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ARTICLE XI

Storm Drainage Criteria

Division 1 General Provisions

Sec. 8-11-10. Purpose and authority.

These Weld County Storm Drainage Criteria are adopted in order to provide minimum standards to preserve and protect the public health, safety and general welfare in the unincorporated lands of the County, pursuant to authority granted by Part 4 of Article 15 of Title 30, and Article 35 of Title 30, C.R.S. (Weld County Code Ordinance 2006-7)

Sec. 8-11-20. Adoption of storm drainage standards – short title.

The Denver, Colorado, Urban Drainage and Flood Control District's "Urban Storm Drainage Criteria Manual," consisting of Volume 1 (June 2001), Volume 2 (June 2001) and Volume 3, Best Management Practices (September 1999), is hereby adopted by reference, with the amendments which are set forth herein. The provisions of this Article shall be known as the "Weld County Storm Drainage Criteria." All facilities for storm drainage on properties located within the unincorporated lands of the County, whether public or private, shall be designed and constructed in accordance with such criteria, unless required otherwise by an applicable master drainage plan approved by the County. A copy of the "Urban Storm Drainage Criteria Manual" shall be kept on file in the office of the Clerk to the Board of County Commissioners for inspection during regular business hours. It may be downloaded by visiting the Urban Drainage and Flood Control District website at www.udfcd.org, or ordered by contacting the Urban Drainage and Flood Control District at 303-455-6277. (Weld County Code Ordinance 2006-7)

Sec. 8-11-30. Weld County Addendum to Text of the Urban Storm Drainage Criteria – Volume 1.

The criteria adopted herein are hereby modified as follows:

Chapter 1 — Drainage Policy

1. Amend Section 1.4, Planning, to read:

"Storm drainage is a part of the total urban environmental system. Therefore, storm drainage planning and design must be compatible with comprehensive regional plans. A master plan for storm drainage should be developed and maintained in an up-to-date fashion at all times for each urbanizing drainage watershed in Weld County. The planning for drainage facilities should be coordinated with planning for open space and transportation. By coordinating these efforts, new opportunities may be identified that can assist in the solution of drainage problems. Natural

drainageways should be used for storm runoff waterways wherever feasible. Major consideration must be given to the floodplains and open space requirements of the area (White 1945). Planning and design of stormwater drainage systems should not be based on the premise that problems can be transferred from one location to another. Stormwater runoff can be stored in detention reservoirs. Such storage can reduce the drainage conveyance capacity required immediately downstream. Acquisition of open space having a relationship to drainageways will provide areas where storm runoff can spread out and be stored for slower delivery downstream."

2. Amend Section 1.5, Technical Issues, to read:

"Storm drainage planning and design should follow the criteria developed and presented in this Urban Storm Drainage Criteria Manual (Manual). Every urban area has 2 separate and distinct drainage systems, whether or not they are actually planned and designed. One is the initial system, and the other is the major system. To provide for orderly urban growth, reduce costs to future generations and avoid loss of life and major property damage, both systems must be planned, properly engineered and maintained. The determination of runoff magnitude should be by the Rational Formula, the Colorado Urban Hydrograph Procedure (CUHP), HEC-1, HEC-HMS or statistical analyses based on an adequate record of actual measured flood occurrences as set forth in the RUNOFF chapter of this Manual. Use of streets for urban drainage should fully recognize that the primary use of streets is for traffic. Streets should not be used as floodways for initial storm runoff. Urban drainage design should have as an objective reduction of street repair and maintenance costs to the public. Irrigation ditches should not be used as outfall points for initial or major drainage systems, unless such use is shown to be without unreasonable hazard, as substantiated by thorough hydraulic engineering analysis, and written approval of the ditch owner(s) is obtained. In addition, irrigation ditches cannot be relied on for mitigating upstream runoff. Proper design and construction of stormwater detention basins are necessary to minimize future maintenance and operating costs and to avoid public nuisances and health hazards. This is particularly important, given the many detention and retention facilities in Weld County. Weld County has adopted and needs to maintain its floodplain management program. Floodplain management must encompass comprehensive criteria designed to encourage, where necessary, the adoption of permanent measures which will lessen the exposure of life, property and facilities to flood losses, improve the long-range land management and use of flood-prone areas and inhibit, to the maximum extent feasible, unplanned and economically unjustifiable future development in such areas."

3. Amend Section 1.6, Flood Insurance, to read:

"Flood insurance is an integral part of the strategy to manage flood losses. Weld County continues to participate in the National Flood Insurance Program, set forth in the National Flood Insurance Act (NFIA) of 1968, as amended."

4. Add the following to Section 2.1, Drainage is a Regional Phenomenon That Does Not Respect the Boundaries Between Government Jurisdictions or Between Properties:

"Weld County may from time to time enter into Agreements with adjacent counties to cooperate on regional planning. The Policy of Weld County shall be to pursue a jurisdictionally unified drainage effort to assure an integrated drainage system and to cooperate with other regional and local planning agencies on drainage matters."

5. Amend Section 3.1.2, Rainfall-Runoff Relationships, to read:

"A program should be maintained to collect and analyze rainfall-runoff relationships in urban areas of Weld County."

6. Amend Section 3.1.4, Library, to read:

"Weld County should acquire and actively maintain a library, which should be available for use by all governmental agencies, practicing planners and engineers. The public should be encouraged to use the library as part of Weld County's educational and outreach programs."

7. Amend Section 3.1.5, Runoff Magnitudes, to read:

"Where practical, the magnitude of computed and measured runoff peaks should be tabulated for Weld County streams and gulches so that comparisons may be readily made between watersheds and erroneous values may be more easily identified."

8. Amend Section 3.2, Floodplain Data, to read:

"The program to delineate flood hazard areas along all waterways in the region should be maintained. This program should make full use of such sources as the FEMA Flood Insurance Studies, data from the Natural Resources Conservation Service, the USGS and floodplain studies by private consulting engineers. This information should be regularly reviewed and updated to reflect changes due to urbanization, changed channel conditions and the occurrence of extraordinary hydrologic events."

9. Amend Section 3.2.2, Data Inventory, to read:

"The information collected should be stored in a Weld County Department of Public Works file available to all planners, developers and engineers."

10. Amend the first sentence of Section 3.2.4, Priority for Data Acquisition, to read:

"Weld County will establish priorities for acquisition of data because it is recognized that not all of the data can be collected at one time."

11. Amend Section 3.3.1, Master Plan, to read:

"Drainage design does not lend itself to a piecemeal approach; therefore, master plans for drainage should be prepared on a priority basis. Such plans already cover most of the developed major drainageways in Weld County. Additional plans will be developed for areas yet unplanned. In addition, existing master plans will be updated as needed to reflect changed conditions that take place over time."

12. Amend Section 4.1, Total Urban System, to read:

"Storm drainage is a part of the total urban environmental system. Therefore, storm drainage planning and design should be compatible with comprehensive regional plans. Master plans for storm drainage have been developed and maintained in an up-to-date fashion for Weld County. An effort to complete the coverage of drainage master plans for yet unplanned areas of Weld County should be continued until full coverage is achieved."

13. Amend Section 4.1.2, Master Plan, to read:

"Early work includes the planning of major drainageways from the point of outfall, proceeding in an upstream direction. The major drainageways are generally well-defined and often dictate the design of the initial drainage system, including storm sewers, detention facilities and water quality systems. Weld County has established a suitable format for master plan reports and drawings so that a uniform planning approach and coordination of efforts can more easily be made. Master planning should be done in enough detail and with adequate thoroughness to provide a ready drainage development guide for the future in a particular watershed. Generalized concepts based on rule-of-thumb hydrological analyses should not be used as master plans; a more rigorous analysis is necessary. The Policy of Weld County shall be to enforce and implement adopted Master Drainage Plans. These Master Drainage Plans may be amended from time to time in the future."

14. Amend Section 4.1.3, paragraph #2, Planning Process Ingredients, to read:

"2. Initial Drainage System Planning. All local and regional planning must take into consideration the initial drainage system to transport the runoff from storms expected to occur once every 2 years. The planner of an initial system must strive to minimize future drainage complaints."

15. Amend the second paragraph of Section 4.1.6, Water Quality, to read:

"Sanitary sewerage systems that overflow or bypass untreated sewage into surface streams should not be permitted in Weld County. Existing systems that discharge sewage should be adjusted by their owners to eliminate this problem."

16. Add the following to Section 4.3.1, Channelization:

"It shall be the policy of Weld County to review proposed channel designs on a case-by-case basis. Proposed modifications to natural channels shall be approved only if the proposed work causes no injury to water rights and is not in violation of state or federal law."

17. Add the following to Section 4.5, Detention and Retention Storage:

"Except as set forth below, the Policy of Weld County shall be to require regional and/or on-site detention for all future developments. Temporary or interim detention/ retention may be required if the downstream regional facilities have not yet been constructed per the applicable Master Plan. Stormwater retention facilities are normally not allowed in Weld County, but will be considered for special circumstances. It is Weld County policy to require detention of runoff from the 100-year storm falling on the developed site and release of the detained water at the rate of the runoff of the 5-year storm falling on the undeveloped site. Detention releases based on soil types are not approved for Weld County. Proposed developments must provide for safe conveyance of off-site flows through the proposed development site. Off-site flows may be routed through or around the proposed detention facilities. Positive drainage must be provided. Weld County will not approve any detention or retention pond that does not drain in less than seventy-two (72) hours, causes injury to water rights, or is in violation of state or federal law. Upon evaluation, improvements may be necessary to downstream capacity.

"No stormwater detention shall be required for rural residential developments of nine (9) lots or fewer, where the average lot size is equal to or greater than three (3) acres per lot and: 1) downstream roadway criteria are not exceeded (6-inches water depth on road for the 10-year storm); and 2) the total post-development imperviousness for the rural residential development

does not exceed ten percent (10%), assuming that all internal roads and driveways are paved (or eventually will be paved).

"No stormwater detention shall be required for redevelopment of commercial and industrial sites where the change of use does not increase the imperviousness of the site; however, water quality capture shall be required."

18. Amend Section 4.5.4, Reliance on Non-Flood-Control Reservoirs, to read:

"Jurisdictional dams are classified by the State Engineer as either low, moderate or high hazard structures, depending on conditions downstream. Dams are classified as 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.

"The Policy of the Weld County shall be to:

"1. Restrict upstream development to areas outside of the jurisdictional dam water surface elevation created by a 100-year storm plus freeboard.

"2. Restrict downstream development to areas outside of the jurisdictional dam 100-year floodplain. The jurisdictional dam 100-year floodplain is defined as either:

"a. The 100-year floodplain downstream of the emergency spillway assuming the dam is full to the elevation of the emergency spillway at the beginning of the 100-year storm and the 100-year storm is routed through the dam and out the emergency spillway,

"OR

"b. The path that the basin's 100-year floodplain would form through the downstream development if the dam were removed by the owner."

19. Amend Section 4.5.5, Reliance on Embankments, to read:

"The detention of floodwaters behind embankments created by railroads, highways or roadways resulting from hydraulically undersized culverts or bridges should not be utilized by the drainage engineer for flood peak mitigation when determining the downstream flood peaks for channel capacity purposes unless such detention has been covered by a binding agreement approved by Weld County."

20. Amend Section 5.1, Design Criteria, to read:

"Storm drainage planning and design should adhere to the criteria developed and presented in this Manual maintained by Weld County."

21. Amend Section 5.1.1, Design Criteria, to read:

"The design criteria presented herein represent current good engineering practice, and their use in Weld County is recommended. The criteria are not intended to be an ironclad set of rules that the planner and designer must follow; they are intended to establish guidelines, standards

and methods for sound planning and design. The Weld County Department of Public Works may grant variances from the design criteria of this Manual by acceptance of the Final Drainage Report in which the variance request is well-documented."

22. Delete the second paragraph of Section 5.2.1, Design Storm Return Periods.

23. Amend Section 5.2.2, Initial Storm Provisions, to read:

"The initial storm drainage system, capable of safely handling 10-year floods, is necessary to reduce the frequency of street flooding and maintenance costs, to provide protection against regularly recurring damage from storm runoff, to help create an orderly urban system and to provide convenience to urban residents. Normally, the initial drainage system cannot economically carry major runoffs, though the major drainage system can provide for the initial runoff. A well-planned major drainage system will reduce or eliminate the need for storm sewer systems (Jones 1967). Storm sewer systems consisting of underground pipes are a part of initial storm drainage systems."

24. Amend Section 5.4.1, Use of Streets, to read:

"Streets are significant and important in urban drainage, and full use should be made of streets for storm runoff up to reasonable limits, recognizing that the primary purpose of streets is for traffic. Reasonable limits of the use of streets for transportation of storm runoff should be governed by reasonable design criteria as summarized in Table DP-1 and in the Streets/Inlets/Storm Sewers chapter of this Manual. Urban drainage design should have as objectives reduction of street repair, maintenance costs, nuisance to the public and disruption of traffic flow.

"When maximum allowed encroachment is present, the storm sewer system design based on the initial storm should commence. Development of a major drainage system that can often drain the initial runoff from the streets is encouraged, thus making the point at which the storm sewer system should commence further downstream. Initial and major drainage planning should go hand-in-hand.

"While it is the intent of this policy to have major storm runoff removed from public streets at frequent and regular intervals and routed into major drainageways, it is recognized that water will often tend to follow streets and roadways and that streets and roadways often may be aligned so they will provide a specific runoff conveyance function. Planning and design objectives for the major drainage system with regard to public streets should be based upon following the limiting criteria summarized in Table DP-2 and in the Streets/Inlets/Storm Sewers chapter of this Manual.

"The allowable flow across a street should be within the criteria presented in Table DP-3 and in the Streets/Inlets/Storm Sewers chapter of this Manual.

"An arterial street crossing will generally require that a storm sewer system be commenced, unless the topography is such that day-lighted inlet culverts or other suitable means can transport the initial storm runoff under the arterial street or water can be routed to a major drainage facility. Bubblers (inverted siphons which convey flows beneath roadways) are not encouraged in Weld County because of possible plugging with sediment and difficulty in maintaining them. Collector streets should have cross pans only at infrequent locations as specified by the governing agency and in accordance with good traffic engineering practices. The local street

criteria for overtopping also apply to any private access road that serves commercial areas or more than one residence, for emergency access and safety reasons."

25. Add the following to Section 5.5, Irrigation Ditches:

"It is the policy of Weld County to prohibit the discharge of stormwater runoff from developed areas into irrigation ditches and facilities, except as required by water rights or where such discharges are in conformance with approved Master Drainage plans. Further, wherever new development will alter patterns of drainage into irrigation ditches by increasing flow rates or volumes, or will change the historic concentration points of runoff, the County shall require each new development to obtain written consent of the appropriate ditch company before approving the drainage design and development."

26. Amend Section 5.5.1, Use of Ditches, to read:

"The irrigation ditches coursing through urban areas are laid out on flat slopes and with limited carrying capacity. Based on experience and hydraulic calculations, irrigation ditches cannot, as a general rule, be used as an outfall point for the initial storm drainage system because of physical limitations. Exceptions to the rule can occur when the capacity of the irrigation ditch is adequate to carry the normal ditch flow plus the initial storm runoff with adequate freeboard to avoid creating a hazard to those below the ditch. Written approval must be obtained from the ditch owner stating that the owner understands the physical and legal (i.e., liability) consequences of accepting said runoff. If there is a question about the use of irrigation ditches as outfalls for initial storm runoff, there is no question about their unsuitability as an outfall for the major storm runoff. Without major reworking of irrigation ditches to provide major carrying capacity without undue hazard to those downstream or below the ditch, the ditches are almost always totally inadequate for such a use and should not be used as an outfall. Moreover, because ditches are normally privately owned, one cannot assume the perpetual existence or function of a ditch. Land planners and engineers with a proposed development downhill from a ditch shall plan for preditch drainage conditions as well as continued ditch seepage. For new development, it shall be the policy of Weld County to prohibit undetained discharges to roadside ditches located in the County right-of-way. In the event a proposed development wishes to design stormwater discharge to a County right-of-way, the developer, at the request of the County, shall have the requirement to design and construct drainage improvements to the right-of-way at the developer's own expense. Such improvements shall include, but not be limited to: detention ponds, armored channels, culverts and other drainage facilities. Cost sharing of such needed improvements may be borne by adjacent developments, such cost sharing to be negotiated by the developer. Weld County may require written agreements and construction bonding of such offsite drainage improvements."

27. Amend Section 5.5.3, Conformance With Master Plan, to read:

"Use of irrigation ditches for collection and transport of either initial or major storm runoff should be prohibited unless specifically provided in the Weld County master plans or approved by Weld County and the ditch owner."

28. Amend Section 5.6, Detention and Retention Facilities Maintenance, to read:

"The significant cost of handling stormwater runoff, coupled with the social benefits to be derived from proper storm drainage facilities, points towards the use of detention and retention basins for storage of stormwater runoff in Weld County. Maintenance provisions must be

arranged. Maintenance of detention or retention facilities includes the removal of debris, excessive vegetation from the embankment and sediment. Without maintenance, a detention/retention facility will become an unsightly social liability and eventually become ineffective."

29. Amend Section 6.1, Purpose, to read:

"Floodplain management includes comprehensive criteria designed to encourage, where necessary, the adoption of permanent state or local measures which will lessen exposure of property and facilities to flood losses, improve long-range land management and use of flood-prone areas and inhibit, to the maximum extent feasible, unplanned future development in such areas."

30. Amend the first sentence of Section 6.2, Goals, to read:

"There are two goals in regard to floodplain management: To reduce the vulnerability of Weld County residents to the danger and damage of floods."

31. Amend Section 6.3.2, New Development, to add the following:

"The Policy of Weld County shall be to outsource engineering review of all CLOMR and LOMR submittals received with a development application. The developers shall reimburse the Weld County Department of Public Works for all outsourced engineering review costs. Upon FEMA approval of a CLOMR or LOMR, payment of all outsourced engineering review costs is due and payable to Weld County. Developers are welcome to contract directly with our outsourced consultant(s) for the preparation of CLOMRs and LOMRs, if they so desire."

32. Amend Section 7.1, Adoption of Drainage Master Plans, to read:

"This Manual and master plans should be adopted and used by all governmental agencies operating within Weld County."

33. Amend Section 7.3, Amendments, to read:

"Problems in urban drainage administration encountered by anyone should be reviewed by Weld County to determine if equity or public interests indicate a need for drainage policy, practice or procedural amendments. Weld County should continually review the needs of the community in regard to urban runoff criteria and should recommend changes as necessary to this Manual."

34. Add Section 7.5, Drainage Improvements, to read:

"Weld County Master Drainage Plans set forth improvements required for existing and future growth areas. There are areas of Weld County for which no Master Drainage plans yet exist. Weld County may require a Master Drainage study in support of proposed development. The policy of Weld County regarding the design and construction of improvements within the Master Drainage Plan areas shall be as set forth below, subject to Weld County budget and appropriation approvals.

"1. Weld County shall identify needed design and construction of improvements as set forth in adopted Master Drainage Plans for existing and future growth areas.

"2. The drainage systems for future development and redevelopment shall be designed and constructed by the developers.

"3. The developers shall be responsible for design and construction of temporary or interim storm drainage systems required due to the lack of adequate storm drainage facilities downstream of new development.

"4. The developers may be responsible for design and construction of permanent storm drainage systems required due to the lack of adequate storm drainage facilities downstream of new development."

Chapter 3 — Planning

35. Amend the first paragraph of Section 7.1, Initial Drainage, to read:

"Planning and design for urban storm runoff must be considered from the viewpoint of the regularly expected storm occurrence, which includes the initial storm and the major storm. The initial (minor) storm has been defined by Weld County to have a return frequency of once in 10 years (the 10-year storm) for all uses. The major storm has been defined to have a return period of 100 years. The objective of major storm runoff planning and design is to reduce the potential for major damage and loss of life. The initial drainage system is necessary to reduce inconvenience, frequently recurring damages and high street maintenance and to help create an orderly urban system with significant sociological benefits."

36. Amend the second paragraph of Section 9.1, Storm Sewers, to read:

"The initial drainage system, including storm sewers, is that portion of the total drainage system that often receives the most attention from engineers. It is what the average citizen considers to be the urban drainage system. It is what directly contributes to the orderly growth of a community by handling the storm runoff expected to occur once every 10 years (the 10-year storm) for all uses."

37. Amend Section 9.4, System Sizing, to read:

"The design return period to be used for storm sewer design in Weld County is the 10-year storm for all land uses. Storm sewers passing flow under County roads shall have a minimum design capacity for the 10-year storm and a minimum diameter of 15 inches or equivalent open area. System sizing design shall adhere to Weld County street inundation criteria of 6 inches for the minor storm, and 18 inches for the major storm event. This is a departure from the policy of recommending different return periods for different land uses. Experience has shown that it is not practical to vary storm sewer design by land use because a single system often serves multiple land uses. Instead, greater attention is necessary to ensure that the major system is adequate to protect the public and property within all areas, regardless of land use."

Chapter 4 — Rainfall

38. Add the following to Section 1.0, Rainfall:

"For proposed Weld County development drainage design, the Rainfall Depth-Duration-Frequency maps presented in the USDCM may be utilized only for those areas of Weld County shown on the Figures in that manual (Figures RA-1 through RA-12). Drainage designs proposed

for locations outside of the areas of Weld County covered by Figures RA-1 through RA-12 should utilize the depth-duration-frequency information provided in the *Precipitation-Frequency Atlas of the Western United States, Volume II – Colorado*, published by the National Oceanic and Atmospheric Administration (NOAA). The NOAA Atlas may be accessed at: www.nws.noaa.gov/oh/hdsc/noaaatlas2.htm. Where development is proposed in larger watersheds, design hydrology should utilize longer storm durations appropriate for the size of the entire watershed. See Tables RA-1 and RA-3 in the USDCM for storm duration and area adjustments."

Chapter 5 — Runoff

39. Add the following to Section 3.3.1, Rainfall:

"See Tables RA-1 and RA-2 within the USDCM Rainfall Chapter for 1-hour and 2-hour rainfall area adjustments and distributions. For locations outside of Weld County, covered by USDCM Figures RA-1 through RA-12, utilize the depth-duration-frequency information provided in the *Precipitation-Frequency Atlas of the Western United States, Volume II*."

40. Amend Section 5.1, Published Hydrologic Information, to read:

"Weld County has prepared hydrologic studies for the major drainageways within Weld County boundaries. These studies contain information regarding peak flow and runoff volume from the 2-year through 100-year storm events for numerous design points within the watershed. They also contain information regarding watershed and subwatershed boundaries, soil types, percentage imperviousness and rainfall. The studies are available at the Weld County Department of Public Works. When published flow values are available from Weld County for any waterway of interest, these values should be used for design unless there are compelling reasons to modify the published values."

Chapter 6 — Streets/Inlets/Storm Sewers

41. Amend Section 1.3, Components of Urban Stormwater Collection and Conveyance Systems, to read:

"Urban stormwater collection and conveyance systems within Weld County are comprised of three primary components: (1) street gutters and roadside swales; (2) stormwater inlets; and (3) storm sewers (and appurtenances like manholes, junctions, etc.). Street gutters and roadside swales collect runoff from the street (and adjacent areas) and convey the runoff to a stormwater inlet while maintaining the street's level-of-service."

42. Amend first two paragraphs of Section 2.2, Design Considerations, to read:

"Certain design considerations must be taken into account in order to meet street drainage objectives. The primary design objective is to keep the spread (encroachment) of stormwater on the street below an acceptable value for a given return period of flooding. As mentioned previously, when stormwater collects on the street and flows down the gutter, the top width (or spread) of the water widens as more stormwater is collected. If left unchecked, the spread of water would eventually hinder traffic flow and possibly become hazardous (i.e., reduced skid resistance, hydroplaning, splash, etc.). Based on these considerations, Weld County has established encroachment (spread) standards for the minor storm event. These standards are provided in Chapter 3, Planning, Section 9.4 of the Weld County Storm Drainage Criteria.

"Standards for the major storm and street cross flows are also required. The major storm needs to be assessed to determine the potential for flooding and public safety. Cross flows also need to be regulated for traffic flow and public safety reasons. Weld County has established street inundation standards during the major storm event and allowable cross-street flow standards. These standards are provided in Chapter 3, Planning, Section 9.4 of the Weld County Storm Drainage Criteria. Allowable flow depth is measured vertically from the gutter flowline at the curb face."

43. Amend the second paragraph of Section 2.3.1.3, Allowable Gutter Hydraulic Capacity Weld County, to read:

"There are 2 sets of reduction factors developed for Denver metropolitan areas (Guo 2000b) and they shall also be utilized for Weld County. One is for the minor event and another is for the major event. Figure ST-2 shows that the reduction factor remains unity (1.0) for a street slope < 1.5%, and then decreases as the street slope increases."

44. Add the following to Section 3.1, Inlet Functions, Types and Appropriate Applications:

"The standard inlets permitted for use in Weld County streets are:

<i>"INLET TYPE PERMITTED USE</i>	
Curb opening inlet Type R	All street types with 6" vertical curb
Grated inlet Type C	All streets with a roadside ditch or swale
Grated inlet Type 13	Alleys or private drives with a valley gutter
Combination inlet Type 13	All street types with 6" vertical curb"

45. Add the following to Section 3.3.6, Inlet Clogging:

"To account for effects which decrease the capacity of the various types of inlets, such as debris plugging, pavement overlaying and variations in design assumptions, the theoretical capacity calculated for the inlets is to be reduced by the factors presented below for the standard inlets permitted for use in Weld County.

<i>"WELD COUNTY ALLOWABLE INLET CAPACITY</i>		
<i>Condition</i>	<i>Inlet Type</i>	<i>Percent of Theoretical Capacity Allowed</i>
Sump or continuous grade	CDOT Type R	
	5' length	88
	10' length	92
	15' length	95
Continous grade	Combination Type 13	66
Sump	Grated Type C	50
	Grated Type 13	50
Sump	Combination Type 13	65"

46. Amend the first paragraph of Section 3.4.2, Design Considerations, to read:

"The primary design consideration for the location and spacing of inlets on continuous grades is the spread limitation. This was addressed in Section 2.2."

47. Amend the third paragraph of Section 4.2, Design Process, Considerations, and Constraints, to read:

"Once a final layout is chosen, storm sewers are sized using hydrologic techniques (to determine peak flows) and hydraulic analysis (to determine pipe capacities). This is accomplished by designing the upstream pipes first and moving downstream. The minimum size storm sewer pipe within a Public Right-of-Way or Public Drainage Easement shall be 15 inches in diameter or equivalent open area. Refer to the 'Weld County Development Standards and Specifications Governing the Construction of Public Improvements,' latest edition, for allowable storm sewer pipe materials. Pipes generally increase in size moving downstream since the drainage area is increasing. It is not good design practice to decrease the pipe size moving downstream, even if a steeper slope is encountered that will provide sufficient capacity with a smaller pipe. The potential for clogging is always a concern."

48. Add the following to Section 4.4.1, Flow Equations and Storm Sewer Sizing:

"The Manning's roughness coefficient 'n' for all storm sewer pipe capacity Weld County calculations shall be 0.013 regardless of pipe material (i.e., concrete, PVC or HDPE), with the exception of corrugated metal pipes, which shall have a coefficient of 0.025."

49. Add the following to Section 4.5, Hydraulic and Energy Grade Line Calculations:

"The hydraulic grade line and energy grade line shall be calculated for each storm sewer system and included in the Final Drainage Report. Each storm sewer system shall be profiled on the Final Construction Drawings and shall include the design flow hydraulic grade line (HGL). The energy grade line (EGL) for the design flow shall be at least 6 inches below the final finished elevation of the manhole rims and inlet flowlines."

Chapter 7 — Major Drainage

50. Add the following to the first paragraph of Section 3.2.3.2, Side Slopes:

"For constructed or natural channels with side slopes steeper than 2:1, appropriate construction setbacks from the channel edge may be required to allow potential future channel meandering. Access for maintenance may require easement."

51. Amend Section 3.2.7, Summary of Preliminary Design Guidance, to add the following note to Table MD-2:

"Grass-lined open channels conveying < 50 cfs may reduce the minimum 1.0-foot freeboard requirement to the freeboard required to convey 1.33 times the 100-year design flow. The reduced freeboard may only occur if a 1.0-foot minimum freeboard is not physically or reasonably possible and a variance request is submitted."

52. Delete the first paragraph of Section 3.2.8, Maintenance Eligibility, and replace with the following:

"Weld County will only maintain eligible major drainageways by special agreement. The requirements below must be satisfied as of (adoption date) for a major drainage channel to be eligible for Weld County maintenance. Note that the Weld County 'Maintenance Eligibility Guidelines' may change with time."

53. Amend the first sentence of Section 3.2.8.3, Grass-Lined Channel Design, to read:

"The design for a grass-lined channel must meet the following criteria to be eligible for Weld County maintenance:"

54. Amend Section 3.3.4, Maintenance, to read:

"Weld County and the design engineer shall work together to provide access to all major drainageways as determined appropriate at the time of preliminary and final design. Weld County encourages volunteers to assist Weld County in performing routine maintenance of all the drainageways within the County through an adoption program and will assist these groups in a variety of ways."

55. Amend the fourth paragraph of Section 3.5, Choice of Channel Lining, to read:

"Manufactured channel linings such as gabions, interlocked concrete blocks, synthetic linings, etc., are not recommended for new developments, but will be considered by Weld County on a case-by-case basis. As with concrete- and riprap-lined channels, all of these types are best considered for helping to solve existing urban flooding problems where right-of-way is very limited. Manufactured channel linings should be used with caution, and each type of channel lining must be scrutinized for its merits, applicability, ability to meet other community needs, long-term integrity and maintenance needs and costs."

56. Add the following to Section 4.1.5, Trickle and Low-Flow Channels:

"Underdrain pipes shall not be used in lieu of trickle channels within Weld County but will be considered by Weld County on a case-by-case basis."

57. Amend the first paragraph of Section 4.1.7, Water Surface Profile, to read:

"Water surface profiles should be computed for all channels conveying > 50 cfs within Weld County. Computation of the water surface profile should include standard backwater methods, taking into consideration all losses due to changes in velocity, drops, bridge openings and other obstructions. Computations should begin at a known point and extend in an upstream direction for subcritical flow. It is for this reason that the channel should be designed from a downstream direction to an upstream direction. It is necessary to show the energy gradient on all preliminary drawings to help ensure against errors. Whether or not the energy grade line is shown on the final drawings is an option of the reviewing agency, although the District encourages this."

58. Add the following as the third paragraph of Section 4.1.7, Water Surface Profile:

"Hydraulic grade lines shall be shown on the Final Construction Drawing profiles of open channels conveying > 50 cfs within Weld County. It is not necessary to show energy grade lines

on Final Construction Drawing profiles, but it is encouraged. The energy grade line for the design flow shall be at, or below, the final finished top of channel bank elevation. Hydraulic grade lines on Final Construction Drawings are encouraged and will ease assessment and review of compliance with street inundation criteria."

59. Amend Section 4.1.8, Maintenance, to read:

"Grass-lined channels must be designed with maintainability in mind. See Section 3.2.8 for the District's 'Maintenance Eligibility Guidelines,' which also provide guidance for elements of design that permit good maintenance of these installations. Weld County and the design engineer shall work together to provide access to all major drainageways as determined appropriate at the time of preliminary and final design."

60. Amend the fifth paragraph of Section 4.2.2, Design Procedure, to read:

"Water surface profiles shall be computed for all open channels conveying > 50 cfs within Weld County. Computation of the water surface profile should utilize standard backwater methods, taking into consideration all losses due to changes in velocity, drops, bridge openings and other obstructions. Computations begin at a known point and extend in an upstream direction for subcritical flow. It is for this reason that the channel should be designed from a downstream direction to an upstream direction. It is necessary to show the energy gradient on all preliminary drawings to help prevent errors. Whether or not the energy gradient line is shown on the final drawings is the option of the reviewing agency but is encouraged by the District."

61. Add the following to the last paragraph of Section 4.2.2, Design Procedure:

"Hydraulic grade lines shall be shown on the final drawing profiles of open channels conveying > 50 cfs within the Weld County. Energy grade lines on final drawing profiles are encouraged. Hydraulic grade lines on Final Construction Drawings are encouraged to ease assessment and review of compliance with street inundation criteria."

62. Amend second paragraph of Section 4.2.3, Life Expectancy and Maintenance, to read:

"Weld County and the design engineer shall work together to provide access to all major drainageways as determined appropriate at the time of preliminary and final design."

63. Amend the second paragraph of Section 4.3, Concrete-Lined Channels, to read:

"Concrete-lined channels can be used for conveyance of both subcritical and supercritical flows. In general, however, other types of channels such as grass-lined channels or channels with wetland bottoms are preferred for subcritical flows. The use of a concrete-lined channel for subcritical flows should not be used except in unusual circumstances where a narrow right-of-way exists. Vegetated channels are normally preferable in Weld County because available thalweg slopes are generally steep enough."

64. Amend the fourth paragraph of Section 4.3, Concrete-Lined Channels, to read:

"In Weld County, all channels carrying supercritical flow shall be lined with continuously reinforced concrete linings, both longitudinally and laterally. There shall be no diminution of wetted area cross sections at bridges or culverts. Adequate freeboard shall be provided to have a suitable safety margin. Bridges or other structures crossing the channel must be anchored

satisfactorily to withstand the full dynamic load that might be imposed upon the structure in the event of major trash plugging."

65. Amend Section 4.3.6, Maintenance, to read:

"Concrete channels require periodic maintenance, including debris and sediment removal, patching, joint repair and other such activities. Their condition should be periodically monitored, especially to assure that flows cannot infiltrate beneath the concrete lining. Weld County and the design engineer shall work together to provide access to all major drainageways as determined appropriate at the time of preliminary and final design."

66. Amend Section 4.4.1.3, Wire-Enclosed Rock (Gabions), to read:

"Wire-enclosed rock, or gabions, refers to rocks that are bound together in a wire basket so that they act as a single unit. The durability of wire-enclosed rock is generally limited by the life of the galvanized binding wire that has been found to vary considerably under conditions along waterways. Water carrying sand or gravel will reduce the service life of the wire dramatically. Water that rolls or otherwise moves cobbles and large stones breaks the wire with a hammer-and-anvil action, considerably shortening the life of the wire. The wire has been found to be susceptible to corrosion by various chemical agents and is particularly affected by high-sulfate soils. Wire-enclosed rock installations have been found to attract vandalism, and flat mattress surfaces seem to be particularly susceptible to having wires cut and stones removed. For these reasons, Weld County discourages the use of wire-enclosed rock. If the designer chooses to utilize gabions, they should be placed above the low-flow channel or 2-year water surface elevation. All flat mattresses must be filled with topsoil and then covered with a 6-inch layer of topsoil."

67. Amend Section 4.4.7, Maintenance, to read:

"Weld County and the design engineer shall work together to provide access to all major drainageways as determined appropriate at the time of preliminary and final design. Requirements for District maintenance eligibility are reviewed in Section 3.2.8 of this chapter. Of particular concern is long-term loss of riprap, particularly due to the public moving the rock (for smaller sizes). Grout can deteriorate with time, and this should be monitored as well. Improper grout installation creates long-term maintenance problems."

68. Amend Section 4.5, Bioengineered Channels, to read:

"Bioengineered channels (see Photographs MD-10 and MD-11) emphasize the use of vegetative components in combination with structural measures to stabilize and protect stream banks from erosion. Weld County advocates the integration of bioengineering techniques into drainage planning, design and construction when the use of such channels is consistent with Weld County's policies concerning flow-carrying capacity, stability, maintenance and enhancement of the urban environment and wildlife habitat. The following discussion on bioengineered channels interfaces closely with Section 4.2, Wetland Bottom Channels, and Section 4.6, Natural Channels; designers are encouraged to read Sections 4.2, 4.5 and 4.6, concurrently. In addition, because bioengineered channels require some structural assistance to maintain stability in urban settings, the designer is referred to guidance on drop structures in the HYDRAULIC STRUCTURES chapter."

69. Amend Section 4.5.3, Bioengineering Resources, to read:

"The purpose of this section is to provide the designer with an overview of bioengineering and basic guidelines for the use of bioengineered channels on major drainage projects within Weld County. There are many sources of information on bioengineering that the designer should consult for additional information when planning and designing a bioengineered channel (Watson, Biedenharn, and Scott 1999; USFISRWG 1998; Riley 1998; and Biedenharn, Elliot, and Watson 1997)."

70. Amend the first two (2) paragraphs of Section 4.5.4, Characteristics of Bioengineered Channels, to read:

"The following characteristics are generally associated with bioengineered channels:

"1. Their design must address the hydrologic changes associated with urbanization (increased peak discharges, increased runoff volume, increased base flow and increased bank-full frequency). These changes typically necessitate the use of grade control structures. In the absence of grade control structures, especially in the semi-arid climate of Weld County, purely bioengineered channels will normally be subject to bed and bank erosion, channel instability and degradation.

"2. In addition to grade controls, bioengineered channels may require some structural methods to assist the vegetation with maintaining channel stability. Examples include buried riprap on toes and outer channel banks (see Figures MD-16, MD-17 and MD-18)."

71. Add the following to the last paragraph of Section 4.5.4, Characteristics of Bioengineered Channels:

"Weld County is open to review and accept alternate bioengineering methods that provide protection to toes of bank slopes (i.e., jacks and lunkers, etc.)."

72. Amend the first paragraph of Section 4.5.5, Advantages of Bioengineered Channels, to read:

"Public reaction to bioengineered channels is generally favorable, not only in northern Colorado, but also regionally and nationally. In contrast to major drainageway stabilization projects that focus on structural measures, such as concrete-lined or riprap-lined channels, bioengineered channels:"

73. Amend subparagraph 6 of Section 4.5.5, Advantages of Bioengineered Channels, to read:

"6. Create a living system that will strengthen over time."

74. Add the following to Section 4.5.5, Advantages of Bioengineered Channels:

"8. Are less costly to maintain."

75. Amend the first paragraph of Section 4.5.6, Technical Constraints, to read:

"The following constraints may be associated with bioengineered channels:

"1. There is only limited experience to rely on for successful design of urban channels. The majority of the experience with bioengineering techniques relates to channels in nonurban settings.

"2. The semi-arid conditions that characterize Weld County can be at odds with the need for an adequate water supply for maintaining the vegetation. Careful species selection that reflects the site's soils and water availability characteristics is essential.

"3. A basic design criterion within Weld County is to demonstrate channel stability during the major (100-year) storm, due to public safety and property protection concerns within urban areas. There is little evidence (locally, regionally or nationally) as to whether purely bioengineered channels can withstand 100-year (or lesser) flood forces."

There is no change to the remainder of the paragraph.

76. Amend the second paragraph of Section 4.5.6, Technical Constraints, to delete the sixth bulleted item.

77. Amend the second paragraph of Section 4.5.6, Technical Constraints, to amend the last bulleted item to read:

"Many of these problems may be avoided through selection of the appropriate type and species of vegetation. Such selections and expert advice must be obtained from qualified individuals in revegetation and bioengineering."

78. Amend the first two (2) paragraphs of Section 4.6, Natural Channels, to read:

"Natural waterways in Weld County are sometimes in the form of steep-banked gulches, which have eroding banks and bottoms. On the other hand, many natural waterways exist in urbanized and to-be-urbanized areas, which have mild slopes, are reasonably stable and are not currently degrading. If the channel will be used to carry storm runoff from an urbanized area, it can be assumed that the changes in the runoff regime will increase channel erosion and instability. Careful hydraulic analysis is needed to address this projected erosion. In most cases, stabilization of the channel will be required. Stabilization using bioengineering techniques, described in Section 4.5 of this chapter, has the advantage of preserving and even enhancing the natural character and functions of the channel. Some structural stabilization measures will also be required in combination with the bioengineered stabilization measures.

"In Weld County, most natural waterways will need drops and/or erosion cutoff check structures to maintain a mild channel slope and to control channel erosion. Typically, these grade control structures are spaced to limit channel degradation to what is expected to be the final stable longitudinal slope after full urbanization of the tributary watershed. In the Denver area, this slope, depending on watershed size and channel soils, has been observed to range from 0.2 to 0.6%, with the South Platte River itself approaching a slope of 0.1%. Whenever feasible, natural channels should be kept in as near a natural condition as possible by limiting modifications to those necessary to protect against the destabilizing hydrologic forces caused by urbanization."

79. Amend the fifth paragraph of Section 4.6, Natural Channels, to read:

"The following design criteria are recommended when evaluating natural channels:

"1. The channel and overbank floodplain should have adequate capacity for the 100-year flood.

"2. A water surface profile should be defined in order to identify the 100-year floodplain, to control earthwork and to build structures in a manner consistent with Weld County's floodplain regulations and ordinances."

There is no change to the remainder of Section 4.6. (Weld County Code Ordinance 2006-7; Weld County Code Ordinance 2008-9)

Sec. 8-11-40. Weld County Addendum to Text of the Urban Storm Drainage Criteria – Volume 2.

The criteria adopted herein are hereby modified as follows:

Chapter 8 — Hydraulic Structures

1. Add the following to Section 4.1.2, Bridge Opening Freeboard:

"The bridge low chord elevation shall be a minimum of 1 foot above the 100-year watercourse energy grade line."

Chapter 9 — Culverts

2. Amend the third paragraph of Section 1.1.2, Headwater, to read:

"The maximum culvert headwater-to-diameter ratios are:

<i>"Storm Frequency</i>	<i>Headwater to Diameter</i>
10-year	HW/D < 1.0
100-year	HW/D < 1.5

"The minimum culvert capacities are:

<i>"Street Classification</i>	<i>Minimum Capacity (Recurrence Interval)</i>
Local	10-year
Collector	10-year
Arterial	10-year

"When the flow in a roadside ditch exceeds the capacity of the culvert and overtops the cross street, the flow over the street crown shall not exceed the minor storm and major storm depth limits presented in Chapter 3, Planning, Section 9.4 of the Weld County Storm Drainage Criteria manual. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties."

3. Add the following to Section 2.1.1, Energy and Hydraulic Grade Lines:

"The hydraulic grade line and energy grade line shall be determined for each culvert system and included in the Final Drainage Report. Each culvert system shall be profiled on the Final Construction Drawings and shall include the design flow hydraulic grade line."

4. Amend Section 3.5.3, Culvert Diameter to read:

"It is the policy of Weld County to require a minimum culvert diameter of 15 inches. Weld County may require additional culvert capacity in order to prevent flooding of adjacent properties. After the invert elevations have been assumed and using the design computation forms (e.g., Figure CU-8), the capacity charts (e.g., Figure CU-7) and the nomographs, the diameter of pipe that will meet the headwater requirements should be determined. Since small diameter pipes are often plugged by sediment and debris, it is recommended that pipe smaller than 18 inches not be used for any drainage where this Manual applies. Refer to the "Weld County Design and Construction Standards and Specifications," latest edition, for allowable culvert pipe materials. The Manning's roughness coefficient "n" for all culvert pipe sizing calculations shall be 0.013 regardless of pipe material (concrete, PVC or HDPE), with the exception of corrugated metal pipes, which shall have a coefficient of 0.025."

5. Add the following to the last paragraph of Section 4.1, Projecting Inlets:

"At a minimum, a culvert entrance and outlet shall include a flared end section. Erosion protection (riprap, etc.) may be required."

6. Amend the fifth paragraph of Section 8.0, Trash/Safety Racks, to read:

"Weld County strongly recommends against the installation of trash racks at culvert outlets, because debris or a person carried into the culvert will impinge against the rack, thus leading to pressurized conditions within the culvert, virtually destroying its flow capacity and creating a greater hazard to the public or a person trapped in the culvert than not having one."

7. Amend Section 8.1, Collapsible Gratings, to read:

"Weld County does not recommend the use of collapsible gratings. On larger culverts where a collapsible grating is deemed necessary by a local jurisdiction or an engineer, such gratings must be carefully designed from the structural standpoint so that collapse is achieved with a hydrostatic load of perhaps one-half of the maximum backwater head allowable. Collapse of the trash rack should be such that it clears the waterway opening adequately to permit the inlet to function properly without itself contributing to potential plugging of the culvert."

Chapter 10 — Storage

8. Add the following subparagraph to the sixth paragraph of Section 2.0, Application of Different Types of Storage:

"6. Aboveground parking lot detention ponds may be utilized when land area for a grass-lined detention pond is not available. To prevent damage to and flotation of automobiles, parking lot detention ponds shall not exceed 12 inches in depth at any point. Parking lot detention ponds shall have signage to inform the general public about the potential for flooding. The 100-year water surface elevation of a parking lot detention pond shall not encroach into a public street."

9. Amend Section 3.1.2, Use of Regional (i.e., Hydrograph Routing) Detention Sizing Procedure, to read:

"For tributary catchments larger than 90 acres in size, Weld County recommends or may require the use of hydrograph flood routing procedures (i.e., using CUHP-generated hydrographs and reservoir routing calculations; see Section 3.4). In addition, if there are upstream detention facilities in the watershed, hydrograph routing methods should be employed.

"If offsite tributary areas contribute runoff to an onsite detention facility, the total tributary area, assuming fully developed offsite land uses, must be included in the sizing of the onsite storage volumes in order to account for the total runoff volume in the watershed. Sizing of detention storage volumes shall utilize outflow hydrographs that have been properly calculated to account for variable head discharge rates."

10. Add the following to Section 3.1.3, Water Quality Capture Volume in Sizing Detention Storage:

"Within Weld County, the water quality capture volume shall be considered a portion of the total 100-year detention pond volume."

11. Amend the first paragraph of Section 3.2.1, Maximum Allowable Unit Release Rates for On-Site Facilities, to read:

"The maximum allowable unit release rates per acre for onsite detention facilities for a number of design return periods are listed in Table SO-1. These rates apply unless other rates are recommended in a Weld County-approved master plan."

12. Amend Section 3.2.2, Empirical Equations for the Sizing of On-Site Detention Storage Volumes, to read:

"Urbonas and Glidden (1983), as part of the District's ongoing hydrologic research, conducted studies that evaluated peak storm runoff flows along major drainageways. The following set of empirical equations provided preliminary estimates of onsite detention facility sizing for areas within Weld County. They are not intended for use when offsite inflows are present or when multi-stage controls are to be used (e.g., 10- and 100-year peak control) at the storage facility. In addition, these equations are not intended to replace detailed hydrologic and flood routing analysis, or even the analysis using the Rational Formula-based FAA method for the sizing of detention storage volumes. The District does not promote the use of these empirical equations. It does not object, however, to their use by local governments who have adopted them or want to adopt them as minimum requirements for the sizing of onsite detention for small catchments within their jurisdiction. Where Weld County has a master drainage plan that contains specific guidance for detention storage or sizing of onsite detention facilities, those guidelines should be followed instead. The empirical equations are as follows:..."

The remainder of the section: no change.

13. Amend Section 3.2.4, Multi-Level Control, to read:

"Weld County recommends that no more than two levels of controls, in addition to the WQCV controls, be used for onsite detention facilities. These levels should be the 100-year storm, in combination with the 10-year storm. More levels of control may appear to provide

increased protection, but the added complexity of design and the questionable accuracy of the extended precision for such requirements rarely justify their use. Design Example 6.1 shows calculations of allowable release rate and storage requirement using empirical equations."

14. Add the following to Section 3.3, Design Storms for Sizing Storage Volumes:

"The 10-year and 100-year storms shall be the design storms for all water quality and detention pond designs, respectively, within Weld County."

15. Amend Section 3.3.2, Drainage and Flood Control, to read:

"Sizing of storage facilities and outlet works for flood control purposes is generally based on whether the facility is on site or regional. For an individual development site, local municipalities will often dictate the onsite detention design storms that need to be addressed by the new development. On a watershed level, full system master planning studies are needed to identify the appropriate release rates for various design storms. Thus, whenever a Weld County-approved master plan recommends detention sites and release rates or onsite detention/retention storage and release rates, those rates should be used in final design of detention/retention facilities. Other considerations that have to be taken into account include downstream system stability, the stream's capacity to convey discharges from the detention/retention facility in combination with the downstream runoff contributions to the drainage system, potential for flood damages to downstream properties and other factors that may be specific to each situation at hand."

16. Add the following to Section 3.3.3, Spillway Sizing:

"Each detention pond shall contain an emergency spillway capable of conveying the peak 100-year storm discharge draining into the detention pond. The invert of the emergency spillway shall be set equal to or above the 100-year water surface elevation. The depth of flow out the emergency spillway shall be < 6 inches and the spillway shall have effective erosion protection."

17. Amend Section 3.3.4, Retention Facilities, to read:

"When a retention basin is proposed as a temporary solution to an evolving drainage problem, Weld County recommends that it be sized to capture, as a minimum, the runoff equal to 1.5 times the 24-hour, 100-year storm plus 1-foot freeboard. The facility also has to be situated and designed so that when it overtops, no human-occupied or critical structures (e.g., electrical vaults) will be flooded, and no catastrophic failure at the facility (e.g., loss of dam embankment) will occur. It is also recommended that retention facilities be as shallow as feasible to encourage infiltration and other losses of the captured urban runoff. When a trickle outflow can be accepted downstream, one shall be provided and sized in accordance with the locally approved release rates, preferably capable of emptying the full volume in 10 to 14 days. Weld County will not approve any detention or retention pond that does not drain in less than 72 hours, causes injury to water rights or is in violation of state or federal law."

18. Amend subparagraph #2 of Section 3.4, Reservoir Routing of Storm Hydrographs for Sizing of Storage Volumes, to read:

"2. Determine Hydrology: Determine the inflow hydrograph to the storage basin and the allowable peak discharge from the basin for the design storm events. The hydrograph may be available in Weld County Master Drainage Plans or Updates. The allowable peak discharge is

limited by the local criteria or by the requirements spelled out in a Weld County-approved master plan."

19. Amend subparagraph #3 of Section 3.4.1, Initial Sizing, to read:

"The outflow rate Q_o (cfs) calculated as:

$$"Q_o = \frac{T}{T} Q_{po}$$

(SO-10)

"in which Q_{po} is the peak outflow rate. The allowable peak outflow rate is determined from a Weld County master plan, local ordinance or other considerations described in Section 3.3.2."

20. Amend Section 3.4.2, Initial Shaping, to read:

"The initial shaping of the storage basin provides a starting point for defining the stage-storage relationship. The stage-storage relationship will be refined during preliminary and final design phases of the project. The initial shaping is easiest when regular geometry (such as a triangle or rectangle) is used for approximation. The detention volume needed for any specific design storm is combined with site constraints (e.g., size or depth limitations, number of control stages, etc.) and the simplified formulas describing the basin geometry in order to develop an initial depth, length and width for the basin. Design spreadsheets can be used to assist in preliminary shaping of the storage facility. Weld County does not encourage the use of storage facilities with uniform, geometric properties. To the contrary, Weld County encourages designers to collaborate with landscape architects to develop storage facilities that are attractive visually, fit into the fabric of the landscape and enhance the overall character of an area. However, using regular geometry can approximate initial shaping of a non-uniformly shaped facility."

21. Amend Section 4.0, Final Design Considerations, to read:

"Final design of a storage facility should recognize the kinds of considerations described in this section. It is beyond the scope of this Manual to provide detailed dam design guidance. There are many excellent references in this regard, such as Design of Small Dams (U.S. Bureau of Reclamation 1987). Weld County urges all designers to review and adhere to the guidance in such references because the failure of even small embankments can have serious consequences for the public. General guidelines for the final design phase of detention or retention facilities follow."

22. Amend Section 4.3, Geometry of Storage Facilities, to read:

"The geometry of a storage facility depends on specific site conditions such as adjoining land uses, topography, geology, preserving/creating wildlife habitat, volume requirements, etc. Several key features should be incorporated in all storage facilities located within Weld County (see Figure SO-6). These include: (a) 4:1 or flatter side slopes of all banks, (b) low-flow or trickle-flow channel unless a permanent pool takes its place, (c) forebay, (d) pond bottom sloped at least 1 percent to drain toward the low-flow or trickle-flow channel or the outlet, and (e) emergency spillway with erosion protection designed to safely convey the 100-year overtopping flows."

23. Amend subparagraph #2 of Section 4.4, Embankments and Cut Slopes, to read:

"2. Freeboard — The elevation of the top of the embankment shall be a minimum of 1 foot above the 100-year water surface elevation in the detention pond. When relevant, all SEO dam safety criteria must be carefully considered when determining the freeboard capacity of an impoundment."

24. Add the following two (2) subparagraphs to Section 4.4, Embankments and Cut Slopes:

"5. Emergency Spillway Downstream Protection — In order to protect the emergency spillway from catastrophic erosion failure, buried riprap shall be placed from the emergency spillway downhill to the embankment toe of slope and covered with 6 inches of topsoil. The riprap shall be sized at the time of final engineering design. Grouting of the riprap may be required.

"6. Concrete Cutoff Wall — A concrete cutoff wall, 8 inches thick, 3 feet deep, extending 5 feet into the embankment beyond the emergency spillway opening, is encouraged on all private detention ponds and required on all publicly owned regional detention ponds. A concrete cutoff wall will permanently define the emergency spillway opening. The emergency spillway elevation shall be tied back into the top of embankment using a maximum slope of 4:1."

25. Add the following to Section 4.7, Outlet Works:

"The outlet pipe of regional detention ponds shall contain a minimum of 2 concrete cutoff walls embedded a minimum of 18 inches into undisturbed earthen soil. The cutoff walls shall be a minimum of 8 inches thick. The outlet pipe bedding material shall consist of native earthen soil and not granular bedding material to at least the first downstream manhole or daylight point."

26. Add the following to Section 4.8, Trash Racks:

"For safety reasons, trash rack angles are to be 3 horizontal to 1 vertical (3:1) or flatter per Urban Drainage research (Nelson & Kroeger, 2005)."

27. Add the following subparagraph to Section 4.10, Operation and Maintenance:

"15. An operations maintenance manual for each water quality pond, detention pond and outlet structure facility shall be developed and provided to the Weld County Department of Public Works and the development homeowners' association at the time of final submittal."

28. Add the following to Section 4.11, Access:

"Drivable access applies only to regional detention facilities within Weld County. Each regional detention pond will be considered on a case-by-case basis at the time of final design."

29. Add the following as the third paragraph of Section 5.0, Criteria For District Maintenance Eligibility:

"Regional Master Planned detention ponds, designed and constructed by or on behalf of Weld County, shall be owned and maintained by the County as specified in the applicable

Development Agreement(s). All other detention ponds shall be considered privately owned and privately maintained."

Chapter 11 — Flood Proofing

30. Amend the second paragraph of Section 1.2.1, Classification of Flood Proofing, to read:

"In Weld County, flood-proofing efforts should focus on permanent measures due to the rapid response of most of the Front Range stream systems. Contingent measures are more effective when combined with an early flood warning system or in areas not immediately adjacent to a stream channel."

31. Amend Section 4.1.1, Determine Flood Hazards, to read:

"Information about flooding in the area available from Weld County officials or directly from FEMA at: <http://www.msc.fema.gov/hardcopy.shtml>. Local officials, design professionals and contractors can use this information, along with the flood hazard information developed by FEMA and other agencies and organizations, to provide advice about retrofitting options."

32. Amend the first paragraph of Section 4.1.3, Contact Local Officials, to read:

"Weld County officials have copies of the FIS and FIRM published for the community by FEMA. Weld County officials can determine whether a building is in the regulatory floodplain and, if so, the FPE at the location of the building."

Chapter 12 — Revegetation

33. Amend Section 1.0, Introduction, to read:

"This chapter provides information on methods and plant materials needed for revegetation of drainage facilities within Weld County. Establishment of a robust cover of vegetation is critical to the proper functioning of drainage structures such as grass-lined channels, detention basins, retention ponds and wetlands. Vegetation serves multiple purposes, including stabilization of structures to prevent excessive erosion and removal of pollutants in stormwater. The semi-arid nature of the climate, prevalence of introduced weeds and variety of soil types encountered in Weld County virtually mandate prompt implementation of a revegetation plan to achieve revegetation success."

34. Add the following to the last paragraph of Section 2.0, Scope of This Chapter and Relation to Other Relevant Documents:

"See revisions to RV tables included in this chapter for Weld County-specific seed mix recommendations."

35. Add the following as a bulleted item of Section 3.2, Site Preparation:

"• Before revegetation work is started, an inventory of vegetation should be taken. If noxious weeds, as listed in Weld County Code Chapter 15, exist on site, appropriate steps need to be taken before, during and after work is completed, to control their spread. Contact the Weld

County Department of Public Works Weed Division Supervisor at 970-304-6496 for additional information, if needed."

36. Add the following as a bulleted item of Section 3.3, Seeding and Planting:

"• Seed mixtures should be coated with Mycorrhiza at the rate of 2 pounds per acre at the time of seeding. If mulching with straw, be sure the straw is seed-free and weed-free."

37. Amend the second and third bulleted items of Section 3.4, Maintenance, to read:

"• Access to and grazing on recently revegetated areas should be limited with temporary fencing and signage while plants are becoming established (for 1 to 2 years at least).

"• Weed infestations should be managed using appropriate physical, chemical or biological methods as soon as possible."

38. Add the following as the last bulleted item of Section 3.4, Maintenance:

"• The project owner/developer, not Weld County, will be responsible for site maintenance until vegetative establishment."

39. Amend the first paragraph of Section 4.2, Soil Amendments, to read:

"Native topsoil should be stripped and saved for revegetation. If this is not appropriate due to poor soil quality or for some other reason, then subsoil can be made conducive for plant growth through the use of amendments. Since soil pH is typically suitable within Weld County, amendments are not usually needed for increasing organic matter content or providing nutrients in the form of fertilizers. Consideration should be given to importing topsoil from the vicinity, instead of amending poor quality subsoil, as this may be less expensive."

40. Amend the third paragraph of Section 4.2, Soil Amendments, to read:

"Detailed information on the types and amounts of soil amendments and fertilizers needed is beyond the scope of this document and can be found in the documents previously referenced. However, information is provided on the use of humate soil conditioner and biosol fertilizer. Both of these materials are relatively new and show promise as soil conditioners and sources of slow-release fertilizers for revegetation work in Weld County."

41. Amend the second paragraph of Section 4.3, Recommended Seed Mixes, to read:

"Recommended seed mixes for the bottom (wet soils) and side slopes of drainage facilities within Weld County are included in Tables RV-1 and RV-2. Mixes for different soil conditions in upland areas are provided in Tables RV-3 to RV-6. The seeding rates in these mixes are recommended minimum rates that should be used for drill seeding. These rates should be doubled for broadcast seeding and increased by 50% if a Brillion drill or hydro-seeding is used."

42. Add the following as the fourth paragraph of Section 4.3, Recommended Seed Mixes:

"The inclusion of wildflowers in the seed mix is optional in Weld County. Areas seeded along Weld County roads may be spot sprayed by the County to control the spread of noxious

weeds. This spraying may affect some wildflower species. Do not plant trees or shrubs in the County right-of-way."

43. Amend Table RV-1 as follows:

"Table RV-1 — Recommended Seed Mix for High Water Table Conditions ¹					
Common Name (Variety)	Scientific Name	Growth Season	Growth Form	Seeds/Lb	Lbs PLS/Acre
Redtop*	<i>Agrostis alba</i>	Warm	Sod	5,000,000	0.1
Switchgrass (Pathfinder)	<i>Panicum virgatum</i>	Warm	Sod/bunch	389,000	2.2
Western wheatgrass (Arriba)	<i>Pascopyrum smithii</i>	Cool	Sod	110,000	7.9
Inland saltgrass	<i>Distichlis spicata</i>	Warm	Sod	520,000	1.0
Wooly sedge	<i>Carex lanuginose</i>	Cool	Sod	400,000	0.1
Baltic rush	<i>Juncus balticus</i>	Cool	Sod	109,300,000	0.1
Prairie cordgrass	<i>Spartina pectinata</i>	Cool	Sod	110,000	1.0
					12.4
Wildflowers					
Nuttall's sunflower	<i>Helianthus nuttallii</i>	---	---	250,000	0.10
Wild bergamot	<i>Monarda fistulosa</i>	---	---	1,450,000	0.12
Yarrow	<i>Achillea millefolium</i>	---	---	2,770,000	0.06
Blue vervain	<i>Verbena hastata</i>	---	---		0.12
					0.40

¹ For areas of facilities located near or on the bottom or where wet soil conditions occur. Planting of potted nursery wetland plants 2 feet on-center is recommended for sites with wetland hydrology.

* Nonnative."

- a. Delete the row containing "Redtop (*Agrostis alba*).
- b. Delete the row containing Nuttall's sunflower (*Holianthus nuttallii*).

44. Amend Table RV-2 as follows:

"Table RV-2 — Recommended Seed Mix for Transition Areas ¹					
<i>Common Name (Variety)</i>	<i>Scientific Name</i>	<i>Growth Season</i>	<i>Growth Form</i>	<i>Seeds/Lb</i>	<i>Lbs PLS/Acre</i>
Sheep fescue (Durar)	<i>Festuca ovina</i>	Cool	Bunch	680,000	1.3
Western wheatgrass (Arriba)	<i>Pascopyrum smithii</i>	Cool	Sod	110,000	7.9
Alkali sacaton	<i>Spolobolus airoides</i>	Warm	Bunch	1,758,000	0.5
Slender wheatgrass	<i>Elymus trachycaulus</i>	Cool	Bunch	159,000	5.5
Canadian bluegrass (Ruebens) ^{*2}	<i>Poa compressa</i>	Cool	Sod	2,500,000	0.3
Switch grass (Pathfinder)	<i>Panicum virgatum</i>	Warm	Sod/Bunch	389,000	1.3
					16.8
Wildflowers					
Blanket flower	<i>Gaillardia aristata</i>	---	---	132,000	0.25
Prairie coneflower	<i>Ratibida columnaris</i>	---	---	1,230,000	0.20
Purple prairie clover	<i>Petalostemum purpurea</i>	---	---	210,000	0.20
Gayfeather	<i>Liatris punctata</i>	---	---	138,000	0.06
Flax	<i>Linum lewisii</i>	---	---	293,000	0.20
Penstemon	<i>Penstemon strictus</i>	---	---	592,000	0.20
Yarrow	<i>Achillea millefolium</i>	---	---	2,770,000	0.03
					1.14

¹ For side slopes or between wet and dry areas.

² Substitute 1.7 lbs PLS/acre of inland salt grass (*Distichlis spicata*) in salty soils.

* Nonnative."

- a. Delete the row containing Canadian bluegrass (*Ruebens*) (*Poa compressa*).
- b. Delete the row containing Flax* (*Linum lewisii*).

45. Amend Table RV-3 as follows:

"Table RV-3 — Recommended Seed Mix for Alkali Soils					
<i>Common Name (Variety)</i>	<i>Scientific Name</i>	<i>Growth Season</i>	<i>Growth Form</i>	<i>Seeds/Lb</i>	<i>Lbs PLS/Acre</i>
Alkali sacaton	<i>Sporobolus airoides</i>	Cool	Bunch	1,750,000	0.5
Streambank wheatgrass (Sodar)	<i>Agropyron riparium</i>	Cool	Sod	156,000	5.6
Inland salt grass	<i>Distichlis stricta</i>	Warm	Sod	520,000	1.7
Western wheatgrass (Arriba)	<i>Pascopyrum smithii</i>	Cool	Sod	110,000	7.9
Blue grama (Hachita)	<i>Chondrosom gracile</i>	Warm	Sod	825,000	4.0
Buffalograss	<i>Buchloe dactyloides</i>	Warm	Sod	56,000	2.0
					21.7
Wildflowers					
Blanket flower	<i>Gaillardia aristata</i>	---	---	132,000	0.25
Prairie conflower	<i>Ratibida columnais</i>	---	---	1,230,000	0.20
Purple prairie clover	<i>Petalostemum purpurea</i>	---	---	210,000	0.20
Gayfeather	<i>Liatris punctata</i>	---	---	138,000	0.06
Blue flax	<i>Linum lewisii</i>	---	---	293,000	0.20
Rocky Mountain penstemon	<i>Penstemon strictus</i>	---	---	592,000	0.20
Yarrow	<i>Achillea millefolium</i>	---	---	2,770,000	0.03
					1.14"

a. Delete the row containing Blue flax (*Linum lewisii*).

46. Amend Table RV-4 as follows:

"Table RV-4 — Recommended Seed Mix for Loamy Soils					
<i>Common Name (Variety)</i>	<i>Scientific Name</i>	<i>Growth Season</i>	<i>Growth Form</i>	<i>Seeds/Lb</i>	<i>Lbs PLS/Acre</i>
Sheep fescue (Durar)	<i>Festuca ovina</i>	Cool	Bunch	680,000	0.6
Canby bluegrass	<i>Poa canbyi</i>	Cool	Bunch	926,000	0.5
Thickspike wheatgrass (Critana)	<i>Elymus laneolatus</i>	Cool	Sod	154,000	5.7
Western wheatgrass (Arriba)	<i>Pascopyrum smithii</i>	Cool	Sod	110,000	7.9
Blue grama (Hahita)	<i>Chondrosium gracile</i>	Warm	Sod/bunch	825,000	1.1
Switchgrass (Pathfinder)	<i>Panicum virgatum</i>	Warm	Sod/bunch	389,000	1.0
Sideoats grama (Butte)	<i>Boutelou curtipendula</i>	Warm	Sod	191,000	2.0
					18.8
Wildflowers					
Blanket flower	<i>Gaillardia aristata</i>	---	---	132,000	0.25
Prairie coneflower	<i>Raibida columnaris</i>	---	---	1,230,000	0.20
Purple prairie clover	<i>Petalostemum purpurea</i>	---	---	210,000	0.20
Gayfeather	<i>Liatris punctata</i>	---	---	138,000	0.06
Flax	<i>Linum lewisii</i>	---	---	293,000	0.20
Penstemon	<i>Penstemon strictus</i>	---	---	592,000	0.20
Yarrow	<i>Achillea millefolium</i>	---	---	2,770,000	0.03
					1.14"

- a. Delete the row containing Canby bluegrass (*Poa canbyi*).
- b. Delete the row containing Flax (*Linum lewisii*).

47. Amend Table RV-5 as follows:

"Table RV-5 — Recommended Seed Mix for Sandy Soils					
<i>Common Name (Variety)</i>	<i>Scientific Name</i>	<i>Growth Season</i>	<i>Growth Form</i>	<i>Seeds/Lb</i>	<i>Lbs PLS/Acre</i>
Blue grama (Hachita)	<i>Chondrosium gracile</i>	Warm	Sod/Bunch	825,000	2.1
Little bluestem (Camper)	<i>Schizachyrium scoparium</i>	Warm	Bunch	260,000	3.0
Prairie sandreed	<i>Calamovilfa longifolia</i>	Warm	Sod	274,000	3.0
Sand dropseed	<i>Sporobolus cryptandrus</i>	Warm	Bunch	5,298,000	0.3
Sideoats grama (Vaughn)	<i>Bouteloua curtipendula</i>	Warm	Sod/Bunch	191,000	5.6
Western wheatgrass (Arriba)	<i>Pascopyrum smithii</i>	Cool	Sod	110,000	8.0
					22.0
Wildflowers					
Blanket flower	<i>Gaillardia aristata</i>	---	---	132,000	0.25
Prairie coneflower	<i>Ratibida columnifera</i>	---	---	1,230,000	0.20
Purple prairie clover	<i>Petalostemum purpurea</i>	---	---	210,000	0.20
Gayfeather	<i>Liatris punctata</i>	---	---	138,000	0.06
Flax	<i>Linum lewisii</i>	---	---	293,000	0.20
Penstemon	<i>Penstemon strictus</i>	---	---	592,000	0.20
Yarrow	<i>Achillea millefolium</i>	---	---	2,770,000	0.03
					1.14"

- a. Change 2.1 to 0.3 in Table RV-5.
 - b. Change 0.3 to 2.1 in Table RV-5.
 - c. Delete the row containing Flax (*Linum lewisii*).
48. Amend Table RV-7 as follows:

"Table RV-7 — Wildflower Mix (to be seeded with grass seed mix)"¹				
<i>Common Name (Variety)</i>	<i>Scientific Name</i>	<i>Flower Color</i>	<i>Seeds/Lb</i>	<i>Lbs PLS/Acre</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	Red/orange	500,000	0.6
Blue flax	<i>Linum lewisii</i>	Blue	293,000	0.6
Purple prairie clover	<i>Petalostemum purpureum</i>	Red-purple	210,000	0.7
White prairie clover	<i>Petalostemum candidum</i>	White	354,000	0.6
California poppy	<i>Eschscholtzia californica</i>	Orange	293,000	0.3
Blanket flower	<i>Gaillardia aristata</i>	Yellow/red	132,000	1.0
Prairie aster	<i>Aster tanacetifolius</i>	Violet	496,000	0.3
Blackeyed Susan	<i>Rudbeckia hirta</i>	Yellow	1,710,000	0.3
Purple coneflower	<i>Echinacea purpurea</i>	Purple	117,000	0.9
Yarrow	<i>Achillea millefolium</i>	White	2,770,000	0.1
Gayfeather	<i>Liatris punctata</i>	Rose/purple	138,000	0.6
			Total	6.0

¹ This is a general mix for the District that stresses native perennials that do well in a range of soil types in sunny locations."

- a. Delete the row containing Blue Flax (*Linum lewisii*).
- b. Delete the row containing California poppy (*Eschscholtzia californica*).
- c. Delete the row containing Blackeyed Susan (*Rudbeckia hirta*).

49. Amend Section 4.4, Trees, Shrubs and Wetland Plantings, Table RV-8 and Table RV-9 as follows:

"4.4 Trees, Shrubs and Wetland Plantings

"Trees and shrubs add diversity to a planting plan and value for wildlife and birds. Trees and shrubs that impede flow and reduce the capacity of the structure should not be planted in the bottom of a drainage channel. It is recommended that containerized stock of the species listed in Table RV-8 be planted, as shown on Figures RV-2 and RV-3. Alternatively, cottonwood pole plantings and coyote (or sandbar) willow cuttings may be used to establish cottonwood trees and willows, especially in soils with a shallow groundwater table.

"The species of trees and shrubs to be planted should be chosen carefully to meet specific site conditions. For example, a shrub species that requires moderate to high soil moisture (e.g., sandbar willow) should not be planted on a dry hillside or upper streambank unless there is evidence of a high groundwater table or another continuous water source.

"Table RV-8 — Recommended Shrubs and Trees ¹					
Common Name	Scientific Name	Height (ft)	Sun/Shade	Planting Zone	Notes
Shrubs					
Saskatoon serviceberry	<i>Amelanchier alnifolia</i>	3 — 15	Sun	Upland	Good for wildlife
Lead plant	<i>Amorpha fruticosa</i>	3 — 8	Sun	Upland	Drought-tolerant
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>	2 — 3	Sun	Upland	Drought-tolerant
Wild plum	<i>Prunus Americana</i>	5 — 20	Sun/shade	Transition	Forms thickets
Chokecherry	<i>Prunus virginiana</i>	5 — 20	Sun/shade	Transition	Forms thickets
Smooth sumac	<i>Rhus glabra</i>	4 — 7	Sun/shade	Upland	Good for wildlife
Oakbrush sumac	<i>Rhus trilobata</i>	2 — 6	Sun/shade	Upland	Drought tolerant
Wax currant	<i>Ribes cereum</i>	3 — 5	Sun/shade	Transition	Good for wildlife
Redosier dogwood	<i>Cornus stolonifera</i>	3 — 9	Shade	Wetland	Drought-tolerant
Sandbar willow	<i>Salix exigua</i>	6 — 10	Sun	Transition or Wetland	Requires more water
Snowberry	<i>Symphoricarpos oreophilus</i>	2 — 5	Sun/shade	Transition	Prefers moist area
Spanish bayonet	<i>Yucca glauca</i>	1 — 2	Sun	Upland	Drought-tolerant
Woods rose	<i>Rosa woodsii</i>	2 — 3	Sun	Upland	Establishes quickly
Silver buffaloberry	<i>Shepherdia argentea</i>	6 — 13	Sun	Upland	Drought-tolerant
Trees					
Narrow leaf cottonwood	<i>Populus angustifolia</i>	10 — 30	Sun	Transition or wetland	Requires more water
Plains cottonwood	<i>Populus deltoides</i>	50	Sun	Transition	Requires more water
Rocky Mountain juniper	<i>Juniperus scopulorum</i>	5 — 15	Sun	Upland	Drought-tolerant
Colorado blue spruce	<i>Picea pungens</i>	60 — 100	Sun	Transition	Requires more water
Ponderosa pine	<i>Pinus ponderosa</i>	75 — 100	Sun	Upland	Drought-tolerant
Peach leaf willow	<i>Salix amygdaloides</i>	15 — 30	Sun	Wetland	Requires more water

¹ Trees and shrubs should not be planted in the bottoms of drainage channels or where they could impede flow and decrease channel capacity. It is recommended that containerized stock (e.g., 2-gallon, 5-gallon) be used for trees and shrubs."

- a. Delete the row containing Rubber rabbitbrush (*Chrysothamnus nauseosus*).
- b. Delete the row containing Spanish bayonet (*Yucca glauca*).

"Wetland vegetation should be established in constructed wetlands, wetland bottom channels and, at times, along the shoreline of retention ponds. Such vegetation serves multiple functions, including assistance with pollutant removal, shoreline stabilization, aesthetics, and wildlife and

bird habitat. Wetland plants should be planted in "zones" based on water depth. A common problem with establishing wetlands within the District is invasion by cattails. Actively planting a constructed wetland and keeping open areas with a water depth greater than 2 feet will discourage cattail invasion. Recommended plants for wetlands are shown in Table RV-9 by water depth. It is recommended that containerized stock be used for wetland plantings. Additional information on design of constructed wetlands and retention ponds can be found in Volume 3 of this *Manual*.

"Table RV-9 — Recommended Plants for Constructed Wetlands and Retention Pond Shelf ¹			
Depth of Water (ft)	Common Name	Scientific Name	Notes
0 — 1.5	Soft stem bulrush	<i>Scirpus validus</i>	* Planted plants should extend above water * Plants will invade deeper water with time
	Hard stem bulrush	<i>Scirpus acutus</i>	
	Arrowhead	<i>Sagittaria latifolia</i>	
	Alkali bulrush	<i>Scirpus maritimus</i>	
	Smart weed	<i>Polygonum persicaria</i>	
0.25 — 0.5	Three-square	<i>Scirpus americanus</i>	* Planted plants should extend above water
	Spike rush	<i>Eleocharis palustris</i>	
0 — 0.25	Rice cut grass	<i>Leersia oryzoides</i>	* Species will adjust to moisture conditions with time
	Nebraska sedge	<i>Carex nebrascensis</i>	
	Soft rush	<i>Juncus effuses</i>	
	Baltic rush	<i>Juncus balticus</i>	
	Torrey's rush	<i>Juncus torreyi</i>	
	Foxtail barley	<i>Hordeum jubatum</i>	
Height above water			
0 — 1	Milkweed	<i>Asclepias incarnata</i>	
0 — 3	Switchgrass	<i>Panicum virgatum</i>	* Best to plant near water where soil is wet * Colorful wildflower
	Prairie cordgrass	<i>Spartina pectinata</i>	
	Beebalm	<i>Monarda fistulosa</i>	

¹ It is recommended that containerized stock be used for wetland plantings. It is not recommended that cattails be planted since they will invade naturally."

- a. Delete the row containing Smart weed (*Polygonum persicaria*).
- b. Delete the row containing Foxtail barley (*Hordeum jubatum*).

50. Add the following to Section 4.4, Trees, Shrubs and Wetland Plantings:

"GRASS SEEDING RECOMMENDATIONS FOR WELD COUNTY — GENERAL INFORMATION

"1. If a species is listed as '15% to 30%' in mixture, please use a percentage within the given parameters to arrive at the amount used in the seed mix.

"2. The numbers listed in the 'Seeding Rate – Dryland' column are to be used for most dryland sites in this area. The amounts listed in 'Seeding Rate – Irrigated' are to be used for those areas that will be irrigated, or sites that are highly erodible.

"3. A seed mix is complete when a combination of the species chosen totals 100%.

"4. The recommended varieties column lists the preferred varieties that are known to do well in this area. If this column is blank, refer to a local seed dealer for recommendations on varieties.

"TO OBTAIN DESIRED SEED MIX

"1. Refer to the appropriate range site, defined in the local soil survey.

"2. Choose the species within each range site. Names in bold italics represent the preferred species for each site.

"3. If the range of percentage in the mix column lists 'up to 45%,' then choose an amount of the species to use in the mix that correlates within this range.

"4. Take the percentage of each species used in the mix and multiply by the seeding rate.

"a. Example:

"1) Site is a dryland site.

"2) Sand bluestem at 8.0 pounds of PLS/Acre is used at 25% in the seed mix.

"3) Take $25\% \times 8.0 = 2.0$ pounds of Sand bluestem to use in the mix per acre.

"4) Multiply the 2.0 pounds by the number of acres to get the total amount of pounds of the species to use for the mix.

"b. NOTE: The seeding rates are listed in Pounds of Pure Live Seed (PLS) per acre, and not in bulk pounds.

"Refer to the following tables for grass seeding recommendations.

"TABLE RV-10 GRASS SEEDING TABLES BASED ON RANGE SITES
Species indicated in bold italics indicates the preferred species

RANGE SITE: Deed Sands, Choppy Sands, Sandy Bottomland, Sandy Meadow, Sandy Foothills, Sandy Divide			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Sand bluestem	Elida, Woodward, Garden	20 to 35	8.0	16.0
Yellow Indiangrass	Liano, Holt, Cheyenne, Oto	10 to 30	5.0	10.0
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	10 to 30	2.5	4.5
Prairie sandreed	Goshen	10 to 30	3.5	6.5
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	Up to 15	4.5	9.0
Little bluestem	Pastura, Cimmarron	Up to 10	3.5	7.0
Blue grama	Hachital, Lovington	Up to 10	1.5	3.0
Western wheatgrass	Arriba, Barton, Rosana	Up to 10	8.0	16.0
Needleandthread		Up to 15	7.5	15.0
Thickspike wheatgrass	Critana	Up to 10	5.5	11.0
Indian ricegrass	Paloma	Up to 10	6.0	12.5
RANGE SITE: Sandy Plains			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Sand bluestem	Elida, Woodward, Garden	15 to 30	8.0	16.0
Prairie sandreed	Goshen	10 to 25	3.5	6.5
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	10 to 30	2.5	4.5
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	5 to 20	4.5	9.0
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	5 to 20	5.0	10.0
Western wheatgrass	Arriba, Barton, Rosana	Up to 20	8.0	16.0
Blue grama	Hachital, Lovington	Up to 15	1.5	3.0
Little bluestem	Pastura, Cimmarron	Up to 10	3.5	7.0
Needleandthread		Up to 15	7.5	15.0
Thickspike wheatgrass	Critana	Up to 10	5.5	11.0
Indian ricegrass	Paloma	Up to 10	6.0	12.5

RANGE SITE: Loamy Plains, Clayey Plains, Loamy Slopes			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Western wheatgrass	Arriba, Barton, Rosana	20 to 45	8.0	16.0
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	20 to 40	4.5	9.0
Blue grama	Hachital, Lovington	10 to 25	1.5	3.0
Green Needlegrass		Up to 30	5.0	10.0
Needleandthread		Up to 15	7.5	15.0
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	Up to 20	2.5	4.5
Big bluestem	Kaw	Up to 10	5.5	11.0
Little bluestem	Pastura, Cimarron	Up to 10	3.5	7.0
Buffalograss	Texoka, Sharps Improved	Up to 10	Bur: 8.0 Floret: 3.0	Bur: 16.5 Floret: 6.0
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	Up to 10	5.0	10.0
RANGE SITE: Gravel Breaks, Loess Breaks, Sandstone Breaks			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	20 to 45	4.5	9.0
Little bluestem	Pastura, Cimarron	10 to 35	3.5	7.0
Western wheatgrass	Arriba, Barton, Rosana	10 to 20	8.0	16.0
Blue grama	Hachital, Lovington	5 to 15	1.5	3.0
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	Up to 20	2.5	4.5
Prairie sandreed	Goshen	Up to 20	3.5	6.5
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	Up to 20	5.0	10.0
Big bluestem	Kaw	Up to 20	5.5	11.0
Needleandthread		Up to 15	7.5	15.0
Indian ricegrass	Paloma	Up to 10	6.0	12.5
RANGE SITE: Shaly Plains, Alkaline Plains, Salt Flat, Salt Meadow, Saline Overflow			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Western wheatgrass	Arriba, Barton, Rosana	30 to 45	8.0	16.0
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	20 to 40	4.5	9.0
Alkali sacaton	Salado	10 to 35	1.0	1.5
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	Up to 20	2.5	4.5
Blue grama	Hachital, Lovington	Up to 15	1.5	3.0
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	Up to 10	5.0	10.0
Big bluestem	Kaw	Up to 10	5.5	11.0

RANGE SITE: Overflow			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Western wheatgrass	Arriba, Barton, Rosana	30 to 45	8.0	16.0
Green Needlegrass		10 to 30	5.0	10.0
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	10 to 20	2.5	4.5
Big bluestem	Kaw	5 to 20	5.5	11.0
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	5 to 20	5.0	10.0
Blue grama	Hachital, Lovington	Up to 10	1.5	3.0
RANGE SITE: Wet Meadow			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Switchgrass	Grenville, Nebraska 28, Blackwell, Pathfinder	15 to 30	2.5	4.5
Yellow Indiangrass	Llano, Holt, Cheyenne, Oto	15 to 30	5.0	10.0
Big bluestem	Kaw	15 to 30	5.5	11.0
Prairie cordgrass		15 to 30		
Little bluestem	Pastura, Cimarron	Up to 10	3.5	7.0
Western wheatgrass	Arriba, Barton, Rosana	10 to 20	8.0	16.0
Slender wheatgrass	San Luis	Up to 10	5.5	11.0
RANGE SITE: North of Highway 14			SEEDING RATE	
<i>Common Name</i>	<i>Recommended Varieties</i>	<i>% in Mix</i>	<i>Dryland</i>	<i>Irrigated</i>
Western wheatgrass	Arriba, Barton, Rosana	30	8.0	16.0
Blue grama	Hachital, Lovington	30	1.5	3.0
Sideoats grama	Vaughn, Butte, Niner, El Reno, Haskell	30	4.5	9.0
Buffalograss	Texoka, Sharps Improved	Up to 10	Bur: 8.0 Floret: 3.0	Bur: 16.5 Floret: 6.0"

51. Add the following as the last two (2) bulleted items of Section 4.5, Mulching:

"• At least 70 % of the mulch by weight shall be 10 inches or more in length.

"• The appropriate use of fabric blankets under trees and shrubs is suggested."

52. Amend Section 5.0, Post-Construction Monitoring, to read:

"Monitoring is necessary to check the status of revegetation work and to implement any follow-up measures needed, such as mowing, weed control, watering, overseeding, etc. This is especially important for establishing native species since it may take 3 to 5 years for vegetation to become adequately established. Sites should be observed several times during their first 2 to 3 growing seasons and at least twice a year thereafter. The guidelines in Section 3.4 should be followed.

"Design Examples — Weld County does not have specific values to use for the C1, C2 and C3 coefficients within the 'Detention Volume by Modified FAA Method' spreadsheet. Please use the Urban Drainage and Flood Control District (Denver area) values."

(Weld County Code Ordinance 2006-7)

Sec. 8-11-50. Weld County Addendum to Text of the Urban Storm Drainage Criteria – Volume 3.

The criteria adopted herein are hereby modified as follows:

Chapter 2 — New Development Planning

1. Amend Section 1.2, Four-Step Process, the portion titled "Step 3," second paragraph, to read:

"Constructed Grass, Riprap or Concrete-Lined Channel. This method of channel stabilization has been in practice for some time; it is described in Volume 2 of the Manual. The water quality benefit associated with these channels is the reduction of severe bed and bank erosion that can occur in the absence of a stabilized channel. On the other hand, the hard-lined low flow channels that are often used do not offer much in the way of water quality enhancement or wetland habitat. Weld County does not recommend the use of riprap or concrete-lined flood conveyance channels, but does recommend the use of low-flow channels lined with soil riprap."

2. Add the following to the last paragraph of Section 1.3, Other BMPs:

"Weld County will consider and allow use of new, innovative BMP technologies upon review of the proposed BMP(s) on a case-by-case basis."

3. Amend the second paragraph of Section 1.5.4, Guidance for Selecting and locating WQCV Facilities, to read:

"Laying out WQCV facilities within a development site and watershed requires thought and planning. Often, this decision-making occurs during a master planning process undertaken by Weld County. Outfall system plans and other reports may depict a recommended approach for implementing WQCV on a watershed basis. Such reports may call for a few large regional WQCV facilities, smaller subregional facilities or, alternatively, an on-site approach. It is always a good idea to find out if a master planning study has been completed that addresses water quality and to attempt to follow the plan's recommendations."

4. Add the following to the last paragraph of Section 1.5.5, Incorporating WQCV into Stormwater Quantity Detention Basins:

"Weld County requires that the 100-year detention volume be provided for a given site and allows the WQCV to be incorporated within the 100-year volume."

Chapter 3 — Structural BMPs

5. Amend the third paragraph of Section 6.4, Design Considerations, to read:

"Perforated outlet and trash rack configurations are illustrated in the TYPICAL STRUCTURAL BMP DETAINS AND SPECIFICATIONS chapter. Figure EDB-3 equates the WQCV that needs to be emptied over 40 hours to the total required area of perforations per row

for the standard configurations shown in that section. The chart is based on the rows being equally spaced vertically at 4-inch centers. This total area of perforations per row is then used to determine the number of uniformly sized holes per row (see detail in the TYPICAL STRUCTURAL BMP DETAILS AND SPECIFICATIONS chapter). One or more perforated columns on a perforated orifice plate integrated into the front of the outlet can be used; however, the fewer the number of columns, the better, maximizing the size of the orifice. Using least number of columns and the largest possible orifice reduces clogging possibilities. Other types of outlets may also be used, provided that they control the release of the WQCV in a manner consistent with the drain time requirements and are accepted in advance by Weld County."

6. Add the following to Section 9.0, Retention Pond (RP) — Sedimentation Facility:

"Retention facilities are normally not allowed in Weld County, but will be considered by Weld County for special circumstances. Retention facilities shall be sized to contain a volume equal to twice the 100-year storm runoff volume plus one foot of freeboard. Water within a retention facility shall be mechanically removed and disposed of off site by the property owner within 48 hours after a storm event."

Chapter 4 — Typical Structural BMP Details

7. Amend Table 1 as follows:

"Table 1 — Typical Notes for EDB, RP and CWB Outlet Structures	
1. The details shown herein are conceptual design in nature. Preparation of final design plans that address details of structural adequacy, excavation, foundation preparation, concrete work, reinforcing steel, backfill, metalwork, and appurtenances, including preparation of technical specifications, is the responsibility of the design engineer in charge of the project.	
2. Alternate designs to the typical outlet structures shown herein may be considered; however, alternate designs must address the hydraulic and trash handling functional features and intent for the structures shown in this <i>Manual</i> .	
3. Wingwalls shown herein are designed to have the structure to be backfilled to be flush with the side slopes of the basin. The use of this geometry is recommended and permits the structure to blend into the landscape most aesthetically. Other geometries may be considered, however, they need to be developed with full consideration of public safety, aesthetics, maintainability, and function. The superiority of these designs should be demonstrated to be equal to or better than the design concepts shown in this <i>Manual</i> .	
4. Permanent Water Surface refers to the water surface of the micro-pool for Extended Detention Basins and the permanent pool for Constructed Wetland Basins and Retention Ponds.	
5. Perforated orifice plate shown herein is used to provide the specified the drain time of the WQCV. To reduce clogging potential, it is recommended that the largest possible circular opening be selected to minimize the number of columns. The intent is to have an outlet that empties the WQCV in the time specified (e.g., 12-, 24- or 40-hours), and being within - 3% to 5% of this time is considered acceptable. See Figure 4 for orifice design information.	
6. Vertical Trash Rack option is preferred; however, an Adverse-Slope Trash Rack is also acceptable. Both help to shed the accumulated trash as the water level after the storm recedes. The use of a Continuous-Slope Trash Rack for WQCV outlets is not recommended. See Figure 6 for trash rack design information.	
7. Drainage or flood control detention above the WQCV may be sized for any storm event specified by local stormwater criteria and not only the the 2- or 10-year events shown herein.	
8. Underdrains along the perimeter of the permanent pool, including a shutoff valve, are recommended for Constructed Wetland Basins and a Retention Ponds to help dewater the pool for rehabilitative maintenance.	
9. When the outlet designs differ from those shown herein:	
a) Provide needed orifices that are distributed over the vertical height of the WQCV, with the invert of the lowest orifice located at 2'-6", or more above the bottom of the micro-pool and above the bottom of Retention Ponds and Constructed Wetland Basins.	
b) Provide full hydraulic calculations demonstrating that the outlet will provide the minimum required drain time of the Water Quality Capture Volume for the BMP type being used.	
c) Outlet openings (orifices) shall be protected by trash racks having a minimum net open area specified in Figure 7. All opening dimensions shall be less than any dimension of outlet openings.	
d) Trash racks shall be manufactured from stainless steel or aluminum alloy structurally designed to not fail under a full hydrostatic load on the upstream side and assuming zero backwater depth on the downstream side.	
Urban Drainage and Flood Control District Drainage Criteria Manual (V.3)	Typical Outlet Structure General Notes for Extended Detention Basin, Retention Pond and Constructed Wetland Basin Outlets"

a. Amend the text of Table 1, item 8 as follows:

"8. Underdrains accessible from the perimeter of the permanent pool, including a shutoff valve, are recommended for Constructed Wetland Basins and Retention Ponds to help dewater the pool for rehabilitative maintenance."

8. Delete, in its entirety, Figure 1 — Typical WQCV Outlet Structure Profile, Including 100-year Detention.

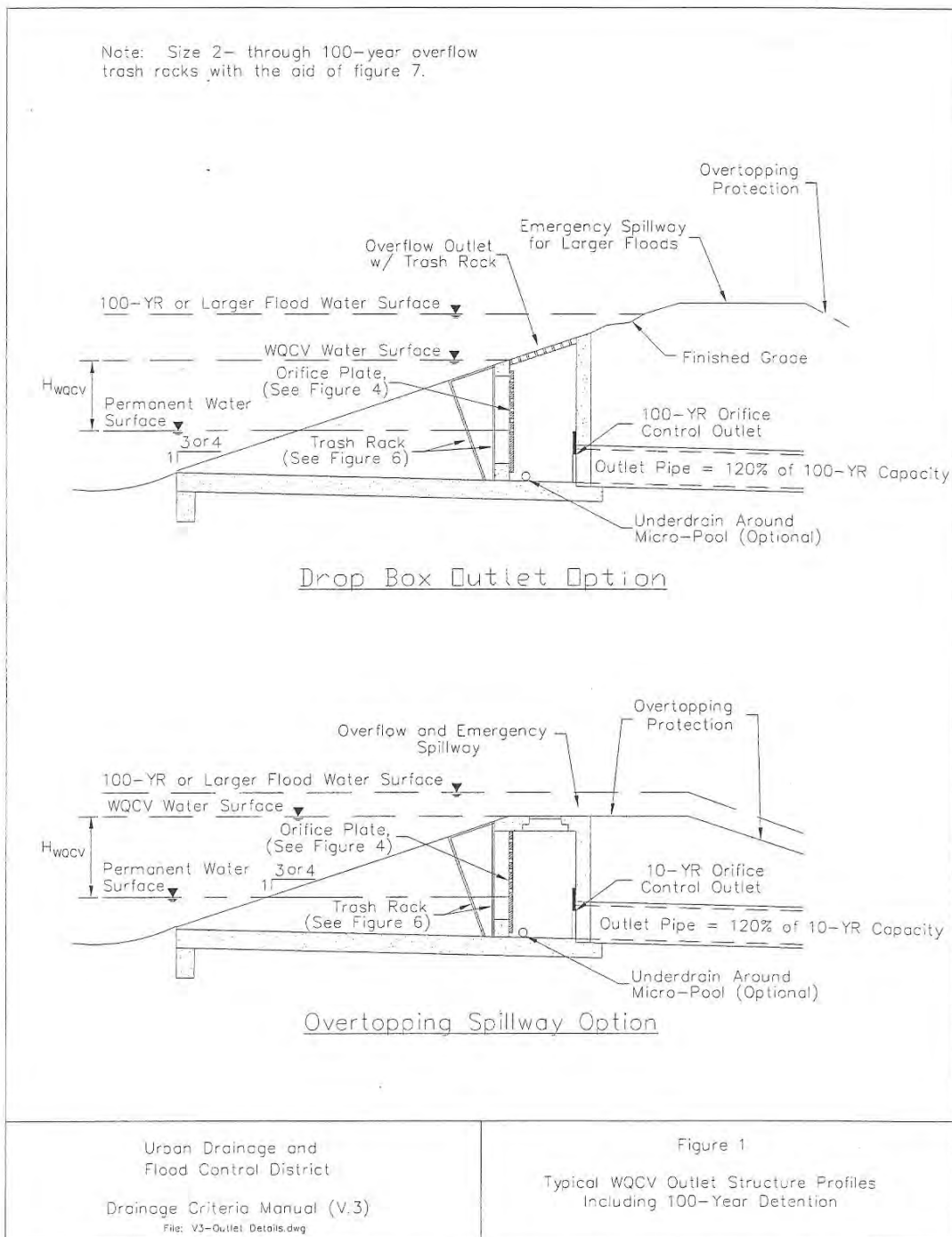


Figure 1—Typical WQCV Outlet Structure Profile, Including 100-year Detention.

9. Amend Figure 2 as follows:

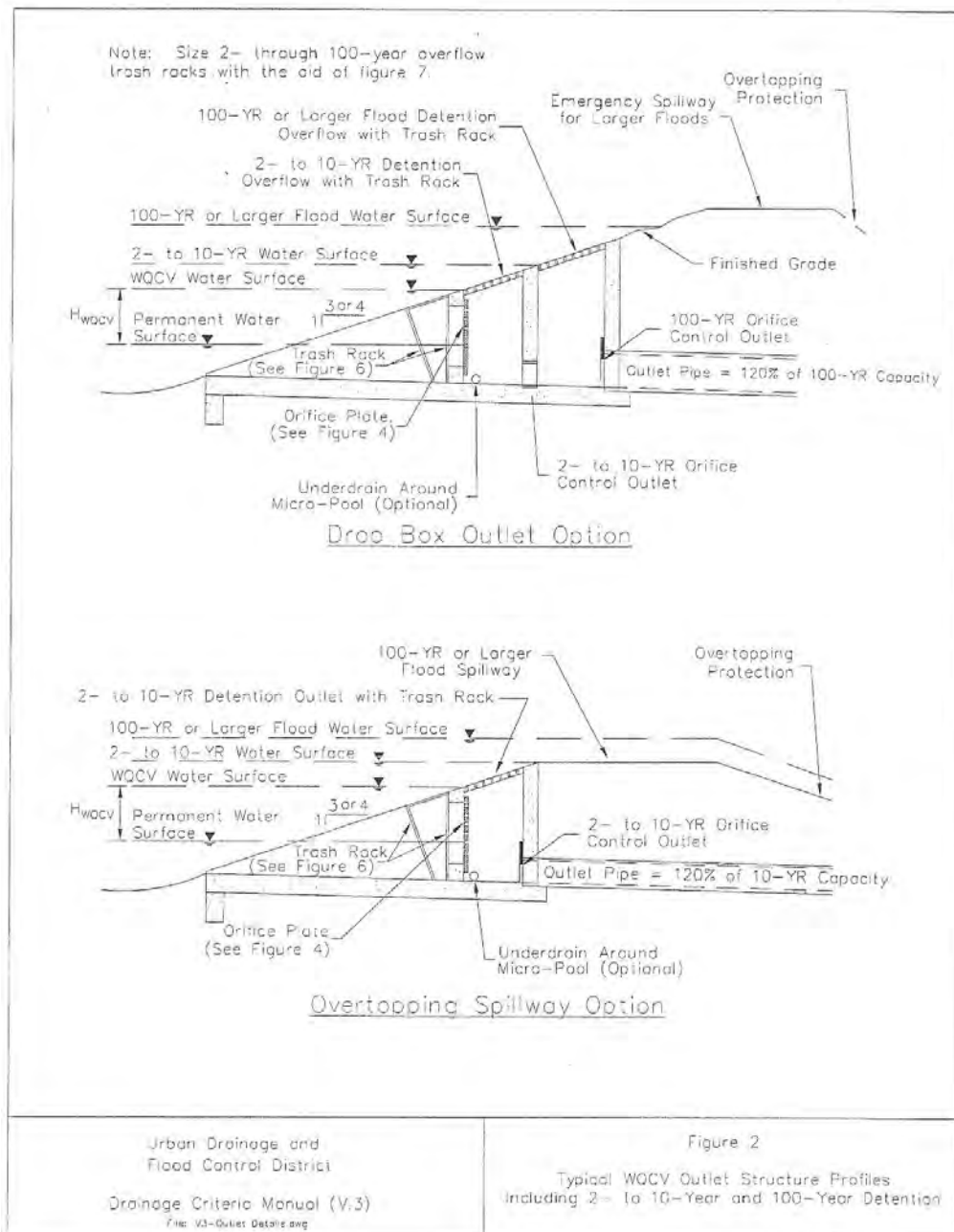


Figure 2—Typical WQCV Outlet Structure Profile, Including 2- to 10-year and 100-year Detention.

- a. Delete the Overtopping Spillway Option from Figure 2.
- b. Change "Outlet Pipe = 120% of 100-YR Capacity" within the Drop Box Outlet Option to "Outlet Pipe = 100% of 100-YR Capacity" within the Drop Box Outlet Option.

10. Amend Figure 2-a as follows:

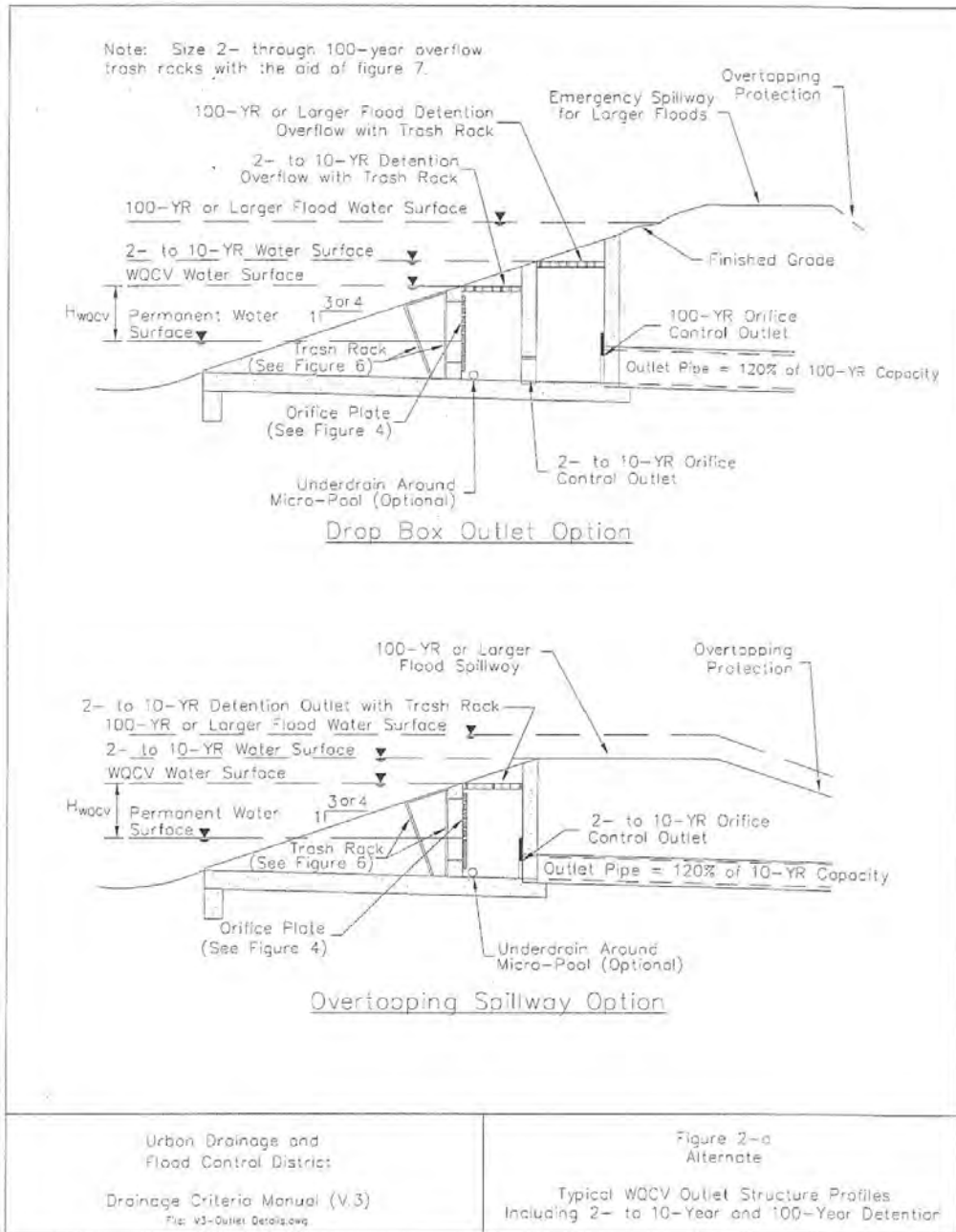


Figure 2-a—Typical WQCV Outlet Structure Profile, Including 2- to 10-year and 100-year Detention.

- a. Delete the Overtopping Spillway Option.
- b. Change "Outlet Pipe = 120% of 100-YR Capacity" within the Drop Box Outlet Option to "Outlet Pipe = 100% of 100-YR Capacity" within the Drop Box Outlet Option.

Chapter 5 — Maintenance Recommendations

11. Add the following introductory paragraph prior to Section 1, Grass Buffer:

"Weld County will require that all submittals include an operations and maintenance manual for all water quality and detention pond facilities. The operations and maintenance manuals shall also be distributed to the applicable homeowners' association and/or business park association (or equivalent). The operations manuals will include instructions on safe and correct operations, repair and maintenance of all installed equipment and facilities and recommended inspection schedules."

Chapter 6 — Industrial and Commercial Best Management Practices

12. Add the following introductory paragraph under Section 1.0, Introduction:

"Weld County will require that all submittals include an Operations and Maintenance manual for all industrial and commercial water quality and detention pond facilities. The operations and maintenance manuals shall also be distributed to the applicable business park association (or equivalent). The operations manuals will include instructions on safe and correct procedures for the operation, repair and maintenance of all installed equipment and facilities. The manuals shall provide recommended inspection schedules."

13. Amend Section 5.0, Structural Controls, Table IC-1, as follows:

"Table IC-1 — Suggested Structural Controls		
<i>Control</i>	<i>Sources</i>	<i>Applicability</i>
Grass Buffer	Parking Areas	Applicable to Industrial and Commercial Operations
Grass Swale	Parking Areas	Applicable to Industrial and Commercial Operations
Modular Block Parsons Pavement	Parking Areas	Applicable to Industrial and Commercial Operations
Pavement Micro-Detention	Parking Areas	Applicable to Industrial and Commercial Operations
Landscape Micro-Detention	Parking Areas	Applicable to Industrial and Commercial Operations
Extended Detention Basin	Parking Areas	Applicable to Industrial and Commercial Operations
Constructed Wetlands	Parking Areas	Applicable to Industrial and Commercial Operations
Retention Pond	All Sources	Associated with Industrial or commercial operations with storage of large quantities of toxic pollutants
Constructed Wetlands Channel	Parking Areas	Applicable to Industrial and Commercial Operations
Spill Containment and Control (Containment Diking, Curbing, Installation of spill and overflow protection)	Liquid Storage, Washing, Manufacture, Outside Storage, Waste Management, Fueling Areas, Loading and Unloading	Applicability to all Industrial and Commercial Operations
Covering of Storage/Handling Facilities	Fueling Areas, Loading and Unloading, Liquid Storage, Material Storage, Outside Manufacturing, Waste Management	Applicability to all Industrial and Commercial Operations"

a. Delete "Retention Pond" and replace with "Spill Containment Area."

Chapter 8 — Construction Best Management Practices

14. Amend the second paragraph of Section 1.1, General, to read:

"An Erosion and Sediment Control Plan must be developed and submitted to Weld County to obtain a grading permit or a building permit. Site planning and drainage planning should, whenever possible, occur concurrently with site grading and erosion control planning. When site grading precedes final development, an erosion and sediment control plan for site grading must be submitted. This plan may have to be modified at the time a final site development plan is prepared. This modified plan must be submitted for review and approval prior to final development."

15. Amend Section 1.3, Erosion and Sediment Control Plan, to read:

"An Erosion and Sediment Control Plan consisting of a written narrative report and a site plan map must be submitted to Weld County for review and acceptance. Figures C-1 and C-1A provide standard symbols that can be used on such plans. An example plan is given in APPENDIX B. The written narrative report can be a subsection within the drainage report. The erosion and sediment control plan must include specific inspection and repair/maintenance requirements."

16. Amend paragraph #16 of Section 1.3.1, Narrative Report, to read:

"16. This Erosion and Sediment Control Plan has been placed in the Weld County file for this project. The plan appears to fulfill Weld County criteria for erosion control. I understand that additional erosion control measures may be needed if unforeseen erosion problems occur or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the landowner until such time as the plan is properly completed, modified or voided."

17. Amend paragraph 3.m of Section 1.3.2, Site Plan, to read:

"m. This Erosion and Sediment Control Plan has been placed in the Weld County file for this project and appears to fulfill applicable erosion control criteria. I understand that additional erosion control measures may be required of the owner and his or her agents due to unforeseen erosion problems or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the landowner until such time as the plan is properly completed, modified or voided."

18. Replace the current text of Section 1.3.3, Approval of Erosion and Sediment Control Plan, with the following:

"An Erosion and Sediment Control Plan must be accepted prior to issuance of a grading permit or a building permit. The final Erosion and Sediment Control Plan must be consistent with the Drainage Report. Approval of the Erosion and Sediment Control Plan does not imply acceptance or approval of Drainage Plans, Utility Plans, Street or Road Plans or any other aspect of site development."

19. Amend Section 1.3.4, Exemptions and Variances, to read:

"A provision for exemptions and variances may be provided by Weld County. These are generally processed according to the applicable subdivision regulations and reviewed on a case-by-case basis."

20. Amend paragraph 1.b of Section 1.3.4, Exemptions and Variances, to read:

"b. Grading or an excavation below finished grade for basements, footings, retaining walls or other structures where the disturbed area will be less than 1 acre in size unless required otherwise."

21. Amend paragraph 1.d of Section 1.3.4, Exemptions and Variances, to read:

"d. Land-disturbing activities involving less than 1 acre of disturbed area. Individual lots involving less than 1 acre of disturbed area in a larger subdivision project shall not be considered separate development projects, but rather as a part of the subdivision development as a whole. It will be the responsibility of the homeowner or homebuilder to conform to all requirements of the locally accepted Erosion and Sediment Control Plan for the subdivision. As part of any building permit for which a specific erosion control plan is not required, the following statement must be included: 'We have reviewed the Erosion and Sediment Control Plan for (subdivision name) and agree to conform to all requirements contained therein and all erosion control requirements of the (insert name of local jurisdiction). We further agree to construct and maintain all erosion and sediment control measures required on the individual lot(s) subject to this Building Permit and/or in accordance with the provisions of the Erosion Control section of the Manual of the Urban Drainage and Flood Control District.'"

22. Amend paragraph 1.h of Section 1.3.4, Exemptions and Variances, to read:

"h. Where the owner certifies in writing to Weld County and Weld County agrees, in writing, that the planned work and the final structures or topographical changes will not result in or contribute to soil erosion or sedimentation, will not interfere with any existing drainage course in such a manner as to cause damage to any adjacent property or result in the deposition of debris or sediment on any public way, will not present any hazard to any persons or property and will have no detrimental influence upon the public welfare or upon the total development of the watershed."

23. Amend paragraph 2 of Section 1.3.4, Exemptions and Variances, to read:

"2. Variances — The Weld County Engineer may grant variances from the criteria of the Construction Best Management Practices chapter by his/her acceptance of the Final Drainage Report in which the variance request is well documented."

24. Amend the fourth bulleted item under Section 2.2, Summary of Criteria, to read:

"• Revegetation. A viable vegetative cover should be established within one year on all disturbed areas and soil stockpiles not otherwise permanently stabilized. Vegetation is not considered established until a groundcover is achieved which, in the opinion of Weld County, is sufficiently mature to control soil erosion and can survive severe weather conditions. (Section 3.3)."

25. Amend the 22nd bulleted item under Section 2.2, Summary of Criteria, to read:

"• Disposition of Temporary Measures. All temporary erosion and sediment control measures shall be removed within 30 days after final stabilization is achieved, or after the temporary measures are no longer needed, whichever occurs earliest, or as authorized by Weld County. (Section 8)."

26. Amend the second paragraph of Section 2.4.2, Stormwater Quality Plans, to read:

"Stormwater quality plans should be developed consistent with the guidelines in the STORMWATER QUALITY MANAGEMENT and BMP PLANNING FOR NEW DEVELOPMENT AND REDEVELOPMENT chapters of Volume 3 of the Manual."

27. Amend the second paragraph of Section 3.3.2, Temporary Revegetation, to read:

"To provide temporary vegetative cover on disturbed areas which will not be paved, built upon or fully landscaped within 12 months but will be completed within 24 months, plant an annual grass appropriate for the time of planting and mulch the planted areas. The annual grasses generally suitable for Weld County are listed in Table C-2. These are to be considered only as a general recommendation whenever specific design guidance for a particular site is not available."

28. Amend the second paragraph of Section 4.1, Vehicle Tracking, to read:

"For sites greater than 2 acres, a stabilized vehicle tracking control must be constructed (see Figure C-8). Whenever deemed necessary by Weld County, wash racks shall be installed to remove mud and dirt from the vehicle and its tires before it enters onto public roads (see Figure C-8A)."

29. Amend the first paragraph of Section 4.3.3, Sediment Basins, to read:

"Areas draining more than 1 acre must be routed through a sediment basin similar to one shown in Figures C-15, C-15A and C-16. Sediment basins in Weld County shall be designed to a minimum 1,800 cubic feet of volume per tributary acre and shall be cleaned out prior to becoming half full."

30. Amend the last paragraph of item #2 under Section 5.1, Working Within or Crossing a Waterway, to read:

"2. A permit is required for placement of fill in a waterway under Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers has issued nationwide general permit Number 14 for Minor Road Crossing Fills. This is defined as placement of less than 200 cubic yards of fill material below the plane of ordinary high water. The local office of the Corps should be contacted about the requirements for obtaining a 404 permit. Weld County should also be consulted and can provide assistance. A further discussion on the need for 404 permits is included in Section 2.1, MAJOR DRAINAGE, of the Manual."

31. Amend the first paragraph of Section 5.3, Outlet Protection, to read:

"To protect adjacent downstream properties from erosion due to concentrated flows, a stable outlet or channel is necessary. If there is no stable outlet, one may have to be constructed. In lieu of constructing a temporary or permanent outlet to the storm drainageway system, temporary total retention of the runoff may be considered on a case-by-case basis upon acceptance from Weld County. Weld County will not approve any detention or retention pond that does not drain in less than 72 hours, causes injury to water rights or is in violation of state or federal law."

32. Amend Section 8.0, Disposition of Temporary Measures, to read:

"All temporary erosion and sediment control measures shall be removed and disposed within 30 days after final site stabilization is achieved, or after the temporary measures are no longer needed, whichever occurs earliest, or as authorized by Weld County and applicable coordinating agencies (CDOT, CDPHE). For example, a site containing only 1 building will have temporary erosion control measures removed after building construction is complete and final landscaping is in place. Temporary erosion control measures may be removed from a commercial construction site or residential subdivision only after streets are paved and all areas have achieved final stabilization. Trapped sediment and disturbed soil areas resulting from the disposal of temporary measures must be returned to final plan grades and permanently stabilized to prevent further soil erosion. The Professional Engineer preparing the construction phase erosion and sediment control plan shall obtain the approval of Weld County before removal of any temporary measures."

33. Amend the second paragraph of Section 9.0, Maintenance, to read:

"The Professional Engineer preparing the permanent erosion and sediment control plan shall submit a schedule of planned inspection and instructions for operations and maintenance for all installed permanent erosion and sediment control measures. The plan shall include identification and specifications (size, materials, etc.) of parts and equipment potentially needing repair or replacement over the life of the installed measures. A copy of the inspection schedule and instructions for operations and maintenance shall be provided to the applicable homeowners' association or business park management (or equivalent). Weld County will not approve any detention or retention pond that does not drain in less than 72 hours, causes injury to water rights or is in violation of state or federal law."

34. Add Section 10.0, Erosion and Sediment Control Warranty, to read:

"Prior to acceptance and approval of all installed permanent erosion and sediment control measures, Weld County will require that the owner shall warrant that the measures shown on the approved erosion and sediment control plan are properly constructed, installed and free from defective materials and/or defective workmanship."

(Weld County Code Ordinance 2006-7)

Sec. 8-11-60. Enforcement responsibility.

It shall be the duty of the Department of Public Works to interpret and enforce the provisions of the Weld County Storm Drainage Criteria, using the following guidelines:

A. In the interpretation and application, the provisions of the Weld County Storm Drainage Criteria shall be held as the minimum requirements for promotion of the health, safety and general welfare of the community.

B. The Weld County Storm Drainage Criteria is not intended to interfere with, abrogate or annul any other regulation, statute or other provision of law.

C. Where any provision of the Weld County Storm Drainage Criteria imposes restrictions different from those imposed by any other provisions of the Weld County Storm Drainage Criteria or any other regulation or provision of law, that provision which is more restrictive or imposes higher standards shall govern.

D. The Weld County Storm Drainage Criteria is not intended to abrogate any easement, covenant or any other private agreement or restriction, provided that where the provisions of the Weld County Storm Drainage Criteria are more restrictive or impose higher standards or requirements than such easement, covenant or other private agreement or restriction, the provisions of these regulations shall govern. (Weld County Code Ordinance 2006-7)

*Division 2
Drainage Planning Submittal Requirements*

Sec. 8-11-100. Review process.

All new developments and subdivisions within the jurisdiction of the Weld County Storm Drainage Criteria shall submit drainage reports, construction drawings and existing condition and as-built information in accordance with the requirements of this Article. (Weld County Code Ordinance 2006-7)

Sec. 8-11-110. Sketch plan drainage report.

The purpose of the sketch plan drainage report submitted at the sketch plan review stage of the planning review process is to identify and define conceptual solutions to storm drainage problems which may occur on site and off site as a result of the proposed development. In addition, those problems that exist on site prior to development must be addressed during the conceptual phase. For proposed projects that will have rural residential levels of development, the Department of Public Works will review the site, surroundings and proposed improvements and advise the applicant as to what additional information and/or engineering design may be required for change of zone and final plat approvals. The term *rural residential levels of development* is defined as residential development with nine (9) lots or fewer and the average lot size is equal to or greater than three (3) acres. No sketch plan drainage report shall be required for recorded exemptions.

A. All reports shall be typed on 8.5-inch-by-11-inch paper and bound. Drawings measuring twenty-four (24) inches by thirty-six (36) inches may be included, as needed. The drawings shall be bound within the report or included within a pocket attached inside the back cover of the report. The report needs to stand alone; therefore, all important reference material and supporting documents and calculations should be copied and included within the report appendix. The report shall include a cover letter presenting the conceptual design for review and shall be prepared or supervised by an engineer licensed in Colorado. Only original documents sealed in ink will be accepted. The sealed report shall contain a certification sheet as follows:

"I hereby certify that this report for the conceptual drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of the Weld County Storm Drainage Criteria for the owners thereof.

Registered Professional Engineer

State of Colorado No. _____

(Affix Seal)"

B. Sketch plan drainage report contents. Sketch plan drainage reports shall be prepared in accordance with the following outline and contain the applicable information listed:

1. General location and description.
 - a. Location.
 - 1) Township, Range, Section, Quarter Section.
 - 2) Local streets within, and adjacent to, the development.
 - 3) Major open channels, lakes, streams, irrigation and other water resource facilities within and adjacent to the proposed development.
 - 4) Names of surrounding developments, including jurisdictions (municipalities).
 - b. Description of property.
 - 1) Area in acres.
 - 2) Groundcover.
 - 3) Major open channels and ownership.
 - 4) General project description.
 - 5) Irrigation facilities and ownership information.
 - 6) Groundwater characteristics (where applicable).
2. Drainage basins and sub-basins.
 - a. Major basin description.
 - 1) Reference to applicable Weld County or adjacent county Master Drainage Plans.
 - 2) Major basin drainage characteristics.
 - 3) Identification of all irrigation facilities within two hundred (200) feet of the property boundary.
 - 4) Identification of all FEMA-defined one-hundred-year floodplains and floodways affecting the property.
 - b. Sub-basin description.
 - 1) Historic drainage patterns on the subject property and adjacent properties.
 - 2) Off-site drainage flow patterns and impacts on the subject property.
3. Drainage facility design.
 - a. General proposed concept.
 - 1) Proposed concept and typical drainage patterns.

- 2) Compliance with off-site runoff considerations and constraints.
- 3) Anticipated and proposed drainage patterns.
- 4) Identify all requests for variance from Weld County Storm Drainage Criteria.

b. Specific details.

1) Describe design storms and source of design storm depth information (National Oceanic and Atmospheric Administration Atlas, Urban Drainage and Flood Control District maps, etc.).

2) Drainage problems encountered and proposed solutions at specific locations.

3) Maintenance access and aspects of the proposed design.

C. Sketch plan drainage report drawing contents.

1. A general location (vicinity) map shall be provided at a scale of 1" = 2000' or larger in sufficient detail to identify upstream off-site drainage areas flowing into the proposed development and general drainage patterns.

2. A drainage plan of the proposed development shall be provided at a scale from 1" = 100' or 1" = 200' on a twenty-four-inch-by-thirty-six-inch drawing. The plan shall show the following information:

a. Existing contours at two-foot maximum intervals; contours should extend at least two hundred (200) feet from all project boundaries, or further if necessary, to show upstream and downstream drainage relationships impacting the proposed development.

b. Property lines, existing and proposed lot lines and existing and proposed easements.

c. Streets with names.

d. Existing drainage facilities, pipes, structures, irrigation facilities and sizes.

e. Overall drainage area boundary and sub-area boundaries.

f. Proposed flow directions using arrows.

g. Conceptual location of storm sewers, swales, open channels, culverts, detention ponds and other appurtenances.

h. Identification of outfall locations and receiving waters.

i. Location of all defined one-hundred-year floodplains affecting the property.

j. Any other items so noted within the drainage report. (Weld County Code Ordinance 2006-7; Weld County Code Ordinance 2008-9)

Sec. 8-11-120. Change of zone drainage report.

The purpose of the change of zone drainage report is to identify and define preliminary solutions to problems which may occur on site and off site as a result of the proposed development. In addition, those problems that exist on site prior to development must be addressed during the preliminary phase.

A. All reports shall be typed on 8.5-inch-by-11-inch paper and bound. Drawings measuring twenty-four (24) inches by thirty-six (36) inches shall be included, as needed. The drawings shall be bound within the report or included within a pocket attached inside the back cover of the report. The change of zone drainage report needs to stand alone; therefore, all important reference material should be copied and included within the report appendix. The report shall include a cover letter presenting the preliminary design for review and shall be prepared or supervised by an engineer licensed in Colorado. Only original documents sealed in ink will be accepted. The sealed report shall contain a certification sheet as follows:

"I hereby certify that this report for the preliminary drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of the Weld County Storm Drainage Criteria for the owners thereof.

Registered Professional Engineer

State of Colorado No. _____

(Affix Seal)"

B. Change of zone drainage report contents. The change of zone drainage report shall be in accordance with the following outline and contain the applicable information listed:

1. General location and description.
 - a. Location.
 - 1) Township, Range, Section, Quarter Section.
 - 2) Local streets within, and adjacent to, the development.
 - 3) Major open channels, lakes, streams, irrigation and other water resource facilities within, and adjacent to, the proposed development.
 - 4) Names of surrounding developments, including jurisdiction (municipalities).
 - b. Description of property.
 - 1) Area in acres.
 - 2) Groundcover.
 - 3) Major open channels and ownership.
 - 4) General project description.

- 5) Existing irrigation facilities and utilities and ownership information.
 - 6) Groundwater characteristics (where applicable).
2. Drainage basins and sub-basins.
 - a. Major basin description.
 - 1) Reference to Weld County Master Drainage Plans where applicable.
 - 2) Major basin drainage characteristics.
 - 3) Identification of all irrigation facilities and utilities within two hundred (200) feet of the property boundary.
 - b. Sub-basin description.
 - 1) Historic drainage patterns on the subject property.
 - 2) Off-site drainage flow patterns and impacts on the subject development.
 3. Drainage design criteria.
 - a. Regulations: Discussion of the optional criteria selected or the deviation from the Weld County Storm Drainage Criteria, if any.
 - b. Development criteria reference and constraints.
 - 1) Discussion of previous drainage studies (i.e., project master plans) for the subject property that influence, or are influenced by, the proposed drainage design and how the studies and plans will affect drainage design for the site.
 - 2) Discussion of site constraints such as slopes, streets, utilities, existing structures and the proposed development or site plan impacts on the proposed drainage plan.
 - c. Hydrological criteria.
 - 1) Identify design rainfall and source of design storm depth information (National Oceanic and Atmospheric Administration Atlas, Urban Drainage and Flood Control District maps, etc.).
 - 2) Identify design storm recurrence intervals.
 - 3) Identify runoff calculation methods and any computer models.
 - 4) Identify detention discharge and storage calculation methods and computer models.
 - 5) Discussion and justification of other criteria or calculation methods used that are not presented in, or referenced by, the Weld County Storm Drainage Criteria.
 - d. Hydraulic criteria.

- 1) Identify capacity references and any computer models.
 - 2) Identify detention outlet type.
 - 3) Identify check/drop structure criteria used.
 - 4) Discussion of other drainage facility design criteria used that are presented in the Weld County Storm Drainage Criteria.
4. Drainage facility design.
- a. General concept.
 - 1) Discussion of concept and typical drainage patterns for historical conditions.
 - 2) Discussion of compliance with off-site runoff considerations and constraints.
 - 3) Discussion of the content of all tables, charts, figures or drawings presented in the report.
 - 4) Discussion of anticipated and proposed drainage patterns.
 - b. Specific details.
 - 1) Discussion of compliance with drainage criteria (street, inlet and pipe capacities, etc.).
 - 2) Discussion of drainage problems encountered and solutions at specific design points.
 - 3) Discussion of detention storage and outlet design.
 - 4) Discussion of maintenance access and aspects of the design.
 - 5) Provide copies of draft Colorado Department of Public Health and Environment or State Engineer's permit applications (where applicable).
5. Conclusions.
- a. Compliance with the Weld County Storm Drainage Criteria.
 - b. Drainage concept.
 - 1) Effectiveness of drainage design to control damage from storm runoff.
 - 2) Influence of proposed development on any applicable Weld County master drainage plan recommendations.
 - 3) Identification and written approval of affected irrigation company or other property owners. The County may require that the applicant provide evidence that off-site impacted jurisdictions have been notified of the proposed drainage plans and potential impacts.

6. References.

- a. Reference all criteria and technical information used.

7. Appendices.

- a. Hydrology computations.

- 1) Land use assumptions regarding adjacent properties.
- 2) Initial and major storm runoff computations at specific design points.
- 3) Historic and fully developed runoff computations at specific design points.
- 4) Computer model input and output.

- b. Hydraulic computations.

- 1) Culvert sizing.
- 2) Storm sewer sizing.
- 3) Street capacity evaluation.
- 4) Storm inlet sizing.
- 5) Swale sizing.
- 6) Open channel sizing.
- 7) Check dam and/or drop structure sizing.
- 8) Detention pond area/volume capacity and outlet sizing.

9) Changes to calculation methods. If the applicant/design engineer modifies any portion of the Urban Drainage and Flood Control District spreadsheets used for hydrologic or hydraulic calculations, the applicant/design engineer shall identify all changes to calculation assumptions or computer programs as to type of change and specific factors that were modified.

- 10) Computer model input and output.

C. Change of zone drainage report drawing contents.

1. A general location (vicinity) map shall be provided at a scale of 1" = 2000' or larger in sufficient detail to identify upstream off-site drainage areas flowing into the development, downstream areas receiving site flows and general drainage patterns in the project area.

2. A drainage plan of the proposed development shall be provided at a scale from 1" = 100' or 1" = 200' on a twenty-four-inch-by-thirty-six-inch drawing. The plan shall show the following information:

- a. Existing contours at two-foot maximum intervals; contours should extend at least two hundred (200) feet from all project boundaries, or further if necessary, to show upstream and downstream drainage relationships impacting the development.
- b. Property lines, lot lines, utility crossings and easements.
- c. Streets with names.
- d. Existing drainage facilities, pipes, structures, irrigation facilities and sizes.
- e. Overall drainage area boundary and sub-area boundaries.
- f. Proposed contours and flow directions indicated with arrows.
- g. Location of proposed storm sewers, swales, open channels, culverts, cross-pans and other appurtenances.
- h. Proposed outfall points for runoff from the development area and facilities to convey flows to the final outfall point without damage to downstream properties.
- i. Location and elevations of all defined one-hundred-year floodplains and floodways affecting the property.
- j. Location and types of proposed permanent erosion control features. (Weld County Code Ordinance 2006-7)

Sec. 8-11-130. Final drainage report.

The purpose of the final drainage report is to update the preliminary design concepts and to present the design details for the drainage facilities discussed in the change of zone drainage report. Also, any change to the preliminary concept shall be presented. The final drainage report shall identify all approved requests for variance from Weld County Storm Drainage Criteria.

A. All final reports shall be typed on 8.5-inch-by-11-inch paper and bound. Drawings measuring twenty-four (24) inches by thirty-six (36) inches shall be included. The final drawings shall be bound within the report or included within a pocket attached inside the back cover of the report. The final report needs to stand alone; therefore, all calculations, computer outputs, plans, supporting documents and important reference material should be copied and included within the report appendix. The report shall include a cover letter presenting the final design for review and shall be prepared or supervised by an engineer licensed in Colorado. Only original documents sealed in ink will be accepted. The sealed report shall contain a certification sheet as follows:

"I hereby certify that this report for the final drainage design of (Name of Development) was prepared by me (or under my direct supervision) in accordance with the provisions of the Weld County Storm Drainage Criteria for the owners thereof.

Registered Professional Engineer

State of Colorado No. _____

(Affix Seal)"

B. Final drainage report contents. The final drainage report shall be prepared in accordance with the outline shown above under change of zone drainage report. In addition to including all of the items required for the report and plans submitted with the change of zone described above under change of zone drainage report and drawings, the final drainage report and drawings should include:

1. Proposed location and sizing of all storm sewers, swales, open channels, culverts, cross-pans and other appurtenances, including cross-sections of swales and open channels.
2. Routing and accumulation of flows at various critical points for the minor storm runoff.
3. Routing and accumulation of flows at various critical points for the major storm runoff.
4. Detention storage facilities and outlet works, including proposed one-hundred-year water surface elevations.
5. Location of all existing and proposed utilities.
6. Routing of off-site drainage flows through the development.
7. Minimum lowest opening elevations of residential and commercial buildings above the one-hundred-year water surface in streets, open channels, ditches, swales or other drainage facilities, as illustrated by the preliminary grading plans.
8. Proposed on-site private and public drainage easements.
9. Proposed off-site private and public drainage easements.
10. Elevations of manhole and inlet inverts in relation to project datum.
11. Proposed water surface elevations for street encroachments for the minor and major storm.
12. Critical hydraulic structure dimensions.
13. Orifice plate sizes.
14. Detention pond volumes.
15. All other critical hydraulic elevations.
16. Operations and maintenance instructions for the proposed stormwater drainage facilities.
17. Construction-phase erosion and sediment control calculations.
18. Permanent erosion and sediment control calculations.

C. The final drainage report design hydraulic calculations shall be provided for each of the proposed elements of the final drainage design. (Weld County Code Ordinance 2006-7)

Sec. 8-11-140. Construction drawings and specifications.

A. Where drainage improvements are to be constructed in accordance with the accepted final drainage report, the signed and sealed construction plans (on 24"-x-36" Mylar) and specifications shall be submitted in conformance with the final plat for review and acceptance prior to construction. The sealed plans and specifications for the drainage improvements shall include all drainage components designed within the final drainage report.

B. The information required for the drawings and specifications shall be in accordance with sound engineering principles, the Weld County Storm Drainage Criteria and the County requirements for development and subdivision design. Construction documents shall include geometric, dimensional, structural, foundation, bedding, hydraulic, landscaping, erosion control and other details as needed to construct the storm drainage facilities. The accepted final drainage plan shall be included as part of the construction documents for all facilities affected by the drainage plan. Submittal of digital format final plans and as-built drawings may also be required by the Department of Public Works. The County requires a minimum of three (3) sets of paper construction plans for use by County inspectors.

C. Where erosion control and sediment control improvements are to be constructed in accordance with the accepted final drainage report, the erosion control and sediment control construction plans (on 24"-x-36" Mylar) and specifications shall be submitted in conformance with the final plat for review and acceptance prior to construction. The plans and specifications for the erosion control and sediment control improvements shall include all erosion control and sediment control components designed within the final drainage report.

D. Both construction-phase and post-construction (permanent) erosion control and sediment control construction drawings shall be submitted. The construction-phase erosion control and sediment control construction drawings shall be submitted separately from post-construction (permanent) erosion control and sediment control drawings. The construction-phase and post-construction erosion control and sediment control construction drawings shall be the basis of compliance evaluations by County inspectors. (Weld County Code Ordinance 2006-7)

Sec. 8-11-150. As-built drawings.

A. Recording of drawings.

1. The project record drawings shall be submitted to, and accepted by, the County. Drawings will be submitted in appropriate digital form when requested by the County.

2. Each drawing shall be labeled "DRAWINGS OF RECORD" in neat, large-printed letters.

3. Construction information shall be recorded concurrently with construction progress by the contractor.

4. Project record drawings shall be marked legibly and with an indelible pen.

5. Project record drawings shall record actual construction and contain, but are not limited to, the following:

a. Field dimensions, elevations and details.

b. Field changes which are made by minor deviations to the design drawings.

- c. Details which are not on the original construction drawings.
 - d. Elevations of manhole and inlet inverts in relation to project datum.
 - e. Critical hydraulic structure dimensions.
 - f. Orifice plate sizes.
 - g. Detention pond volumes.
 - h. All other critical hydraulic elevations.
 - i. Floodplain and floodway delineations and Base Flood Elevations (BFEs), where applicable.
 - j. Dimensions of erosion control installations.
6. Payment of permit fees must precede final acceptance.

B. Submission.

1. The project record drawings shall be submitted to, and accepted by, the County inspectors with a transmittal letter containing the following:
 - a. Date.
 - b. Project title.
 - c. Design engineer's name, address and telephone number.
 - d. Title and number of each record document.
 - e. The signature of the design engineer and his or her professional engineering stamp.
2. The initial acceptance of the storm drainage improvements will not be made until all County installation requirements are satisfied and the project record drawings are received and accepted by the County.
3. Acceptance of storm drainage improvements will not be made until all on-site drainage easements have been recorded. Acceptance of storm drainage improvements will not be made until all off-site drainage easement agreements have been signed and notarized.
4. The final drawings of the storm drainage improvements will not be made until the project record drawings are received and accepted by the County.
5. The County requires that the project record drawings first be submitted in blue-line form for preliminary acceptance before final Mylars are submitted. Submittal of digital format final plans and digital format as-built drawings may also be required by the Department of Public Works. (Weld County Code Ordinance 2006-7)