they will reimburse the County for its costs and expenses incurred in the process of completing construction of, cleaning, maintaining, and/or repairing the detention basin/BMP(s) pursuant to the provisions of this Agreement; however, the obligation and liability of the Developer hereunder shall only continue until such time as the Developer transfers the entire management and operation of the Association to the individual lot owners within the Subdivision. Notwithstanding the previous sentence, the Association and the individual lot owners within the Subdivision shall always remain obligated and liable hereunder, and as per the provisions of Paragraph Two (2) above.

The term "actual costs and expenses" shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering

and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney's fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same. The scope of liability therefor of the Developer, the Association, and the individual lot owners shall be as set forth in Paragraph Two (2) above.

8. Contingencies of Subdivision Approval: Developer's and the Association's execution of this Agreement is a condition of subdivision approval. Additional conditions of this Agreement include, but are not limited to, the following:

- a. The County's receipt of a copy of the Articles of Incorporation for the Association, as filed with the Colorado Secretary of State; receipt of the Certificate of Incorporation or other comparable proof for the same from the Colorado Secretary of State; a copy of the Bylaws of the Association; a copy of the organizational minutes or other appropriate document of the Association, properly executed and attested, establishing that the Association has adopted this Agreement as an obligation of the Association; and
- b. A copy of the Covenants of the Subdivision establishing that the Association is obligated to inspect, clean, maintain, and repair the detention basin/BMP(s); that the Association has adopted this Agreement as an obligation of the Association; and that a funding mechanism is in place whereby individual lot owners within the Subdivision pay a regular fee to the Association for, among other matters, the inspection, cleaning, maintenance, and repair of the detention basin/BMP(s); and
- c. A copy of the Covenants of the Subdivision establishing that this Agreement is incorporated into the Covenants, and that such Agreement touches and concerns each and every lot within the Subdivision.

The County shall have the right, in the sole exercise of its discretion, to approve or disapprove any documentation submitted to it under the conditions of this Paragraph, including but not limited to, any separate agreement or amendment, if applicable, identifying any specific maintenance responsibilities not addressed herein. The County's rejection of any documentation submitted hereunder shall mean that the appropriate condition of this Agreement has not been fulfilled.

9. Distribution to Lot Purchasers: Upon the initial sale of any lot within the Subdivision, prior to closing on such sale, the Developer shall give a copy of this Agreement to the potential Buyer.

10. Agreement Monitored by El Paso County Planning and Community Development Department and/or El Paso County Department of Public Works: Any and all actions and decisions to be made hereunder by the County shall be made by the Director of the El Paso County Planning and Community Development Department and/or the Director of the El Paso County Department of Public Works. Accordingly, any and all documents, submissions, plan approvals, inspections, etc. shall be submitted to and shall be made by the Director of the Planning and Community Development Department and/or the Director of the El Paso County Department of Public Works.

11. Indemnification and Hold Harmless: To the extent authorized by law, Developer and the Association agree, for themselves, their respective successors and assigns, including the individual lot

owners in the Subdivision, that they will indemnify, defend, and hold the County harmless from any and all loss, costs, damage, injury, liability, claim, lien, demand, action and causes of action whatsoever, whether at law or in equity, arising from or related to their respective intentional or negligent acts, errors or omissions or that of their agents, officers, servants, employees, invitees and licensees in the construction, operation, inspection, cleaning (including analyzing and disposing of any solid or hazardous wastes as defined by State and/or Federal environmental laws and regulations), maintenance, and repair of the detention basin/BMP(s), and such obligation arising under this Paragraph shall be joint and several. Nothing in this Paragraph shall be deemed to waive or otherwise limit the defense available to the County pursuant to the Colorado Governmental Immunity Act, Sections 24-10-101, *et seq.* C.R.S., or as otherwise provided by law. However, the obligation and liability of the Developer hereunder shall only continue until such time as the Developer transfers the entire management and operation of the Association to the individual lot owners within the Subdivision.

12. Severability: In the event any Court of competent jurisdiction declares any part of this Agreement to be unenforceable, such declaration shall not affect the enforceability of the remaining parts of this Agreement.

13. Third Parties: This Agreement does not and shall not be deemed to confer upon or grant to any third party any right to claim damages or to bring any lawsuit, action or other proceeding against either the County, the Developer, the Association, or their respective successors and assigns, including any individual lot owners in the Subdivision, because of any breach hereof or because of any terms, covenants, agreements or conditions contained herein.

14. Solid Waste or Hazardous Materials: Should any refuse from the detention basin/BMP(s) be suspected or identified as solid waste or petroleum products, hazardous substances or hazardous materials (collectively referred to herein as “hazardous materials”), the Developer and the Association shall take all necessary and proper steps to characterize the solid waste or hazardous materials and properly dispose of it in accordance with applicable State and/or Federal environmental laws and regulations, including, but not limited to, the following: Solid Wastes Disposal Sites and Facilities Acts, §§ 30-20-100.5 – 30-20-119, C.R.S., Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, 6 C.C.R. 1007-2, *et seq.*, Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k, and Federal Solid Waste Regulations 40 CFR Ch. I. The County shall not be responsible or liable for identifying, characterizing, cleaning up, or disposing of such solid waste or hazardous materials. Notwithstanding the previous sentence, should any refuse cleaned up and disposed of by the County be determined to be solid waste or hazardous materials, the Developer and the Association, but not the County, shall be responsible and liable as the owner, generator, and/or transporter of said solid waste or hazardous materials.

15. Applicable Law and Venue: The laws, rules, and regulations of the State of Colorado and El Paso County shall be applicable in the enforcement, interpretation, and execution of this Agreement, except that Federal law may be applicable regarding solid waste or hazardous materials. Venue shall be in the El Paso County District Court.

IN WITNESS WHEREOF, the Parties affix their signatures below.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, by:

NEW BREED RANCH INC.

By: \_\_\_\_\_  
James Scott, President

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, by James Scott, President.

Witness my hand and official seal.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, by:

NEW BREED RANCH ASSOCIATION, INC., a Colorado nonprofit corporation.

By: \_\_\_\_\_  
\_\_\_\_\_, President

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, by \_\_\_\_\_, President, NEW BREED RANCH ASSOCIATION, INC., a Colorado nonprofit corporation.

Witness my hand and official seal.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by:

BOARD OF COUNTY COMMISSIONERS  
OF EL PASO COUNTY, COLORADO

By: \_\_\_\_\_  
Meggan Herington, Executive Director  
Planning and Community Development Department  
Authorized signatory pursuant to LDC

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_,  
20\_\_, by Meggan Herington, Executive Director of El Paso County Planning and Community  
Development Department.

Witness my hand and official seal.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

Approved as to Content and Form:

\_\_\_\_\_  
Assistant County Attorney



## EXHIBIT A

### DEVELOPMENT PROPERTY DESCRIPTION

A parcel of land in the South one half of Section 10, Township 12 South, Range 66 West of the 6<sup>th</sup> Principal Meridian, El Paso County, Colorado, more particularly described as follows:

Beginning at the Southeast corner of Lot 11, New Breed Ranch Filing One, recorded in the El Paso County Clerk and Recorder's office on June 03, 2002 under Reception Number 202089110 and considering the East line of Abert Estates from the Northwest Corner of Section 15 to the Northeasterly corner of Lot 21, as monumented and described on said Filing One to bear North 00° 49' 55" West, with all bearings contained herein relative thereto;

Thence Easterly along the North right of way line of Meadow Run Circle and along the arc of a curve to the left a distance of 203.27 feet to a point of tangent, said curve has a radius of 570.00 feet and a central angle of 20° 25' 56";

Thence North 78° 49' 00" East along said North right of way line and along said tangent a distance of 201.09 feet to the Northeast corner of Meadow Run Circle as platted in said Filing One;

Thence continuing North 78° 49' 00" East along said right of way line and said tangent now in New Breed Ranch Filing Two, recorded June 6<sup>th</sup>, 2013 under Reception Number 213713330, a distance of 344.97 feet to a point of curve;

Thence Easterly along the arc of a curve to the right a distance of 217.21 feet, said curve has a radius of 630.00 feet and a central angle of 19° 45' 14" to a point of reverse curve;

Thence Easterly along the arc of a curve to the left a distance of 204.27 feet, said curve has a radius of 570.00 feet and a central angle of 20° 31' 58" to the Southerly corner of Lot 11, said Filing Two;

Thence leaving said right of way line and along the West line of Filing Two the following 4 courses:

Thence North 11° 57' 44" West a distance of 431.17 feet;

Thence North 55° 16' 25" East a distance of 369.76 feet;

Thence North 35° 15' 41" West a distance of 188.74 feet;

Thence North 35° 28' 30" East a distance of 342.73 feet to the Northwest corner of Lot 10;

Thence North 61° 41' 56" West, leaving said Filing Two a distance of 1043.78 feet to a point on the East line of Lot 8, New Breed Ranch Filing One that is 153.32 feet Southwest of the Northeast corner of said Lot 8;

Thence Southwesterly along the East line of said Filing One the following 4 courses:

Thence South 28° 18' 04" West a distance of 561.87 feet;

Thence South 15° 46' 29" West a distance of 386.12 feet;

Thence South 11° 51' 54" West a distance of 418.88 feet;

Thence South 11° 51' 54" West a distance of 413.40 feet to the Point of Beginning.

Containing 34.70 acres, more or less.

## EXHIBIT B

### RAIN GARDEN A LEGAL DESCRIPTION

Rain Garden Property Description: Part of Lot 1, New Breed Ranch Filing Three (per subdivision plat)

# Operation and Maintenance Manual Porous Landscape Detention (PLDs) / Rain Gardens (RGs)

For

New Breed Ranch Filing Three  
SF247

## Rain Garden I-9.1

Reference:

**This plan is adapted from various maintenance manuals developed in the  
Colorado Front Range**

## PLD-1 BACKGROUND

Porous Landscape Detention (PLD) or Rain Garden (RG) is a common type of Stormwater BMP utilized within the Front Range of Colorado. PLDs consist of a low-lying vegetated area underlain by a sand and peat bed with an underdrain pipe. A shallow surcharge zone exists above the PLD for temporary storage of the Water Quality Capture Volume (WQCV). During a storm, accumulated runoff ponds in the vegetated zone and gradually infiltrates into the underlying sand and peat bed, filling the void spaces of the sand. The underdrain gradually dewateres the sand and peat bed and discharges the runoff to a nearby channel, swale, or storm sewer. The PLD provides for filtering, adsorption, and biological uptake of constituents in stormwater<sup>1</sup>. The popularity of PLDs has increased because they allow the WQCV to be provided on a site that has little open area available for stormwater management.

## PLD-2 INSPECTING POROUS LANDSCAPE DETENTION (PLD)

### **PLD-2.1 Access and Easements**

Inspection or maintenance personnel may refer to the figures located in the approved GEC Plans for the project (SF247), containing the locations of the access points and potential maintenance easements of the PLD within this development (Rain Garden I-9.1).

### **PLD-2.2 Stormwater Best Management Practice (BMP) Locations**

Inspection or maintenance personnel may utilize the figures located in the approved GEC Plans for the project (SF247), containing the locations of the PLD within this development (Rain Garden I-9.1).

### **PLD-2.3 Porous Landscape Detention (PLD) Features**

PLDs have a number of features that are designed to serve a particular function. Many times the proper function of one feature depends on another. It is important for maintenance personnel to understand the function of each of these features to prevent damage to any feature during maintenance operations. Below is a list and description of the most common features within a PLD and the corresponding maintenance inspection items that can be anticipated:

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<sup>1</sup> Design of Stormwater Filtering Systems, Centers for Watershed Protection, December 1996

**Table PLD-1  
Typical Inspection & Maintenance Requirements Matrix**

	<b>Sediment Removal</b>	<b>Mowing Weed control</b>	<b>Trash/ Debris Removal</b>	<b>Erosion</b>	<b>Overgrown Vegetation Removal</b>	<b>Removal/ Replacement</b>	<b>Structure Repair</b>
<b>Inflow Points</b>	X		X	X			X
<b>Landscaping</b>	X	X	X	X	X		
<b>Filter Media</b>	X	X	X	X	X	X	
<b>Underdrain System</b>						X	
<b>Overflow Outlet Works</b>	X		X				X
<b>Embankment</b>		X	X	X	X		

PLD-2.3.1 Inflow Points

Inflow points or outfalls into PLDs are the point of stormwater discharge into the facility. An inflow point is commonly a curb cut with a concrete or riprap rundown. In limited cases, a storm sewer pipe outfall with a flared end section may be the inflow point into the PLD.

An energy dissipater (riprap or concrete wall) is typically immediately downstream of the discharge point into the PLD to protect the PLD from erosion. In some cases, the storm sewer outfall can have a toe-wall or cut-off wall immediately below the structure to prevent undercutting of the outfall from erosion.

*The typical maintenance items that are required at inflow points are as follows:*

*a. Riprap Displaced* – Many times, because of the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap rundown or apron appears to have settled, soil is present between the riprap, or the riprap has shifted, maintenance may be required to ensure future erosion is prevented.

*b. Erosion Present/Outfall Undercut* – In some situations, the energy dissipater may not have been sized, constructed, or maintained appropriately and erosion has occurred. Any erosion within the vicinity of the inflow point will require maintenance to prevent damage to the structure(s) and sediment transport within the facility. It is imperative that material utilized to correct erosion problems within the filter media meets the requirements for filter media as shown on the approved construction drawings.

*d. Sediment Accumulation* – Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in performance of the infrastructure, sediment that accumulates in this area must be removed on a timely basis.

*e. Structural Damage* – Structural damage can occur at anytime during the life of the facility. Typically, for an inflow, the structural damage occurs to the concrete or riprap rundown or pipe flared end section (concrete or steel). Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

#### PLD-2.3.2 Landscaping

The landscaped area consists of specific plant materials and associated landscaping mulch in the bottom of the PLD. These plantings provide several functions for the PLD. Planting not only provides an aesthetic value for the PLD, but in many cases assists with biological uptake or removal of pollutants.

The plants are carefully selected for use in the PLDs. Plants utilized in PLDs must be able to grow in dry sandy soils but also be able to withstand frequent inundation by stormwater runoff. These plants also must be able to withstand a variety of pollutants commonly found in stormwater runoff. In addition, plants utilized in PLDs cannot have a deep extensive root system that may cause maintenance difficulty or damage to the facility.

*The typical maintenance activities that are required within the landscape areas are as follows:*

*a. Woody Growth/Weeds Present* – Undesirable vegetation can grow in and around the landscaped area in the PLD that can significantly affect the performance of the facility. This type of vegetation includes dense areas of shrubs (willows) and noxious weeds. If undesired vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the filter media. Also, shrub and weed roots can cause damage to the filter media and underdrain system. Routine management is essential to prevent more extensive and costly future maintenance.

*b. General Landscape Care* – The landscape elements of the PLD are the same as any other landscape area and need to be provided with regular care. Landscape mulch will need to be removed and replaced to ensure the aesthetics of the PLD.

### PLD-2.3.3 Filter Media

The filter media is the main pollutant removal component of the PLD. The filter media consists of 18-inches of a mixture of washed sand and peat. The filter media removes pollutants through several different processes, including sedimentation, filtration, absorption, infiltration and microbial uptake.

Sedimentation is accomplished by the slow release of stormwater runoff through the filter media. This slow release allows sediment particles to be deposited on the top layer of the filter media where they are easily removed through routine maintenance. Other pollutants are also removed through this process because many pollutants utilize sediment as a transport mechanism.

Filtration is the main pollutant removal mechanism of PLDs. When the stormwater runoff migrates down through the filter media, many of the particulate pollutants are physically strained out as they pass through the filter bed of sand and are trapped on the surface or among the pores of the filter media.<sup>2</sup>

Absorption results from the peat utilized in the filter media. Organic materials have a natural ability to attach to soluble nutrients, metals and organic pollutants. This attachment then prevents these pollutants from leaving the PLD.

PLDs that are not lined with an impervious liner allow for infiltration into the native soils. This process also allows for additional pollutant removal.

Microbes that naturally occur in the filter media can assist with pollutant removal by breaking down organic pollutants.

*The typical maintenance activities that are required within the filter media areas are as follows:*

*a. Infiltration Rate Check* – The infiltration rate of the PLD needs to be checked in order to ensure proper functioning of the PLD. Generally, a PLD should drain completely within 12-hours of a storm event. If drain times exceed the 12-hour drain time then maintenance of the filter media shall be required.

*b. Sediment Removal* – Although PLDs should not be utilized in areas where large concentrations of sediment may enter the PLD, it is inevitable that some sediment will enter the PLD.

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<sup>2</sup> Design of Stormwater Filtering Systems, Centers for Watershed Protection, December 1996

*c. Filter Replacement* - The top layers of the filter media are the most susceptible to pollutant loading and therefore may need to be removed and disposed of properly on a semi-regular basis when infiltration rates slow.

#### PLD-2.3.4 Underdrain System

The underdrain system consists of a layer of geotextile fabric, gravel storage area and perforated PVC pipes. The geotextile fabric is utilized to prevent the filter media from entering the underdrain system. The gravel storage area allows for storage of treated stormwater runoff prior to the discharge of the runoff through the perforated PVC pipe.

*The typical maintenance activities that are for the underdrain system are as follows:*

With proper maintenance of the landscape areas and filter media, there should be a minimum amount of maintenance required on the underdrain system. Generally the only maintenance performed on the underdrain system is jet-vac cleaning.

#### PLD-2.3.5 Overflow Outlet Works

Generally, the initial runoff (or WQCV) during the storm event contains the majority of the pollutants. PLDs are designed to treat only the WQCV and any amount over the WQCV is allowed to go to a detention facility without water quality treatment. The overflow outlet works allows runoff amounts over the WQCV to exit the PLD to the stormwater system. The outlet works is typically constructed of a reinforced concrete box in the embankment of the PLD. The concrete structure typically has a steel grate to trap litter and other debris from entering the storm sewer system. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the PLD.

*The most typical maintenance items that are found with overflow outlet works are as follows:*

*a. Structural Damage* - The overflow outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel grate on the overflow outlet structure is also susceptible to damage.

*b. Woody Growth/Weeds Present* – The presence of plant material not part of the original landscaping, such as wetland plants or other



woody growth, can clog the overflow outlet works during a larger storm event, causing flooding damage to adjacent areas. This plant material may indicate a clogging of the filter media and may require additional investigation.

*c. Trash/Debris* – Trash and debris can accumulate in the upper area after large events, or from illegal dumping. Over time, this material can clog the PLD outlet works.

#### PLD-2.3.6 Embankments

Some PLDs utilize irrigated turf grass embankment to store the WQCV.

*The typical maintenance activities that are required with the embankments areas are as follows:*

*a. Vegetation Sparse* – The embankments are one of the most visible parts of the PLD, and therefore aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance of the PLD. Vegetation can reduce the potential for erosion and subsequent sediment transport to the filter media, thereby reducing the need for more costly maintenance.

*b. Erosion* – Inadequate vegetative cover may result in erosion of the embankments. Erosion that occurs on the embankments can cause clogging of the filter media.

#### PLD-2.3.7 Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the PLD. This category on the inspection form is for maintenance items that are commonly found in the PLD, but may not be attributed to an individual feature.

*a. Access* – Access needs to be maintained.

*b. Graffiti/Vandalism* – Vandals can cause damage to the PLD infrastructure. If criminal mischief is evident, the inspector should forward this information to the local emergency agency.

*c. Public Hazards* – Public hazards include items such as containers of unknown/suspicious substances, and exposed metal/jagged concrete on structures. **If any hazard is found within the facility area that poses an immediate threat to public safety, contact the local emergency services at 911 immediately.**

*d. Other* – Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

## PLD-3 MAINTAINING POROUS LANDSCAPE DETENTIONS (PLD)

### **PLD-3.1 Maintenance Personnel**

Maintenance personnel should be experienced to properly maintain PLDs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

### **PLD-3.2 Equipment**

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on a PLD:

- 1.) Mowing Tractors
- 2.) Trimmers (extra string)
- 3.) Shovels
- 4.) Rakes
- 5.) All Surface Vehicle (ASVs)
- 6.) Skid Steer
- 7.) Back Hoe
- 8.) Track Hoe/Long Reach Excavator
- 9.) Dump Truck
- 10.) Jet-Vac Machine
- 11.) Engineers Level (laser)
- 12.) Riprap (Minimum - Type M)
- 13.) Geotextile Fabric
- 14.) Erosion Control Blanket(s)
- 15.) Sod
- 16.) Illicit Discharge Cleanup Kits
- 17.) Trash Bags
- 18.) Tools (wrenches, screw drivers, hammers, etc)
- 19.) Confined Space Entry Equipment

- 20.) Approved Inspection and Maintenance Plan
- 21.) ASTM C-33 Sand
- 22.) Peat
- 23.) Wood Landscaping Mulch

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

### **PLD-3.3 PLD Maintenance Categories and Activities**

A typical PLD Maintenance Program will consist of three broad categories of work: Routine, Restoration (minor), and Rehabilitation (major). Within each category of work, a variety of maintenance activities can be performed on a PLD. A maintenance activity can be specific to each feature within the PLD, or general to the overall facility. This section of the SOP explains each of the categories and briefly describes the typical maintenance activities for a PLD.

A variety of maintenance activities is typical of PLDs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of the PLD filter media or underdrain system. Below is a description of each maintenance activity, the objectives, and frequency of actions:

### **PLD-3.4 ROUTINE MAINTENANCE ACTIVITIES**

The majority of this work consists of scheduled mowings, trash and debris pickups and landscape care for the PLD during the growing season. It also includes activities such as weed control. These activities normally will be performed numerous times during the year.

The Routine Maintenance Activities are summarized below, and further described in the following sections.

**Table PLD-2  
Summary of Routine Maintenance Activities**

<b>Maintenance Activity</b>	<b>Minimum Frequency</b>	<b>Look for:</b>	<b>Maintenance Action</b>
<b>Mowing</b>	Twice annually	Excessive grass height/aesthetics	2"-4" grass height
<b>Trash/Debris Removal</b>	Twice annually	Trash & debris in PLD	Remove and dispose of trash/debris
<b>Overflow Outlet Works Cleaning</b>	As needed - after significant rain events – twice annually minimum	Clogged outlet structure; ponding water above outlet elevation	Remove and dispose of debris/trash/sediment to allow outlet to function properly
<b>Weed Control</b>	As needed, based upon inspection	Noxious weeds; Unwanted vegetation	Treat w/herbicide or hand pull; consult a local Weed Inspector

PLD-3.4.1 Mowing

Routine mowing of the turf grass embankments is necessary to improve the overall appearance of the PLD. Turf grass should be mowed to a height of 2 to 4- inches and shall be bagged to prevent potential contamination of the filter media.

*Frequency* – Routine - Minimum of twice annually or depending on aesthetics.

PLD-3.4.2 Trash/Debris Removal

Trash and debris must be removed from the entire PLD area to minimize outlet clogging and to improve aesthetics. This activity must be performed prior to mowing operations.

*Frequency* – Routine – Prior to mowing operations and minimum of twice annually.

PLD-3.4.3 Overflow Outlet Works Cleaning

Debris and other materials can clog the overflow outlet work's grate. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

*Frequency* - Routine – After significant rainfall event or concurrently with other maintenance activities.

#### PLD-3.4.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the PLD. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with a local Weed Inspector is highly recommended prior to the use of herbicide. Herbicides should be utilized sparingly and as a last resort. All herbicide applications should be in accordance with the manufacturer's recommendations.

*Frequency* – Routine – As needed based on inspections.

### **PLD-3.5 RESTORATION MAINTENANCE ACTIVITIES**

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. In the event that the PLD needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. All dewatering activities shall be properly permitted.

**Table PLD-3  
Summary of Restoration Maintenance Activities**

<b>Maintenance Activity</b>	<b>Minimum Frequency</b>	<b>Look for:</b>	<b>Maintenance Action</b>
<b>Sediment/Pollutant Removal</b>	As needed; Based on infiltration test	Sediment build-up; decrease in infiltration rate	Remove and dispose of sediment
<b>Erosion Repair</b>	As needed, based upon inspection	Rills/gullies forming on embankments	Repair eroded areas & revegetate; address cause
<b>Jet Vac/Cleaning underdrain system</b>	As needed, based upon inspection	Sediment build-up /non draining system	Clean drains; Jet-Vac if needed

#### PLD-3.5.1 Sediment/Pollutant Removal

Sediment/Pollutant removal is necessary to ensure proper function of the filter media. The infiltration rate of the PLD needs to be checked in order to ensure proper functioning of the PLD. Generally, a PLD should drain completely within 12-hours of a storm event. If drain times exceed the 12-hour drain time then maintenance of the filter media shall be required.

Generally, the top 3-inches of filter media should be removed at each removal period. Additional amounts of filter media may need to be removed if deeper sections of the filter media are contaminated. New filter media will need to replace the removed filter media. It is critical that only sand that meets the American Society for Testing and Materials (ASTM) C-33 standard be utilized in the replacement of the filter media.

ASTM C-33 Sand Standard

<b>US Standard Sieve Size (Number)</b>	<b>Total Percent Passing (%)</b>
9.5 mm (3/8 inch)	100
4.75 mm (No. 4)	95-100
2.36 mm (No. 8)	80-100
1.18 mm (No. 16)	50-85
600µm (No. 30)	25-60
300µm (No. 50)	10-30
150µm (No. 100)	2-10

In addition, only Peat Moss that meets current City/County specifications (Drainage Criteria Manual, V. 2) and percentages shall be utilized with the filter media.

Other types of sand or soil material may lead to clogging of the PLD. The minor sediment removal activities can typically be addressed with shovels, rakes, and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur. The major sediment removal activities will also require surveying with an engineer’s level to ensure design volumes/grades are achieved.

Stormwater sediments removed from PLDs do not meet the regulatory definition of “hazardous waste”. However, these

sediments can be contaminated with a wide array of organic and inorganic pollutants and handling must be done with care. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a licensed landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup and disposal is imperative.

*Frequency* – Non-routine – As necessary, based upon inspections and infiltration tests. Sediment removal in the forebay and trickle channel may be necessary as frequently as every 1-2 years.

#### PLD-3.5.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper functioning of the PLD, to minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to filter media and embankments, to rills and gullies in the embankments and inflow points. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, and sod. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur.

*Frequency* – Non-routine – As necessary, based upon inspections.

#### PLD-3.5.3 Jet-Vac/Clearing Drains

A PLD contains an underdrain system that allows treated stormwater runoff to exit the facility. These underdrain systems can develop blockages that can result in a decrease of hydraulic capacity and create standing water. Many times the blockage to this infrastructure can be difficult to access and/or clean. Specialized equipment (jet-vac machines) may be necessary to clear debris from these difficult areas.

*Frequency* – Non-routine – As necessary, based upon inspections.

### **PLD-3.6 REHABILITATION MAINTENANCE ACTIVITIES**

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. This work requires review of the original design and construction drawings to assess the situation and assign the necessary maintenance. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

**Table PLD-4  
Summary of Rehabilitation Maintenance Activities**

<b>Maintenance Activity</b>	<b>Minimum Frequency</b>	<b>Look for:</b>	<b>Maintenance Action</b>
<b>Major Sediment/Pollutant Removal</b>	As needed – based upon scheduled inspections	Large quantities of sediment; reduced pond capacity	Remove and dispose of sediment. Repair vegetation as needed
<b>Major Erosion Repair</b>	As needed – based upon scheduled inspections	Severe erosion including gullies forming, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
<b>Structural Repair</b>	As needed – based upon scheduled inspections	Deterioration and/or damage to structural components – broken concrete, damaged pipes & outlet works	Structural repair to restore the structure to its original design
<b>PLD Rebuild</b>	As needed – due to complete failure of PLD	Removal of filter media and underdrain system	

PLD-3.6.1 Major Sediment/Pollutant Removal

Major sediment removal consists of removal of large quantities of pollutants/sediment/filter media/landscaping material. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur. Some PLDs also contain an impermeable liner that can be easily damaged if care is not taken when removing the filter media. Stormwater sediments removed from PLDs do not meet the regulatory definition of “hazardous waste”. However, these sediments can be contaminated with a wide array of organic and inorganic pollutants and handling must be done with care to ensure proper removal and disposal. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a licensed landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup and disposal is



imperative. Vegetated areas need special care to ensure design volumes and grades are preserved or may need to be replaced due to the removal activities.

*Frequency* – Non-routine – Repair as needed, based upon inspections.

#### PLD-3.6.2 Major Erosion Repair

Major erosion repair consists of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur.

*Frequency* – Non-routine – Repair as needed, based upon inspections.

#### PLD-3.6.3 Structural Repair

A PLD generally includes a concrete overflow outlet structure that can deteriorate or be damaged during the service life of the facility. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time. Major repairs to structures may require input from a structural engineer and specialized contractors.

*Frequency* – Non-routine – Repair as needed, based upon inspections.

#### PLD-3.6.4 PLD Rebuild

In very rare cases, a PLD may need to be rebuilt. Generally, the need for a complete rebuild is a result of improper construction, improper maintenance resulting in structural damage to the underdrain system, or extensive contamination of the PLD.

*Frequency* – Non-routine – As needed based upon inspections.

#### **Reference:**

This Manual is adapted from the SEMSWA (2007) and the Douglas County, Colorado (2005), Standard Operating Procedure for Extended Detention Basin (EDB) Inspection and Maintenance