Volume 1, Chapter 1 - **Drainage Policy**

Users' Guidance:

If a UDFCD *Section* number in this chapter is **skipped**:
It was adopted as is; please refer to that Section in the **corresponding UDFCD Manual**, Volume, Chapter and *Section.*

If a UDFCD *Section* number in this chapter is **amended or a new COFC *Section* in this Chapter is added**:
It is **listed below**; please refer to it in **this document**.

If a UDFCD *Section* in this chapter is **deleted then** it was **not** adopted by the City of Fort Collins;
The deleted UDFCD *Section* number will be **identified as deleted in the text below**.

(1) *Section 1.0* is amended to read as follows:

1.0 Policy

1.1 Drainage Policy

The requirements contained in the Urban Drainage and Flood Control District Criteria Manual (the "Urban Drainage Manual"), as adopted by the City Council of the City of Fort Collins and as modified by these Fort Collins Amendments (together referred to as the "Fort Collins Stormwater Criteria Manual," the "Stormwater Criteria Manual, or "Manual') are the basis for all stormwater management within the city of Fort Collins and are to be used as guidelines in the design and evaluation of all storm drainage facilities.

In general, these requirements address five areas of concern: (1) overall storm drainage planning and management; (2) the interface between urban development and irrigation facilities such as dams, reservoirs and canals; (3) the treatment of historic drainageways and natural channels; (4) the requirements and specifications for engineering design of storm drainage facilities; and (5) the quality and extent of urban stormwater runoff and erosion control.

1.2 Purpose and Scope

(a) The purpose of this Manual is to set forth the technical criteria to be utilized in the analysis and design of drainage systems within the city limits of Fort Collins, Colorado and its Growth Management Area.

(b) Any reference in the Urban Drainage Manual to a city, region or district is to the City of Fort Collins (the "City") or the Fort Collins area or region.

(c) This Manual applies to all land disturbing activities defined as development in the Land Use Code of the City of Fort Collins (the "City Land Use Code") or otherwise regulated by the City, including activities on public or private lands, including but not limited to activities on private land, public rights-of-way, easements dedicated for public

use, private roads and to all privately, publicly, and quasi-publicly owned and maintained facilities.

(d) All planned public or private improvements, or any other proposed construction or development activities regulated by the City must include an adequate plan for storm drainage. This plan must be based on an analysis and design in compliance with all the applicable regulations and specifications set forth in this Manual.

(e) Prior to commencement of any construction or development activities subject to the requirements of this Stormwater Criteria Manual, formal approval must be obtained from the Executive Director of the Utilities or his designee.

(f) Should a conflict arise between the Code of the City of Fort Collins (the "City Code"), the City Land Use Code, or other City adopted standards and requirements, including but not limited to these Fort Collins Amendments, and the Urban Drainage Manual, the City Code, City Land Use Code or other City-adopted standards will govern.

(g) References to "standards" or "criteria" refer to those in effect on the date the "Drainage Plans" for a site development or public improvements are approved.

1.3 Regional Master Planning

(a) In recognition that drainage boundaries are non-jurisdictional, the City has developed regional basin-wide "Master Drainage Plans". These Master Drainage Plans establish at a watershed level what public improvements, if any, are needed in each basin and guide or dictate requirements for new developments proposed in each basin.

(b) Where a Master Drainage Plan for a given area of the City is available, proposed drainage systems design and construction must comply with all requirements set forth in that Plan. In areas where a Master Drainage Plan is not available, drainage systems must be planned and constructed in a manner that ensures continuity in flow quantity and quality with existing flow conditions.

(c) Master Drainage Plans must be developed and, or updated in cooperation with Larimer County, the appropriate affected irrigation companies and any other affected governmental agencies within a given basin or basins. Such plans or updates to plans will be adopted only after they have been reviewed by all affected entities, and after, soliciting public input.

(d) Master Drainage Plans are available from the City at the Fort Collins Utilities offices.

1.4 Local Master Planning

(a) Local flood control facilities, as planned by the City or developers, are an integral part of the total drainage system required to preserve and promote the general health, welfare, and economic wellbeing of the area.

(b) Any facility that generates benefits exclusively to a development (or a group of developments sharing a facility) and not designated by the City as a regional facility, is considered a local facility, and as such is to be maintained by its private owner(s).

(c) The City requires the planning and construction of all private local stormwater control and treatment facilities be performed in a manner that ensures that such facilities are compatible with all regional drainage master plans including the City's Master Drainage Plans.

1.5 Storm Runoff Determination

(a) The runoff analysis for a particular area must be based on the proposed land use for that area. Contributing runoff from upstream areas must be based on the existing land use and the topographic characteristics of those areas.

(b) All runoff calculations, requirements and assumptions must be based on the Master Drainage Plan for the area, if one is available.

(c) Natural topographic features are the basis of location for easements and future runoff calculations. In developed and undeveloped areas, average land slopes may be utilized in runoff computations. Wherever existing drainage patterns and slopes are defined, these must be used. The drainage facilities so designed must be able to handle the design flows with virtually no erosion damage to the system.

(d) The City requires storm runoff to be determined by the use of either the "Rational Method", or the "Stormwater Management Model" (SWMM), within the limitations set forth in this Manual.

1.6 Reasonable Use

The City's management of drainage facilities is guided by the "Reasonable Use" principle. This principle is defined as one that:

(a) Limits the rate of flow from developing properties to those release rates as defined in the City's Master Drainage Plans.

(b) Limits the rate of flow from developing properties to their "2-year pre-development condition flow rate" during the 100-year storm event unless otherwise specified by the relevant Master Drainage Plan.

(c) Allows a larger release rate than is existing at the time of development or redevelopment if it can be demonstrated that downstream facilities at full watershed development, and analyzed in accordance with the applicable Master Drainage Plan(s), can accommodate a larger release rate to a master planned major drainageway.

(d) Causes no increase in downstream runoff rates after development from that under existing conditions unless otherwise specified in the applicable Master Drainage Plan.

(e) Properly and orderly transitions flows from developing properties to their pre-development paths on downstream properties unless the downstream property owners agree to alterations of those changes by granting drainage easements for the new drainage paths.

(f) Maintains flows, to the extent possible, in their natural and historic drainage paths.

In certain instances the transfer of drainage flows from one basin to another is a permissible alternative if it is done in accordance with the approved Master Drainage Plan for that basin and if it causes no undue burden or harm to any downstream property. Basin transfers of drainage flows are subject to City review and may be approved, on a case-by-case basis, subject to a showing of no undue burden or harm satisfactory to the Utilities Executive Director, and a determination by the Utilities Executive Director that the modification of this requirement is appropriate.

1.7 Water Rights

The City recognizes the potential effect of drainage facilities on existing water rights. The City requires that the interrelation between the proposed facilities and water rights be accounted for in planning, reviewing and designing drainage and subdrain systems or facilities.

1.8 Drainage Planning and Required Space

(a) The stormwater drainage system is an integral part of the urbanization process; and requires storm drainage planning for all developments to include the allocation of space for drainage facilities' construction and maintenance which may entail the dedication of right-of-way and, or easements.

(b) Drainage facilities, such as channels, storm sewers, and detention facilities serve conveyance, treatment as well as storage functions for water quantity and quality. When space requirements are considered, the provision for adequate drainage becomes a competing use for space. Therefore, adequate provision must be made in the land use plan for drainage space requirements. This may entail the dedication of adequate right-of-way or easements, in order to minimize potential conflict with other land uses.

1.9 Use of Streets

The use of streets to convey storm runoff interferes with their primary function as transportation corridors. However, streets are an important component of the storm drainage system due to their large storm runoff carrying capacity obtained for little or no drainage-related costs. In order to balance these two competing street uses, limits on the street carrying capacity are required based on the classification of the street related to emergency usage during flood events.

The City allows the use of streets for drainage within the limitations discussed in the "Streets" section as described in Volume 1, Chapter 6 of this Manual, "Streets, Inlets, Storm Sewers". :

1.10 Nuisance Water

The City's stormwater policies and requirements are primarily intended to address water quantity and quality concerns as they relate to the health, safety and welfare of the general public as well as the protection of the environment. This involves the control of runoff during large rainfall or snow melt events on major public drainage systems that could have flooding potential and the control and improvement of the water quality of runoff that enters the City's receiving waters.

Control of "nuisance" waters such as shallow ponding that occasionally concentrate on flat lawns, landscaped, paved or other such areas is strictly the responsibility of the property owner of the land where ponding occurs. Shallow ponding sometimes occurs in street cross pans or flat sections of curb and gutter. These usually are not a major threat to the health safety and welfare of the public.

The City will make reasonable efforts to minimize the occurrence of such nuisances through its review and inspection authorities, but if such nuisances do occur, the City is not responsible or obligated to correct or require any other party to correct such a problem.

1.11 Retention Ponds and Pumping

1.11.1 Positive Outfall

The City requires that all drainage facilities be designed in a manner that provides a gravity-driven positive outfall into a natural drainageway such as a river or creek, or a component of or a tributary to the public storm drainage infrastructure system. Positive outfall in this context refers to the provision that all sites must be designed to drain with a gravity system to the public infrastructure system or natural drainageway(s).

1.11.2 Retention Ponds

Retention ponds are sometimes necessary to hold water until a permanent outfall is built. The City may approve retention ponds as an interim solution until a permanent outfall is built. If accepted, these ponds must be designed to hold twice the 100-year volume generated by a two-hour storm and be evacuated within seventy-two (72) hours. Permanent retention ponds are not allowed to serve as permanent water quantity or quality control measures for any development within the city of Fort Collins.

1.11.3 Pumps in Detention Ponds

Pumps in detention ponds may be allowed only when approved in writing in advance by the Utilities Executive Director or his designee. A pump shall only be approved when a satisfactory showing is made that the pump is needed as a back-up system to an infiltration pond or as a designed temporary retention pond. Temporary in this context means that a permanent gravity controlled outlet system is planned to be built within the next 5 years. These must be designed and built with a sump pit as well as a back-up pump. The pump must be of sufficient capacity to drain the retention pond in seventy-two (72) hours or less**.**

1.11.4 Sump Pumps

(a) Discharge from foundation drains or sump pumps must comply with all applicable State requirements and those set forth in Section 26-214 of the City Code, which prohibits discharge across the sidewalk or into or upon any street, alley or gutter and of Section 26-498, which prohibits connections to a storm drainage facility to convey flows other than storm drainage flows and uncontaminated groundwater flows.

(b) Discharge from sump pumps must be tied to the City's stormwater system upon approval from the Utilities Executive Director. All tie-in points must be installed at approved locations such as at a manhole or at an inlet. No direct tie-in to a storm drain pipe will be allowed. Sump pump discharge flows can only be released into a stormwater conveyance system (such as pipes, channels or ponds) specifically designed and approved by the City to accept such discharge. Please refer to Section 26-214 of the City Code for further guidance.

1.12 Conveyance or Detention on Private Single Family Lots

In designing drainage systems, the City requires that no undue burden be placed on the owners of single family lots by the placement of large storm drainage conveyance or detention facilities on their property. In order to prevent or minimize such occurrences all storm drainage channels, pipes or detention facilities serving more than three (3) properties must be located within tracts dedicated as drainage easements to the City.

1.13 Lot Grading

(a) The City requires that there be a positive grade away from all structures. More specifically, the City requires that there be a minimum grade of five percent (5%) away from a structure within the first five to ten feet adjacent to single family residences.

(b) Minimum grades required for different types of sheet flow drainage surfaces are as follows:

Grass swales	Two (2) percent

A one percent (1%) longitudinal slope grass swale may be allowed on single family lots when the swale is draining the runoff from only two adjoining properties.

Asphalt	One (1) percent
Concrete	One half (0.5) percent

(c) The top of foundation elevation for a structure must be set a minimum of six (6) inches above the highest grade surrounding the structure.

1.14 Use of Criteria, Amendments, Technical Revisions and Administrative Modifications of Standards

(a) All public or private storm drainage facilities regulated by the City must be planned and designed in accordance with the standards and criteria set forth in this Stormwater Criteria Manual.

(b) The Stormwater Criteria Manual may be periodically revised and amended, either by approval of the City Council of the City or by Technical Revision approved by the Utilities Executive Director in accordance with Section 26-500 of the City Code, as new technology is developed and, as experience in gained in the use of the criteria.

(c) The purpose of this Manual is to promote the health, safety, welfare, and property of the City and citizens through the proper control and treatment of stormwater, (whether above or below surface); and, to ensure uniformity in performance with respect to design and construction of all drainage facilities. Consequently, when the Utilities Executive Director determines that an applicant has made a sufficient showing that an alternate design, analysis or procedure would meet the purposes of a specific requirement of this Manual in a manner and to an extent equal to or better than would compliance with the specific requirement the Utilities Executive Director may authorize a modification of the standard to allow for the use of the alternative design, analysis or procedure, as applicable.

(2) *Section 2.11* is amended to read as follows:

2.11 Historic Drainage and Easements

(a) Whether or not natural drainageways are dedicated, or otherwise formally recognized, these are considered the most appropriate location of stormwater conveyance systems. Historic and natural drainage paths and channels are recognized as easements for storm drainage conveyance.

(b) Even when historic drainage is accomplished by means of sheet flow, it is reasonable to assume that after site development, flows will be channelized and concentrated at a point, and an easement for the concentrated flows still exists to the extent of its historic use for the conveyance of stormwater.

(3) *Section 2.12* is amended to read as follows:

2.12 Off-Site Flows

(a) The only way to maintain truly historic drainage flows is to prohibit all future development. “Reasonable” development is allowed so long as any increase or change in runoff does not injure downstream properties. The Master Drainage Plans, as adopted by

City Council, establish the most "reasonable" drainage system for the entire basin. All proposed developments are required to be planned and constructed in conformance with the approved Master Drainage Plan(s).

(b) Downstream properties have an obligation to accept off-site flows from upstream properties. This obligation includes future developed flows provided they are the result of "reasonable" development upstream in compliance with the applicable Master Drainage Plan for the upstream property and do not result in any injury or have an adverse impact on the downstream property.

(c) Drainage easements are needed on the downstream property when the upstream flows entering that property are altered in quality, quantity, or character.

(d) If stormwater is being imported from one basin to another, or if a completely artificial drainage path is being created altering the historical flow patterns (in quality, quantity or character) of an existing channel, a natural easement argument cannot be used to justify directing any additional drainage into an existing drainage channel.

(e) New improvements that affect or have an impact upon existing drainage easements must preserve and maintain those easements.

(4) A new *Section 2.13* is added, to read as follows:

2.13 Watershed Approach to Stormwater Management

(a) The City has initiated a "Watershed Approach" to stormwater management. This program includes three major watershed components and associated objectives:

(i) Land – The objectives of this component is pollution prevention, including public education, regulation, and enforcement. This is accomplished through implementation of the City's Municipal Separate Storm Sewer System (MS4) permit, as described in Section 4.1.7, "Water Quantity and Quality Integration" in this chapter.

(ii) Tributaries – The objectives of this component are stormwater treatment and pollutant load reduction and include the development of design criteria for "Best Management Practices" (BMPs).

(iii) Receiving Waters – The objectives of this component are aimed at stream and habitat protection and restoration and include the creation of buffer zones on creeks and natural drainageways.

(b) The water quality protection regulations as specified in this Manual are primarily directed at the Tributaries component of this approach. This includes BMPs for erosion control during construction and post-construction controls for new development and re-development. These BMPs are intended to be located on-site and therefore address runoff from development or re-development sites or from any public improvements.

(c) Any public or private improvement that has an impact on receiving waters must be constructed in accordance with the criteria specified in this Manual, the City's Master Drainage Plans, the City Land Use Code, and any other applicable State or Federal regulations such as the United States Army Corps of Engineers (USACE) 404 permit requirements.

(d) Runoff generated from any public or private improvement and directed into historic and natural drainageways must be done in a manner that would promote the multi-functional use of these drainageways, protect and restore their natural functions and enhance their aesthetic value.

(e) Natural drainageways, creeks or streams are considered important community assets that contribute to the aesthetic value and the livability of the urban environment. Their function extends beyond that of conveying floodwater, to their use as trails and open space corridors, for water quality protection and enhancement, and to preserve natural vegetation and wildlife habitat to the greatest extent possible.

(f) Public or private improvements located in or near receiving waters, must not adversely affect the natural character of the stream or water course. To that effect, the following provisions must be met:

(i) Pollutant reduction and treatment facilities must be located upstream of streams and natural drainageways.

(ii) Natural drainageways must remain in as near a natural state as practicable.

(iii) Any proposed modification, including any erosion mitigating measures, must be designed and constructed in a manner that protects and enhances the natural character of receiving waters. Such modification must be addressed in the Drainage Report and clearly shown on the associated Drainage Plans

(5) A new *Section 2.14* is added, to read as follows:

2.14 Erosion and Sediment Control

The clearing and stripping of land for development can cause high, localized soil erosion with subsequent deposition and damage to off-site properties and to receiving waters.

The City requires an "Erosion Control Plan", be prepared and implemented for all public improvement projects, private development projects and all redevelopment projects in accordance with the criteria set forth in Volume 3, Chapter 7, "Construction BMPs", of this Manual. The terms "development" and "redevelopment" are as defined in the City Land Use Code.

The purpose of implementing this policy is to minimize the impact of construction to an acceptable level without placing undue burdens on any public or private infrastructure, downstream drainageway(s), or the community in general.

(6) *Section 3.1* is deleted in its entirety.

(7) *Section 3.2* is deleted in its entirety.

(8) *Section 3.3* is deleted in its entirety.

.

(9) *Section 4.1.2* is deleted in its entirety

(10) A new *Section 4.1.7* is added, to read as follows:

4.1.7 Water Quantity and Quality Integration

(a) The public's concerns with stormwater are not limited to flooding and public safety. Stormwater runoff can have a significant and lasting impact on the City's receiving waters. This impact is reflected not only in the quality of streams and aquatic ecosystems, but more generally in the quality of life in the community.

(b) Pursuant to federal law and regulations of the U.S. Environmental Protection Agency ("EPA") operators of small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas are required to obtain permit coverage for their stormwater discharges. In Colorado, the Water Quality Control Division of the Colorado Department of Public Health and Environment has primary enforcement authority over MS4 permits via the Colorado Discharge Permit System. Pursuant to these requirements, as an operator of an MS4 the City is required to implement stormwater management programs, which must include the following program elements:

1. Public Education and Outreach – The city must implement a public education program in an effort to promote behavior change by the public to reduce water quality impacts associated with pollutants in stormwater runoff and illicit discharges.
2. Public Participation and Involvement – The city must provide a mechanism and process to allow the public to review and provide input on the MS4 Stormwater Management Program.
3. Illicit Discharge Detection and Elimination – The city must implement and enforce a program to detect and eliminate illicit discharges (non-stormwater discharges to the MS4), including procedures for tracing and removing the source and training for municipal staff.
4. Construction Site Runoff Control – The city must develop and implement a program to assure adequate design, implementation, and maintenance of BMPs at construction sites within the MS4 to reduce pollutant discharges and protect water quality.
5. Post-Construction Stormwater Management in new Development and Redevelopment – The city must implement and enforce a program to address stormwater runoff from new development and redevelopment projects that discharge into the MS4. The program must ensure that controls are properly designed, installed, and maintained to prevent or minimize water quality impacts.
6. Pollution Prevention/Good Housekeeping for Municipal Operations – The city must implement an operation and maintenance program to prevent or reduce pollutants in stormwater runoff from municipal operations, including written standard operating procedures for stormwater pollution prevention and training of municipal staff.

(c) Requirements numbered 4 and 5 above are addressed primarily through this Manual, reviewed through the City's development review process, and implemented through the City's Municipal Separate Storm Sewer System ("MS4") construction and post-construction inspection and enforcement program.

(11) *Section 4.3.4* is amended to read as follows:

4.3.4 Maintenance and Maintenance Access

(a) All drainage facilities must be designed to minimize the need for facility maintenance and must provide for ease of maintenance access to all storm drainage facilities in order to ensure the continuous operational function of the system.

(b) Maintenance access for all stormwater control and treatment facilities must be adequate and must be clearly delineated on the Final Plat and on the Final Development

Plans for any development. Maintenance responsibility must be clearly described on the Final Plats and on the Final Development Plans.

(c) Stormwater control and treatment facilities must be continually maintained to ensure their long term operational effectiveness. Maintenance of storm drainage facilities includes, but is not limited to the regular performance of the following activities:

(i) Sediment and debris must be periodically removed from channels, storm sewers and stormwater treatment facilities.

(ii) Trash racks and street inlets must be cleared of debris.

(iii) Pipe inlets and outlets must be regularly flushed.

(iv) Channel bank erosion or damage to drop structures must be repaired to avoid reduced conveyance and treatment capability, unsightliness, and ultimate failure.

(d) The owner of the drainage facility is responsible for the maintenance of all components of the drainage system located on their property; including inlets, pipes, culverts, channels, ditches, hydraulic structures, detention basins or other such appurtenances unless modified by the development agreement or as described in City Code Section 26-547.

(e) Should the owner or responsible party fail to adequately maintain said facilities, the City has the right to enter said property for the purpose of maintenance as described in City Code Section 26-22. All such maintenance costs will be assessed to the property owner in accordance with City Code Section 26-28.

. (f) Required minimum widths of drainage easements for common types of drainage facilities are listed in Table-DP-4.

Table – DP-4

Required Maintenance Easements

DRAINAGE FACILITY	MINIMUM EASEMENT WIDTH
Storm Sewer	
(a) Storm Sewer Diameter < 36 inches	
Depth to Invert less than5 feet	20 feet
5 feet < Depth to Invert≤ 10 feet	30 feet
Depth to Invert greater than 10 feet	Minimum of 30 feet or Pipe I.D. + 6 + Depth * 2 (in feet)
(b) Storm Sewer Diameter ≥ 36 inches	
Depth to Invert less than 5 feet	Minimum of 20 feet or Pipe I.D. + 7 + Depth * 2 (in feet)
5 feet < Depth to Invert ≤ 10 feet	Minimum of 30 feet or Pipe I.D. + 7 + Depth * 2 (in feet)
Depth to Invert greater than 10 feet	Pipe I.D. + 7 + Depth*2 (in feet)

Open Channel/Swales	
100-Year Discharge less than 20 cfs	Minimum of 15 feet or Top Width of Channel With Freeboard + 10 feet
20 cfs ≤ 100 year Discharge < 100 cfs	Minimum of 25 feet or Top Width of Channel With Freeboard + 10 feet
100-Year discharge greater than 100 cfs	Minimum of 30 feet or Top Width of Channel With Freeboard + 10 feet
Detention Ponds	As required to contain storage, freeboard, and associated facilities plus adequate maintenance access around perimeter

(g) Smaller drainage easements widths are allowed along residential lot lines (five feet to ten feet on each side), when these are for swales or channels that carry a limited amount of drainage, and drain at the most three residential lots.

(12) A new *Section 4.3.5* is added, to read as follows:

4.3.5 Open Channels

(a) Developments in or near major runoff channels in and near developing areas must be designed to maintain channel stability. Developments in and near major runoff channels must adopt measures to ensure that excessive erosion does not occur under peak flood flow conditions.

(b) Realignment of natural channels in urban areas is not encouraged and may only be permitted if the City approves a design that maintains stream stability and aesthetics, enhances or improves the ecological character of the natural channel and prevents failure and erosion under peak flow conditions.

(c) The City prohibits the use of backyard swales on residential lots where these can be physically avoided. Where these cannot be avoided due to physical or grade constraints, they must be designed in a manner that will minimize the basin area contributing to the backyard swale. Backyard swales must not receive runoff from more than three (3) residences.

(d) Residential lots that include backyard swale(s) are subject to "Certification" as defined in Section 7.1.12.3 of this chapter, "Certifications for Single Family Developments" as well as fencing restrictions that would prohibit the impedance of drainage flows from one residential lot to an adjacent one. Fencing restrictions must be recorded on the development's plat, and the appropriate deed restrictions on that plat must be filed with Larimer County.

(e) The design of all open channels must comply with all the appropriate provisions set forth in Section 4.0, "Open Channel Criteria", Volume 1, Chapter 7 "Major Drainage", of this Manual.

(13) *Section 4.5.4* is amended to read as follows:

4.5.4 Water Quantity Control

(a) Detention storage of stormwater runoff as directed by individual Master Drainage Plans and a hydrologic routing analysis is required. In basins where a Master Drainage Plan has not been approved, the City may require detention storage in accordance with

the criteria set forth in this Manual as well as when such storage is deemed necessary to protect irrigation rights or structures or to protect downstream properties. More specific information about detention storage criteria are described in Volume 2, Chapter 10, "Storage" chapter of this Manual.

(b) Urban development is not permitted immediately downstream of existing or proposed emergency spillways or in areas that may act as spillways for canals, dams, or embankments impounding stormwater.

(c) On-site detention is required for all new development, expansion, and redevelopment. The required minimum detention volume and maximum release rate(s) for the developed condition 100-year recurrence interval storm must be determined in accordance with the conditions and regulations established in the appropriate Master Drainage Plan(s) for that development and in accordance with the criteria set forth in this Manual.

(d) On-site detention requirements may be deemed met where the Utilities Executive Director determines that an applicant has made a sufficient showing that existing regional conveyance or detention facilities are sized with the capacity to accommodate flows from a fully developed basin and are publicly owned and maintained, provided that any requirements for cost sharing or reimbursement to the City have been met.

(14) *Section 4.5.5* is amended to read as follows:

4.5.5 Water Quality Treatment

(a) Water quality treatment of stormwater runoff is required, at a minimum, for land disturbing activities greater than or equal to one half an acre, including projects less than one half an acre that are part of a larger common plan of development or sale.

(b) On-site water quality detention requirements may be deemed met where the Utilities Executive Director determines that an applicant has made a sufficient showing that existing regional water quality detention facilities are sized with the capacity to accommodate flows from a fully developed basin and are publicly owned and maintained, provided that any requirements for cost sharing or reimbursement to the City have been met.

(c) Water quality control and treatment can be achieved through the use of an array of methods and devices as described in Chapter 4, Volume 3, "Treatment BMPs" of this Manual.

(d) Water quality treatment structures must be built in compliance with all applicable City, State and Federal regulations.

(15) *Section 5.1.1* is amended to read as follows:

5.1.1 Design Criteria

If a proposed development site is located within an area encompassed within a Master Drainage Plan, the criteria specified in the appropriate Master Drainage Plan will hold precedence over the criteria set forth in this Manual in the event these differ or conflict.

(16) *Section 5.1.3* is amended to read as follows:

5.1.3 Use of Criteria

The City will make reasonable efforts to design and build storm drainage improvements and to evaluate the design and construction of non-City drainage improvements, based on the criteria, standards and specifications set forth in this Manual.

(17) *Section 5.2.1* is amended to read as follows:

5.2.1 Design Storm Return Periods

(a) The 2-year drainage system, as a minimum, must be designed to transport the runoff from the 2-year recurrence interval storm event with minimal disruption to the urban environment. The 2-year storm runoff can be conveyed in the curb and gutter area of the street or roadside ditch (subject to street classification and capacity), by a storm sewer, a channel, or other conveyance facility.

(b) The 100-year drainage system, as a minimum, must be designed to convey runoff from the 100-year recurrence interval flood to minimize life hazards and health, damage to structures, and interruption to traffic and services. Runoff from the 100-year storm can be conveyed in the urban street system, channels, storm sewers and other facilities, provided the conveyance is done within acceptable criteria as specified in this Manual.

(c) Storms with recurrence intervals greater than 100-year, must still be considered in the drainage analysis, if only on a qualitative basis.

(d) All new public and private improvements must plan, design, and construct drainage systems that account for the 2-year storm event as well as the 100-year storm.

(e) The 100-year storm event is the standard level of protection in the city of Fort Collins unless otherwise specified by the applicable Master Drainage Plan.

(18) *Section 5.4.1* is deleted in its entirety.

(19) *Section 5.5.1* is amended to read as follows:

5.5.1 Use of Ditches

(a) Stormwater facilities and improvements must be designed to avoid discharge of runoff from urban areas into irrigation facilities except as required by water rights or where such discharge is in conformance with the approved Master Drainage Plan. Where these conditions are present, the responsible party must submit to the Utilities Executive Director and the affected ditch company or other affected parties documentation of the relevant water rights-related constraint or Master Drainage Plan condition. The Utilities Executive Director may approve a modification of this requirement upon a determination that sufficient showing has been made that a discharge into irrigation facilities is acceptable to the affected ditch company and is not expected to result in harm or interfere with the operation of affected stormwater management plans or systems, and that the requirements for a modification have been met. Notwithstanding the foregoing, whenever irrigation ditches cross major drainage channels in developing areas, the responsible party must separate stormwater runoff flows from normal ditch flows.

(b) Whenever development occurs where an irrigation ditch or facility is present, the responsible party must provide adequate right-of-way for ditch maintenance as required by the owners of the ditch or irrigation company.

(c) The City requires the appropriate ditch company's approval wherever public or private improvements cause any of the following:

(i.) Alteration of the existing patterns of drainage into irrigation ditches;

(ii.) Increased flow rates or volumes discharged into the ditch;

(iii.) Changes in the quality of runoff entering the ditch;

(iv.) Change in the historic point of discharge into the ditch;

(v.) Any proposed ditch crossing(s) or relocation(s);

(vi.) Any proposed grading within the ditch right-of-way;

(vii.) Access to the ditch right-of-way during construction activities.

This approval may be in the form of signature on the construction plans or documents. If determined by the Utilities Executive Director to be sufficient, other formal legal agreements may be substituted for an approval signature on the construction plans. The list above is not exhaustive and represents examples of circumstances when ditch company approval is required. Early contact with affected irrigation companies may be beneficial.

(d) In the rare instance where an irrigation ditch is allowed to serve as the outfall for a stormwater facility the following provisions must be met:

(i) The ditch flow water surface elevation must be determined based on the maximum amount of flow in the ditch.

(ii) The water surface elevation of the ditch must be obtained by combining the maximum irrigation flow in the ditch with the 100-year stormwater flows in the ditch.

(iii) The detention outlet must be designed such that backflow from the ditch into the detention facility is prevented.

(iv) The backwater effects caused by the design of a detention outlet, if any, must be reviewed and approved by both the City and the appropriate ditch company.

(v) The outlet design must consider tailwater effects on the outlet pipe resulting from the combination of the maximum irrigation flow and the 100-year storm discharge within the ditch. The appropriate ditch or irrigation company, is the determining authority in regards to the maximum irrigation flow in the ditch. Written verification of the maximum irrigation flow from the ditch or irrigation company must be submitted with the hydraulic analysis of the ditch water surface elevation.

(vi) The 100-year water surface elevation of the ditch must be determined using the appropriate Master Drainage Plan or if not available, additional studies may be required from the party seeking to discharge into the ditch. For cases where 100-year discharges are not available, upstream restrictions can be considered for determining ditch flows.

(e) If new developments are adjacent to irrigation facilities but no flows are being directed into the ditch or canal, the ditch company must be notified of the proposed development. In such cases, ditch company approval shall be required prior to any approval by the City, unless the Utilities Executive Director determines that the

development will result in no impact on or to the ditch company, that there will be no impact on stormwater flows or improvements from the adjacent irrigation facilities, and that the conditions for a modification of this requirement have been met.

(f) The party seeking modifications to existing ditch conditions must to obtain the appropriate ditch company approvals and signatures prior to seeking City approval for such modifications.

(g) When privately owned and maintained irrigation facilities abut private property, it is the responsibility of the private parties involved to develop and implement a policy regarding safety.

(h) In summary, City requirements regarding the use of ditches are as follows:

(i) Drainage analysis must ensure that an irrigation ditch does not intercept the storm runoff from the upstream basin and that the upstream basin is tributary to the basin area downstream of the ditch.
(ii.) Plans for the development must direct the storm runoff into historic and natural drainageways and avoid discharging into an irrigation ditch except as required by water rights.
(iii.) Whenever new development will alter patterns of the storm drainage into irrigation ditches by increasing or decreasing flow rates, volumes, or changing points of concentration, the written consent from the ditch company must be submitted with the development applications. The discharge of runoff into the irrigation ditch will be approved only if such discharge is consistent with an adopted Master Drainage Plan and is in the best interest of the City.
(iv.) Whenever irrigation ditches cross major drainageways within the developing area, the developer is required to design and construct the appropriate structures needed to separate storm runoff from ditch flows subject to the condition noted in item (ii.) above.
(v.) Whenever drainage that is less than the historic amount in quantity and rate drains into an irrigation canal or ditch, such flow is allowed to freely discharge into the irrigation canal or ditch.

(20) *Section 6.0* is amended to read as follows:

6.0 Review Process

(a) As it relates to drainage, all development proposals must be processed and approved through the City's development review process in accordance with the City Land Use Code.

(b) Building Permit Applications, Overall Development Plans (ODPs), Project Development Plans (PDPs), and Final Plans (FPs), and all other development applications submitted to the City under the City Land Use Code, must include storm drainage, floodplain, floodway and erosion control information (in addition to any other information required by applicable City Land Use Code or other related provisions) if the development increases the impervious area in excess of 350 square feet.

(c) An analysis and review of floodplain modifications may be necessary if the development proposes to modify the floodplain or floodway.

(d) In addition to the submittals mentioned above, a site certification must be submitted to the City, as well as individual lot certifications as appropriate.

(21) *Section 6.1* is amended to read as follows:

6.1 Conceptual Review

The Conceptual Review is an opportunity to discuss requirements, standards, and procedures that apply to a development proposal. During the Conceptual Review, major problems as they relate to drainage must be identified so that they can be resolved prior to a formal application being submitted to the City. At that meeting, the applicant must furnish at minimum a sketch showing the location of existing and proposed streets, drainage courses, drainage facilities and any other significant natural features near the proposed development.

(22) *Section 6.2* is amended to read as follows:

6.2 Overall Development Plan (ODP) Submittal Requirements

An ODP is required for any property that is proposed to be developed over time in at least two separate project development plan submittals. The purpose of the ODP is to establish general planning and development control parameters for these multi-phase projects. The required drainage information presented in an ODP submittal does not normally entail a detailed drainage analysis of the project but does require a general presentation of the project's features and effects on drainage. The drainage report for the ODP must review at a conceptual level the feasibility and design characteristics of the proposed development. The drainage report must be written in accordance with the outline contained in Section 6.4 of this chapter listed below and must contain all the applicable information as described in that section.

(23) *Section 6.3* is amended to read as follows:

6.3 Drainage Plan Submittal and Review

All single family residences not in a previously approved subdivision, subdivisions without a drainage plan, new multi-family developments, and commercial developments with an increase in impervious area of 350 square feet or greater must submit Drainage Reports and Plans to be approved by the City.

When an Overall Development Plan (ODP) is required an Overall Drainage Plan may also be required. The detailed information contained in such Drainage Plan must be consistent with the ODP. At a minimum, off-site runoff, conveyance locations, detention ponds, outfall systems, and other drainage facilities must be shown on the Overall Drainage Plan. Applicants are encouraged to prepare a plan with as much detail as possible. Please contact the City Stormwater Department early in the process to determine the detail level needed for that plan.

All 100-year storm floodplain boundaries must be shown on all preliminary and final Drainage Plans and labeled in the NAVD 1988 and NGVD 1929 (unadjusted) vertical datum for FEMA basins. City basin base flood elevations must be reported in NGVD 1929 only.

Review and acceptance by the City of Drainage Plans, studies, and construction drawings are required in order to obtain a final drainage system that is consistent and integrated in analysis, design, and level of protection to the City's Master Drainage Plans.

Due to the dynamic nature of urbanization, the needs of the public will change with time, requiring adjustment of design and construction requirements. Therefore, a time limitation on the approved construction plans shall be as follows: construction of any drainage facility not initiated within a three-year period from time of final plan approval will be re-evaluated and be subject to a renewed approval by the City.

(24) *Section 6.4* is amended to read as follows:

6.4 ODP Drainage Report Contents

Drainage report contents must contain at the minimum the following elements:

I. GENERAL LOCATION AND DESCRIPTION

A. Location

1. City, County, State Highway and local streets within and adjacent to the site, or the area to be served by the drainage improvements.
2. Township, range, section, ¼ section
3. Major drainageways and facilities
4. Names of surrounding developments

B. Description of Property

1. Area in acres
2. Ground cover (type of ground cover and vegetation)
3. Major drainageways
4. Existing major irrigation facilities such as ditches and canals
5. Proposed land use

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

1. Reference to major drainageway planning studies such as flood hazard delineation report, major drainageway planning reports, and flood insurance rate maps
2. Major basin drainage characteristics, existing and planned land uses within the basin, as defined by the Planning Department
3. Identification of all nearby irrigation facilities within 150-feet of the property boundary, which will influence or be influenced by the local drainage

B. Sub-Basin Description

1. Discussion of historic drainage patterns of the property in question
2. Discussion of offsite drainage flow patterns and impact on development under existing and fully developed basin conditions pursuant to zoning and land use plans adopted by the City.
3. Soils information of the site shall be presented. The discussion on soils shall include rainfall and wind erodibility problems, limiting characteristics, groundwater depths, and suitability of the soils for development. Information shall be presented concerning conceptual

plans for controlling wind and rainfall erosion and the effectiveness of establishing vegetation.

III. DRAINAGE FACILITY DESIGN

A. General Concept

1. Discussion of concept and typical drainage patterns
2. Discussion of compliance with offsite runoff considerations
3. Discussion of anticipated and proposed drainage patterns
4. Discussion of the content of tables, charts, figures, plates, or drawings presented in the report
5. Discussion of the need to provide offsite public improvements for conveyance of minor or major flows to the major drainageway.

B. Specific Details (Optional Information)

1. Discussions of drainage problems encountered and solutions at specific design points
2. Discussion of detention storage and outlet design
3. Discussion of maintenance and access aspects of the design
4. Discussion of impacts of concentrating the flow on the downstream properties

IV. REFERENCES

Reference all criteria, master plans, and technical information used in support of the concept.

V. APPENDICES

A. On-site and off-site flow calculations

B. Preliminary sizing of detention ponds, storm sewers, and channels.

(25) *Section 6.5* is amended to read as follows:

6.5 ODP Drawing Contents

(a) General Location Map: All drawings must be 22" x 34" in size. A map in sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns must be provided. The map should show the path of all drainage from the upper end of any offsite basins to the defined major drainageways. The map shall identify any existing and proposed facilities from the property (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the flow path to the nearest major drainageway.

(b) Existing and Future Land Use: Existing and proposed vegetation and landscaping must be shown to the extent that it is known at the ODP level. Existing and proposed building footprints, parking lots, sidewalks, and streets shall be submitted. If details of the proposed

information are unknown, the zoning as shown on the ODP diagram is acceptable.

(c) Floodplain Information: All 100-year floodplain and floodway boundaries, cross sections, and base flood elevation lines must be shown. Base flood elevations must be reported in NAVD 1988 and NGVD 1929 (unadjusted) vertical datum for all FEMA basins. City basin base flood elevations must be reported in NGVD 1929 only. All floodplain requirements as detailed in Chapter 10 of the City Code shall apply.

(d) Drainage Plan: Map(s) of the proposed development at a scale of 1" = 20' to 1" = 200' on a 22" x 34" drawing must be included. The plan must show the following:

1. Existing topographic contours at 2-foot maximum intervals. In terrain where the slope exceeds 15%, the maximum interval is 10 feet. The contours shall extend 50 feet beyond the property lines or further, if necessary, to show the drainage relationship with the adjacent property.
2. All existing drainage facilities.
3. Approximate flooding limits based on available information.
4. Conceptual major drainage facilities including detention basins, storm sewers, streets, culverts, channels, swales, riprap, and hydraulic structures in the detail consistent with the proposed development plan.
5. All watercourses, rivers, wetlands, creeks, irrigation ditches or laterals located within 150 feet of the property.
6. Major drainage boundaries and sub-boundaries.
7. Any offsite feature influencing development.
8. Proposed flow directions and, if available, proposed contours.
9. Legends to define map symbols.
10. All water quality on-site detention facilities required for every new development and redevelopment must be designated on the plans, including notes indicating the approximate surface area and volume of the facilities.

(26) *Section 6.6* is amended to read as follows:

6.6 Project Development Plan (PDP) and Building Permit Submittal Requirements

A PDP is needed after the ODP if the project will be completed in phases, or a PDP is needed after the Conceptual Review if the project will be completed in only one phase. The PDP submittal shall contain a general description of the existing and proposed land uses and layout of the site. All Building Permit Process submittals have the same requirements as the PDP requirements.

All analyses and designs of storm drainage systems within the City limits of Fort Collins must be submitted to the City for review and must obtain the City's written approval before any phase of construction. PDP submittals to the Stormwater Utility must consist of two copies of a Drainage and Erosion Control Report with one set of engineering drawings containing the necessary information.

The information and calculations contained within the Drainage Report and Erosion Control Report must be presented in a neat and orderly fashion to facilitate review.

All reports must be stamped and signed by a Colorado licensed professional engineer and must include, at the minimum:

- a cover letter indicating the date
- the name of the project or subdivision
- a vicinity map
- the name of the engineer(s) designing the site
- a statement of compliance with this Manual.

Detailed engineering drawings must be included in the Drainage Report supporting the information and calculations provided in the report.

All PDP submittals must indicate whether any portion of the development site is located within or is directly adjacent to a FEMA or City designated floodplain. In the event where any portion of the development site meets that condition, then the proposed development plan must comply with all applicable floodplain regulations as specified in Chapter 10 of City Code, "Flood Prevention and Protection".

(27) *Section 6.7* is amended to read as follows:

6.7 PDP Drainage Report

6.7.1 Report Contents

The Report must be formatted in accordance with the following outline and must contain all the applicable information listed below and meet the requirements of Vol. 3, Chapter 7, "Construction BMPs."

I. GENERAL LOCATION AND DESCRIPTION

A. Location

1. Vicinity Map: A map showing the project location within the City. The project area shall be shaded, major arterial streets labeled, the major water courses and water bodies shall be labeled, and the City's drainage basin that the site is located in shall be labeled. The map shall be a minimum size of 6 inches by 6 inches with a scale ranging from 1" = 1000' to 1" = 3000'. The vicinity map shall be located directly after the table of contents of the drainage report.
2. Township, range, section, ¼ section
3. Local streets within and adjacent to the subdivision with ROW width shown.
4. Major drainageways, facilities, and easements within or adjacent to the site.
5. Names of surrounding developments

B. Description of Property

1. Area in acres
2. Ground cover (type of trees, shrubs, vegetation, general soil conditions, topography, and slope)

3. Major drainageways
4. General project description
5. Irrigation facilities
6. Proposed land use

C. Floodplain Submittal Requirements

1. "City of Fort Collins Floodplain Review Checklist for 50% Submittals"

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

1. Reference to major drainageway planning studies such as flood hazard delineation reports, major drainageway planning reports, and flood insurance rate maps
2. Major basin drainage characteristics, existing and planned land uses
3. Identification of all irrigation facilities within the basin, which will influence or be influenced by the local drainage design

B. Sub-Basin Description

1. Discussion of historic and proposed drainage patterns of the property in question
2. Discussion of offsite drainage flow patterns and impact on development under existing and fully developed basin conditions

III. DRAINAGE DESIGN CRITERIA

A. Regulations: Discussion of the optional provisions selected or the deviation from the criteria, if any, and its justification.

B. Discussion on how the Directly Connected Impervious Area (DCIA) is being minimized and or disconnected and discussion on how compliance with the "Four Step Process" is being implemented.

C. Development Criteria Reference and Constraints

1. Discussion of previous drainage studies (i.e., project master plans) for the site in question that influence or are influenced by the drainage design and how the plan will affect drainage design for the site.
2. Discussion of the effects of adjacent drainage studies.
3. Discussion of the drainage impact of site constraints such as streets, utilities, rapid transit, existing structures, and development or site plan.

D. Hydrological Criteria

1. Identify design rainfall
2. Identify runoff calculation method
3. Identify detention discharge and storage calculation method
4. Identify design storm recurrence intervals

5. Discussion and justification of other assumptions or calculation methods used that are not referenced by the criteria.

E. Hydraulic Criteria
   1. Identify various capacity references
   2. Discussion of other drainage facility design criteria used that are not referenced in the criteria
   3. If there are proposed modifications to areas within the 100-year floodplain or floodway, a "Floodplain Modeling Report" must be submitted
   4. If there are proposed modifications to a natural drainageway where a 100-year floodplain has not been designated, a "Floodplain Modeling Study" must be submitted

F. Floodplain Regulations Compliance
   1. Complete a "City of Fort Collins Floodplain Review Checklist for 50% Submittals" that clearly states the intent to comply with all applicable City of Fort Collins floodplain regulations as specified in Chapter 10 of the City Code.

G. Modifications of Criteria
   1. Identify provisions by section number for which a modification is requested
   2. Provide justification for each modification requested

IV. DRAINAGE FACILITY DESIGN

A. General Concept
   1. Discussion of concept and typical drainage patterns
   2. Discussion of compliance with off-site runoff considerations
   3. Discussion of the content of tables, charts, figures, plates, or drawings presented in the report
   4. Discussion of anticipated and proposed drainage patterns

B. Specific Details
   1. Discussion of drainage problems encountered and solutions at specific design points
   2. Discussion of detention storage and outlet design
   3. A summary table for each detention storage pond on the site to include:
      - Stage-Storage Curve
      - Stage-Discharge Curve
      - Detention Pond Volume Required
      - Detention Pond Volume Provided
      - Water Quality Capture Volume (WQCV)
      - Water Quality Elevation
      - Spillway Elevation

- Pond Freeboard
- Outlet(s) size(s)

4. Discussion of maintenance access
5. Discussion of easements and tracts for drainage purposes, including the conditions and limitations for use
6. Discussion of the facilities needed offsite for the conveyance of minor and major flows to the major drainageway

V. CONCLUSIONS

A. Compliance with Standards

1. Compliance with Fort Collins Stormwater Criteria Manual
2. Compliance with the City's Master Drainage Plan(s)
3. Compliance with the City's floodplain regulations
4. Compliance with all State and Federal regulations

B. Drainage Concept

1. Effectiveness of drainage design to control damage from storm runoff
2. Influence of proposed development on the Master Drainage Plan recommendation(s)

VI. REFERENCES

Reference all criteria and technical information used

VII. APPENDICES

A. Hydrologic Computations

1. Land use assumptions regarding adjacent properties
2. Initial and major storm runoff at specific design points
3. Historic and fully developed runoff computations at specific design points
4. Hydrographs at critical design points
5. Time of concentration and runoff coefficients for each basin

B. Hydraulic Computations

1. Culvert capacities
2. Storm sewer capacity. Allowable models include StormCAD, UDSewer, FlowMaster, and Extran. Other models will be accepted on a case by case basis upon prior approval from the City
3. Street flow calculations for the 2-year and 100-year events regarding street encroachment, theoretical capacity, and allowable gutter flow
4. Storm inlet capacity including inlet control rating at connection(s) to storm sewer system
5. Open channel design
6. Check dam and/or channel drop design

7. Detention facility design including area/volume capacity, outlet capacity, soil analysis, and ground water table elevations
8. Downstream/outfall system capacity to the major drainageway system
9. Design of erosion protection measures for culverts, and storm sewer outlets.

C. Letters of intent to acquire all necessary off-site easements

D. Water quality design calculations

E. Printed copies of input and output files for all computer models used in the analysis and design

F. Digital copies of input and output files for all computer models used in the analysis and design

6.7.2 PDP Engineering Drawings for Drainage Reports

The drawings must contain all the applicable information listed below and meet the requirements of Vol. 3, Chapter 7, "Construction BMPs." All drawings shall be prepared by a Colorado licensed civil engineer and must be on a reproducible medium of one or more sheets with an outer dimension of twenty-four by thirty-four (22x34) inches. Please note that if feasible and legible the Grading Plan and Erosion Control Plan can be combined.

The plan set should include the following sheets:

a) Vicinity Map
b) Drainage Plan
c) Floodplain Plan
d) Grading Plan
e) Erosion Control Plan

The Drainage and Erosion Control Report and associated drawings must include the following information in aggregate:

a) The name of the subdivision or project.
b) The date of preparation, the scale, and symbol designating true north.
c) The boundary lines of the subdivision or project, right-of-way lines of streets, easements and other rights of way, irrigation ditches, detention ponds, watercourses, and lot lines, with accurate bearings and distances.
d) Designations of all streets and other rights of way, including dimensions and names of such streets.
e) The location and dimensions of any easements.
f) All required floodplain information and studies as specified in the City of Fort Collins Floodplain Review Checklist for 50% Development Review Submittals.
g) Existing and proposed contours at two foot intervals. Spot elevations or one foot contours where two foot contours do not show on the property or where needed to depict the grading. Spot elevations may be needed in critical areas, especially adjacent to existing developed property.

h) The location, size, and type of all storm sewers.

i) The location, size, and type of all inlets, cross pans, manholes, and other storm sewer appurtenances.

j) Profile views for all subsurface drainage facilities showing their size, slope, lengths, design storm hydraulic grade lines (2-year and 100-year), cover, details of structures or City Standard details, and relationship with existing utilities.

k) The location, size, and type of all culverts, including box culverts.

l) The location, size, and type of all open channels, including irrigation ditches with profile views where applicable.

m) The location, size, and type of all existing utilities.

n) Cross-sectional views of all open channels, including irrigation ditches, trickle channels, spillway structures, etc. These views must include applicable easement/right-of-way boundaries and water surface elevations such as the 100-year storm depth, 2-year storm depth, major storm freeboard, and operating irrigation level.

o) Capacity, discharge, outlet structure, spillways, permanent pool water level (if any), and 100-year high water level for all detention ponds, including both the water quality and water quantity elevations. Cross-hatching of the area inundated by the 100-year water surface elevation is recommended.

p) Water surface profiles for all major open channels, or as required.

q) Show the lowest floor elevation (the basement floor elevation or the bottom of the crawl space) and grade at foundation elevations of all buildings. Grading away from the foundation within the first 5 feet adjacent to the building shall be a minimum of 5%. In residential developments, also provide lot corner elevations and any grade break elevations critical to the grading concept. The minimum opening elevations are also required for all lots that are adjacent to a major drainage channel, a detention pond, or a water body, or located in or adjacent to a floodplain.

r) Spot elevations critical to describe drainage features and their function (e.g., inlets, cross pans, spillways, inlets/outlets of manholes, culverts, and storm sewers).

s) Drainage sub-basin boundaries and concentration points for the developed site clearly delineated and labeled.

t) A summary table of site hydrology, including offsite flows entering the site for the 2-year and 100-year design storms, basin numbers, basin areas, runoff coefficients, and onsite flows for the 2-year and 100-year design storms at the concentration points.

u) A summary table for each detention pond on the site to include:

- Stage-Storage Curve
- Stage-Discharge Curve
- Detention pond volume required
- Detention pond volume provided
- Water Quality Capture Volume (WQCV)
- Water Quality Elevation
- Spillway Elevation
- Pond Freeboard
- Outlet(s) size(s)

v) A vicinity map showing the project location within the city. The project area shall be shaded, and major arterial streets labeled. The map shall be a minimum size of 6" x 6", with a scale ranging from 1"=1000' to 1"=3000’.

w) Letters of intent to acquire all necessary offsite easements shall be included with the submittal

x) If SWMM modeling is used, a sub-basin map and a SWMM schematic diagram are required to depict the sub-basins and conveyance elements represented in the model.

y) General notes relating to the design of the drainage features of the development are required on the utility plan cover sheet. (Additional notes are required by other departments, such as Engineering and Water/Wastewater.) The required drainage notes are as follows:

1) All street, sanitary sewer, storm sewer and water construction shall conform to City Standards and Specifications current at date of execution of the Development Agreement pertaining to this development. Any construction occurring three years after the execution of the development agreement shall require re-examination of the plans by the Director who may require that they be made to conform to standards and specifications current at that time.

2) The type, size, location, and number of all known underground utilities are approximate as shown on the drawings. It shall be the responsibility of the contractor to verify the existence and location of all underground utilities along the route of the work. Before commencing new construction, the contractor shall be responsible for locating unknown underground utilities.

3) These plans have been reviewed by the City for concept only. The review does not imply responsibility by the reviewing department, the City Engineer, or the City for accuracy or correctness of the calculations. Furthermore, the review does not imply that the quantities of the items on the plans are the final quantities required. The review shall not be construed in any reason as acceptance of financial responsibility by the City for additional quantities of items shown that may be required during the construction phase.

4) Prior to the commencement of any construction, the contractor must give the City Engineering Department (970-221-6605) and the Erosion Control Inspector (970-221-6700) twenty-four (24) hours advance-notice. Initial erosion control measures must be installed and a site inspection by the Erosion Control Inspector is required before commencing construction activities.

5) Maintenance of onsite drainage facilities shall be the responsibility of the property owners.

6) All recommendations of the final drainage and erosion control study for this development by (Engineering Firm) must be met.

7) Prior to final inspection and acceptance by the City, certification of the drainage facilities by a Colorado registered professional engineer must be submitted to and approved by the City Stormwater Department. (including the applicable note as set forth below)

<u>For commercial and multi-family developments</u>, certification of all drainage facilities shall be submitted to the City Stormwater Department at least two weeks prior to the release of a certificate of occupancy. Individual lot certification, elevation certification, or floodproofing certification, as specified in the development agreement, must be submitted to the City Stormwater Department at

least two weeks prior to the release of a certificate of occupancy for such lot.

For single family developments, certification of all drainage facilities must be submitted to the City Stormwater Department in accordance with all conditions as prescribed by the development agreement associated with this development. Individual lot certification, elevation certification, or floodproofing certification, as specified in the development agreement, must be submitted to the City Stormwater Department at least one week prior to the release of a certificate of occupancy for such lot.

8) If dewatering is used to install utilities, and discharge will be into the street, gutter, storm sewer, channel, irrigation ditch, or any waters of the State a State Construction Dewatering Industrial Wastewater Discharge Permit is required.

9) All land disturbing activities greater than or equal to one acre must comply with the State of Colorado permitting process for Stormwater Discharges Associated with Construction Activity. For more information contact the Colorado Department of Public Health and Environment, Water Quality Control Division, at 303-692-3500 or refer to the web site at http://www.cdphe.state.co.us/wq/PermitsUnit/ .

10) Benchmark: City of Fort Collins Vertical Control located at the Elevation = _____feet, City of Fort Collins Datum.

11) If fill or dredged material is discharged into waters of the United States, a USACE 404 permit is required.

12) If construction affects any Colorado Highway, a Colorado Department of Transportation right-of-way permit is required.

(28) A new *Section 6.8* is added, to read as follows**:**

6.8 PDP Erosion Control Report and Plan

An Erosion Control Report and an Erosion Control Plan must be prepared for all land disturbing activity subject to this Manual for areas that are greater than or equal to ten thousand (10,000) square feet in area and less than four to one (4:1) slopes except emergency work or where construction activities are within fifty (50) feet of the outer limits of sensitive areas. This includes but is not limited to floodplains, slopes, riparian corridors, wetlands, lakes, or irrigation ditches. Said report and plan must be prepared in accordance with the specifications set forth in Volume 3, Chapter 7, "Construction BMPs", of this Manual. Land disturbing activity refers to any activity that results in a change in the existing soil cover (both vegetative and non-vegetative) and/or the existing soil topography including but not limited to, clearing, grading, excavation, demolition, installation of new or improved haul roads and access roads, staging areas, stockpiling of fill materials, and borrow areas. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or the original purpose of the facility.

(29) A new *Section 6.9 is* added, to read as follows:

6.9 Final Plan (FP) Submittal Requirements

After the PDP submittal has been approved, the applicant can present the FP submittal to the City. The FP is the site-specific development plan, which describes and establishes the type and intensity of use for a specific development.

The FP submittal shall contain one set of the following:

a) A statement of compliance to the approved PDP.

b) All easements in final form (except City signatures) must be submitted with the FP submittal.

c) Any necessary revisions to the PDP Drainage Report and drawings and to the Erosion Control Report and drawings.

d) Final construction drawings.

e) A statement of compliance with all floodplain requirements specified in chapter 10 of the City Code as well as the completion "City of Fort Collins Floodplain Review Checklist for 100% Development Review Submittals"

Upon approval of the Final Plan, three final Drainage and Erosion Control Reports and one complete set of construction drawings must be sent to the City Stormwater Department. The Engineering Department will require additional copies for other departments. One copy of the report must include digital copies of the input and output files for all computer models used for the analysis and design. In addition, one copy of the Erosion Control Plan with details must be submitted to the Erosion Control Inspector.

(30) A new *Section 6.10* is added, to read as follows:

6.10 Floodplain Modeling Reports

All guidelines and requirements as specified in Chapter 10 of the City Code must be satisfied. All requirements identified in the document titled "Guidelines for Submitting Floodplain Modeling Reports" must be completed and submitted.

(31) A new *Section 6.11* is added, to read as follows:

6.11 Drainage Certification

All new developments are required to submit for review and approval, an overall site certification of the constructed drainage facilities. The overall site certification must specify the proposed and the as-built conditions of the site's drainage facilities. Any variation from the approved plans must be noted and proven to function properly within the standards in this Manual. Supporting calculations to justify any variation from the approved plans shall be provided, including but not limited to, detention volumes, detention discharge rates, pipe capacities, channel capacities, water surface and lowest opening elevations, and swale capacities.

The City will review the certified record drawing information with the construction drawings. A Certification will only be accepted if:

1. The record drawing information demonstrates that the construction complies with the design intent.
2. The record drawings are certified by both a registered professional land surveyor and a registered professional engineer in the state of Colorado.
3. There is a compliance statement by the professional engineer.

4. Any discrepancies between the original drainage plan and the constructed system need to be discussed and shown to function within the criteria set forth in this Manual. If the construction does not comply with the criteria, the design engineer must redesign the drainage facilities and plan and revise the construction plan mylars to correct the deficiencies.
5. All Floodplain certifications required by the City's Floodplain Administrator must also be included. These may include FEMA Elevation or Floodproofing Certifications and No-Rise Certifications and or other documents as specified in Chapter 10 of the City Code.

6.11.1 Overall Site Certifications

This type of certification is for the overall site drainage facilities shown on the construction plan drawings. The construction plans together with the development agreement identify when and what facilities must be certified and how many building permits and/or Certificates of Occupancy ("Cos") are allowed prior to certifying the facilities. Twenty-five percent of the building permits can be issued prior to acceptance of an overall site certification. In multi-family building projects the overall site certification must be accepted before or at the same time as the release of the first certificate of occupancy in that phase.

6.11.2 Certifications for Commercial and Multi-Family Developments

Individual lot or building certification is required before the release of a Certificate of Occupancy ("CO"). Certification of all drainage facilities must be submitted to the City at least two weeks before the release of a CO.

6.11.3 Certifications for Single Family Developments

Certification of all drainage facilities must be submitted to the City at least one week before the release of additional building permits to those allowed by the development agreement. The development agreement for single-family developments usually allows for the release of 25% of the total building permit. An overall site drainage certificate shall be submitted and approved by the City before the release of any remaining building permits in the development as specified in the development agreement. Individual lot certifications are required prior to the release of a Certificate of Occupancy ("CO") for any lot.

6.11.4 Individual Lot Certifications

Certification may be required for individual lots to ensure lot grading was completed according to the approved grading plan. Lots requiring certification will be specified in the development agreement. A lot certification must show the proposed and the "as-built" conditions of the lot grading, including corner lot elevations, high points, side-lot swales, drainage patterns, and minimum building opening elevations.

It must include separate discussions of the intent of the grading on the previously approved grading plan as well as the final grading being certified. If the final grading matches the approved plan there must be a statement of compliance or if not an explanation of what is different and why. In the latter case, the changes must be justified or explained in order to obtain City approval and the release of the Certificate of Occupancy ("CO").

For properties within floodplains, a flood-proofing or elevation certificate is required for all structures prior to the release of the CO.

(32) A new *Section 6.12* is added, to read as follows:

6.12 Final Close-Out Inspection

A Final Close-Out Inspection is required for all new developments and redevelopments.

This inspection must be scheduled at the conclusion of all construction activities on the site and prior to transferring ownership and maintenance responsibilities of the site to a subsequent entity such as a Home Owners' Association.

The Owner must request the Final Close-Out Inspection from the City. The Final Close-Out Inspection must be scheduled with the City following a minimum two-week advance notice.

At the time of the Close-Out Inspection the Owner must provide to the City contact information for the entity that will be assuming ownership and maintenance responsibilities and a plan for funding and carrying out these responsibilities.

During the Final Close-Out Inspection, the Owner must demonstrate to the satisfaction of the City that:

a) All permanent drainage facilities and BMPs have been constructed in compliance with the approved final plan documents and are functioning as designed.

b) All revegetation measures are complete and all soil surfaces are stable.

c) All drainage facilities and appurtenances have been cleared of any debris and sediment.

d) All temporary BMPs have been removed from the development site.

(33) *Section 7.0* is deleted in its entirety.

(34) *Section 7.1* is deleted in its entirety.

(35) *Section 7.2* is deleted in its entirety.

(36) *Section 7.3* is deleted in its entirety.

(37) *Section 7.4* is deleted in its entirety.

(38) *Table DP-1* is deleted in its entirety.

(39) *Table DP-2* is deleted in its entirety.

(40) *Table DP-3* is deleted in its entirety.

(41) *Table DP-4* "Required Maintenance Easements" is added.

(42) *Figure DP-1* is deleted in its entirety.