

PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT TECHNICAL POLICY

POLICY NO.: Technical Policy, TECH-026

EFFECTIVE DATE: May 18, 2021

REVISED: N/A

POLICY TITLE: Regulation of Single-Lot Development within Flow Corridors

PURPOSE:

The purpose of this policy is to establish guidelines for permitting development within Flow Corridors.

BACKGROUND:

Flow Corridors are a regulatory concept first established in 1999 with the delineation of the flow corridors in the Brawley Wash area. These flow corridors were identified in order to establish continuous flow paths for the most hazardous areas within the large, distributary Brawley Wash floodplain. This concept was more fully considered during the development of the Lee Moore Wash Basin Management Plan (May 17, 2011), which established Development Criteria for the flow corridors delineated in that study. Flow Corridors are the primary flow paths within the floodplain where sheet flow or braided or distributary flow regimes are present. Flow Corridors are intended to serve as the designated floodplain for regional drainage, when land use planning. Maintaining the efficient conveyance of flood water downstream through Flow Corridors is important for maintaining flood storage capacity and the natural functions of the floodplain.

Within Flow Corridors, flow depths and velocities are expected to be greater and flow paths will often be variable and uncertain, creating hazardous conditions that may change over relatively short time periods, possibly during the course of a single flow event. Less restrictive than Administrative Floodways, the purpose of establishing Flow Corridors is to provide a tool to regulate development within and direct development away from these high hazard areas.

POLICY:

Due to the more hazardous flood conditions within Flow Corridors, greater caution is necessary when development is proposed. As such, in order to ensure public safety, this policy establishes development standards within Flow Corridors.

For the purpose of this policy, braided or distributary flow shall be defined as any area where there are multiple channels across the cross-section of the flow corridor. A channel will generally be considered to be a low-lying flow area with a sandy bottom that may or may not have a defined bank, but which is an area of more frequent flow than the surrounding land.

I. Conditions Applicable to Any Single Lot Development

The following policies shall apply to any development on a parcel impacted by a Flow Corridor:

A. Avoidance

1. For properties that are not entirely within a Flow Corridor, any new development shall be located entirely outside of the Flow Corridor unless there is insufficient space outside the Flow Corridor or other limiting factors necessitates placing the development within the Flow Corridor.
2. For any development placed wholly or partially within a Flow Corridor, the development shall be placed in the least hazardous area within the Flow Corridor.

B. Exceptions

The following developments are not subject to this Policy. This does not exempt these developments from requiring permits or from any other rule, regulation or policy:

1. Open fencing as defined in Technical Policy TECH-005.
2. Septic system, provided:
 - a. it is located in an area where the associated structure can be located outside of the Flow Corridor, and
 - b. it is not within an erosion hazard area unless supported by an engineering analysis completed by an Arizona registered civil engineer which has been reviewed and approved by the District.
3. Unimproved driveways that cross washes at-grade.
4. Open-sided shade structures.

In addition to the exceptions above, permitting flexibility will be allowed for improvements that are functionally dependent upon existing improvements, such as the construction of a detached garage on a property with an existing residence. In these types of cases, the District may relax the requirements of this Policy that go above and beyond the requirements of other rules or policies.

C. Drainage Analysis

The following criteria must be considered for development within a Flow Corridor.

1. Development in braided or distributary flow areas shall not concentrate flows or eliminate flow paths that change the flow rate or flow distribution on adjacent parcels.
2. For drainage infrastructure design and erosion hazard setback purposes, if a hydraulic rating is used to determine flow distribution at a flow-split, at least 50% of the base flood discharge upstream of the flow split shall be applied on any single channel downstream of the split unless a publicly maintained engineered structure controls the flow distribution. If no hydraulic modeling is provided, the full base flood discharge upstream of the flow split shall be applied on each downstream channel.
3. An analysis of the drainage must include a review of historical aerial photographs in order to determine whether the proposed development is located within an historic flow path. If historic flow paths impact the development, the drainage analysis shall:
 - a. demonstrate that a return to that flow path is restricted by a publicly maintained engineered structure that controls flow distribution, or by natural, durable changes within the watershed, or
 - b. require an engineered design to protect the development from the hazard, assuming flow returns to the historic flow path.
4. The District may require that the evaluation of the above criteria be completed by an Arizona registered civil engineer. An analysis is required under the following conditions:
 - a. flow depths within the area of concern (see Section II) are 2 feet or more, or
 - b. more than 25% of the width of the flow corridor will be obstructed by the development, or
 - c. other conditions or hazards exist that warrant analysis, as determined by the District.

II. Conditions Applicable to Structures

The placement of structures within floodplains represents placing lives and property at risk. Since Flow Corridors are areas of higher risk, every effort must be made to locate structures outside of Flow Corridors. When relocation is not an option, extra design considerations are warranted to ensure that construction accounts for current and foreseeable future conditions within the Flow Corridor.

A habitable structure is any structure that is used for purposes other than vehicle parking and limited storage. Habitable structures include site-built homes, manufactured homes, guest houses, studios, workshops, etc.

A. Requirements for Structures Within Flow Corridors

1. When the flow corridor is subject to braided or distributary flow, it must be assumed that flow conditions at the location of the proposed structure will change over time. Therefore flow depths and velocities at the site may increase. When determining the appropriate Base Flood Elevation (BFE) and erosion protection measures for a structure, the more restrictive of the following criteria shall be used unless an alternative is justified by an engineering analysis:
 - a. a minimum BFE of at least 0.5 feet regardless of current flood conditions, or
 - b. the most restrictive flow conditions (BFE and velocity) within 50 feet of any habitable structure and 25 feet of any non-habitable structure.
2. Any structure, including any fill pad associated with the structure, shall not be placed on existing or historic channels or flow paths unless an engineering report submitted to and approved by the District:
 - a. demonstrates that the proposed location is the least hazardous location on the parcel, and
 - b. provides a foundation design using the analysis criteria in I.C.

III. Fences and Walls

Fences and walls have the potential to significantly alter or obstruct flow, and are discouraged within Flow Corridors. Whenever fences/walls are proposed within a Flow Corridor, open type fences, as defined by Technical Policy TECH-005, are the preferred option.

Except as noted in this policy, fences and walls shall be constructed pursuant to the standards of Technical Policy TECH-005. Application of the requirements below is at the discretion of the District based upon site-specific conditions.

A. Open Fences

Open fences shall be constructed pursuant to the standards of Technical Policy 005.

B. Woven Wire and Wrought Iron Fences

The following additional criteria apply to woven wire fences within Flow Corridors:

1. In all cases, woven wire and wrought iron fences shall be elevated at or above the Base Flood Elevation, unless:
 - a. the fence is less than 50% of the width of the property perpendicular to flow (property line setback requirements from Technical Policy TECH-005 still apply), and/or
 - b. the fence encloses a small portion of the parcel for the purpose of:
 - i. enclosing a swimming pool, or
 - ii. providing a small enclosure for pets or personal use.
2. When spanning regulatory washes, woven wire fences must be elevated at or above the Regulatory Flood Elevation as measured at the top of the banks of the channel.
3. Individual strands of wire may be placed horizontally below the bottom of the fence at six inch intervals per Technical Policy 005.

C. Solid Fences and Walls

The following additional criteria apply to walls and solid fences within Flow Corridors.

1. Walls and non-elevated solid fences are prohibited, unless.
 - a. the wall/fence is located entirely upon an approved fill pad, or

- b. an engineering report prepared by an Arizona registered civil engineer demonstrates that wall/fence will not adversely impact any adjacent parcel under intact and failed conditions, or
 - c. the purpose of the wall/fence is to enclose a swimming pool and the wall/fence is;
 - i. at least 50 feet from any property boundary, OR
 - ii. located immediately upstream or downstream of the principle dwelling unit and,
 - iii. located at least 25 feet from the upstream property boundary, and
 - iv. the wall/fence does not create more than 25 feet of additional encroachment as measured perpendicular to the direction of flow.
2. In lieu of C.1.a through C.1.c above, solid fences may be elevated at or above the Regulatory Flood Elevation.
 3. Individual strands of wire may be placed below the bottom of the fence/wall at six inch intervals per Technical Policy 005

IV. Access and Utilities

Since flows within Flow Corridors are expected to be both more frequent and more hazardous, use of Flow Corridors for property access increases the risk of harm and lack of access to/from the property by residents and emergency response personnel and is therefore discouraged.

Driveway/Roadway crossings within Flow Corridors may also create considerable maintenance and safety issues if not properly designed, constructed, and maintained. These problems include sediment-transport disruption, increased flow velocities and scour downstream of the crossing, ponding and flow diversion upstream of the crossing, unintended overtopping of the roadway due to debris clogging of culverts and erosion of channel banks adjoining the crossing. Crossings that utilize the natural main-channel depth, width, and slope at the crossing location will have the least impact and are therefore recommended.

Similarly, placement of utilities within Flow Corridors can present safety hazards, and improper design of utility crossings could lead to disruption of service and create additional safety hazards due to damage.

A. Access Crossings

The following standards apply to driveway and roadway crossings (hereafter, access crossings).

1. Access crossings are discouraged at locations where the watercourse is braided. Where braided watercourses must be crossed, crossings that minimize flow contraction and disruption of sediment balance are recommended.
 - a. Unimproved access crossings are recommended.
 - b. Improved access crossings shall be designed per Technical Policy 027.
2. Access crossings shall be designed so the roadway alignment is perpendicular to the watercourse in order to minimize disruption to the floodplain. Exceptions may be made due to site constraints such as easements, on a case by case basis.
3. Access crossings shall generally be located:
 - a. at the narrowest part of the floodplain, or
 - b. where there are the least number of braids to be crossed.
4. Approval of the access crossing or the development necessitating the crossing may be conditional upon inspection of the construction of the crossing during or after construction.

B. Utility Crossings

The following guidelines apply to utility crossings.

1. Utilities shall be buried below the total 100-year scour depth in the main channel(s), including any long-term scour component (i.e., streambed degradation), unless acceptable engineering mitigation is provided;

2. Where the potential for lateral migration of the main channel(s) exists, underground utilities shall be buried at the same elevation in the overbank areas or erosion-hazard area as in the main channel, unless controls are in place to prevent utility damage and/or exposure after lateral movement of the main channel;
3. When practical, utilities shall cross at the same location and in the same manner as access crossings, and be:
 - a. located on the upstream side of the culvert or at-grade crossing unless placement at the downstream location is justified, or
 - b. incorporated into the design of improved crossings;
4. After construction, utility crossings not associated with an access crossing shall be revegetated in a manner consistent with all applicable local, state, and federal laws and regulations. U.S. Army Corps of Engineers 404 Permit requirements typically provide guidance for this activity.
5. Utility crossings that are not co-located with access crossings shall generally be located:
 - a. at the narrowest part of the floodplain, or
 - b. where the least number of braids will be crossed.
6. Approval of the utility crossing or the development necessitating the crossing may be conditional upon inspection of the burial depth of the utilities and/or constructed development protecting the utilities. Inspections may be conducted by the District and/or other agencies.

V. Historical Flow Corridors and Corridor Equivalents

There are several Flow Corridors or equivalents that were established prior to this Policy with specific requirements that differ from this Policy. The treatment of each of these Flow Corridors and equivalents is established below. Any Flow Corridor not specifically referenced below is subject to the requirements above in full.

A. Black Wash Administrative Floodway

The Black Wash Administrative Floodway was established by Floodplain Study #15, *Black Wash Drainage Analysis and Policy Assessment Report*, dated 9/12/1990. As a result of this study, the Black Wash Administrative Floodway has been regulated under the floodway provisions of the Floodplain Management Ordinance. The Black Wash Administrative Floodway shall continue to be regulated in this manner.

B. Brawley Wash Corridor

The Brawley Wash Corridor was established by Floodplain Study #42, titled *Brawley Wash Primary Flood Corridor Study*, by Simons, Li & Associates dated 6/1/1999. By at least 9/27/2002, per a memorandum by Barbara L. Johnson, P.E., Manager, an engineering study was required for development within the Brawley Wash Primary Flood Corridor (hereafter Brawley Wash Corridor) established by Floodplain Study #42. This was preceded by a history of denying permits within the Brawley Wash that predated even the mapping of the Brawley Wash Corridor, according a memorandum from Director Antonio C. Paez dated 6/2/1995.

In practice, the engineering requirement within the Brawley Wash Corridor has only applied to the construction or placement of structures within the corridor. As such:

1. For the construction of structures, including the placement of manufactured homes, within the corridor, an engineering analysis shall be required that, at minimum,
 - a. assesses the flood conditions on the property,
 - b. determines the potential scour depth at the location of the proposed structure, and
 - c. designs a foundation that protects the structure from erosion and scour.
2. For all other types of development, the provisions of this Policy shall apply to the Brawley Wash Corridor.

C. Lee Moore Wash Basin Management Study Flow Corridor

The Lee Moore Wash Flow Corridors were created by Floodplain Study #10 in 2009, which was an update of an earlier floodplain study for the Lee Moore Wash basin. The Flow Corridors established for the Lee Moore

Wash Basin were created largely to guide new commercial and multi-lot subdivision development. Subsequent restudy of the Lee Moore Wash watershed was completed in 2019. The 2019 study also delineated Flow Corridors. This report was not intended to guide single-lot development. As such:

1. For commercial and subdivision development the rules established by the 2009 report *Implementation Plan and Development Criteria for the Lee Moore Wash Basin Management Plan* shall apply. Namely,
 - a. Flow Corridors are to be left in their natural condition, and
 - b. Flow Corridors are to be left undeveloped and unimpeded.
2. For single-lot development, the provisions of this Policy shall apply to Flow Corridors using the 2018 and 2019 Flow Corridor delineations.

D. Tortolita Spine Wash

The Tortolita Fan Spine Washes were established by Floodplain Study #24, titled *Tortolita Area Basin Management Plan*, by Cella Barr Associates dated 8/3/1993. By at least 9/27/2002, per a memorandum by Barbara L. Johnson, P.E., Manager, an engineering study was required within these Spine Washes. In practice, the engineering requirement within Spine Washes has only applied to the construction or placement of structures within the Spine Washes. However, recent and more robust floodplain studies within the Tortolita Fan indicate that an engineering analysis isn't always warranted. As such:

1. For the construction of structures, including the placement of manufactured homes, within the mapped spine washes, staff shall determine whether an engineering analysis is required on a case-by-case basis. When required, the engineering analysis shall, at minimum,
 - a. assess the flood conditions on the property,
 - b. determine the potential scour depth at the location of the proposed structure, and
 - c. design a foundation that protects the structure from erosion and scour.
2. When an engineering analysis is not required for structures, and for all other types of development, the provisions of this Policy shall apply to development within the Tortolita Spine Washes.

APPROVED BY:



Suzanne Shields, P.E.
Director and Chief Engineer

5/19/21

Date

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