

3.0 Introduction

Stormwater management is an integral component of overall development planning and site design that must be addressed in the earliest planning stages. Initial feasibility studies or preliminary site analyses cannot be properly performed without a clear understanding of stormwater management regulatory requirements and criteria, site design practices which lead to more effective management of stormwater, existing site characteristics or features which affect stormwater management concepts, and the fact that stormwater cannot be properly managed by allocating minimal space in a portion of a site or development which is convenient or “out of site”. Incorporating stormwater management planning in the initial stages can lead to reduced infrastructure costs, better long term function of stormwater management facilities and increased property values. Facilities which are designed as site amenities can still lower maintenance costs and provide potential mitigation of impacts to downstream properties or drainageways.

Initiating stormwater management planning independently, after development planning or site layout has been accomplished, leads to space allocation problems, increased infrastructure costs, difficulties in meeting regulatory requirements and criteria, and designs that compromise long term function and maintainability, which will not be approved by the County. Initiating stormwater management planning independently, after development planning or site layout has been accomplished, may lead to inadequate space being allocated for stormwater management and other design challenges. Often, this results in an increase in infrastructure costs and difficulties in meeting regulatory requirements and criteria. Douglas County will not accept designs that compromise long-term function and maintenance access.

3.1 Planning for Stormwater Management

The following sections provide some general discussion regarding impacts of urbanization and factors to consider when planning for stormwater management in the site design or development layout processes. Additional guidance for planning of the urban storm runoff system is provided in the Planning section of the *UDFCD Manual*.

3.1.1 Impacts of Development. The increased runoff rates and volumes associated with urbanization and development can significantly impact downstream properties, existing infrastructure, and natural drainageways and other resources. Flooding of downstream properties can result if existing drainage facilities are not adequate to handle the increased runoff peak flows. Drainageways are subject to increased peak discharges, runoff volumes, and more frequent runoff events. Channel bank erosion and degradation occur if channel stabilization measures are not implemented as development occurs.

In addition to challenges presented by increased runoff quantities, changes in stormwater runoff quality, associated with urbanization, can have significant impacts on rivers, streams, and lakes. Some of the urban stormwater pollutants are sediments, nutrients, microbes, organic matter, toxic pollutants, and trash and debris.

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3.1.2 Multi-purpose Resource. Although sometimes considered a liability to urbanization, stormwater runoff is an urban resource, having many potential beneficial uses that are compatible with adjacent land uses and Colorado water law. When treated as a resource, aesthetic and water quality aspects become increasingly important. The stormwater urban sub-system should be multi-purpose to satisfy the competing demands for land within the County. For example, stormwater management facilities can be designed to fulfill recreational purposes and open space requirements along with stormwater runoff conveyance or storage. In addition, facilities not intended primarily for stormwater management, may be designed to incorporate water quantity and quality benefits. Stormwater runoff is considered to be an integral part of surface and groundwater resources and recognizes the potential for other uses.

Wetland or habitat mitigation areas should not be included in stormwater management facilities.

3.1.3 Allocation of Space. The stormwater management system is an integral part of the total urban system and, therefore, planning of drainage facilities must be included in the urbanization process. Stormwater management facilities, such as channels and storm sewers, may serve conveyance, storage, and water quality functions. When the space requirements are considered, the provision for adequate drainage becomes a competing use for space along with other land uses. If adequate provision is not made in a land use plan for the drainage requirements, storm water runoff will conflict with other land uses and will impair or even disrupt the functioning of other urban systems. The County requires storm drainage planning for all developments to include the allocation of space for drainage facility construction and maintenance, which includes the dedication of Right-of-Way and/or easements.

3.1.4 Regional and Local Master Planning. In recognition that drainage boundaries are non-jurisdictional, the County, in cooperation with the UDFCD and other local jurisdictions, has participated in preparing regional, basin-wide master plans to define the major drainageway stabilization and other stormwater management improvements that are needed to mitigate drainage impacts associated with development. The County will also encourage, and may choose to participate in, preparation of such future master plans. In the absence of regional master plans, the developer will be responsible for providing additional information as necessary, and may be required to participate in master planning efforts to ensure that the proposed development and associated stormwater runoff system will be compatible with the properties in the drainage basin. The County may require that stormwater management facilities be designed in conformance with approved regional flood control or water quality master plans.

3.1.5 Site Design and Layout. Good site planning and development layout is the key to effective stormwater management. Initial planning must identify important natural features or environmentally sensitive areas, such as floodplains or wetlands. Protection of those areas should be incorporated into the site plan or

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development plan concept. Other existing site characteristics such as topography, geologic features, or soils may also present unique challenges when developing the stormwater management plan for a site or development. Generally, there are significant benefits to implementing practices that reduce runoff volumes, slow runoff velocities, and ensure careful placement of water quality treatment facilities. The incorporation of infiltration, detention, and stormwater conveyance into landscaped areas furthers the concept of developing stormwater management facilities that are amenities, which are aesthetically pleasing and effective. Attempts to address stormwater management in later stages of development planning will lead to ineffective and costly stormwater management.

3.1.6 Volume Reduction Practices. Runoff volume and peak reduction, through the implementation of the minimizing directly connected impervious areas concept should be considered as an important component in effective stormwater management planning. The goals of implementing this practice are to reduce impervious areas or the effective imperviousness of the site and to slow down runoff and promote infiltration. Reduction in size and cost of downstream stormwater management infrastructure is another potential benefit of implementing minimizing directly connected impervious areas. Reduction of paved or impervious areas and the use of porous pavement, grass buffers, and grass swales are several of the approaches that are part of implementing minimizing directly connected impervious areas. The New Development Planning section in Volume 3 of the *UDFCD Manual* and Chapter 14 Stormwater Quality of these *Criteria* should be consulted for more detailed discussion regarding the implementation of minimizing directly connected impervious areas.

3.1.7 Design of Stormwater Quantity Management Improvements. Detention storage facilities and improvements which convey stormwater runoff must be carefully planned and integrated into the first stages of site planning. Sufficient space must be allocated to allow for designs that meet all technical requirements and that ensures long-term function and maintainability of stormwater facilities. Conveyance facilities which are aesthetic and promote infiltration of stormwater runoff should be considered where feasible.

Inlets, when needed to collect stormwater runoff 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 be chosen with those considerations in mind. Potential inundation depths and limits at inlets must also be acceptable when considering the adjacent property use.

Underground storm sewer systems, required to convey stormwater runoff collected at inlets, must be integrated and located within the site, to facilitate proper function and ease of maintenance. Issues to be considered when developing preliminary storm sewer locations include, but are not limited to, proximity to proposed structures, other utilities, and adjacent properties, depth of

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cover, traffic loading, proposed surface improvements, and accessibility for future maintenance.

Detention storage facilities have special design considerations and space allocation requirements. These facilities should not be designed based on minimum required volume calculations, 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 ease of maintenance are severely compromised when detailed design criteria and maintenance access requirements are not considered in the earliest planning stages. Detention pond designs which incorporate detention storage into the overall landscape plan can lead to detention ponds that are viewed as site amenities.

- 3.1.8 Water Quality Treatment.** Post construction water quality Best Management Practices are required with all new development or re-development within the County. In addition to stormwater volume and peak flow reduction, practices associated with minimizing directly connected impervious area, Best Management Practices that provide Water Quality Capture Volume will also be required for the excess runoff that remains after the volume reduction practices are accounted for. Best Management Practices that have a Water Quality Capture Volume drain slowly to provide for sedimentation of particles and removal of pollutants. Common Water Quality Capture Volume Best Management Practices are porous pavement detention, porous landscape detention, extended detention basins, sand filter extended detention basins, constructed wetland basins, and retention ponds. Incorporation of these Best Management Practices into a site or development must be addressed in the initial planning stages and requires a well coordinated effort between the land planners, landscape architect, and the engineers responsible for stormwater management design. Implementation of water quality Best Management Practices must be addressed hand-in-hand with the stormwater conveyance and detention storage facilities. Consult Volume 3 of the *UDFCD Manual* and the criteria in these *Criteria* for detailed design requirements, considerations, limitations, and information regarding proper implementation.
- 3.1.9 Channel Stabilization.** Drainageways experience more frequent runoff events as a watershed develops. These runoff events increase in rate and volume as the imperviousness in the basin changes. Channel bank erosion and degradation can occur with changes in hydrology, if channel stabilization measures are not implemented with development. There has been a common misconception that providing on-site detention mitigates impacts to downstream drainageways for all storm events. Typical detention facilities often do not provide mitigation for the more frequent runoff volumes or events. The full-spectrum detention approach described in Chapter 13 is expected to improve the reduction of runoff rates for more frequent storms, but will not negate the need for effective channel stabilization. Runoff volumes will still increase and elevated flows will still occur in response to large rainfall events. Drainageway stabilization within or adjacent to a development must be addressed in the overall stormwater management plan. Many watershed Outfall System Planning Studies have been developed through

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cooperative efforts with UDFCD and local governments. These studies provide conceptual or preliminary design information regarding stabilization of many major drainageways. The overall stormwater management plan for any development must address the recommendations contained within the Outfall System Planning Studies.

3.1.10 Maintenance Considerations. Maintenance activities, including routine maintenance, restorative maintenance, and rehabilitation are required to ensure the long-term function and effectiveness of stormwater management facilities and infrastructure. Initial site planning must incorporate provisions for adequate access and space to perform maintenance activities for all stormwater management facilities. All facility designs will be held to the same standards, regardless of the organization or entity that has accepted responsibility for maintenance. Maintenance responsibilities and access issues are discussed in more detail in Section 3.5 of this Chapter.

3.1.11 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 Section in Volume 1 of the *UDFCD Manual* provides a good outline of many of the general principles of Colorado drainage law and it should be consulted for general reference.

3.1.12 County Permits. The construction of stormwater management facilities within the County may require one or more of the following permits:

1. Temporary Construction Access Permit. All access points to or from a construction site require a Temporary Construction Access Permit as outlined in the Douglas County *Roadway Design and Construction Standards Manual* as amended.
2. Floodplain Development Permit. Projects that include work within designated 100-year floodplain limits of drainageways in the County require a Floodplain Development Permit. Consult the Douglas County *Zoning Resolution* and Chapter 5 Floodplain Management of these *Criteria* for additional details.
3. Right-of-Way Use and Construction Permit. Projects that include use of or construction in the County Right-of-Way must obtain a Right-of-Way Use and Construction Permit. Information on Right-of-Way Use and Construction permitting is found in the Douglas County *Roadway Design and Construction Standards Manual*, as amended. This permit is also required for the construction of drainage facilities on private property.
4. GESC Permit. Douglas County requires that a GESC Permit be obtained prior to the start of land-disturbing activities within the unincorporated areas

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of the County. Consult the Douglas County *GESC Manual* and *Douglas County Zoning Resolution* for detailed requirements.

3.1.13 Environmental Permitting. In addition to County permitting processes, the construction of stormwater management facilities often requires permitting through the Colorado Department of Public Health and Environment with regard to the Stormwater Construction permitting requirements, and through the United States Army Corps of Engineers (USACE), relative to Section 404 of the Clean Water Act, and through the United States Fish and Wildlife Service regarding compliance with the requirements of Sections 7 and 9 of the Endangered Species Act of 1973. It is strongly recommended that initial project planning incorporate input from the appropriate agencies to determine permitting process requirements, as these processes can be complex and time consuming.

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

3.2 Special Planning Areas and Districts

There are Special Planning Areas or Districts within the County where additional or unique considerations affect stormwater management planning or design. Special policies or recommendations may be implemented for these areas, as discussed in the following sections.

3.2.1 Arapahoe County Water and Wastewater Authority (ACWWA). Douglas County has an intergovernmental agreement with ACWWA regarding planning and construction of improvements within its service area. In general, ACWWA is responsible for the regional drainageways within its service area, and it collects fees from new development to implement these improvements. The County is responsible for overseeing the local drainage system, including minor drainageways, storm sewer systems, and streets. The County requires that local improvements be guaranteed and constructed by developers, and may establish separate fees to cover part, or all of the cost of these improvements. Drainage reports and construction plans for drainage improvements are reviewed by ACWWA through Arapahoe County, and its approval is required for construction plan approval.

3.2.2 Inverness Water and Sanitation District (Inverness). This area is generally bounded by Centennial Airport, Douglas County, I-25, and as far north as Geddes Avenue. The County also has an intergovernmental agreement with Inverness that gives overall responsibility for the major and minor drainageways to Inverness. The County maintains responsibility for the storm sewers and the streets.

3.2.3 Cherry Creek Basin Water Quality Authority (CCBWQA). The State's Cherry Creek Reservoir Control Regulation No. 72 is in effect for this watershed. The

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CCBWQA was formed to protect and enhance the overall quality of the water within Cherry Creek Reservoir and, therefore, for all development within the Cherry Creek Basin, including tributaries, the CCBWQA will be a referral agency. The CCBWQA will review development proposals and land use applications for conformance with Cherry Creek Reservoir Control Regulation No. 72 requirements and will provide comments to the County.

3.2.4 Chatfield Watershed Authority. The State's Chatfield Reservoir Control Regulation No. 73 is in effect for this watershed. The Chatfield Watershed Authority was formed to promote protection of water quality in the Chatfield Watershed for recreation, fisheries, drinking water supplies, and other beneficial uses. Therefore, Chatfield Watershed Authority will be a referral agency to the County for development proposals and land use applications for conformance with Chatfield Reservoir Control Regulation No. 73 and for conformance with land use policies adopted by the Chatfield Watershed Authority.

3.2.5 Denver Highline Canal. The Highline Canal is a large irrigation ditch that runs throughout the northwest portion of the County, and is owned and operated by the Denver Water Board. Developments adjacent or tributary to the Highline Canal must be reviewed and coordinated with the Denver Water Board. Several master planning studies have been or are being completed to address the interaction between stormwater drainage and irrigation flows in the canal and should be consulted prior to planning drainage facilities that may be tributary to the Highline Canal.

3.2.6 Areas with Existing Drainage Problems. General principles regarding the management of stormwater, engineering expertise and methodologies, accepted design practices, local government oversight, and the development of minimum design standards or criteria have evolved over time. There are areas of the County that developed during the earlier stages of this evolution when there may not have been a thorough understanding of how to properly convey stormwater or mitigate the potential adverse impacts associated with increased peak flow rates and volumes. As a result, some of these areas experience drainage problems and lack adequate infrastructure to properly convey stormwater runoff. In those areas additional analysis and improvements may be required by the County in order to ensure that the existing problems area not exacerbated by new development or redevelopment.

3.3 Special Considerations

3.3.1 Irrigation Ditches. There are many irrigation ditches and reservoirs in the County. The 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 has had negative effects on water quality. Irrigation ditches are designed with flat slopes and have limited carrying capacity, decreasing in the downstream direction. As a general rule, irrigation ditches cannot be used as an outfall point for the storm drainage system because of these physical limitations. In addition, certain

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ditches are abandoned after urbanization and, therefore, can not be successfully utilized for storm drainage.

In certain instances, however, irrigation ditches have been successfully utilized as outfall points for the drainage system, but only after a thorough hydrological and hydraulic analysis. Since the owner's liability from ditch failure increases with the acceptance of storm runoff, the responsibility must be clearly defined before a combined system is approved.

Irrigation facilities shall not be utilized indiscriminately as drainage facilities and, therefore, policies have been established to achieve compatibility between urbanization and the irrigation facilities. The primary irrigation ditch within the urbanized area of Douglas County is the Highline Canal. Several master planning studies are underway or have been completed for the Highline Canal, and should be referenced for all work near or adjacent to the Highline Canal.

In general, stormwater runoff generated by urbanization or development shall be directed into historic flow paths and drainageways, thus avoiding discharging into irrigation canals or ditches, except as required by water rights. The engineer or developer shall coordinate with the ditch owner when specific site characteristics or circumstances present challenges relative to separation of irrigation and stormwater flow paths or conveyance facilities.

The engineer should perform an analysis to verify that an irrigation ditch does not intercept the storm runoff from the upper basin and that the upper basin remains tributary to the basin area downstream of the ditch.

Whenever new development or improvements will alter patterns of the storm drainage into irrigation ditches by increasing flow rate volumes, or changing points of concentration, the written consent from the ditch company shall be submitted with the development application. The discharge of runoff into the irrigation ditch shall be approved only if such discharge is consistent with an adopted master drainage plan.

- 3.3.2 Jurisdictional Dams and Reservoirs.** Jurisdictional dams are classified by the State Engineer as low, moderate, or high hazard structures when, in the event of failure, there is a potential loss of life. Dams presently rated as low or moderate hazard structures may be changed to high hazard rating if development occurs within the potential path of flooding due to a dam breach. In this case, the reservoir owners would be liable for the cost of upgrading the structure to meet the higher hazard classification.

Pursuant to Section 37-87-123, CRS, as amended, the Office of the State Engineer has prepared flood hazard maps that predict potential results of a failure of the high hazard dams within the State. These reports have been made available to various cities, towns, and counties that may be affected by a dam breach. The following shall apply when development is proposed in the vicinity of dams or reservoirs:

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- Development shall be restricted to areas outside of the reservoir's high water line, plus freeboard, created by the design flood for the emergency spillway.
- Development shall be restricted to areas outside of the high water line created by the breach of a dam (excepting high hazard classified dams which have passed inspection by the State Engineer's Office in accordance with *Sections 37-87-105, et. Seq, CRS 1973*). For more information refer to the State Engineer's Office.
- Development shall be restricted to areas outside of the existing or potential spillway paths, beginning at the dam and proceeding to the point where the floodwater returns to the natural drainage course.

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

3.3.3 Groundwater Investigations. Groundwater can affect the function of stormwater management facilities, and other infrastructure. It is the engineer's responsibility to perform investigations and analyses to quantify potential impacts and to develop designs, which mitigate any potential impacts.

There are also cases where groundwater or sub-surface flows seem to increase with development and urbanization. Foundation drains and sump pumps collect and discharge these flows to the surface. If quantities are excessive, icing and algae nuisances can result, which affect the quality of life of residents. Mitigation of these problems typically requires an additional collection system, which must ultimately discharge into the storm sewer system. The function or capacity of the storm sewer system may be compromised and stormwater runoff can surcharge the subsurface drainage collection system. There are likely many factors, including increased irrigation, introduction of non-native soils during grading operations, varying levels of compaction adjacent to structures, etc. that lead to excessive sub-surface flows being discharged to the surface.

It is anticipated that the County will initiate efforts to track and compile data regarding the geographic extent and the number of specific locations where excessive algae and icing have become a problem or where curb chase drains have been installed to mitigate the nuisance at the sidewalk. Potential long-term solutions include, but are not limited to: installation of a public under-drain collection system with other subdivision infrastructure; extension of required storm sewer facilities to allow for under-drain connections; or collection of additional fees at time of subdivision to fund post development mitigation projects. Long-term solutions will depend on the results of the data collection effort along with extensive analysis of the costs and benefits associated with potential solutions.

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To the extent possible, efforts need to be made during the development process to identify potential problems and provide the appropriate mitigation so that the function of storm sewer facilities is not impacted in the future.

It is the developer's responsibility to provide an appropriate analysis and discussion of potential groundwater impacts within a development and address any potential impacts to surrounding properties.

3.4 Construction of Improvements

When Phase III drainage reports, Master Plans of Drainage, Master Drainageway Plans, UDFCD Outfall Systems Planning Studies, 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. In accordance with the *Regulations*, subdividers or developers are required to construct, or guarantee to construct, stormwater management facilities that are necessary to serve the subdivision or development, which 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 local drainage system and the major drainageway system, as described in the remainder of this section.

3.4.1 Local Drainage System. The local drainage system, as defined by the Phase III drainage report and plan, must be designed and constructed with all new development and redevelopment. The local drainage system consists of curb and gutter, inlets and storm sewers, culverts, bridges, swales, ditches, channels, detention facilities, and water quality Best Management Practices within the subdivision or development. The local 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.

3.4.2 The Major Drainageway System. The major drainageway system consists of channels, storm sewers, bridges, culverts, detention facilities, and water quality Best Management Practices generally serving a tributary area of 130 acres or greater and in many cases, more than one subdivision or development. The major drainageway system within the development, as defined by Master Plans of Drainage or as required by the County and defined in the Phase III drainage report and plan, must be designed and constructed with all new development and redevelopment. Equitable participation in the design and construction of the off-site major drainageway system that serves the development as defined by Master Drainageway Plans, as required by the County, or as designated in the Phase III drainage report may be required.

3.4.3 Drainageway Improvements. It is recognized that the development of a property which is directly adjacent to a drainageway may require the design and construction of drainageway improvements. The drainageway improvements

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may be master planned, or may require the preparation of a detailed analysis by the developer. It is the responsibility of the developer's engineer to design improvements that will ensure that the site and infrastructure to be constructed by the development will be protected from minor and major storm flows, flooding, and from channel degradation and bank erosion.

3.5 Stormwater Facility Maintenance

Stormwater management facilities must be properly maintained to function as designed. The County will require that all stormwater management facilities be designed to minimize facility maintenance as well as to provide adequate maintenance access. 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. Such tasks are necessary to preclude the facility from becoming unhealthy and to avoid reduced conveyance capability, unsightliness, and malfunction. An Operation and Maintenance Manual is required in conjunction with the final design of stormwater management facilities. Additional information can be found in Section 4.6.

3.5.1 Maintenance Responsibility. Maintenance responsibility lies with the owner of the land, except as modified by specific agreement. Maintenance responsibility shall be defined on final plats and final development plans. The property owner or designee shall be responsible for the maintenance of all drainage facilities including inlets, pipes, culverts, channels, ditches, hydraulic structures, and detention basins located on their land unless modified by specific agreement. Maintenance access for all facilities must be adequate for the anticipated maintenance vehicles and equipment and should be shown on the final plats and final development plans. The Operation and Maintenance Manual, as described in Section 4.6, shall define those entities responsible for the maintenance and management of stormwater facilities.

3.5.2 Easements. Drainage easements are required in order to ensure for the proper construction, maintenance, and access to drainage improvements that have the potential to affect the public drainage system and other properties. Drainage easements, shall be granted to the County for inspection and maintenance purposes, and shall be shown on the drainage plan, Final Plat and Site Improvement Plan, as applicable. The drainage easement shall state that the County has the right of access on the easements for inspection and maintenance purposes. In general, easements are required for detention or retention ponds, water quality enhancement ponds and Best Management Practices, storm sewers, swales, channels, parking lot areas that convey runoff from adjacent properties (blanket type easements), and major drainageways and floodplains. Easement requirements are specific to the type of stormwater management facility and are discussed in more detail in later chapters.

3.5.3 Operation and Maintenance Manual. An Operation and Maintenance Manual (O&M Manual) shall be required for all permanent stormwater facilities to ensure

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that they function as designed. The purpose of the O&M Manual is to provide guidance and standard forms for those entities that will be responsible for the long-term inspection and maintenance of the facility. The County's standard template shall be used as the basis for the O&M Manual. For more information refer to Section 4.6.

3.5.4 Easements on Residential Lots. It is recognized that there are certain liabilities and responsibilities associated with the ownership and maintenance of drainage facilities within drainage easements. It is undesirable to assign this responsibility/liability to single family lots with individual ownership. An exception shall be provided for the drainage of the individual lot, or a maximum of 3 adjacent lots. The County's policy shall be to require that in residential areas, drainage easements that convey flows from the subdivision, be allowed only on areas that are within a common ownership, such as an HOA, a special district or a similar approved entity. Drainage easements are allowed at a width of 10 to 20 feet along residential lot lines. Swales placed within these easements may only accept a limited amount of drainage from no more than 3 residential lots. In areas, such as above, where easements on residential lots are not permitted, it may be necessary to create tracts, which are owned by a homeowners association, district, or other appropriate entity. A drainage easement shall be provided on the tract for drainage facilities.

3.5.5 UDFCD Maintenance Assistance. The UDFCD has a maintenance program, which, based on a yearly work program, provides drainageway and regional stormwater facility routine, restoration, and rehabilitation maintenance services. Routine maintenance generally consists of mowing, trash and debris pickup, weed control and small revegetation projects on major drainageways during the growing season. Restoration maintenance solves small or isolated drainage problems, including addressing local erosion problems, repair of existing erosion protection, detention pond restoration, tree thinning, and removal of sediment from culverts, channels, and detention ponds. Rehabilitation work is applicable where an existing unimproved channel has extensive erosion problems or where existing drainage improvements on a reach of drainageway have deteriorated or failed.

Funds available to be spent through the work program are allocated to each of the six counties within the UDFCD in direct proportion to the amount of tax revenue each county generates for the maintenance program. The primary purpose of the maintenance program is to assist local governments within the UDFCD boundaries in maintaining major drainageways within their jurisdiction. This provides a direct benefit to the entities responsible for maintenance of drainageways or flood control facilities and the citizens of Douglas County.

Any flood control facility designed and constructed by, or approved for construction by a local public body, after March 1, 1980, within the UDFCD boundaries, must be reviewed and approved by the UDFCD and must be constructed in substantial conformance with the UDFCD approved design before it can be eligible for UDFCD maintenance assistance. UDFCD maintenance

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funds cannot be spent on flood control facilities that did not meet these requirements. Douglas County requires that flood control facilities, meeting the guidelines of the UDFCD Maintenance Program, be designed and constructed in conformance with Douglas County and UDFCD criteria and standards to ensure that those facilities become eligible for UDFCD maintenance assistance.