

**SECTION 3
DRAINAGE POLICY**

**CITY OF FORT LUPTON
STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA**

SECTION 3 DRAINAGE POLICY

3.1 INTRODUCTION

The provision for adequate drainage in urban areas is necessary to preserve and promote the general health, welfare, and economic well-being of the region. Drainage is a regional feature that affects all governmental jurisdictions and all parcels of property. This characteristic of drainage makes it necessary to formulate a program that balances both public and private interests. Overall coordination and master planning must be provided by the governmental units most directly involved, but drainage must be integrated on a regional level.

Certain underlying principles provide direction for planning drainage facilities. These principles are made operational through the following policy statements. The application of the policy is in turn facilitated by technical criteria and data. A brief discussion of the requirements or basis for a policy is presented followed by the actual policy statement which is highlighted by capital letters and underlined.

THE POLICY OF THE CITY SHALL BE TO REVIEW ALL DRAINAGE STUDIES ONLY FOR GENERAL CONFORMANCE WITH SUBMITTAL REQUIREMENTS, CURRENT DESIGN CRITERIA, AND STANDARD ENGINEERING PRINCIPLES AND PRACTICES. THE CITY'S REVIEW AND ACCEPTANCE OF THE DRAINAGE REPORTS AND RELATED CONSTRUCTION DRAWINGS DOES NOT RELIEVE THE DESIGN ENGINEER OF ANY LIABILITY DUE TO ERRORS, OMISSIONS, OR VIOLATIONS OF SUBMITTAL REQUIREMENTS, CURRENT DESIGN CRITERIA OR CITY OF FORT LUPTON STANDARDS AND SPECIFICATIONS.

THE CITY OF FORT LUPTON ASSUMES NO RESPONSIBILITY FOR COMPLETENESS OTHER THAN AS STATED ABOVE.

3.2 BASIC PRINCIPLES

3.2.1 Urban Subsystem

Drainage is a subsystem of all urbanization. The planning of drainage facilities must be included in the urbanization process. The first step is to include drainage planning with all regional and local development master plans. The report shall address the multi-purpose use of land for drainage.

Storm water management facilities, such as channels and storm sewers, serve both a conveyance and storage function. When a channel is planned as a conveyance feature, it requires an outlet as well as downstream storage space. When the space requirements are considered, the provision for adequate drainage becomes a competing use for space along with other land uses. If adequate provision is not made in a land use plan for the drainage requirements, storm water runoff will conflict with other land uses resulting in water damages, impairment, and even disruption of other urban systems.

THE POLICY OF THE CITY SHALL BE TO CONSIDER STORM DRAINAGE A SUBSYSTEM OF THE OVERALL URBAN SYSTEM AND TO REQUIRE STORM DRAINAGE PLANNING FOR ALL DEVELOPMENTS INCLUDING THE ALLOCATION OF SPACE FOR DRAINAGE FACILITIES.

3.2.2 Multi-Purpose Resource

Storm water runoff is an urban resource. Whereas the runoff can be a liability to urbanization, storm water runoff has potential for beneficial use. This use, however, must be compatible with adjacent land uses and Colorado Water Law.

When storm water runoff is treated as a resource, quality aspects of the water become important. This in turn relates to issues such as street cleaning practices, solid waste collection and removal services, and regulations on the development of raw land to control erosion and silt loads. These practices influence succeeding water uses.

The storm water subsystem should be multi-purpose to satisfy the competing demands placed on water within the urban environment. Drainage facilities can fulfill other purposes aside from drainage; and facilities not designed primarily for drainage can frequently provide drainage benefits.

THE POLICY OF THE CITY SHALL BE TO CONSIDER STORM RUNOFF AS A MULTI-PURPOSE RESOURCE WITH THE POTENTIAL FOR APPROPRIATE MULTI-PURPOSE USES WHERE PRACTICAL.

3.2.3 Water Rights

When the drainage subsystem interferes with existing water rights, the value and use of the water are affected. Drainageways and detention facilities frequently interrelate with water rights. This interrelation must be addressed when planning the drainage facility to preserve its integrity.

Irrigation ditches which have direct flow rights from a stream are controlled by head gates. Drainage facilities which alter the quantity or quality of the water available at the head gates may affect the irrigation ditches' ability to divert water. If the water right has not been abandoned or transferred to another location, it is the responsibility of the developer to plan and construct the drainage system including the subsurface system with

water rights taken into consideration. Similar situations can also occur when planning drainage facilities near reservoirs.

THE POLICY OF THE CITY SHALL BE TO RECOGNIZE THE POSSIBLE EFFECTS OF DRAINAGE FACILITIES ON WATER RIGHTS AND TO INCLUDE THE INTERRELATIONSHIP IN THE PLANNING AND DESIGN OF THE PROPOSED DRAINAGE FACILITY.

3.2.4 Jurisdictional Boundaries

Since drainage considerations and problems are regional in nature and do not respect jurisdictional boundaries, a successful plan must emphasize regional cooperation in accomplishing goals.

THE POLICY OF THE CITY SHALL BE TO PURSUE A JURISDICTIONAL UNIFIED APPROACH TO DRAINAGE TO ASSURE AN INTEGRATED PLAN.

3.2.5 Major Drainageway

The definition of a major drainageway is necessary for the clarification and administration of these CRITERIA. For the purpose of these CRITERIA, a major drainageway shall be defined as follows:

THE POLICY OF THE CITY SHALL BE TO DEFINE A MAJOR DRAINAGEWAY AS ANY DRAINAGE FLOW PATH WITH A TRIBUTARY AREA OF 130 ACRES OR MORE.

3.2.6 Major Drainageway Design Flows

Major drainageways shall be designed to convey runoff from the 100-year recurrence interval storm minimizing health and life hazards, damage to structures, and interruption to traffic and services.

THE POLICY OF THE CITY SHALL BE TO DEFINE THE 100-YEAR RECURRENCE INTERVAL STORM FLOW RATES THAT ARE USED IN THE DESIGN OF MAJOR DRAINAGEWAYS AS THAT GIVEN IN THE FLOOD HAZARD AREA DELINEATION STUDIES AS PREPARED BY THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT AND ADOPTED BY THE CITY.

3.3 REGIONAL AND LOCAL PLANNING

3.3.1 Basin Transfer

Colorado drainage law recognizes the inequity of transferring the burden on managing storm drainage from one location or property to another. Liability questions also arise when the historic drainage continuum is altered. The diversion of storm runoff from one basin to another should be avoided unless specific and prudent reasons justify and dictate such a basin transfer. Planning and design of storm water drainage systems should not be based on the premise that problems can be transferred from one location to another.

The subdivision process can and generally will significantly alter the historic or natural drainage paths. When the development of a subdivision results in a drainage system that discharges back into the natural drainageway at or near the historic location and in a manner which closely resembles the historic condition, the drainage system is generally acceptable. However, when the subdivision drainage system does not return the storm water to the historic drainageway at or near the historic location, then inter-basin transfer may result. In addition, if the proposed development significantly increases the tributary drainage area, then inter-basin transfer into the property has also occurred. This inter-basin transfer should be avoided since it may violate a basic civil drainage law principle by discharging water onto a subservient property in a manner or quantity that does more harm than formerly.

THE POLICY OF THE CITY SHALL BE TO AVOID BASIN AND INTER-BASIN TRANSFER OF STORM DRAINAGE RUNOFF AND TO MAINTAIN THE HISTORIC DRAINAGE PATH WITHIN THE BASIN.

3.3.2 Master Planning

As set forth in Section 3.2.1, drainage planning is required for all new developments. In recognition that drainage boundaries are non-jurisdictional as stated in Section 3.2.4, the CITY has participated in regional basin-wide master plans to outline required major drainageway facilities. The CITY will also encourage and participate in future master plans.

THE POLICY OF THE CITY SHALL BE TO DEVELOP REGIONAL DRAINAGE MASTER PLANS WHICH WILL SET FORTH SITE REQUIREMENTS FOR NEW DEVELOPMENT AND IDENTIFY THE REQUIRED IMPROVEMENTS ALONG MAJOR DRAINAGEWAYS.

THE POLICY OF THE CITY SHALL ALSO BE TO REQUIRE DEVELOPERS TO CONSTRUCT THE "MASTER PLAN" DRAINAGEWAY IMPROVEMENTS AS OUTLINED IN THE MASTER DRAINAGE PLANS.

3.3.3 Special Planning Areas

Presently, there may be areas where drainage problems currently exist. Any development or redevelopment in these areas may compound the existing drainage problems. The CITY may define Special Planning Areas within the CITY due to specific drainage concerns such as undersized drainage facilities, areas of uncontrolled flows, or areas with inadequate upstream detention.

THE POLICY OF THE CITY SHALL BE TO REQUIRE ADDITIONAL DRAINAGE ANALYSIS AND TO IDENTIFY ADDITIONAL FACILITIES REQUIRED FOR DEVELOPMENT AND REDEVELOPMENT IN AREAS WHERE DRAINAGE PROBLEMS MAY CURRENTLY EXIST.

3.3.4 Public Improvements

The Local Drainage System consists of curb and gutter, inlets and storm sewers, culverts, bridges, swales, ditches, channels, detention ponds, and other drainage facilities within or adjacent to the development that are required to convey the minor and major storm runoff to the major drainageways. The Major Drainageway System consists of channels, storm sewers, bridges, detention areas, and other facilities serving more than the subdivision or property in question in accordance with Section 3.2.5.

THE POLICY OF THE CITY REQUIRES THAT ALL NEW DEVELOPMENT AND REDEVELOPMENT SHALL PARTICIPATE IN THE REQUIRED DRAINAGE IMPROVEMENTS AS SET FORTH BELOW:

1. DESIGN AND CONSTRUCT THE LOCAL DRAINAGE SYSTEM AS DEFINED BY THE PHASE III DRAINAGE REPORT AND CONSTRUCTION PLANS.
2. DESIGN AND CONSTRUCT THE CONNECTION OF THE LOCAL DRAINAGE SYSTEM TO THE MAJOR DRAINAGEWAY SYSTEM.
3. DESIGN AND CONSTRUCT THE MAJOR DRAINAGEWAY SYSTEM FACILITIES WITHIN OR ADJACENT TO THE DEVELOPMENT AS IDENTIFIED IN THE DRAINAGE “MASTER PLANS” (SECTION 3.3.2) OR AS REQUIRED BY THE CITY.

3.3.5 Floodplain Management

The CITY has adopted floodplain regulations into the CODE as part of its zoning ordinance. The floodplain regulations are provided in the appendix for convenience; however, the design engineer should refer to the CODE for the current adopted floodplain regulations.

THE POLICY OF THE CITY REGARDING FLOODPLAIN MANAGEMENT SHALL BE AS SET FORTH IN THE MOST CURRENTLY ADOPTED FLOODPLAIN REGULATIONS.

THE POLICY OF THE CITY SHALL BE TO DISCOURAGE ANY DEVELOPMENT FROM OCCURRING WITHIN THE EXISTING 100-YEAR FLOODPLAIN BOUNDARIES OF BIG DRY CREEK AND WALNUT CREEK. THE CITY WILL CONSIDER THIS WITH RESPECT TO PUBLIC LAND DEDICATION REQUIREMENTS.

3.3.6 Storm Runoff Detention and Water Quality Enhancement

The value of storm water detention as part of the urban system has been explored by many individuals, agencies, and professional societies. Detention is considered a viable method to reduce urban drainage costs. Temporarily detaining a few acre-feet of storm runoff can significantly reduce downstream flood hazards as well as pipe size and channel size requirements in urban areas. Storage also provides for sediment and debris collection which helps to keep streams and rivers cleaner; thus, public health benefits from the temporary storage of storm runoff. However, such benefits can only be obtained through consistent administration of a detention policy.

Water quality is an important concern of watershed management. Best Management Practices can be used to maintain or improve water quality from developed and disturbed land. Water quality improvement shall be in compliance with the MANUAL Volume 3 per CITY Ordinance No. 2335.

THE POLICY OF THE CITY REQUIRES ON-SITE DETENTION FOR ALL NEW DEVELOPMENT, EXPANSION, AND REDEVELOPMENT. THE REQUIRED MINIMUM DETENTION VOLUMES AND MAXIMUM RELEASE RATES FOR WATER QUALITY, THE MINOR STORM, AND THE MAJOR STORM SHALL BE IN ACCORDANCE WITH THE PROCEDURE AND DATA SET FORTH IN THESE CRITERIA.

3.3.7 Operations and Maintenance

An important part of all storm drainage facilities is the continued maintenance of the facilities to ensure that they will function as designed. Maintenance is necessary to preclude the facility from becoming unhealthy and to retain its effectiveness. Sediment and debris must be periodically removed from channels, storm sewers, and detention ponds. Trash racks and street inlets must be regularly cleared of debris to maintain system capacity. Channel bank erosion, damage to drop structures, crushing of pipe inlets and outlets, and general deterioration of the facilities must be repaired in order to avoid reduced conveyance capacity, unsightliness, and ultimate failure.

Maintenance responsibility of drainage facilities shall be outlined on Preliminary Development Plans, Official Development Plans, and Final Plats. Maintenance of drainage facilities not located in the public ROW or land owned by the CITY is the responsibility of the land owner except as modified by a specific agreement.

THE POLICY OF THE CITY REQUIRES THAT MAINTENANCE ACCESS BE PROVIDED TO ALL STORM DRAINAGE FACILITIES TO ASSURE CONTINUOUS OPERATIONAL CAPABILITY OF THE SYSTEM. THE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL DRAINAGE FACILITIES LOCATED ON THEIR PROPERTY INCLUDING INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, AND DETENTION PONDS UNLESS SUCH RESPONSIBILITY IS MODIFIED BY WRITTEN AGREEMENT WITH THE CITY. IF THE OWNERS FAIL TO ADEQUATELY MAINTAIN SAID FACILITIES, THE CITY SHALL HAVE THE RIGHT TO ENTER SAID LAND FOR THE PURPOSE OF OPERATION AND MAINTENANCE. ALL SUCH MAINTENANCE COSTS INCURRED BY THE CITY WILL BE ASSESSED TO THE PROPERTY OWNERS INCLUDING OVERHEAD AND ADMINISTRATIVE COSTS.

Drainage easements shall be shown on the Official Development Plans and Final Plats. The drainage easements shall state that the CITY has the right of access on the easements and the easements shall be kept clear of obstructions to the flow and obstructions to maintenance access.

The easements required to provide adequate maintenance access are as follows:

**MINIMUM REQUIRED DRAINAGE AND
MAINTENANCE ACCESS EASEMENTS WIDTHS**

Drainage Facility	Minimum Easement Width
Storm Sewer	
(a) less than 36" diameter	Easement of 20 feet or twice the invert depth, whichever is greater.
(b) 36" diameter or greater	Easement of 25 feet or twice the invert depth, whichever is greater. The storm sewer is placed approximately at the 1/3 point in the easement.
Open Channels	
(a) Q ₁₀₀ less than 20 cfs	Easement of 20 feet.
(b) Q ₁₀₀ greater than 20 cfs	The minimum easement width shall include the channel, freeboard, and maintenance access road.
Detention Pond	The minimum easement area shall include the required storage volume plus freeboard, associated facilities, and adequate maintenance access around the perimeter

3.3.8 Erosion and Sedimentation Control

The clearing and stripping of land for development can cause high localized erosion rates with subsequent deposition and damage to off-site properties. Whereas erosion and sedimentation is a natural process, the intensity is increased by development which can destroy the aesthetic and practical values of other properties, streams, and lakes. The purpose of implementing an erosion and sedimentation control plan is to reduce the erosion process to an acceptable level without placing undue burdens on the homeowner, builder, downstream drainageway, or community. The extent and detail of the erosion and sedimentation control plan is a function of the site area.

THE POLICY OF THE CITY SHALL BE TO REQUIRE AN EROSION AND SEDIMENTATION CONTROL PLAN BE PREPARED AND INSTITUTED FOR NEW DEVELOPMENT AND ANY REDEVELOPMENT IN ACCORDANCE WITH THE CRITERIA SET FORTH HEREIN AND IN ACCORDANCE WITH CITY CODE CONCERNING THE CONTROL OF SOIL EROSION AND SEDIMENTATION.

3.4 TECHNOLOGY PLANNING AND DESIGN

3.4.1 Drainage Criteria

The design criteria presented herein represents the state-of-the-art for stormwater management. The CRITERIA are intended to establish minimum guidelines, standards, and methods for the effective planning and design of storm drainage facilities. The CRITERIA may be revised and updated as necessary to reflect advances in the field of urban drainage engineering and urban water resources management.

THE POLICY OF THE CITY REQUIRES THAT ALL STORM DRAINAGE FACILITIES BE PLANNED AND DESIGNED IN ACCORDANCE WITH THE CRITERIA SET FORTH IN THIS DOCUMENT AND IN ACCORDANCE WITH CITY CODE.

Due to the dynamic nature of urbanization, the needs of the public will change with time requiring adjustment of design concepts. Therefore, a time limitation on the approved construction plans and permits shall be established:

IF THE CONSTRUCTION OF ANY DRAINAGE FACILITY IS NOT INITIATED WITHIN A ONE-YEAR PERIOD FROM THE TIME OF CONSTRUCTION PLAN APPROVAL OR IF CONSTRUCTION ACTIVITIES HAVE BEEN ABANDONED FOR A PERIOD OF ONE-YEAR, THE CONSTRUCTION PLANS AND DRAINAGE REPORTS MAY BE REEVALUATED AND ARE SUBJECT TO REVISION AND RE-APPROVAL BY THE CITY.

3.4.2 Water Quality, Minor, and Major Drainage System

Every urban area has three separate and distinct drainage systems whether or not they are actually planned or designed. The water quality system, the minor drainage system, and the major drainage system combine to form the total drainage system.

The water quality system is designed to remove undesirable sediment pollutants and trash from storm runoff. The water quality system minimizes pollutant and sediment discharge, keeps rivers and streams cleaner, maintains quality of water resources, and helps to maintain riverine habitat. Urban development is a source for oils, pesticides, fertilizers, dirt, trash, and debris which can be transported by storm runoff. Water quality facilities in conformance with the MANUAL can help to remove these undesirable elements from storm runoff. The water quality system may incorporate one or a number of combinations of Best Management Practices such as grass buffer strips, water quality ponds, flush inlets, and wetlands.

The minor drainage system is designed to transport the storm runoff from 5-year frequency events with a minimum disruption to the urban environment. Minor storm drainage can be conveyed in the curb and gutter area of the street (subject to street classification and capacity, as defined herein), in the storm sewers, or in other conveyance facilities.

The major drainage system is designed to convey storm runoff from the 100-year recurrence interval storm with minimal health and life hazards, damage to structures, and interruption to traffic and services. Major storm flows can be carried in the urban street system (within acceptable depth criteria), channels, storm sewers, and other conveyance facilities.

THE POLICY OF THE CITY REQUIRES THAT ALL DEVELOPMENTS INCLUDE THE PLANNING, DESIGN, AND IMPLEMENTATION OF THE WATER QUALITY SYSTEM, THE MINOR DRAINAGE SYSTEM (5-YEAR RECURRENCE INTERVAL STORM), AND THE MAJOR DRAINAGE SYSTEM (100-YEAR RECURRENCE INTERVAL STORM).

3.4.3 Storm Runoff

The MANUAL allows storm runoff design flows to be determined by the CUHP Method for basins greater than 90 acres (except as noted herein) and by the Rational Method for basins less than 160 acres.

THE POLICY OF THE CITY ALLOWS STORM RUNOFF DESIGN FLOWS TO BE DETERMINED BY EITHER THE RATIONAL METHOD OR THE COLORADO URBAN HYDROGRAPH PROCEDURE (CUHP) WITHIN THE LIMITATIONS AS SET FORTH IN THIS CRITERIA. FOR BASINS LARGER THAN 160 ACRES, THE

PEAK FLOWS AND VOLUMES SHALL BE DETERMINED BY USING THE COLORADO URBAN HYDROGRAPH PROCEDURE ONLY.

3.4.4 Streets

Streets are an integral part of the urban drainage system and may be used for transporting storm runoff within specified design limits. The design engineer should recognize that the primary purpose of a street is for traffic; and therefore, the use of streets for transporting storm runoff must be restricted.

THE POLICY OF THE CITY ALLOWS THE USE OF STREETS FOR DRAINAGE PURPOSES WITHIN THE FOLLOWING LIMITATIONS:

ALLOWABLE USE OF STREETS FOR MINOR STORM RUNOFF

Drainage Classification	Maximum Theoretical Street Encroachment
Type A (Residential)	NO CURB OVERTOPPING FOR A 6-INCH VERTICAL CURB. FLOW MAY SPREAD TO THE BACK OF THE SIDEWALK FOR A 4-INCH COMBINATION CURB AND SIDEWALK.
Type B (Major and Minor Collector)	NO CURB OVERTOPPING. FLOW SPREAD MUST LEAVE AT LEAST ONE 10-FOOT LANE FREE OF WATER, 5 FEET EITHER SIDE OF THE STREET CROWN.
Type C (Major and Minor Arterial)	NO CURB OVERTOPPING. FLOW SPREAD MUST LEAVE AT LEAST TWO 10-FOOT LANES FREE OF WATER, 10 FEET EACH SIDE OF THE STREET CROWN OR MEDIAN

Note: For state and federal highways, the governing agency may apply more restrictive criteria.

ALLOWABLE USE OF STREETS FOR MAJOR STORM RUNOFF

Drainage Classification	Maximum Theoretical Street Encroachment
Type A (Residential) Type B (Major and Minor Collector)	RESIDENTIAL DWELLINGS, PUBLIC BUILDINGS, COMMERCIAL BUILDINGS, AND INDUSTRIAL BUILDINGS SHALL NOT BE INUNDATED AT THE GROUND LINE. THE DEPTH OF WATER AT THE GUTTER FLOWLINE SHALL NOT EXCEED 12 INCHES.
Type C (Major and Minor Arterial)	RESIDENTIAL DWELLINGS, PUBLIC BUILDINGS, COMMERCIAL BUILDINGS, AND INDUSTRIAL BUILDINGS SHALL NOT BE

	INUNDATED AT THE GROUND LINE. TO ALLOW FOR EMERGENCY VEHICLES, THE DEPTH OF WATER SHALL NOT EXCEED 6 INCHES AT THE STREET CROWN OR 12 INCHES AT THE GUTTER FLOWLINE WHICHEVER IS MORE RESTRICTIVE.
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Note: For state and federal highways, the governing agency may apply more restrictive criteria.

Under no circumstances will the 100-year storm flow encroach on any structure.

Cross-street flow can occur in an urban drainage system under the following three conditions: (1) when the runoff in a gutter spreads across the street crown to the opposite gutter; (2) when cross-pans are used (Cross-pans are prohibited on arterial streets. Cross-pans are allowed on collector streets and local streets only at locations where traffic stops are intended at intersections and no storm sewer is present); (3) when the flow in a drainageway exceeds the capacity of a road culvert and subsequently overtops the crown of the street. For this third condition, refer to the following:

ALLOWABLE CULVERT OVERTOPPING

DRAINAGE CLASSIFICATION	MINOR DRAINAGE SYSTEM MAXIMUM DEPTH	MAJOR DRAINAGE SYSTEM MAXIMUM DEPTH
Type A (residential) Type B (collector)	NONE	12-INCH DEPTH AT GUTTER FLOWLINE
Type C (arterial)	NONE	NONE

The maximum headwater depth for the 100-year design flows shall not exceed 1.5 times the culvert diameter or 1.5 times the rise dimension for non-round pipe shapes for Type A and Type B streets only. In the case of major drainageways, the floodplain regulations as set forth in the CODE shall govern.

3.4.5 Floodproofing (Existing Structures)

Floodproofing can be defined as those measures which reduce the potential for flood damages to existing properties located within a floodplain. The floodproofing measures can range from elevating structures to intentional flooding of non-critical building spaces in order to minimize structural damages. Floodproofing measures are only a small part of good floodplain management which encourages wise floodplain development in order to minimize the adverse effects of floods.

The policy for **existing** structures is as follows:

THE POLICY OF THE CITY SHALL BE TO ENCOURAGE THE FLOODPROOFING OF EXISTING STRUCTURES NOT IN CONFORMANCE WITH THE ADOPTED FLOODPLAIN REGULATIONS BY UTILIZING THE CRITERIA PRESENTED IN THE "COLORADO FLOODPROOFING MANUAL" PREPARED BY THE DEPARTMENT OF NATURAL RESOURCES, COLORADO WATER CONSERVATION BOARD, MOST RECENT EDITION.

3.5 IRRIGATION FACILITIES

3.5.1 Drainageway Interaction

There are many irrigation ditches and reservoirs in the CITY area. The ditches and reservoirs have historically intercepted the storm runoff from the rural and agricultural type basins, generally without major problems. With urbanization of the basins, however, the storm runoff has increased in rate, quantity, and frequency. With respect to water quality, the CITY is very active in assuring that storm runoff entering irrigation facilities is both safe and adequate for the intended uses. To achieve this, additional testing of storm runoff may be required of any development that utilizes an irrigation facility (i.e., reservoir, irrigation ditch) to accept and transport storm runoff waters. Irrigation facilities can no longer be utilized indiscriminately as drainage facilities; and therefore, policies have been established to achieve compatibility between urbanization and the irrigation facilities.

In evaluating the interaction of irrigation ditches for the purpose of basin delineation, the ditch should not be utilized as a basin boundary due to the limiting flow capacity of the ditch. The ditches will generally be flowing full or near full during storms; and, therefore, the tributary basin runoff would flow across the ditch.

THE POLICY OF THE CITY SHALL BE TO REQUIRE THE DRAINAGE ANALYSIS TO ASSUME THAT AN IRRIGATION DITCH DOES NOT INTERCEPT THE STORM RUNOFF FROM THE UPPER BASIN AND THAT THE UPPER BASIN IS TRIBUTARY TO THE BASIN AREA DOWNSTREAM OF THE DITCH.

3.5.2 Permanent Storage Facilities

The problems of dam safety and the related hazard of the emergency spillways have been brought to the attention of the public by nationwide dam failures. Dam safety is the subject of the federal government's National Dam Safety Program. The State Engineer's Office determines whether a dam is or will be jurisdictional based on the height of the dam embankment, storage volume of a reservoir, or the surface area of a reservoir. Jurisdictional dams are classified by the State Engineer's Office as either low, moderate or high hazard structures depending on downstream conditions. 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 a high hazard

rating if development occurs within the potential path of flooding due to a dam breach. In this case, the reservoir owners are liable for the cost of upgrading the structure to meet the higher hazard classification.

Pursuant to Section 37-87-123, C.R.S., as amended, the Office of the State Engineer has prepared flood hazard maps showing the areas where damage would result from the failure of the high hazard dams within the state. These reports have been made available to various cities, towns, and counties that may be affected by a dam breach.

THE POLICY OF THE CITY SHALL BE TO:

RESTRICT DEVELOPMENT TO AREAS OUTSIDE A RESERVOIR'S HIGH WATER LINE CREATED BY THE DESIGN FLOOD FOR THE EMERGENCY SPILLWAY.

RESTRICT DEVELOPMENT TO AREAS OUTSIDE EXISTING OR POTENTIAL FUTURE EMERGENCY SPILLWAY PATHS BEGINNING AT THE DAM AND PROCEEDING DOWNSTREAM TO THE POINT WHERE THE FLOOD WATERS RETURN TO THE NATURAL DRAINAGE COURSE.

FOR HYDROLOGIC PURPOSES, DETENTION OF WATER BY ALL PRIVATE DAMS SHALL BE IGNORED IN THE DEFINITION OF FLOODPLAINS.

3.5.3 Irrigation Ditches

Irrigation ditches are designed with flat longitudinal slopes and limited carrying capacity which decrease in the downstream direction. As a general rule, irrigation ditches cannot be used as an outfall point for the storm drainage system because of these physical limitations. In addition, certain irrigation ditches are abandoned after urbanization and, therefore, could not be successfully utilized for storm drainage.

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

THE POLICY OF THE CITY SHALL BE AS FOLLOWS: TO REQUIRE DEVELOPMENT TO DIRECT THE STORM RUNOFF INTO HISTORIC AND NATURAL DRAINAGEWAYS AND AVOID DISCHARGING INTO A IRRIGATION CANAL OR DITCH EXCEPT AS REQUIRED BY WATER RIGHTS.

WHENEVER NEW DEVELOPMENT WILL ALTER THE PATTERNS OF THE STORM DRAINAGE INTO IRRIGATION DITCHES BY INCREASING FLOW RATES, INCREASING VOLUMES, OR CHANGING THE POINTS OF CONCENTRATION, THE WRITTEN CONSENT OF THE IRRIGATION DITCH

OWNER SHALL BE SUBMITTED WITH THE DEVELOPMENT APPLICATION. THE DISCHARGE OF STORM RUNOFF INTO THE IRRIGATION DITCH SHALL BE APPROVED ONLY IF SUCH DISCHARGE IS CONSISTENT WITH A MASTER DRAINAGE PLAN AND IN THE BEST INTEREST OF THE CITY.

WHENEVER IRRIGATION DITCHES CROSS MAJOR DRAINAGEWAYS WITHIN THE DEVELOPING AREA, THE DEVELOPER SHALL BE REQUIRED TO DESIGN AND CONSTRUCT THE STRUCTURES NECESSARY TO SEPARATE STORM RUNOFF FROM DITCH FLOWS SUBJECT TO THE CONDITION NOTED ABOVE.

ANY DEVELOPMENT OR REDEVELOPMENT ADJACENT TO AN IRRIGATION DITCH SHALL BE REQUIRED TO OBTAIN IN WRITING VERIFICATION FROM THE IRRIGATION DITCH OWNER/OWNERS THAT THEY HAVE REVIEWED AND ACCEPTED THE PROPOSED DEVELOPMENT AND STORMWATER RUNOFF PLAN.

3.6 WETLANDS

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater of a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The Corps of Engineers will make the final determination whether "waters of the U.S." which includes wetlands exists on the project site. If they do not exist or exist but will not be impacted, there is no requirement to advise the Corps of Engineers and go through the permit process.

THE POLICY OF THE CITY SHALL BE AS FOLLOWS:

IF WETLANDS ARE FOUND ON THE SITE, THE CITY WILL REQUIRE A DETERMINATION OF THEIR EXTENT AND THE NEED TO COMPLY WITH EXISTING REGULATORY REQUIREMENTS AT THE FEDERAL AND STATE LEVELS.

ALL DEVELOPMENTS OR REDEVELOPMENTS CONTAINING WETLANDS WILL BE REQUIRED TO INITIATE THE PRE-APPLICATION PROCESS WITH THE CORPS OF ENGINEERS TO ESTABLISH A FIELD REVIEW DATE AND REQUEST A PERMIT DETERMINATION. THE PERMIT DETERMINATION IS AT THE SOLE DISCRETION OF THE CORPS OF ENGINEERS. IF REQUIRED BY THE CORPS OF ENGINEERS, THE DEVELOPER SHALL OBTAIN AN INDIVIDUAL OR NATION-WIDE PERMIT AS DETERMINED BY THE CORPS OF ENGINEERS.

THE DEVELOPER WILL BE REQUIRED TO APPLY FOR ANY OTHER PERMITS DEEMED NECESSARY BY THE CITY, FEDERAL, OR STATE AGENCIES INCLUDING WATER QUALITY CERTIFICATION.

3.7 ENVIRONMENTAL ASSESSMENT

A Phase I Environmental Assessment (ASTM E 1527, most current version) is required for right-of-way, park, and other public land dedication to the CITY. Depending on the results of the Phase I Environmental Assessment, more detailed studies may be required to further investigate the land being dedicated or transferred to the CITY. The CITY may refuse the land dedication or transfer based on the results of the environmental assessment.

THE POLICY OF THE CITY SHALL BE TO REQUIRE AN ENVIRONMENTAL ASSESSMENT ON ALL LAND DEDICATED OR TRANSFERRED TO THE CITY. UPON REVIEW OF THE ENVIRONMENTAL ASSESSMENT, THE CITY SHALL DETERMINE WHETHER THE LAND DEDICATED OR TRANSFERRED WILL BE ACCEPTED.