

Section 13 Stormwater Drainage and Retention Standards

13.1 Introduction

The proper conveyance, storage and release of stormwater is critical to maintain the integrity of Mesa Proving Grounds. Stormwater will be conveyed in accordance with relevant requirements and standards. Drainage facilities, including retention and detention basins, storm drains including inlets, mains and headwalls, channels, drywells and sub-surface storage, shall be designed to minimize impact and disruption to the tight urban fabric. Designs should minimize land area to reduce voids between adjacent uses. Designs should also encourage other uses in the same space to mitigate the effect of voids (i.e. sports courts at the bottom of a stepped wall basin with drywells to drain nuisance water from the recreation area).

Exhibit 13.1 - Urban Retention Character



Note: photos are intended to be representative of the character and quality of the types of urban retention within Mesa Proving Grounds and are not intended to express specific design details, colors or materials.

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- A. Retention Methods. The implementation of the CP for Mesa Proving Grounds will require modification to the City's standard surface storage retention requirements to allow decentralized retention basins to create development conducive to a sustainable urban environment. Traditionally, retention is accommodated within a limited number of well defined irregular shaped areas and multiple small retention basins are not acceptable. The more urban, development environments will require numerous small retention basins that may be of regular shape and varied depth. The decentralized retention basin concept allows for storage of stormwater within numerous areas to create an overall storage concept that meets standard stormwater storage requirements, reduces the amount of stormwater being conveyed within streets and reduces the requirements for storm drain systems. Retention Basins may be publicly or privately owned and maintained. The use of decentralized retention basins will require modifications of the City's Engineering Standards, in accordance with Section 9. If the city agrees, then these basins are privately owned and operated.
- B. General Information
1. The CP includes the use of the City Drainage Design Standards as noted in Section 9.
 2. The Uniform Drainage Policies and Standards for Maricopa County as published by the FCDMC and as amended are applicable.
 3. Any future modifications to the provisions of the drainage standards at the DUP, Site Plan or subdivision level processes are permitted upon approval by the City Engineer in accordance with Section 9.
- C. Drainage Reports
1. The City utilizes a current Drainage Master Plan which was incorporated the Master Drainage Report for Mesa Proving Grounds.
 2. A more detailed analysis for each DU will be provided with each DU Drainage Report that will address any changes in the particular DU and adjacent DUs which may occur as development progresses and densities change. Updates to the Master Drainage Report may be required by the City Engineer if significant changes are made to the LUGs and assumptions utilized to prepare the Master Drainage Report.
 3. Final Drainage Reports are required for specific individual developments to ensure compliance with the Master Drainage Report, the DU Drainage Report and to identify significant changes in infrastructure needed to serve the parcel.
- D. On-site Stormwater Management
1. Retention and detention alternatives to traditional surface storage retention basins are permitted subject to the approval by the City Engineer of the Engineering Design Standards of the specific application {including small decentralized retention systems of varying sizes and depths and subsurface detention systems}. The decentralized retention and detention approach will allow for storage of stormwater within numerous areas to create an overall storage concept that meets standard stormwater storage requirements and reduces the amount of stormwater being conveyed within streets and reduces the requirements for storm drain systems. Modifications to the City Standard Details of facilities shall be considered at the DUP, Site Plan or subdivision process by the City Engineer in accordance with Section 9.
 2. The detailed design of retention and detention facilities shall be determined during the Site Plan or subdivision level process. Non-traditional and innovative methods of retention and detention facilities will be considered pursuant to Section 9.
 3. Common retention facilities for multiple parcels may be established as approved during the DUP, Site Plan or subdivision level process by the City Engineer.

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4. Maximum depths and side slopes of retention basins may vary from city standards. Walls and stepped conditions shall be permitted so long as safety concerns are addressed. Details of facilities are subject to the approval of the City Engineer pursuant to Section 9 at the DUP, Site Plan or subdivision level.
5. Stormwater irrigation within the ROW is allowed as approved by the City Engineer.
6. A permanent solution to disposal of stormwater retention may be accomplished by the construction of drywells. The use of a single chamber or multiple chamber drywells will be determined based on the detailed application. Percolation rates for drywells will be based on standards approved by the City Engineer. Drywells must be maintained and refurbished by the Master Developer when they cease to function properly. Details of drywell applications may be approved at the DUP, Site Plan or subdivision level processes by the City Engineer.

E. Off-site Stormwater Management

F. Storm drainage will be retained and conveyed as outlined in the Master Drainage Report and as approved by the City Engineer at the DUP. Storm Drain Facilities

1. Alternative storm drain inlets include scuppers, curb openings, and various catch basins Storm drain inlet details may be approved at the DUP, Site Plan or subdivision level processes by the City Engineer in accordance with Section 9.
2. Alternative storm drain inlets and outlets may be approved by the City Engineer. The details may be approved at the DUP, Site Plan, or subdivision level processes by the City Engineer in accordance with Section 9.
3. Alternative storm drain materials may be approved by the City Engineer with proper justification and analysis provided. This may be approved at the DUP, Site Plan or subdivision level processes by the City Engineer in accordance with Section 9.
4. Alternative detailed channel designs may be approved by the City Engineer, with concurrence from the Planning Director, with proper justification and analysis provided. This may be approved at the DU, Site Plan or subdivision level processes by the City Engineer in accordance with Section 9.

G. Aesthetic Treatment of Stormwater Drainage and Retention Elements

1. Storm drain and retention area elements shall be aesthetically treated in one of the following manners:
 - a. an extension of the architecture or urban setting,
 - b. an integral part of the landscaping theme,
 - c. a background element that is designed to visually recede or disappear (not draw attention to itself), or
 - d. a combination of the above techniques.
2. Aesthetic treatment may be accomplished through materials, color, or custom designed elements.
3. Retention elements, including railings and headwalls, should be aesthetically pleasing in urban areas and areas with high pedestrian traffic and visibility.