Chapter 3
Stormwater Management Policies

Contents

1.0 Introduction

This chapter provides guidance on stormwater management policies and planning that should be considered in the early stages of projects in the City of Woodland Park (City) and summarizes concepts that are further developed in this Manual. Incorporating stormwater management in the initial stages of planning can lead to reduced infrastructure costs, better long-term function of stormwater management facilities, facilities with better maintenance access, and increased property values. To conduct initial feasibility studies or preliminary site analyses, it is important to have a clear understanding of stormwater management policies, regulatory requirements and criteria, site design practices for effective stormwater management, and existing site characteristics. Additional guidance for planning of the urban storm runoff system is also provided in the Planning Chapter of the UDFCD Manual.

2.0 Planning and Design

The following sections provide policies for addressing the impacts of urbanization and factors to consider when planning for stormwater management.

2.1 Reports and Plans

All project proposals shall receive full site planning and engineering analyses. Drainage reports and plans are required for all new development and redevelopment and shall be prepared in accordance with the City of Woodland Park Municipal Code (submittal requirements summarized in Chapter 4 of this Manual) and other applicable regulations.

2.2 Early Planning

Stormwater management planning is required in the initial planning stages of developments and redevelopments to ensure that adequate space is allocated for the required stormwater management facilities and that key issues are identified and adequately addressed. Planning efforts should include an assessment of sensitive site features and functions and identification of measures for preservation and enhancement of natural features and functions.

2.3 Integrated Comprehensive Planning

Drainage and water quality are important components of the City *Comprehensive Plan*(2010), and the City is in the process of developing an updated stormwater master plan that will replace the previous *City of Woodland Park Stormwater Management Program* that was completed in 1996.These plans, including updates and future plans in place at the time the project is being designed, should be consulted for all projects to assure that there is consistency between the proposed project and these planning documents.

2.4 Multi-purpose Resource

Drainageways and stormwater runoff can be urban resources that are amenities in urbanizing areas. When viewed as a resource, aesthetically pleasing, multi-purpose drainage designs can be integrated into developments, reconciling the competing demands for space during site development. For example, stormwater management facilities can be designed to fulfill recreational purposes and open space requirements along with stormwater runoff conveyance or detention storage. Additionally, facilities not intended primarily for stormwater management purposes may be designed to incorporate water quantity and quality benefits. For example, street medians, parking space islands, parking lots, landscaped areas, and other features can often be designed to provide stormwater management functions. Engineers are

encouraged to involve a landscape architect for effective, multi-functional integration of stormwater management with site landscaping.

2.5 Stormwater Master Plan

The City has conducted planning for drainage and water quality as a part of past plans, including the *Woodland Park Stormwater Management Plan* (1996). The City is currently developing an updated city-wide stormwater master plan that will replace the 1996 plan when it is completed. Developers, project planners and designers are required to incorporate master planned improvements into their development plans. In areas that have not yet been master planned, the developer must conduct analyses necessary to develop a plan that adheres to the criteria in this Manual. Where projects will be phased, development plans shall address the conditions that may occur in the period between development phases, including interim improvements, to comply with this Manual. Master plans will be updated and revised periodically by the City to accommodate changes that may occur within the City and to address additional drainage and water quality needs.

2.6 Site Design and Layout

Good site design and development layout are keys to effective stormwater management. Initial planning must identify important natural features and environmentally sensitive areas such as floodplains, riparian areas, wetlands and areas with soils that are conducive to infiltration. Protection of those areas should be incorporated into the site plan. Other site characteristics such as topography, geologic features, and soils may also present unique challenges for stormwater management planning. Stormwater quality facilities should be carefully planned and located to minimize directly connected impervious area, reduce runoff volumes and slow runoff rates. The incorporation of infiltration and stormwater conveyance into landscaped areas furthers the concept of designing stormwater management facilities that are aesthetically pleasing and effectively integrated within the site.

2.7 Stormwater System Design Storms

Stormwater systems are classified as minor or major systems based on the design storms that they designed to convey. Design requirements for each system are summarized below.

2.7.1 Minor System

The minor stormwater system shall be designed to convey runoff up to a storm event with a return period of 5 years (20% annual exceedence probability). The minor drainage system shall be designed to transport runoff with minimum disruption to the urban environment and to preserve and protect the natural environment.

In many areas minor storm drainage is conveyed in the curb, gutter and storm drain system of the street but in other areas, it is conveyed in roadside ditches/swales, which provide greater opportunities for infiltration and runoff reduction (but that require erosion protection on steep grades). Minor system design shall be based on runoff peak flows and volumes for fully developed conditions in the watershed. The design shall consider the effect of nuisance flows that result from excess irrigation, snowmelt and other sources and implement measures to minimize problems that may result from biological growth or decay, ice formation or other hazards.

Inlets, when needed, shall be located and designed to maximize collection or interception efficiency and with consideration of the proposed use in the vicinity of the inlet locations. Inlets in vehicular traffic or

parking areas are much different than inlets in landscaped or pedestrian traffic areas. Inlet types and grate designs must consider the setting of the inlet and potential inundation effects on adjacent property.

Underground storm drain systems, which convey stormwater runoff collected at inlets should be designed to facilitate proper function and ease of maintenance/repair. Storm drain design and layout should consider proximity to proposed structures, other utilities, and adjacent properties; depth of cover; traffic loading; proposed surface improvements; accessibility for future maintenance/repair; and other factors.

2.7.2 Major System

The major stormwater system shall be designed to convey runoff events up to a return period of 100 years (1% annual exceedence probability). The major drainage system shall be designed to convey runoff in a manner that minimizes health and safety hazards, damage to structures and natural systems, and interruption to traffic and services. Major storm flows typically are carried in the street system, swales/channels, storm drains and other facilities, provided that capacity exists when future development is considered. While the 100-year event is designated as the major event, larger events have occurred in the past and will occur again in the future. In cases with significant risk to public health, safety and welfare, events in excess of the major event may need to be considered and planned for.

2.8 Detention Storage

2.8.1 Purpose and Planning Considerations

Detention storage facilities serve a critical role in the management of increased runoff due to development and must be carefully integrated into early planning stages. Detention storage facilities shall be strategically located to mitigate the effects of increased runoff due to new development, redevelopment or expansion. Although the primary function of detention storage is attenuation of peak flow rates to allowable release rates, some volume reduction also occurs through infiltration into the pond bottom or evaporated as runoff is temporarily stored. Detention storage facilities should be designed to mitigate the full range of developed condition runoff rates by mimicking runoff rates from the upstream basin under undeveloped conditions up to the major storm event. Where site conditions allow, runoff reduction measures should be implemented to reduce the rate and volume of runoff from frequently occurring events in conjunction with detention storage. Runoff reduction and detention should be implemented in redevelopment projects to the extent practical, potentially as a part of street improvements in areas with space constraints.

Per City of Woodland Park Resolution No. 299, Series 1994, detention shall be provided for a low-flow, minor and major event. The low-flow event is based on retaining 75% of the 2-year runoff volume based on a 0.8 inch, one-hour storm. The minor event is the 5-year event with a one-hour storm depth of 1.1 inches, and the outlet must be designed to release 5-year flows at or below historic levels. The major event is the 100-year event with a one-hour storm depth of 2.1 inches, and flows from this event must be released at a rate not to exceed the historic discharge rate. The storage volumes from these events must be added together to determine the total detention storage volume. With approval of the City Engineer, the Water Quality Capture Volume (WQCV) may be substituted for the low-flow volume, and approaches such as Full Spectrum Detention, including providing the Excess Urban Runoff Volume (EURV), may be used to optimize the water quality and flood control benefits of detention facilities as discussed in the Storage Chapter.

Detention storage facilities have special design considerations and space allocation requirements. Sufficient space must be allocated to meet the criteria in this Manual and to allow for long-term maintenance and repair. Detention facilities should not be designed based only on minimum required

volume calculations or by assuming that retaining walls or steep slopes can be used to minimize the land area needed for the improvements. Generally, aesthetics and long-term operation and maintenance are severely compromised when required storage volumes and maintenance access are not integrated early in the planning stages. Detention designs that incorporate detention storage into the overall site and landscape plans can lead to multi-purpose facilities that are viewed as site amenities.

2.8.2 Locating Detention Storage Facilities

The location of a detention storage facility depends on its intended function within the drainage system. Most of the development or redevelopment that occurs in Woodland Park will require detention so that existing storm drain capacity is preserved or improved and/or to avoid causing/contributing to downstream flooding and/or channel erosion and degradation. When detention facilities can be located where upstream sediment loads are well managed (e.g., by BMPs, upstream stabilization, sediment forebays, etc.), maintenance costs may be lowered due to less frequent sediment removal requirements. Detention storage facilities should be designed to be multi-purpose, aesthetically pleasing, safe and maintainable community assets.

To the extent feasible, detention storage facilities should be located to avoid classification as jurisdictional dams by the Office of the State Engineer. The criteria for non-jurisdictional dams are defined in the *Rules and Regulations for Dam Safety and Dam Construction* (State of Colorado Department of Natural Resources, Division of Water Resources Office of the State Engineer 2007). Jurisdictional dams must be reviewed and approved by the State Engineer and may require special design and construction considerations, potentially increasing their costs. Jurisdictional dams require an ongoing inspection and maintenance program.

2.8.3 Previous Detention Approaches

Past detention storage approaches that allowed flows from development to be conveyed long distances before being attenuated in detention facilities have resulted in degradation of the natural functions of drainageways, difficulties in effective implementation and economic burden to the public to stabilize degraded streams. Detention in headwaters areas, including providing the low-flow retention volume, the WQCV or EURV is critical to the stability of downstream drainageways. Detention facilities that do not provide mitigation for the more frequent runoff events and systems that do not include volume reduction practices can result in significant downstream impacts due to erosion and sedimentation.

2.8.4 Full Spectrum Detention

Full spectrum detention is a relatively new approach to stormwater detention that effectively limits peak flow rates to predevelopment levels and reduces the volume of stormwater runoff when used in conjunction with minimizing directly connected impervious area and other volume reduction practices. Placing full spectrum detention ponds for site-level detention will often not be feasible for a single-site development; however, for multiple lots or larger developments, full spectrum detention is a viable option, in conjunction with bioretention, extended dry detention, a sand filter or permeable pavement with detention storage in the aggregate. In addition to reducing runoff rates, full spectrum detention can also provide water quality benefits, primarily through sedimentation. The full spectrum detention approach, as defined in Chapter 13 of this Manual, maybe implemented as an alternative to the standard Low-Flow/5-year/100-year criterion specified by City of Woodland Park Resolution No. 299, Series 1994.

Although full spectrum detention is expected to more effectively mitigate increases in peak flow rates and runoff volumes for the full range of runoff events, it generally will not eliminate the need for channel stabilization downstream. To maximize the benefits of this approach, it must be implemented throughout

a drainage basin and downstream floodplain storage must be preserved. Alternative detention approaches will be evaluated on a case-by-case basis, depending on the facility's ability to achieve results similar to full spectrum detention and/or the City's existing Low-Flow/5-year/100-year criterion.

2.8.5 On-Site Detention

When development or redevelopment is proposed within a basin where downstream facilities are inadequate to pass project flows, on-site detention may be required. Requirements for on-site detention are described more fully in Chapter 13. The appropriateness of on-site detention will be evaluated on a case-by-case basis. In many cases, on site detention for small-scale developments can be accomplished by integrating a relatively small amount of additional storage into water quality facilities such as permeable pavements, bioretention area, sand filters and/or landscape depression storage.

2.8.6 Rooftop and Underground Detention

Rooftop and underground detention for flood control are prohibited, except as approved by the variance process in this Manual. Variances for rooftop or underground detention may be considered when there are severe space limitations or when the downstream system capacity is very limited; however, underground and rooftop detention systems should be avoided when practical, due to difficulties in ensuring adequate inspection and maintenance in locations that may not be easily accessible. Underground stormwater quality facilities may be allowed on a case-by-case basis at the discretion of the City Engineer, and in all cases an agreement stating the maintenance responsibility, frequency and process to rectify poor or delayed maintenance shall be established with the City.

2.9 Stormwater Quality and Runoff Reduction

Stormwater quality management approaches should include a combination of runoff reduction practices and structural and non-structural Best Management Practices (BMPs) to provide the WQCV.

2.9.1 Runoff Reduction

Whenever practical, site planning and design techniques should reduce imperviousness, minimize directly connected impervious area and increase infiltration in order to decrease the rate and volume of stormwater runoff from a site. A series of BMPs should be implemented to meet the goals of this Manual, both in terms of runoff reduction and pollutant concentration and load reduction. BMPs that provide for infiltration as well as water quality treatment have the ability to conjunctively address runoff quantity (for frequently occurring storm events) and quality and may be some of the most cost-effective practices. Volume 3 of the UDFCD Manual should be consulted for a detailed discussion regarding the implementation of runoff reduction practices.

Stormwater runoff volume reduction is beneficial to accomplishing overall stormwater management goals and can potentially reduce the overall cost of stormwater management features in development. Stormwater volume reduction is not currently required by regulation or permit in Woodland Park; however, it is anticipated that future regulations and permit requirements will likely heavily emphasize infiltration, evapotranspiration and/or capture/reuse of excess urban runoff where site conditions are conducive. Capture and reuse of urban runoff is constrained by Colorado Water Law.

2.9.2 Best Management Practices

All new developments and redevelopments are required to address stormwater quality during construction and post-construction conditions, as described in Volume 3 of the UDFCD Manual. Planning and design

of post-construction (permanent) water quality BMPs is best addressed hand-in-hand with stormwater conveyance and detention storage requirements for a site.

2.10 Drainageway Design Considerations

Design considerations for major and minor drainageways are discussed separately below.

2.10.1 Major Drainageways

A major drainageway is defined as any channel draining a tributary area of approximately 130 acres or more. The 130-acre threshold for defining a major drainageway is approximate in Woodland Park and may vary depending on specific site conditions, including the density of upstream development, opportunities for detention embankment construction, street-channel crossing locations, the quality of natural channel features downstream, and the capacity of the downstream system. As discussed in Section 3.3, there are several major drainageways that run through parts of the City. These include Trout Creek and Loy Gulch in the Upper South Platte watershed, and Fountain Creek and tributaries in the Fountain Creek Watershed.

Major drainageways shall be preserved in their natural state or restored where already degraded, to the extent practical, and stabilization measures shall be designed to complement and enhance their natural character. Preserving natural channels provides ecological and hydrologic benefits such as riparian habitat, flood storage and opportunity for groundwater recharge, and usually reduces the overall cost of improvements. Natural channels can also be valuable amenities when integrated into open space areas.

Key considerations for major drainageway design include preserving or restoring the natural character of the channel, limiting velocities to non-erosive levels, planning for maintenance access, and evaluating and mitigating potential safety hazards. To the extent practical, major drainageway channels shall be constructed to provide a natural, smooth transition from the channel to the natural topography. Bank slopes greater than 4:1 for major drainageway channels should be avoided due to stability/erosion concerns and maintenance access. Retaining walls may be used with approval of the City Engineer when appropriate due to space and/or side slope constraints; however, retaining walls are generally discouraged for "natural" channel sections. Varying side slopes and the channel cross section throughout the channel reach is encouraged to provide a less structural, more natural appearance. Channelizing natural drainageways should be avoided when feasible and usually increases flow rates and reduces floodplain storage, causing higher downstream peaks and higher drainage costs, ultimately degrading the environment.

In some cases, it is not feasible to construct a natural, open channel major drainageway due to constraints which may include space limitations due to private property, existing severe erosion problems (e.g. some reaches of Fountain Creek), other infrastructure, etc. In these cases, a channelized or closed conduit solution may be the most practical choice for providing conveyance of flood flows and protecting infrastructure, especially in areas with constrained right of way.

When full spectrum detention and upgradient volume reduction practices are implemented, peak flows entering major drainageways will be reduced, and as redevelopment activities occur in Woodland Park, with facilities that address water quality and detention, better management of runoff will improve the stability of drainageways. Controlling runoff from developed areas so that detention releases more closely approximate predevelopment conditions is critical for implementing "natural" channel designs for major drainageways. However, even with implementation of volume reduction measures and full spectrum detention in the tributary watershed, some channel stabilization work is still typically required.

2.10.2 Minor Drainageways

A minor drainageway is defined as any conveyance that drains a tributary area of less than approximately 130 acres. Minor drainageways typically require significant modifications to accommodate developed flows, especially if adequate detention is not provided for upstream, and in many cases minor drainageways in urbanized areas have been channelized or are in storm drains. Surface conveyances are encouraged and should be considered in areas as storm drains age and require replacement.

2.11 Flood Flows

2.11.1 General

Flood risk evaluation and delineation of the regulatory floodplain and floodway shall be based on a runoff event with a return period of 100 years (annual exceedence probability of 1%). Flood flows shall be based on fully-developed, future land use conditions. Effects of detention storage facilities on flood flow rates can be considered, provided that the detention facilities have been implemented in compliance with approved master plans and have adequate assurances for long-term operation and maintenance (typically publicly owned and/or maintained facilities). Effects of on-site detention practices shall not be taken into account for determination of flood flows because long-term operation and maintenance of private, on-site facilities is not assured. Where critical facilities, such as hospitals, fire stations, wastewater and water treatment plants, police stations, electrical sub-stations or other facilities, provide important public services and emergency response capabilities, protection from a more severe storm event, such as the 500-year event, should be considered. The City recently adopted Floodplain regulations for critical facilities in accordance with CWCB requirements. For the purposes of floodplain delineation, flood flows shall be evaluated as described in Chapter 5 of this Manual.

2.11.2 Floodplain Encroachment

Encroachment into the regulatory floodplains is strongly discouraged, and encroachment into unregulated floodplains is undesirable. When considering requests for floodplain filling or relocation, the impacts to adjacent properties, channel hydraulics, channel aesthetics, flood storage, and riparian habitat shall be evaluated and mitigated. Alterations to floodplains must acknowledge that anticipated flood flows may not be accurately estimated and that less frequent (more extreme) events will occur. Any alteration of the regulatory floodplain must be reviewed by the Floodplain Administrator and approved by FEMA according to the local floodplain regulations.

2.11.3 Building Above Floodplains

When developing adjacent to floodplains, a minimum of 1 foot of freeboard shall be provided above the established Base Flood Elevation (BFE). For approximate floodplains without BFEs, the Applicant shall conduct analyses to determine the estimated 100-year flood elevation. While minimum freeboard required is 1.0 foot above the 100-year flood elevation, the Applicant is strongly encouraged to provide additional freeboard due to uncertainties associated with approximate (Zone A) floodplains. The analyses shall be reviewed and approved by the City Engineer.

2.12 Right-of-Way, Tracts and Easements

All developments must include the allocation of space for drainage facility construction and maintenance, which includes the preservation of natural systems and the conveyance of adequate right-of-way and/or easements or tracts through the execution of appropriate legal documents. Right-of-way for floodplains

must also account for potential increases in flood flows due to development and for the preservation of floodplains and their natural functions.

2.13 Basin Diversions

2.13.1 Intra-basin Diversions

Some intra-basin diversion of runoff may occur within major basins, as sub-basin boundaries are changed with a development. Those diversions should be minimized and, to the extent possible, historic outfall locations to natural drainageways shall be maintained. When a diversion is necessary, any potential adverse impacts that result shall be mitigated with proper stormwater management design and adequate right-of-way.

2.13.2 Inter-basin Diversions

Inter-basin diversion of runoff from one major drainageway basin to another major drainageway basin shall be avoided unless specific and prudent reasons justify and dictate a diversion. These diversions must be part of a master plan that fully recognizes the potential impacts and provides for adequate mitigation measures.

2.14 Groundwater Mitigation

Shallow groundwater has the potential to adversely impact the construction, capacity, long-term function, and maintainability of stormwater management facilities. It is the Applicant's responsibility to perform investigations and analyses to quantify potential effects of shallow groundwater and to implement facility designs that are effective under such conditions. For facilities that are intended to be dry between runoff events, seasonally high groundwater should be at least three feet below the bottom of the facility so that the bottom of the facility does not become inundated as groundwater fluctuates throughout the year. For facilities designed for infiltration, a minimum separation from the annual high groundwater table of at least 5 feet is recommended.

It is also important to note that for infiltration-based BMPs, the groundwater beneath the site is the receiving water for stormwater that is infiltrated. Therefore, infiltration-based BMPs are not recommended for land uses that generate significant loads of dissolved pollutants or for "hot spot" areas such as drive-through lanes, fueling areas, etc.

Other groundwater related issues may occur when groundwater or subsurface flows increase as a result of development and urbanization. In such cases, foundation drains and sump pumps are often installed to collect and discharge these flows to the surface. If discharged quantities are excessive or continuous, icing and algae can create nuisance conditions. Mitigation of these problems typically requires an additional collection system, which may ultimately discharge into the storm drain system. These additional flows have the potential to affect the capacity of the storm drain system. During wet weather, runoff in the storm drain system may surcharge the subsurface collection system.

3.0 Construction of Public Improvements

When drainage reports or other applicable reports or studies identify public improvements that are necessary to properly manage stormwater runoff, mechanisms for funding the improvements are required. Funding mechanisms should equitably distribute the construction and maintenance costs in proportion to the benefits received. Applicants are required to construct, or guarantee to construct, stormwater

management facilities that are necessary to serve their subdivision or development. Such facilities may include improvements to convey off-site flows through the property and participation in the stabilization or improvement of the major drainageway system. Public improvements typically consist of the street/minor drainage system and the major drainageway system, as described in the remainder of this section.

3.1 Minor Drainage System

The minor (or local) drainage system, to convey the 5-year event, must be designed and constructed with all new development and redevelopment. The minor drainage system consists of curb and gutter, inlets and storm drains, culverts, bridges, swales, ditches, channels, detention facilities, and water quality BMPs within the subdivision or development. The minor drainage system also includes facilities required to convey the minor and major storm runoff to the major drainageway system and those facilities necessary to convey off-site flows across or through the developing property. The drainageway improvements may be master planned or may require the preparation of detailed analysis by the Applicant. It is the responsibility of the Applicant to demonstrate that improvements on the site will be protected from minor and major storm flows, flooding, channel degradation and bank erosion. Conveyance of off-site runoff is discussed in detail in Chapter 6, Hydrology.

3.2 Major Drainageway System

The major drainageway system consists of channels, storm drains, bridges, culverts, detention facilities, and water quality BMPs generally serving a tributary area of approximately 130 acres or greater and, in many cases, more than one subdivision or development. Major drainageway systems within proposed developments must be designed and constructed as part of the new development or redevelopment.

3.3 Major Drainageways in the City of Woodland Park

The City of Woodland Park has three major drainageways within its City limits. These drainageways include Trout Creek, which flows south to north; Fountain Creek, which flows north to south; and Loy Gulch, a tributary of Trout Creek, which flows east to west.

1. Trout Creek drains a total area of approximately 24 square miles to the downstream City boundary and is a part of the South Platte River Basin. Tributaries of Trout Creek include Lovell and Loy Gulches. The drainage area is comprised of land uses including public, commercial, residential, and forest.

2. Fountain Creek drains a total area of approximately 5.5 square miles to the downstream City boundary. Fountain Creek, located within the Arkansas River Basin, is subject to more intense rainfall than Trout Creek, in the South Platte River Basin. The drainage area is comprised of land uses including agricultural, public, commercial, business, residential, and forest.

3. Loy Gulch, a tributary of Trout Creek, drains a total area of approximately 6.6 square miles to the downstream City boundary. The drainage area is comprised of land uses including commercial, residential, and forest.

3.4 Master Plan Improvements

Development and redevelopment projects must be designed and constructed in accordance with the *City of Woodland Park Engineering Specifications* (2011). Improvements must be in conformance with the most current versions of stormwater and drainage master plans and the City Comprehensive Plan. Responsibility for these improvements, which may serve multiple ownerships or projects, shall be determined through discussion and negotiation during the preparation of Preliminary and Final Drainage Reports and Plans.

4.0 Stormwater Development Fees

A current schedule of stormwater-related development fees is available from Public Works. The stormwater fee program was established via Ordinances 633 (1994) and 645 (1995) and was amended in 1996 via Ordinance 674.

5.0 Operations and Maintenance

Maintenance activities, including routine maintenance, restorative maintenance, rehabilitation and repair, are required to ensure the long-term function and effectiveness of stormwater management infrastructure. Such tasks are necessary to preclude the facility from becoming ineffective and to avoid reduced conveyance capability, unsightliness, and malfunction. Site plans and projects must incorporate provisions for adequate access and space to perform maintenance activities for all stormwater management facilities. Routine maintenance of facilities may include removal of debris and sediment, trash rack clearing, mowing, noxious weed control, etc. Non-routine restorative maintenance activities include repairs to or replacement of structures and other improvements necessary to retain the effectiveness of the system. All facility designs shall be held to the same standards, regardless of the organization or entity that has accepted responsibility for maintenance.

5.1 Operation and Maintenance Plan

The design of all stormwater management facilities must be performed with access and short-term and long-term operation and maintenance being priority considerations. An Operation and Maintenance Manual (O&M Manual) must be developed and approved concurrent with the design and shall define O&M plans and those entities responsible for the maintenance and management of stormwater facilities. The purpose of the O&M Manual is to provide guidance and standard forms for those responsible for the long-term inspection and maintenance of the facilities. Water quality BMPs require an Inspection and Maintenance Plan as described in Volume 3 of the UDFCD Manual.

5.2 Owner Responsibility

The property owner shall be responsible for the all maintenance, rehabilitation and repair of stormwater facilities located on the property unless another party accepts such responsibility in writing and responsibility is properly assigned through legal documentation. Maintenance responsibility shall be defined on final plats and final development plans or by maintenance agreements.

5.3 Access

Drainage easements, tracts and access easements, or public right-of-way shall be provided for all stormwater management facilities that convey public stormwater runoff or that will be maintained by a public entity. In general, easements are required for detention facilities, structural water quality enhancement BMPs, storm drains, swales, channels, parking lot areas that convey runoff from adjacent properties (blanket type easements), culverts, major drainageways, and floodplains. Drainage easements shall be granted for inspection and maintenance purposes and shall be shown on the drainage plans, Final Plat, and Site Improvement Plans, as applicable. Maintenance access for all facilities must be adequate for the anticipated maintenance vehicles and equipment. Public stormwater runoff shall be defined as surface waters resulting from rainfall, snowmelt or groundwater seepage that originates on privately or publicly owned property and combines with other surface waters from publicly owned property.

5.4 Private Detention Storage

When detention storage facilities receive runoff only from private parcels, but release flows into a public system or onto public right-of-way, easements shall be provided for access, inspection and maintenance.

5.5 Conveyance of Upstream Runoff

Developing properties shall convey runoff from upstream properties across their site within dedicated drainage easements or tracts in accordance with approved drainage plans. This may require the conveyance of developed runoff if the approved plan includes downstream detention storage facilities.

5.6 Easements on Residential Lots

Drainage leaving individual residential lots can combine with other privately owned residential lots and contribute to excess runoff entering adjacent lots, creating the potential for saturated ground, local flooding and a general nuisance. Subdivision plans shall limit the amount of runoff from residential lots so that runoff does not unduly impact adjacent lots. Easements shall be provided along lot lines or through tracts so that these flows can be conveyed safely. Drainage easements are allowed at a width of 10 to 20 feet (total width) along residential lot lines (typically centered on the lot line, with equal portions on each lot). Swales placed within these easements may only accept a limited amount of drainage and must remain free of obstructions such as fences, excessive vegetation and/or debris. Maintenance of swales within any easements is the sole responsibility of the property owners

6.0 Regulatory/Legal

6.1 Local Permits

The construction of stormwater management facilities may require one or more of the following permits:

1. **Flood Hazard Development Permit.** Projects that include work within designated 100-year floodplain limits of drainageways require a Flood Hazard Development Permit. Consult Chapter 5, Floodplain Management, of this Manual for additional details.

2. **Zoning Development Permit.** A Zoning Development Permit is required for any substantial clearing, grading or excavation of any area over one thousand five hundred (1,500) square feet, or a driveway of any size, on lands contemplated for development. Applicants must also obtain a Zoning Development Permit to begin any construction, moving, alteration or renovation of any

building or other structure, aside from ordinary repairs. The Zoning Development Permit defines the type of use and type of occupancy for land and structures. Zoning Development Permits are valid for one year from the date of issue and must be renewed if construction has not started within that time period.

3. **Right-of-Way Access/Street Cut Permit.** Projects that include use of or construction in the public right-of-way must obtain a Right-of-Way Access/Street Cut Permit.

4. **Grading Permit**. A grading and erosion control plan must be submitted and approved prior to the start of land-disturbing activities. A Grading Permit is required for development and redevelopment activities with more than 7,500 ft^2 of disturbance per Chapter 18.41 of City Zoning Regulations.

6.2 Environmental Permitting

In addition to local permitting processes, the construction of stormwater management facilities often requires permitting through the Colorado Department of Public Health and Environment Water Quality Control Division with regard to stormwater management during construction and construction dewatering; permitting through the United States Army Corps of Engineers (USACE) relative to Section 404 of the Clean Water Act (wetlands permitting); and through the United States Fish and Wildlife Service regarding threatened and endangered species. It is strongly recommended that initial project planning incorporate input from the appropriate agencies to determine permitting process requirements because these processes can be complex and time consuming. It is the responsibility of the owner or developer to anticipate and comply with all permit requirements for a project.

Compliance with state or federal permitting requirements does not replace the need to fully comply with local regulations, standards, or criteria. If necessary, joint discussions between all regulatory agencies shall be initiated in project planning stages and continued as needed.

6.3 NPDES/CDPS Permits

Permit holders under the National Pollutant Discharge Elimination System (NPDES) Program requirements of the Federal Clean Water Act, and regulations promulgated by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (Colorado Discharge Permit System [CDPS]) comply with permit requirements, which includes requiring permanent post-construction water quality enhancement BMPs with development or redevelopment. Currently, the City of Woodland Park falls below the size threshold requiring a Municipal Separate Storm Sewer (MS4) permit through CDPHE (generally population greater than 10,000); although, with current EPA Rulemaking it is anticipated that the City of Woodland Park will be required to obtain coverage under and comply with a MS4 permit as the federal regulations are implemented at the state level. In addition, CDPS coverage for Stormwater Discharges Associated with Construction Activities is required for all projects with an area of disturbance of greater than or equal to 1.0 acre.

6.4 Floodplain Regulations

The City of Woodland Park participants in the National Flood Insurance Program (NFIP) and implements and enforces floodplain development regulations that meet or exceed the minimum standards provided in 44 Code of Federal Regulations, Part 60.

6.5 Water Rights

It is the responsibility of the owner/developer to recognize that certain stormwater management facilities may impact water rights. The integrity of water rights shall be preserved in the planning, design, and construction of stormwater drainage facilities according to Colorado law and the rules administered by the Office of the State Engineer.

6.6 Drainage Law

The general principles of Colorado drainage law and specific Colorado Revised Statutes guide and affect many aspects of stormwater management, including, but not limited to, private and municipal liability, maintenance and repair of drainage improvements, construction of drainage improvements by local governments, financing of drainage improvements, floodplain management, irrigation ditches, dams and detention facilities, water rights, and water quality. The Drainage Law Chapter of the UDFCD Manual provides an outline of the general principles of Colorado drainage law and should be consulted for general reference.

7.0 Hazard Minimization & Public Safety

7.1 Public Safety

Public safety shall be an essential objective when planning, designing and maintaining stormwater facilities.

7.2 Potential Hazards

Stormwater facilities shall be designed with careful consideration of the potential hazards associated with the use, operation and maintenance of the facility and shall include appropriate design features to minimize these risks.

7.3 Jurisdictional Dams and Reservoirs

Dam safety issues and hazards may be associated with water storage facilities due to the risks associated with dam failure, emergency spillway locations, and downstream flow paths. Jurisdictional dams are classified by the State Engineer as low, moderate, or high hazard structures depending on the risks dams pose to downstream property and public safety. Currently, there are no jurisdictional drainage dams maintained by the City of Woodland Park[1].

Due to the potential liabilities and regulatory and administrative requirements, the creation of jurisdictional dams is strongly discouraged. The creation of a jurisdictional dam shall not be allowed, unless special approval is obtained. Detention pond embankment heights shall be limited, and other elements of pond design shall be considered to avoid the creation of a jurisdictional dam.

[1] The City owns jurisdictional water supply dams; however, these structures are located outside of City limits.

8.0 Irrigation Canals or Ditches

Irrigation ditches and reservoirs have historically intercepted the storm runoff from rural and agricultural basins. Urbanization of the basins, however, has increased the rate, quantity and frequency of stormwater runoff and can have negative effects on water quality. Irrigation ditches are designed with flat slopes and have limited carrying capacity, decreasing in the downstream direction. In addition, certain ditches are abandoned after urbanization and, therefore, cannot be successfully utilized for storm drainage. Currently, there are no ditches or canals in the City of Woodland Park. If an irrigation ditch or canal is involved in the design of a project, the Applicant shall consult the Colorado Springs Manual for applicable policies.