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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 Woodmen-Utah LLC (Developer). 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) 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 develop on the Property a land use to be known as Woodmen Premier Storage; 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 land use on Developer's promise to construct adequate drainage, water runoff control facilities, and stormwater quality structural Best Management Practices ("BMPs") for the land use; 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 land use one detention basin/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 operate, clean, maintain and repair such detention basin/BMP(s); and

I. WHEREAS, Developer desires to construct the detention basin/BMP(s) the portion of the Property legally described and depicted on the Site Development Plan, and as set forth on Exhibit B attached hereto; and

J. WHEREAS, Developer shall be charged with the duties of constructing, operating, maintaining and repairing the detention basin/BMP(s) on the portion of the Property described in Exhibit B; and

K. WHEREAS, it is the County's experience that subdivision developers and property owners 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 property owners 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 land use due to the Developer's failure to meet its obligations to do the same; and

M. WHEREAS, the County conditions approval of this land use on the Developer's promise to so construct the detention basin/BMP(s) and 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 Property; and

N. WHEREAS, the County could condition land use 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 promises contained herein; and

O. WHEREAS, the County, in order to secure performance of the promises contained herein, conditions approval of this land use 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).

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: Developer agrees 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 itself, its successors and assigns.

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). Developer shall not commence construction of the detention basin/BMP(s) until the El Paso County Planning and Community Development Services 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. In cases where a subdivision is not required, the one-year period will commence to run on the date the Erosion and Stormwater Quality Control Permit (ESQCP) is issued. Rough grading of the detention basin/BMP(s) must be completed and inspected by the PCD 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 its successors and assigns, 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.

4. Maintenance: The Developer agrees, for itself and its successors and assigns, that it will regularly and routinely inspect, clean and maintain the detention basin/BMP(s) in compliance with the County-reviewed Operation and Maintenance Manual, attached hereto as Exhibit C and incorporated herein by reference, and otherwise keep the same in good repair, all at its 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 hereby grants 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 and its successors and assigns,

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 problems. Should the responsible parties fail to correct the specified problems, the County may enter upon the Property to so correct the specified problems. 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 / Covenant Running with the Land: The Developer agrees and covenants, for itself, its successors and assigns, that it 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.

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.

8. Contingencies of Land Use/Land Disturbance Approval: Developer's execution of this Agreement is a condition of land use/land disturbance approval.

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. 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.

10. Indemnification and Hold Harmless: Developer agrees, for itself, its successors and assigns, that it 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 its intentional or negligent acts, errors or omissions or that of its 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.

11. 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.

12. 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, or their respective successors and assigns, because of any breach hereof or because of any terms, covenants, agreements or conditions contained herein.

13. 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 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, but not the County, shall be responsible and liable as the owner, generator, and/or transporter of said solid waste or hazardous materials.

14. 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 3rd day of February, 2026, by:
Woodmen-Utah LLC

By: _____
George C. Hess III, Manager

The foregoing instrument was acknowledged before me this 3rd day of February, 2026 by George C. Hess III, Manager, Woodmen-Utah LLC.

Witness my hand and official seal.

My commission expires: 02/23/2028

_____
Notary Public

AMANDA SLEESMAN
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20244007923
MY COMMISSION EXPIRES FEBRUARY 23, 2028

Executed this 13 day of March, 20__, by:

BOARD OF COUNTY COMMISSIONERS
OF EL PASO COUNTY, COLORADO

By: _____

Christina Prete, Stormwater Operations & Compliance Manager
Engineering Division, Department of Public Works
Designee of Joshua Palmer, County Engineer
Authorized signatory pursuant to Resolution No. 24-145

The foregoing instrument was acknowledged before me this 16 day of march, 2026, by Christina prete, Stormwater Operations & Compliance Manager, El Paso County Department of Public Works.

Witness my hand and official seal.

My commission expires: 8/11/2029

_____

Notary Public

TIMOTHY CHAMBERS
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20254030547
MY COMMISSION EXPIRES 08/11/2029

Approved as to Content and Form:

Erika Keech

Assistant County Attorney

EXHIBIT "A"
LEGAL DESCRIPTION

DRAINAGE EASEMENT
A PORTION OF WARRANTY DEED RECORDED AT RECEPTION NO. 210131368, AND A PORTION OF DECREE QUIETING TITLE RECORDED AT RECEPTION NO. 222062672 OF THE EL PASO COUNTY CLERK AND RECORDER OFFICE, LOCATED IN THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 8, TOWNSHIP 13 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF COLORADO SPRINGS, COUNTY OF EL PASO, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS:
ALL BEARINGS ARE GRID BEARINGS OF THE COLORADO STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NORTH AMERICAN DATUM 1983. THE SOUTH LINE OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 8, TOWNSHIP 13 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN BEARS N89°21'18"E, MONUMENTED BY THE CENTER-NORTH SIXTEENTH CORNER OF SAID SECTION 8, BEING A 3/4" PIPE WITH NO IDENTIFICATION, AND BY THE NORTHEAST SIXTEENTH CORNER OF SAID SECTION 8, BEING A 3/4" PIPE WITH NO IDENTIFICATION.

COMMENCING AT THE NORTHEAST 1/16TH CORNER OF SAID SECTION 8;

THENCE N00°17'27"W, A DISTANCE OF 278.68 FEET TO THE SOUTHEAST CORNER OF SAID WARRANTY DEED, AND BEING THE **POINT OF BEGINNING**;

THENCE WITH THE SOUTH LINE OF SAID WARRANTY DEED AND SAID DECREE, S89°21'03"W, A DISTANCE OF 264.72 FEET TO THE SOUTHWEST CORNER OF SAID DECREE;

THENCE WITH THE WEST LINE OF SAID DECREE, N00°18'22"W, A DISTANCE OF 172.04 FEET;

THENCE DEPARTING SAID WEST DECREE LINE, N90°00'00"E, A DISTANCE OF 264.77 FEET TO A POINT ON THE EAST LINE OF SAID WARRANTY DEED;

THENCE WITH SAID EAST DEED LINE, S00°17'27"E, A DISTANCE OF 169.04 FEET TO THE **POINT OF BEGINNING**.

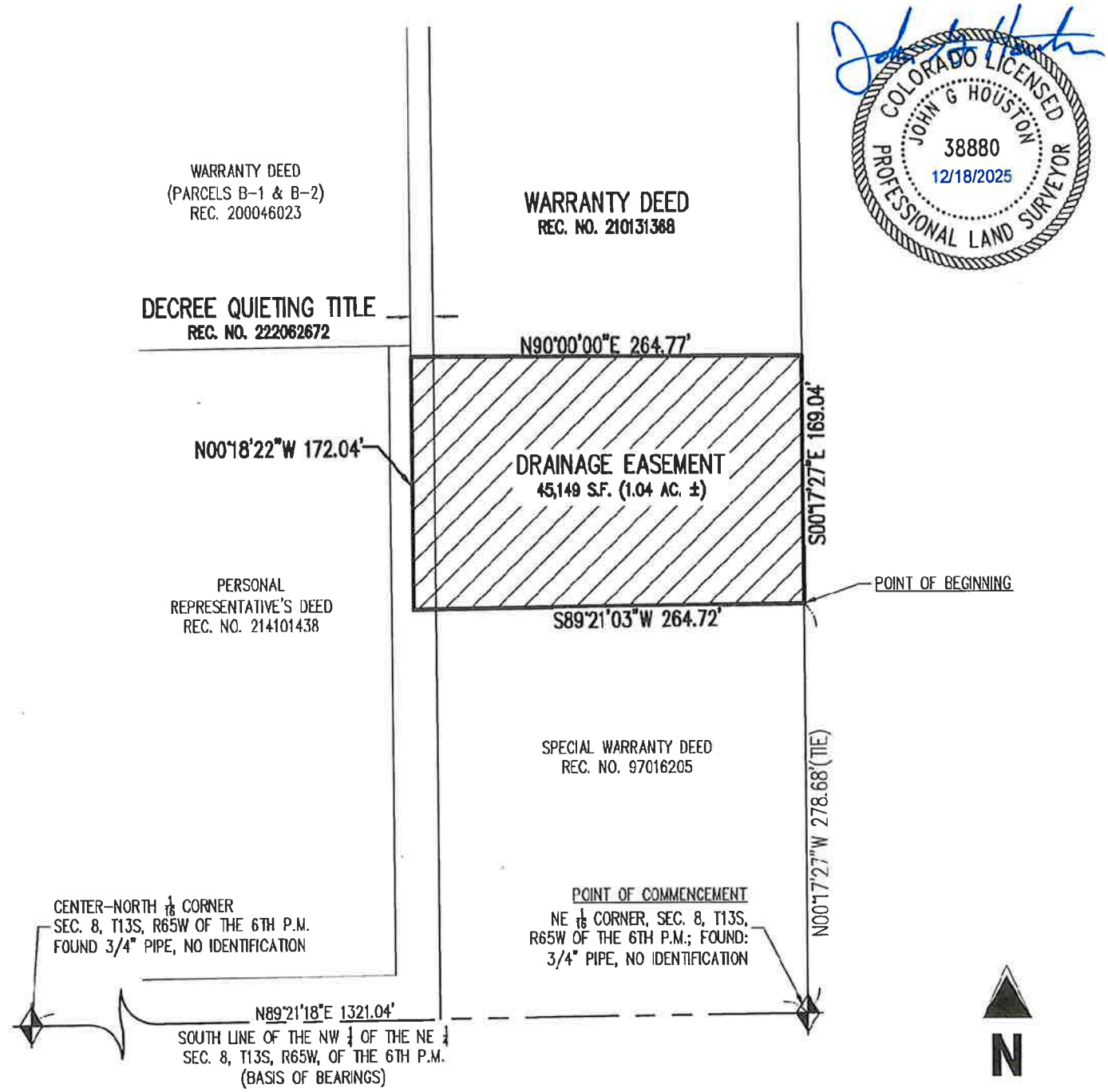
THE ABOVE DESCRIPTION CONTAINS 45,149 SQUARE FEET OR 1.04 ACRES, MORE OR LESS.

ALL LINEAR DISTANCES ARE REPRESENTED IN U.S. SURVEY FEET.

COLORADO LICENSED
JOHN G HOUSTON
38880
12/18/2025
PROFESSIONAL LAND SURVEYOR

JOHN G. HOUSTON, PLS 38880
PREPARED FOR AND ON BEHALF OF GALLOWAY & COMPANY, LLC
1155 KELLY JOHNSON BLVD., SUITE 305
COLORADO SPRINGS, COLORADO 80920
PROJECT NO. VTH000001.10

EXHIBIT "B"



COLORADO LICENSED
JOHN G HOUSTON
38880
12/18/2025
PROFESSIONAL LAND SURVEYOR

NOTE:
THIS DOES NOT REPRESENT A MONUMENTED LAND SURVEY. IT IS INTENDED ONLY TO DEPICT THE ATTACHED DESCRIPTION.

EXHIBIT 'B'
DRAINAGE EASEMENT

A PORTION OF WARRANTY DEED RECORDED AT REC. NO. 210131368 &
A PORTION OF DECREE QUIETING TITLE RECORDED AT REC. NO. 222062672

COLO. SPRINGS, EL PASO COUNTY, COLORADO

Project No:	VTH000001.10
Drawn By:	LMK
Checked By:	JGH
Date:	12/12/2025

Galloway
1155 Kelly Johnson Blvd, Suite 305
Colorado Springs, CO 80920
719.900.7220 • GallowayUS.com

Exhibit C

Galloway

STORMWATER MANAGEMENT FACILITY OPERATION & MAINTENANCE (O&M) MANUAL

Woodmen Premier Storage
E. Woodmen Road & Utah Lane
Colorado Springs, Colorado
PCD File No. PPR25626

PREPARED FOR:
Woodmen-Utah LLC
9540 Federal Drive, Suite 100
Colorado Springs, CO 80921
Tel: (719) 491-0867
Attn: Chad Thurber

PREPARED BY:
Galloway & Company, Inc.
5500 Greenwood Plaza Blvd, Suite 200
Greenwood Village, CO 80111
Tel: (303) 770-8884
Attn: Jessica Greenough PE
Attn:

DATE:
November 4, 2025

This manual is adapted from the Town of Parker, Colorado, STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL, October 2004

TABLE OF CONTENTS

Stormwater Management Facility
Operation and Maintenance (O&M) Manual

This Manual is designed to outline the operation and maintenance of one on-site extended detention basin: EDB-1. Pond EDB-1 is located at the southeast corner of the site and will provide full spectrum detention, including water quality.

I. Compliance with Stormwater Facility Maintenance Requirements

Property owners are responsible for maintaining stormwater facilities on their property to ensure they operate effectively. Occasionally, this responsibility may be delegated to others through specific agreements. The maintenance obligation for a stormwater facility is specified in the Detention Maintenance Agreement for the property. Property owners should have knowledge of their responsibilities regarding stormwater facility upkeep.

II. Inspection & Maintenance – Annual Reporting

Requirements for the inspection and maintenance of stormwater facilities, as well as reporting requirements are included in this Stormwater Management Facility Operation and Maintenance (O&M) Manual.

Verification that the Stormwater facilities have been properly inspected and maintained; submittal of the required Inspection Forms and Inspector qualifications shall be provided to El Paso County on an annual basis.

III. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain the water quality facility is to prevent pollutants from entering the facility in the first place. Most common pollutants include sediment, trash & debris, chemicals, dog waste, runoff from stored materials, illicit discharges into the storm drainage system, and many others. A thorough and intentional maintenance program will include measures to address these potential contaminants and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents to be aware of how their actions affect water quality, and how they can help reduce maintenance costs.
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper disposal of hazardous wastes and chemicals.
- Plan lawn care to minimize the use of chemicals and pesticides.
- Sweep paved surfaces and put the sweepings back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean out the upstream components of the storm drainage system, including inlets, storm sewers and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.

IV. Access and Easements

All stormwater management facilities located on the site have a designated access location. Refer to the Drainage Map located in Appendix B for access location.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present.

If a toxic or flammable substance is discovered, leave the immediate area and contact **911**.

Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas must be referred to **911** immediately for response by the Hazardous Materials Unit. The emergency contact number is **911**.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the pond that is greater than 36" in height, make the appropriate note/comment on the maintenance inspection form.

If any hazard is found within the facility area that poses an immediate threat to public safety, contact 911 immediately.

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of all Stormwater Management Facilities:

- Protective clothing and boots.
- Safety equipment (vest, hard hat, confined space entry equipment).
- Communication equipment.
- Operation and Maintenance Manual for the site including the stormwater management facility location on Drainage Map.
- Clipboard.
- Stormwater Facility Maintenance Inspection Forms
- Manhole Lid Remover
- Flashlight
- Tape Measure
- Shovel

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment). However, this equipment should be available in the vehicle driven to the site.

VII. Inspecting Stormwater Management Facilities

The quality of stormwater entering the waters of the state relies on the proper operation and maintenance of permanent best management practices located upstream of these discharges. Stormwater management facilities must be periodically inspected to ensure that they function as designed. The inspection will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

All stormwater management facilities are required to be inspected by a qualified individual at a minimum of once per year.

B. Inspection Report

The person(s) conducting the inspection activities shall complete the appropriate inspection report for the specific facility. If more than one facility is located on the site, use multiple inspection forms. Inspection forms are located in Appendix A.

The following information explains how to fill out the Inspection Forms:

General Information

This section identifies the facility location, person conducting the inspection, the date and time the facility was inspected, and approximate days since the last rainfall. Property classification is identified as single-family residential, multi-family residential, commercial, or other.

The reason for the inspection is also identified on the form depending on the nature of the inspection. All facilities should be inspected on an annual basis at a minimum. In addition, all facilities should be inspected after a significant precipitation event to ensure the facility is draining appropriately and to identify any damage that occurred as a result of the increased runoff.

Inspection Scoring

For each inspection item, a score must be given to identify the urgency of required maintenance. The scoring is as follows:

0 = No deficiencies identified.

1 = Monitor – Although maintenance may not be required at this time, a potential problem exists that will most likely need to be addressed in the future. This can include items like minor erosion, concrete cracks/spalling, or minor sediment accumulation. This item should be revisited at the next inspection.

2 = Routine Maintenance Required – Some inspection items can be addressed through the routine maintenance program. This can include items like vegetation management or debris/trash removal.

3 = Immediate Repair Necessary – This item needs immediate attention because failure is imminent or has already occurred. This could include items such as structural failure of a feature (outlet works, forebay, etc), significant erosion, or significant sediment accumulation. This score should be given to an item that can significantly affect the function of the facility.

N/A This is checked by an item that may not exist in a facility. Not all facilities have all of the features identified on the form (forebay, micro-pool, etc.).

Inspection Summary/Additional Comments

Additional explanations to inspection items, and observations about the facility not covered by the form, are recorded in this section.

Overall Facility Rating

An overall rating must be given for each facility inspected. The overall facility rating should correspond with the highest score (0, 1, 2, 3) given to any feature on the inspection form.

C. Verification of Inspection and Form Submittal

The Stormwater Management Facility Inspection Form provides a record of inspection of the facility. Verification of the inspection of the stormwater facilities, the facility inspection form(s), and Inspector Qualifications shall be provided to El Paso County on an annual basis. The verification and the inspection form(s) shall be reviewed and submitted by the property owner or property manager.

Refer to Section II of this Manual regarding the annual reporting of inspections.

VIII. Maintaining Stormwater Management Facilities

Stormwater management facilities must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance conducted on the facilities via scheduled times throughout the year can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained.

A. Maintenance Categories

Stormwater management facility maintenance programs are separated into three broad categories of work. These categories are based largely on the Mile High Flood District's Maintenance Program for regional drainage facilities. The categories are separated based upon the magnitude and the type of maintenance activities performed. A description of each category follows:

Routine Work

Routine work on the facility is typically scheduled maintenance, which involves mowing and debris removal from stormwater management facilities during the growing season. This includes clearing out debris and material that may be obstructing the outlet structure well screens and trash racks, as well as controlling weeds, treating mosquitoes, and managing algae, and inspecting and clearing debris from the fence across the emergency spillway. These activities are typically conducted multiple times throughout the year (two times per year minimum). No prior communication with El Paso County is necessary; however, completed inspection forms must be submitted for each maintenance and inspection activity.

Restoration Work

Most restoration work involves isolated or small-scale maintenance work to address operational issues. It can be performed by a small team with basic tools and equipment. Prior communication with El Paso County is necessary, and completed maintenance forms must be submitted for each activity.

Rehabilitation Work

This project involves large-scale maintenance and improvements to address stormwater management failures. It requires consultation with El Paso County, possible engineering design and construction plans, specialized equipment, surveying, construction permits, and external contractor and consultant assistance. Prior communication with the El Paso County

Public Works Department is necessary and completed maintenance forms must be submitted for each activity.

B. Maintenance Personnel

Maintenance personnel must be qualified to properly maintain stormwater management facilities. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs and potential injury.

The websites below have information on training classes and may have information on individuals or companies related to inspection and maintenance of stormwater management facilities. El Paso County cannot recommend or endorse any of the individuals, companies, or institutions.

http://stormwatercenter.colostate.edu (Colorado State University)
http://www.rmecosha.com/catalog.aspx (Red Rocks Community College)

C. Maintenance Forms

The Stormwater Management Facility Maintenance Form provides a record of maintenance activities. Maintenance Forms for each facility type are provided in Appendix A. Maintenance Forms shall be completed by the contractor completing the required maintenance items. The form shall then be reviewed by the property owner or an authorized agent of Woodmen-Utah LLC and submitted on an annual basis to El Paso County.

Refer to Section II of this Manual regarding the annual reporting of inspections and maintenance activities performed.

Standard Operation Procedures
for
Inspection and Maintenance

Extended Detention Basin
(EDBs)

Galloway

Reference:
This SOP is adapted from Arapahoe County, Colorado, November 2007.

TABLE OF CONTENTS

EDB-1 BACKGROUND

Extended Detention Basins (EDBs) are one of the most common types of Stormwater Management Facilities utilized within the Front Range of Colorado. An EDB is a sedimentation basin designed to "extend" the runoff detention time, but to drain completely dry sometime after stormwater runoff ends. The EDB's drain time for the water quality portion of the facility is typically 40 hours. The basins are considered to be "dry" because the majority of the basin is designed not to have a significant permanent pool of water remaining between runoff events.

EDBs are an adaptation of a detention basin used for flood control, with the primary difference being the addition of forebays, micropools and a slow release outlet design. Forebays are shallow concrete "pans" located at the inflow point to the basin and are provided to facilitate sediment removal within a contained area prior to releasing into the pond. These forebays collect and briefly hold stormwater runoff resulting in a process called sedimentation, dropping sediment out of the stormwater. The stormwater is then routed from the forebay into the concrete trickle channel and upper basin, the large grassy portion of the basin. The EDB uses a much smaller outlet that extends the emptying time of the more frequently occurring runoff events to facilitate pollutant removal. An EDB should have a small micropool just upstream of the outlet. This micropool is designed to hold a small amount of water to keep sediment and floatables from blocking the outlet orifices.

EDB-2 INSPECTING EXTENDED DETENTION BASINS (EDBs)

EDB-2.1 Access and Easements

Inspection and maintenance personnel may utilize the stormwater facility map located in Appendix G containing the locations of the access points and maintenance paths of the EDBs within this development.

EDB-2.2 Stormwater Management Facilities Locations

Inspection and maintenance personnel may utilize the stormwater facility map located in Appendix G containing the locations of the EDBs within this development.

EDB-2.3 Extended Detention Basin (EDB) Features

EDBs have a number of features that are designed to serve a particular function. Many times, the proper function of one feature depends on another. For example, if a forebay is not properly maintained, it could negatively affect the performance of a feature downstream (trickle channel, micropool, etc.). Therefore, it is critical that each feature of the EDB is properly inspected and maintained to ensure that the overall facility functions as it was intended. Below is a list and description of the most common features within an EDB and the corresponding maintenance inspection items that can be anticipated:

TABLE EDB-1
Typical Inspection & Maintenance Requirements Matrix

EDB Features	Sediment Removal	Mowing/ Weed control	Trash & Debris Removal	Erosion	Overgrown Vegetation Removal	Standing Water (mosquito/ algae control)	Structure Repair
Inflow Points (outfalls)	X		X				X
Forebay	X		X				X
Low-flow channel	X		X	X	X		X
Bottom Stage	X	X	X	X	X	X	
Micropool	X		X		X	X	X
Outlet Works	X		X				X
Emergency Spillway			X	X	X		X
Upper Stage			X	X			
Embankment		X		X	X		

EDB-2.3.1 Inflow Points

Inflow points or outfalls into EDBs are the point of stormwater discharge into the facility. An inflow point is commonly a curb cut with a concrete or riprap rundown or a storm sewer pipe outfall with a flared end section.

EDBs are designed to treat the WQCV. The WQCV is a volume of water that runs off a site during an 80th percentile event. The splitter box is generally constructed of reinforced concrete. The first stage of the outlet structure will provide the orifice plate that will detain the required Water Quality Capture Volume (WQCV) Water quality holes in the Orifice Plate will provide Excess Urban Runoff Volume (EURV) and the designated holes the orifice will drain the EURV volume within 72 hours. All excess storms will spill over the said orifice plate and then enter a storm sewer system that conveys the runoff to the waterway. Proper inspection and maintenance of the Outlet Structure is essential in ensuring the long-term operation of the EDB.

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

a. *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.

b. *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 hydraulic performance of the upstream infrastructure, sediment that accumulates in this area must be removed in a timely manner.

c. *Structural Damage* – Structural damage can occur at any time during the life of the facility. Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

d. *Woody Growth/Weeds Present* – Undesirable vegetation can grow in and around the inflow area to an EDB that can significantly affect the performance of the drainage facilities discharging into the facility. This type of vegetation includes trees (typically cottonwoods) and dense areas of shrubs (willows). If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the discharge. Also, tree roots can cause damage to the structural components of the inflow. Routine maintenance is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree). In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

EDB-2.3.2 Forebay

A forebay is a solid surface (pad), typically constructed of concrete, immediately downstream of the inflow point. The forebay is designed to capture larger particles and trash to prevent them from entering the main portion of the EDB. The solid surface is designed to facilitate mechanical sediment removal (skid steer). The forebay includes a weir on the downstream end designed to drain the forebay in a specified period of time to promote sedimentation.

The typical maintenance items that are found with forebays are as follows:

a. *Sediment/Debris Accumulation* – Because this feature of the EDB is designed to provide the initial sedimentation, debris and sediment frequently accumulate in this area. If the sediment and debris is not removed from the forebay on a regular basis, it can significantly affect the function of other features within the EDB. Routine sediment removal from the forebay can significantly reduce the need for dredging of the main portion of the EDB using specialized equipment (long reach excavators). Routine removal of sediment from the forebay can substantially decrease the long-term sediment removal costs of an EDB.

b. *Concrete Cracking/Failing* – The forebay is primarily constructed of concrete, which cracks, spalls, and settles. Damage to the forebay can result in decreased performance and impact maintenance efforts.

c. *Weir Clogged* – Many times the weir can be clogged with debris and prevent the forebay from draining properly. This can result in a decrease in performance and create potential nuisances.

d. *Weir/Drain Pipe Damaged* – Routine maintenance activities, vandalism, or age may cause the weir in the forebay to become damaged. Weirs are typically constructed of concrete, which cracks and spalls.

EDB-2.3.3 Trickle Channel (Low-Flow)

The trickle channel conveys stormwater from the forebay to the micro-pool of the EDB. The trickle channel is a 3' wide concrete U-channel.

The typical maintenance activities that are found with trickle channels are as follows:

a. *Sediment/Debris Accumulation* – Trickle channels are typically designed with a relatively flat slope that can promote sedimentation and the collection of debris. Also, if a trickle channel is grass lined it can accumulate sediment and debris at a much quicker rate. Routine removal of accumulated sediment and debris is essential in preventing flows from circumventing the trickle channel and affecting the dry storage portion of the pond.

b. *Concrete/Riprap Damage* – Concrete can crack, spall, and settle and must be repaired to ensure proper function of the trickle channel. Riprap can also shift over time and must be replaced/repaired as necessary.

c. *Woody Growth/Weeds Present* – Because of the constant moisture in the area surrounding the trickle channel, woody growth such as cottonwoods and willows can become a problem. Trees and dense shrub type vegetation can affect the capacity of the trickle channel and can allow flows to circumvent the feature.

d. *Erosion Outside of Channel* – In larger precipitation events, the trickle channel capacity will likely be exceeded. This can result in erosion immediately adjacent to the trickle channel that must be repaired to prevent further damage to the structural components of the EDB.

EDB-2.3.4 Bottom Stage

The bottom stage is 2.5 feet deeper than the upper stage and is located in front of the outlet works structure. The bottom stage is designed to store the smaller runoff events, assists in keeping the majority of the basin bottom dry resulting in easier maintenance operations, and enhances the facilities pollutant removal capabilities.

The typical maintenance items that are found with the bottom stage are as follows:

a. *Sediment/Debris Accumulation* – The micro-pool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

b. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the micro-pool, woody growth such as cottonwoods and willows can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

c. *Bank Erosion* – The micro-pool is 2.5 feet deeper than the other areas of the ponds. Erosion can be caused by water dropping into the micro-pool if adequate protection/armor is not present. Erosion in this area must be mitigated to prevent sediment transport and other EDB feature damage.

d. *Mosquitoes/Algae Treatment** – Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micro-pool may be necessary to reduce these impacts to adjacent homeowners. (*At the time this SOP template was compiled in 2007, Arapahoe County used a bacterial larvacide for mosquito control, Vectobac-G, or approved equal.)

e. *Petroleum/Chemical Sheen* – Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored

soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact the supervisor immediately. Proper removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.5 Micro-pool

The micro-pool is a concrete structure directly in front of the outlet works. At a minimum, the micropool is 2.5 feet deep and is designed to hold water. The micro-pool is critical in the proper function of the EDB; it allows suspended sediment to be deposited at the bottom of the micro-pool and prevents these sediments from being deposited in front of the outlet works causing clogging of the outlet structure.

The typical maintenance items that are found with micro-pools are as follows:

a. *Sediment/Debris Accumulation* – The micro-pool can frequently accumulate sediment and debris. This material must be removed to maintain volume and proper function of the outlet structure.

b. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the micro-pool, woody growth such as cottonwoods and willows can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micro-pool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

c. *Mosquitoes/Algae Treatment** – Nuisance created by stagnant water can result from improper maintenance/treatment of the micro-pool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment* of the micro-pool may be necessary to reduce these impacts to adjacent homeowners. (*A bacterial larvicide for mosquito control, such as Vectobac-G, or approved equal, may be an option.)

d. *Petroleum/Chemical Sheen* – Many indicators of illicit discharges into the storm sewer systems will be present in the micro-pool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact the supervisor immediately. Proper

removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

EDB-2.3.6 Outlet Works

The outlet works is the feature that drains the EDB in specified quantities and periods of time. The outlet works is typically constructed of reinforced concrete into the embankment of the EDB. The concrete structure has a steel orifice plate anchored/embedded into it to control stormwater release rates. The larger openings (flood control) on the outlet structure have trash racks over them to prevent clogging. The water quality orifice plate (smaller diameter holes) has a well screen covering it to prevent smaller materials from clogging it. The outlet structure is the single most important feature in the EDB operation. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the EDB.

The typical maintenance items that are found with the outlet works are as follows:

a. *Trash Rack/Well Screen Clogged* – Floatable material that enters the EDB will most likely make its way to the outlet structure. This material is trapped against the trash racks and well screens on the outlet structure (which is why they are there). This material must be removed on a routine basis to ensure the outlet structure drains in the specified design period.

b. *Structural Damage* - The outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel trash racks and well screens are also susceptible to damage.

c. *Orifice Plate Missing/Not Secure* – Many times residents, property owners, or maintenance personnel will remove or loosen orifice plates if they believe the pond is not draining properly. Any modification to the orifice plate(s) will significantly affect the designed discharge rates for water quality and/or flood control. Modification of the orifice plates is not allowed without approval from the Town of Johnstown.

d. *Manhole Access* – Access to the outlet structure is necessary to properly inspect and maintain the facility. If access is difficult or not available to inspect the structure, chances are it will be difficult to maintain as well.

e. *Woody Growth/Weeds Present* - Because of the constant moisture in the soil surrounding the outlet works, woody growth such as cottonwoods and willows can create operational problems for the

EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate around the outlet works, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and "quieter" than a mature tree).

EDB-2.3.7 Emergency Spillway

An emergency spillway is typical of all EDBs and designed to serve as the overflow in the event the volume of the pond is exceeded. The emergency spillway is typically armored with Turf Reinforcement Mat (TRM) and has a concrete cutoff wall to maintain the proper elevation during larger stormwater events. The emergency spillway is a weir in the basin embankment. Proper function of the emergency spillway is essential to ensure flooding does not affect adjacent properties.

The typical maintenance items that are found with emergency spillways are as follows:

a. *Reinforcement Displaced* – As mentioned before, the emergency spillway is armored with TRM to provide erosion protection. Over the life of an EDB, the TRM may shift or become undermined due to flow.

b. *Erosion Present* – Although the spillway is typically armored, stormwater flowing through the spillway can cause erosion damage. Erosion must be repaired to ensure the integrity of the basin embankment, and proper function of the spillway.

c. *Woody growth/Weeds Present* – Management of woody vegetation is essential in the proper long-term function of the spillway. Larger trees or dense shrubs can capture larger debris entering the EDB and reduce the capacity of the spillway.

d. *Obstruction/Debris* – The spillway must be cleared of any obstruction (manufactured or natural) to ensure the proper design capacity.

EDB-2.3.8 Upper Stage (Dry Storage)

The upper stage of the EDB provides the majority of the water quality flood detention volume. This area of the EDB is higher than the micro-pool and typically stays dry, except during storm events. The upper stage is the largest feature/area of the basin. With proper maintenance of the micro-pool and forebay(s), the upper stage should not experience much

sedimentation; however, bottom elevations should be monitored to ensure adequate volume.

The typical maintenance items that are found with upper stages are as follows:

a. *Vegetation Sparse* – The upper basin is the most visible part of the EDB, and therefore aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance and acceptance of the EDB by the public. In addition, vegetation can reduce the potential for erosion and subsequent sediment transport to the other areas of the pond.

b. *Woody Growth/Undesirable Vegetation* – Although some trees and woody vegetation may be acceptable in the upper basin, some thinning of cottonwoods and willows may be necessary. Remember, the basin will have to be dredged to ensure volume, and large trees and shrubs will be difficult to protect during that operation.

c. *Standing Water/Boggy Areas* – Standing water or boggy areas in the upper stage is typically a sign that some other feature in the pond is not functioning properly. Routine maintenance (mowing, trash removal, etc.) can be extremely difficult for the upper stage if the ground is saturated. If this inspection item is checked, make sure you have identified the root cause of the problem.

d. *Sediment Accumulation* – Although other features within the EDB are designed to capture sediment, the upper storage area will collect sediment over time. Excessive amounts of sedimentation will result in a loss of storage volume. It may be more difficult to determine if this area has accumulated sediment without conducting a field survey.

   Below is a list of indicators:
   1. Ground adjacent to the trickle channel appears to be several inches higher than concrete
   2. Standing water or boggy areas in upper stage
   3. Uneven grades or mounds
   4. Micro-pool or Forebay has excessive amounts of sediment

e. *Erosion (banks and bottom)* – The bottom grades of the dry storage are typically flat enough that erosion should not occur. However, inadequate vegetative cover may result in erosion of the upper stage. Erosion that occurs in the upper stage can result in increased dredging/maintenance of the micro-pool.

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

g. *Maintenance Access* – The EDBs has a gravel maintenance access path from the platted ROW. This access path should be inspected to ensure the surface is still drivable.

EDB-2.3.9 Miscellaneous

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

a. *Encroachment in Easement Area* – Private lots/property can sometimes be located very close to the EDBs, even though they are required to be located in tracts with drainage easements. Property owners may place landscaping, trash, fencing, or other items within the easement area that may affect maintenance or the operation of the facility.

b. *Graffiti/Vandalism* – Damage to the EDB infrastructure can be caused by vandals. If criminal mischief is evident, the inspector should forward this information to the local Police Office.

c. *Public Hazards* – Public hazards include items such as vertical drops of greater than 4-feet without fall protection, 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 Police Office at 911 immediately.**

d. *Burrowing Animals/Pests* – Prairie dogs and other burrowing rodents may cause damage to the EDB features and negatively affect the vegetation within the EDB.

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

EDB-2.4 Inspection Forms

EDB Inspection forms are located in Appendix D. Inspection forms shall be completed by the person(s) conducting the inspection activities. Each form shall be reviewed and submitted by Revere at Johnstown Metropolitan District No. 1 or property manager to the Town of Johnstown per the requirements of

the Operations and Maintenance Manual. These inspection forms shall be kept indefinitely and made available to the Town of Johnstown upon request.

EDB-3 MAINTAINING EXTENDED DETENTION BASINS (EDBs)

EDB-3.1 Maintenance Personnel

Maintenance personnel must be qualified to properly maintain EDBs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

EDB-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 an EDB:

1.) Loppers/Tree Trimming Tools
2.) Mowing Tractors
3.) Trimmers (extra string)
4.) Shovels
5.) Rakes
6.) All Surface Vehicle (ASVs)
7.) Skid Steer
8.) Back Hoe
9.) Track Hoe/Long Reach Excavator
10.) Dump Truck
11.) Jet-Vac Machine
12.) Engineers Level (laser)
13.) Riprap (Minimum - Type M)
14.) Geotextile Fabric
15.) Erosion Control Blanket(s)
16.) Seed Mix (Native – Foothills)
17.) Illicit Discharge Cleanup Kits
18.) Trash Bags
19.) Tools (wrenches, screw drivers, hammers, etc.)
20.) Chain Saw
21.) Confined Space Entry Equipment
22.) Approved Stormwater Facility Operation and Maintenance Manual

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.

EDB-3.3 Safety

Vertical drops may be encountered in areas located within and around the EDB. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the EDB that is greater than

48-inches in height without fall protection, make the appropriate note/comment on the maintenance inspection form.

EDB-3.4 Maintenance Forms

The EDB Maintenance Form provides a record of each maintenance operation performed by maintenance contractors. The EDB Maintenance Form shall be filled out in the field after the completion of the maintenance operation. Each form shall be reviewed and submitted by the property owner or property manager to the Town of Johnstown per the requirements of the Operations and Maintenance Manual. The EDB Maintenance form is located in Appendix E.

EDB-3.5 Maintenance Categories and Activities

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

A variety of maintenance activities are typical of EDBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of drainage infrastructure. Below is a description of each maintenance activity, the objectives, and frequency of actions.

EDB-3.6 Routine Maintenance Activities

The majority of this work consists of routine mowing, trash and debris pickups for the EDB during the growing season. It also includes activities such as weed control, mosquito treatment*, and algae treatment. These activities normally will be performed numerous times during the year. These items typically do not require any prior correspondence with Johnstown, however, completed inspection and maintenance forms shall be submitted to Johnstown for each inspection and maintenance activity.

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

TABLE EDB-2
Summary of Routine Maintenance Activities

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Mowing	Twice annually	Excessive grass height/aesthetics	Mow grass to a height of 4" to 6"
Trash/Debris Removal	Twice annually	Trash/debris in EDB	Remove and dispose of trash and debris

Outlet Works Cleaning	As needed - after significant rain events – twice annually minimum	Clogged outlet structure; ponding water	Remove and dispose of debris/trash/sediment to allow outlet to function properly
Weed control	Minimum twice annually	Noxious weeds; Unwanted vegetation	Treat w/herbicide or hand pull; consult a local weed specialist
Mosquito Treatment*	As needed	Standing water/mosquito habitat	Treat w/ EPA approved chemicals *
Algae Treatment	As needed	Standing water/ algal growth/green color	Treat w/ EPA approved chemicals

(*A bacterial larvicide for mosquito control, such as Vectobac-G, or approved equal, may be an option.)

EDB-3.6.1 Mowing

Occasional mowing is necessary to limit unwanted vegetation and to improve the overall appearance of the EDB. Native vegetation should be mowed to a height of 4-to-6 inches tall. Grass clippings should be collected and disposed of properly.

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

EDB-3.6.2 Trash/Debris Removal

Trash and debris must be removed from the entire EDB 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.

EDB-3.6.3 Outlet Works Cleaning

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.

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

EDB-3.6.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the EDB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with a local weed specialist 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.

EDB-3.6.5 Mosquito/Algae Treatment

Treatment of permanent pools is necessary to control mosquitoes and undesirable aquatic vegetation that can create nuisances. Only EPA approved chemicals/materials can be used in areas that are warranted.* (*A bacterial larvicide for mosquito control, such as Vectobac-G, or approved equal, may be an option.)

Frequency – As needed.

EDB-3.7 Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance or operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. **These items require prior approval from Johnstown.** Completed inspection and maintenance forms shall be submitted to the Town of Johnstown for each inspection and maintenance period. In the event that the EDB needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. All dewatering activities shall be coordinated with Johnstown.

TABLE EDB-3
Summary of Minor Maintenance Activities

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Sediment Removal	As needed; typically every 1 –2 years	Sediment build-up; decrease in pond volume	Remove and dispose of sediment

Erosion Repair	As needed, based upon inspection	Rills/gullies forming on side slopes, trickle channel, other areas	Repair eroded areas & revegetate; address source of erosion
Vegetation Removal/Tree Thinning	As needed, based upon inspection	Large trees/wood vegetation in lower chamber of pond	Remove vegetation; restore grade and surface
Drain Cleaning/Jet-Vac	As needed, based upon inspection	Sediment build-up /non-draining system	Clean drains; Jet-Vac if needed

EDB-3.7.1 Sediment Removal

Sediment removal is necessary to maintain the original design volume of the EDB and to ensure proper function of the infrastructure. Regular sediment removal (minor) from the forebay, inflow(s), and trickle channel can significantly reduce the frequency of major sediment removal activities (dredging) in the upper and lower stages. The minor sediment removal activities can typically be addressed with shovels and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. The major sediment activities will also require surveying with an engineer's level, and consultation with Johnstown Public Works to ensure design volumes/grades are achieved.

Stormwater sediments removed from EDBs do not meet the criteria of "hazardous waste". However, these sediments are contaminated with a wide array of organic and inorganic pollutants and handling must be done with care. Sediments from permanent pools must be carefully removed to minimize turbidity, further sedimentation, or other adverse water quality impacts. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a landfill for proper disposal. Prompt and thorough cleanup is important should a spill occur during transportation.

Frequency – Non-routine – As necessary, based upon inspections. Sediment removal in the sedimentation chamber may be necessary as frequently as every 1-2 years.

EDB-3.7.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper functioning of the EDB, to minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to trickle channels, energy dissipaters, and rilling to major gullies in the embankments and spillways. The repair of eroded areas may require the use of excavators, earthmoving equipment, concrete, erosion control blankets, and turf reinforcement mats. Major erosion repair to the pond

embankments, spillways, and adjacent to structures will require consultation with Johnstown Public Works.

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

EDB-3.7.3 Vegetation Removal/Tree Thinning

Dense stands of woody vegetation (willows, shrubs, etc.) or trees can create maintenance problems for the infrastructure within an EDB. Tree roots can damage structures and invade pipes/channels thereby blocking flows. Also, trees growing in the upper and lower stages of the EDB will most likely have to be removed when sediment/dredging operations occur. A small tree is easier to remove than a large tree, therefore, regular removal/thinning is imperative. All trees and woody vegetation that is growing in the bottom of the EDB or near structures (inflows, trickle channels, outlet works, emergency spillways, etc.) should be removed. Any trees or woody vegetation in the EDB should be limited to the upper portions of the pond banks.

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

EDB-3.7.4 Clearing Drains/Jet-Vac

An EDB contains many structures, openings, and pipes that can be frequently clogged with debris. These blockages can result in a decrease of hydraulic capacity and create standing water in areas outside of the micro-pool. 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.

EDB-3.8 Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires consultation with Johnstown Public Works to ensure the proper maintenance is performed. This work requires that Johnstown Public Works review the original design and construction drawings to assess the situation and work with the property owner to determine the necessary maintenance activities. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

TABLE EDB-4

Summary of Major Maintenance Activities

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Major Sediment Removal	As needed – based upon scheduled inspections	Large quantities of sediment; reduced pond capacity	Remove and dispose of sediment. Repair vegetation as needed
Major Erosion Repair	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
Structural Repair	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

EDB-3.8.1 Major Sediment Removal

Major sediment removal consists of removal of large quantities of sediment or removal of sediment from vegetated areas. Care shall be given when removing large quantities of sediment and sediment deposited in vegetated areas. Large quantities of sediment need to be carefully removed, transported and disposed of. Vegetated areas need special care to ensure design volumes and grades are preserved.

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

EDB-3.8.2 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.

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

EDB-3.8.3 Structural Repair

An EDB includes a variety of structures that can deteriorate or be damaged during the course of routine maintenance. 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. These structures include items like outlet works, trickle channels, forebays, inflows and other features. In-house operations staff can perform some of the minor structural repairs. Major repairs to structures may require input from a structural engineer and specialized contractors. **Consultation with Johnstown Public Works shall take place prior to all structural repairs.**

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

Appendix A
Annual Inspection and Maintenance Reporting Form

Extended Detention Basin (EDB) Inspection Form

Inspection Date: _____

Inspector: _____

Subdivision/Business Name: _____

Property Address _____

City & State: _____

Weather: _____

Date of Last Rainfall: _____ Amount: _____ Inches

Property Classification: (Circle One) Residential Multi Family Commercial Other:

Reason For Inspection: (Circle One) Routine Compliant After Significant Rainfall Event

INSPECTION SCORING - For each facility inspection item, insert one of the following

0 = No deficiencies identified
1 = Monitor (potential for future problem)
2 = Routine maintenance required
3 = Immediate repair necessary
N/A = Not applicable

Inflow Points

_____ Riprap Displaced
_____ Erosion Present/Outfall Undercut
_____ Sediment/Debris Accumulation
_____ Structural Damage (pipe, end-section, etc.)
_____ Wood Growth/Weeds Present

Forebay

_____ Sediment/Debris Accumulation
_____ Concrete Cracking/Failing
_____ Drain Pipe/Wier Clogged (not draining)
_____ Wier/Drain Pipe Damage

Trickle Channel (Low-Flow)

_____ Sediment/Debris Accumulation
_____ Concrete/Riprap Damage
_____ Wood Growth/Weeds Present
_____ Erosion Outside Channel

Bottom Stage (Micro-Pool)

_____ Sediment/Debris Accumulation
_____ Woody Growth/Weeds Present
_____ Bank Erosion
_____ Mosquitoes/Algae Treatment
_____ Petroleum/Chemical Sheen

Outlet Works

_____ Trash Rack/Well Screen Clogged
_____ Structural Damage (concrete, steel, subgrade)
_____ Orifice Plate(s) Missing/Not Secure
_____ Manhole Access (cover, steps, etc.)
_____ Wood Growth/Weeds Present

Emergency Spillway

_____ Riprap Displaced
_____ Erosion Present
_____ Woody Growth/Weeds Present
_____ Obstruction/Debris at Fence Across Spillway

Upper Stage (Dry Storage)

_____ Vegetation Sparse
_____ Woody Growth/Undesirable Vegetation
_____ Standing Water/Boggy Areas
_____ Sediment Accumulation
_____ Erosion (banks and bottom)
_____ Trash/Debris
_____ Maintenance Access

Miscellaneous

_____ Encroachement in Easement Area
_____ Graffiti/Vandalism
_____ Public Hazards
_____ Burrowing Animals/Pests
_____ Other

Inspection Summary/Additional Comments: _____

Overall Facility Rating (Circle One)

0 = No Deficiencies Identified
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary

EXTENDED DETENTION BASIN (EDB)
MAINTENANCE FORM

Subdivision/Business Name:_____ Completion Date:_____

Subdivision/Business Address:_____ Contact Name:_____

Maintenance Category: (Circle all that apply) Routine Restoration Rehabilitation

MAINTENANCE ACTIVITIES PERFORMED

ROUTINE WORK

____ MOWING
____ TRASH/DEBRIS REMOVAL
____ OUTLET WORKS CLEANING (TRASH RACK/WELL SCREEN)
____ WEED CONTROL (HERBICIDE APPLICATION)

RESTORATION WORK

____ SEDIMENT REMOVAL
- ____ INFLOW POINT/SPLITTER BOX
- ____ OUTLET WORKS
- ____ FILTER MEDIA
- ____ SEDIMENTATION CHAMBER
- ____ EMERGENCY OVERFLOW

____ EROSION REPAIR
- ____ INFLOW POINT/SPLITTER BOX
- ____ OUTLET WORKS
- ____ EMBANKMENTS
- ____ SEDIMENTATION CHAMBER
- ____ EMERGENCY OVERFLOW
- ____ FILTER MEDIA

____ REVEGETATION
____ JET-VAC/CLEARING DRAINS
- ____ INFLOWS
- ____ OUTLET WORKS
- ____ UNDERDRAIN

REHABILITATION WORK

____ SEDIMENT REMOVAL (DREDGING)
- ____ FILTER MEDIA
- ____ SEDIMENTATION CHAMBER

____ EROSION REPAIR
- ____ INFLOW POINT/SPLITTER BOX
- ____ OUTLET WORKS
- ____ EMBANKMENTS
- ____ SEDIMENTATION CHAMBER
- ____ EMERGENCY OVERFLOW
- ____ FILTER MEDIA

____ STRUCTURAL REPAIR
- ____ INFLOW POINT/SPLITTER BOX
- ____ OUTLET WORKS
- ____ FILTER MEDIA
- ____ SEDIMENTATION CHAMBER
- ____ EMERGENCY OVERFLOW

OTHER_____

_____

_____

ESTIMATED TOTAL MANHOURS: _____

EQUIPMENT/MATERIAL USED: _____

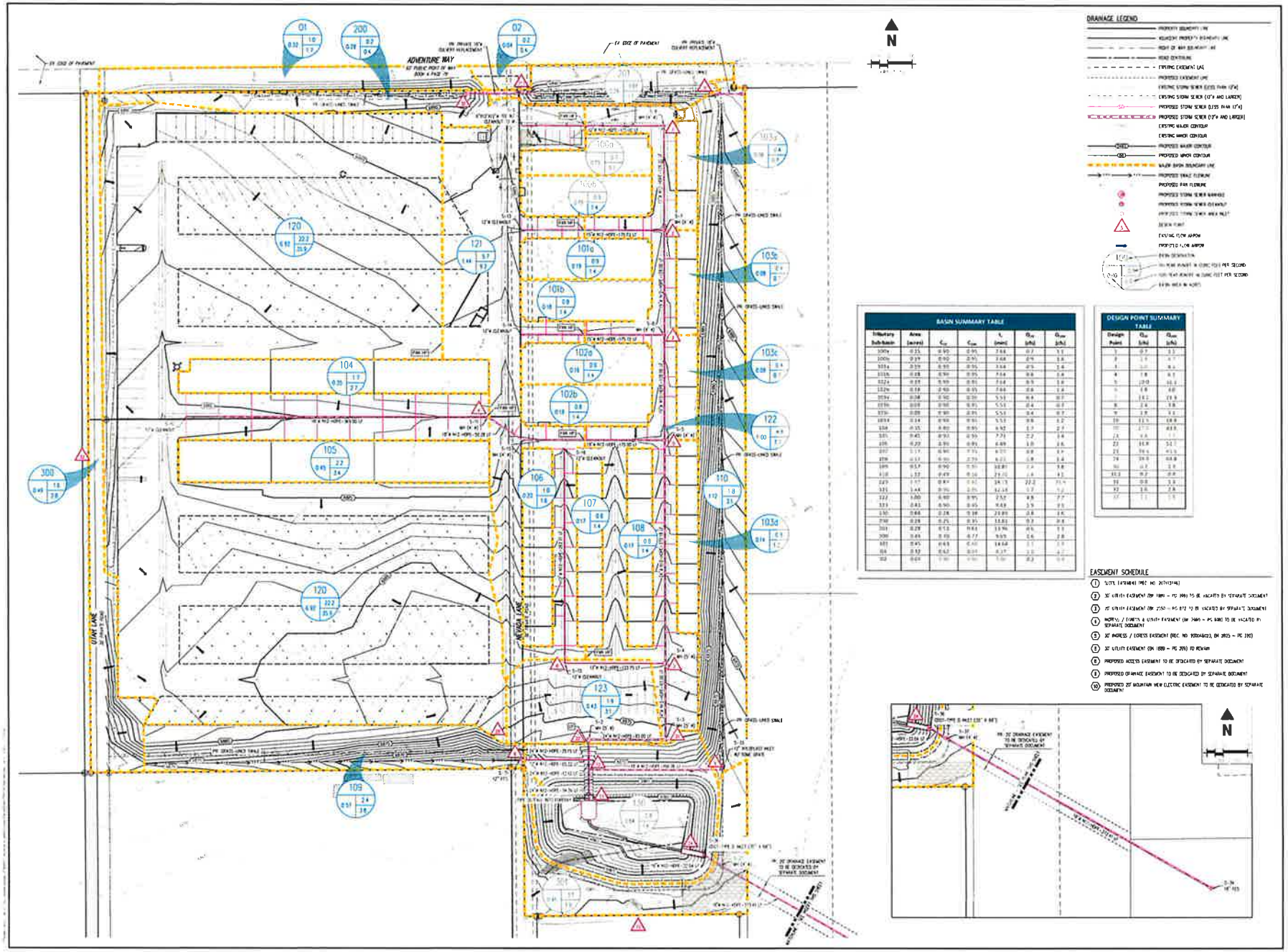
_____

_____

COMMENTS/ADDITIONAL INFO: _____

_____

Appendix B
Proposed Drainage Map



DRAINAGE LEGEND

- PROPERTY BOUNDARY LINE
- ADJACENT PROPERTY BOUNDARY LINE
- RIGHT-OF-WAY DEDICATION LINE
- ROAD CENTERLINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- EXISTING STORM SEWER (LESS THAN 12"ø)
- EXISTING STORM SEWER (12"ø AND LARGER)
- PROPOSED STORM SEWER (LESS THAN 12"ø)
- PROPOSED STORM SEWER (12"ø AND LARGER)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- MAJOR BASIN BOUNDARY LINE
- PROPOSED SWALE FLOWLINE
- PROPOSED PAN FLOWLINE
- PROPOSED STORM SEWER MANHOLE
- PROPOSED STORM SEWER END SECTION
- PROPOSED STORM SEWER AREA INLET
- DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- BASIN DESIGNATION
- 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- BASIN AREA IN ACRES

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	C_{5}	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
100a	0.25	0.90	0.95	7.66	0.7	1.1
100b	0.27	0.90	0.95	7.66	0.8	1.3
101a	0.59	0.90	0.95	7.66	1.7	2.8
101b	0.68	0.90	0.95	7.66	2.0	3.2
101c	0.69	0.90	0.95	7.66	2.0	3.2
102a	0.58	0.90	0.95	7.66	1.6	2.6
102b	0.58	0.90	0.95	7.66	1.6	2.6
103a	0.28	0.90	0.95	5.51	0.9	1.5
103b	0.09	0.90	0.95	5.51	0.3	0.5
103c	0.09	0.90	0.95	5.51	0.3	0.5
103d	0.14	0.90	0.95	5.51	0.5	0.7
104	0.35	0.80	0.95	6.92	0.7	1.1
105	0.45	0.93	0.99	7.71	1.2	1.8
106	0.22	0.90	0.95	6.89	0.6	1.0
107	0.17	0.90	0.95	6.77	0.5	0.8
108	0.11	0.90	0.95	6.21	0.3	0.5
109	0.57	0.90	0.95	10.81	1.4	2.3
110	0.12	0.49	0.66	14.15	0.2	0.5
120	1.44	0.90	0.95	12.14	3.2	5.2
121	1.00	0.90	0.95	7.57	2.5	3.9
122	0.43	0.90	0.95	9.49	1.0	1.6
123	0.64	0.28	0.58	23.05	0.4	1.4
200	0.28	0.25	0.95	13.81	0.3	0.8
201	0.29	0.13	0.61	13.96	0.1	0.5
300	0.45	0.90	0.97	9.55	1.0	1.8
301	0.45	0.63	0.90	14.68	0.7	1.6
04	0.13	0.62	0.91	6.17	0.3	0.7
302	0.64	0.90	0.95	7.66	2.3	3.6

DESIGN POINT SUMMARY TABLE

Design Point	Q_5 (cfs)	Q_{100} (cfs)
1	0.7	1.1
2	1.3	2.1
3	2.0	3.3
4	1.8	3.1
5	12.0	19.3
6	1.8	3.0
7	14.1	22.6
8	2.4	3.8
9	1.8	3.1
10	12.5	19.9
11	17.2	27.5
12	3.5	5.6
13	16.9	26.7
14	19.1	30.2
15	3.2	5.0
16	19.5	30.8
17	4.2	6.6
18	0.8	1.3
19	0.8	1.3
20	1.6	2.6
21	1.1	1.9

EASEMENT SCHEDULE

1. 30' UTILITY EASEMENT (REC NO 2070134)
2. 30' UTILITY EASEMENT (BK 1989 – PG 399) TO BE VACATED BY SEPARATE DOCUMENT
3. 20' UTILITY EASEMENT (BK 2150 – PG 872) TO BE VACATED BY SEPARATE DOCUMENT
4. NORTH 5' / EAST 5' & UTILITY EASEMENT (BK 2989 – PG 688) TO BE VACATED BY SEPARATE DOCUMENT
5. 30' INGRESS / EGRESS EASEMENT (REC NO 2020042023, BK 2015 – PG 280)
6. 30' UTILITY EASEMENT (BK 1989 – PG 399) TO REMAIN
7. PROPOSED ACCESS EASEMENT TO BE DEDICATED BY SEPARATE DOCUMENT
8. PROPOSED DRAINAGE EASEMENT TO BE DEDICATED BY SEPARATE DOCUMENT
9. PROPOSED 20' MOUNTAIN VIEW ELECTRIC EASEMENT TO BE DEDICATED BY SEPARATE DOCUMENT

Galloway

PRELIMINARY
NOT FOR BIDDING
NOT FOR CONSTRUCTION

WOODMEN PREMIER STORAGE
VANTAGE HOMES CORPORATION
CIVIL CONSTRUCTION DRAWINGS

E. WOODMEN ROAD & NEVADA LANE
COLORADO SPRINGS, CO

#	Date	Issue / Description	Init.
1	6/29/23	FIRST SUBMITTAL	SMH
2	11/7/23	2ND SUBMITTAL	SMH

Project No. VP-21
Drawn By AM
Checked By SMH
Date 10/30/2023

PROPOSED DRAINAGE MAP

2
2 of 3