

PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT TECHNICAL POLICY

POLICY NO.: Technical Policy, TECH-005-- --

EFFECTIVE DATE: November 5, 2007

REVISED DATE: ~~11/2/15~~ DRAFT 1/27/20

POLICY TITLE: ~~Construction Standards for Fences and Walls within Regulatory Floodplains~~

PURPOSE: ~~To clarify 16.20.020.C.5 by establishing guidelines regarding the design and construction of fencing and walls that may be approvable without providing an engineering study demonstrating no adverse impact (i.e. encroachment criteria have been met).~~

BACKGROUND:

~~The~~ Depending on the amount of area enclosed, the location and orientation relative to the floodplain, and proximity to property boundaries, fences (wire, wrought iron, woven wire, chain-link, wood, sheet steel, etc.) and walls (masonry, block, etc.), hereafter collectively called fences/walls, have the potential to significantly impact flood flows and adversely impact adjacent properties. In addition to their impact to floodplains, the structural failure of fences/walls that are not designed to accommodate floods or withstand flood forces can cause structures to flood that otherwise may not have flooded. Floodplain Management Ordinance provision 16.20.020.C states that an applicant proposing new development may be required to provide an engineering study, prepared by an Arizona-registered civil engineer, outlining the effects that the development will have on the flow of flood waters through the area being developed and through surrounding areas. If an engineering study reasonably demonstrates that there is no adverse impact (i.e. meets encroachment criteria), a Floodplain Use Permit (FPUP) may be issued for the new development. In many cases, fences and walls can be reasonably assured to have a negligible impact on flood waters through the use of certain construction and design standards without the need for an engineering analysis.

An FPUP is required for construction of any ~~wall or fence/wall~~ within a regulatory floodplain in order to ensure compliance with the Ordinance. ~~Depending on the nature of the flood hazard at the site, and the proposed characteristics of the wall or fence/wall, the District may accept certain wall or fence/wall configurations without requiring an engineering study.~~ As a basic starting point, the allowed wall or fence/wall configurations types are summarized allowed for each flood hazard area can be found on the attached Table titled: FLOODPLAIN MANAGEMENT PRACTICES FOR FENCES / WALLS.

Because solid ~~(masonry block)~~ walls (masonry, block) and certain types of fencing such as woven wire, wood or sheet steel ~~(hereafter collectively described as fences/walls)~~ have the potential to significantly obstruct or alter flow within floodprone areas and create hazardous conditions on surrounding properties, the Table indicates that these fences/walls may be allowed on a case-by case basis. Often an engineering study is required in these cases.

This policy establishes specific standards that may affect the acceptability of fence/wall designs including the proximity of the fence/wall to property boundaries, the alignment of the fence/wall relative to flow direction, the total amount of area enclosed or obstructed by the fence/wall, and the incorporation of flood openings in the fence/wall construction. This will result in consistent implementation of the construction standards and the requirement to obtain an engineering study when these standards have not been met.

In 2020, this policy was revised to add additional clarity, consistency and address rule changes or clarifications from local, state and federal agencies. New sections were added related to floodways, pool enclosures and wrought iron fences.

POLICY:

~~The minimum standard for fences/walls is that they shall not adversely impact adjacent properties. This standard is typically addressed through an engineering study. Since an engineering study can be cost prohibitive, this policy establishes design criteria for fences/walls that can be used in lieu of an engineering analysis or an engineered design provided certain conditions are met. Depending on the nature of the flood hazard at the site and the proposed characteristics of the fence/wall, the District may accept certain defined fence/wall configurations in lieu of requiring an engineering study. The allowed-acceptable fence/wall configurations are summarized for each type of flood hazard area on the attached Table titled: *FLOODPLAIN MANAGEMENT PRACTICES FOR FENCES / WALLS*, effective January 13, 1994, and revised November 5, 2007/December 11, 2018. This Table specifies a case by case review for fences/walls constructed within the floodway fringe area. Designs that meet the design criteria standards outlined below may be approved by the District without an engineering study. Upon identification of unusual flood hazards, the District may still require an engineering study for designs in conformance with these standards, unless uncertain, unusual, or high hazard conditions exist.~~

A. Fences/Walls within Floodways

~~The FEMA guidance document titled *Certification Requirements for Simple Floodway Encroachments* states, “. . . nothing that offers any resistance to the flow of floodwaters may be placed in a regulatory floodway unless compensatory action is taken to restore the lost conveyance.” As such, any fence or wall proposed within a mapped regulatory floodway must:~~

- ~~1. meet the requirements in Sections C through K of this policy, **and**~~
- ~~2. except for three or four strand wire fences, be justified by an engineering analysis prepared by an Arizona registered civil engineer that:~~
 - ~~a. Addresses debris loading on the fence/wall,~~
 - ~~b. Designs compensatory conveyance of flood flows, **and**~~
 - ~~c. Demonstrates that the improvements cause no rise in the base flood elevation at any property boundary.~~

~~The Ordinance establishes that, where a floodway has not been defined, the primary channel of any regulatory wash is considered to be a floodway. Section A.2 does not apply to this definition of floodway.~~

B. Fences/Walls with Designated Flow Corridors

~~Fences and walls within regulatory Flow Corridors are further subject to the provisions of *Technical Policy 026: Regulation of Single-Lot Development within Flow Corridors*, which modifies some of the requirements within this policy.~~

A.C. All Fences/Walls

~~The requirements in this section apply to all ~~walls and~~ fences/walls.~~

- ~~1. **Accurate and Complete Site Plan**—The FPUP application must be accompanied by a site plan of the property, to a measurable scale, which meets all of the requirements of 16.20.020, including showing all existing and proposed development, existing and proposed grading, topography, riparian habitat, and floodplain/erosion hazard setback delineations.~~

2. The site plan must also ~~provide~~ show the proposed fence/wall ~~alignment~~ location in relation to the property boundaries, as well as a dimensioned elevation view detail showing the height of the bottom of the fence/wall above natural grade and/or flood openings or a reference to one of the standard details ~~supplied by the District in this Policy~~, if applicable. The site plan must indicate the location and size of any required flood openings, and demonstrate that these flood openings are aligned with similar flood openings on adjacent properties (if existing).
3. ~~Covenant~~ — Prior to Approval of the FPUP shall be conditioned on the owner shall signing of a covenant stipulating that all flood openings will be kept free of debris at all times and remain open for the passage of floodwaters and/or that fences/walls will be elevated and kept free of debris, as applicable. The property owner must also acknowledge that if the fence/wall poses a flood hazard at any time in the future, the fence/wall shall be modified at the owner's expense to eliminate the hazard.
4. ~~Walls or fences~~ Fences/walls that are intended to contain livestock are not allowed in the channel of a regulatory wash.
5. Single strands of wire may be placed below the bottom of a fence/wall at six inch intervals.
 - a. The lowest strand shall be at least six inches above natural grade (natural grade is not to be altered). Where the fence/wall crosses a wash channel, the distance to the lowest strand shall be measured from the channel overbank.
 - b. The highest strand shall be at least six inches below the bottom of the fence.
 - c. For example, if the fence is elevated one foot above grade, a single strand is allowed below the bottom of the fence. One additional strand is allowed for each additional 6 inches that the fence is elevated.
6. If the fence crosses a regulatory wash, the bottom of the fence shall be elevated at or above the Base Flood Elevation (BFE). In floodplains such as sheetflow floodplains where the BFE is a depth of flow, the point of measurement for the bottom of the fence across the channel shall be the highest bank of the wash (see Figure 005-1).
 - a. Vertical support posts are not allowed within the channel.
 - ~~a.~~ b. Nothing is allowed below the bottom of the fence within the channel, except as provided in C.7 and C.8.
7. Trash racks or any kind of mesh screening are not allowed within the channel of a regulatory wash unless the following conditions are met:
 - a. The trash rack or screening is offset at least 25 feet from any property boundary for washes with a base flood discharge of less than 500 cubic feet per second (cfs),
 - b. The trash rack or screening is offset at least 50 feet from any property boundary for washes with a base flood discharge of 500 cfs to less than 2000 cfs,
 - c. Trash racks or screens are not allowed on washes with a discharge of 2000 cfs or more.
8. Flap gates, flip gates, or similar type designs are prohibited within regulatory washes unless a design by an Arizona registered civil engineer is approved by the District. Flap gates are commonly desired as a solution to allow the passage of floodwaters while preventing unwanted entry of wildlife or exit of domestic pets through the open space required by this policy. However, they often fail to perform as intended and as a result, divert, obstruct or retard flow.

~~— The requirements of Technical Policy 026 shall be applied to walls and fences and walls within Flow Corridors.~~

D. Special Considerations for Pool Enclosures

When Building Code safety requirements dictate that when pool barriers are necessary, that barrier shall not allow the passage of a 4-inch diameter sphere. This often conflicts with District requirements for flood openings. In addition, the pool code requires the bottom of a pool enclosure fence to be no more than two inches above grade when grade is earth, as opposed to block or concrete. The bottom of a pool enclosure may be four inches above grade when grade is hardscaped, such as concrete. When a pool enclosure is proposed within a regulatory floodplain and flood openings are necessary, the following shall apply:

- ~~—The bottom of pool enclosure fences shall be exactly four inches above natural grade in order to keep the bottom of the fence as high as possible within the limits of the pool safety requirements.~~
- ~~—As a result, the area below the fence must be block or concrete and cannot be dirt or loose rock.~~
- ~~1. It is recommended that applicants verify the acceptability of any other materials with Development Services.~~
 - ~~2. The District may require an alteration of the size or configuration of the fence to offset the reduced capacity to pass flows through the fence/wall caused by the pool enclosure safety requirements.~~
 - ~~3. The District may require flow-through fencing or wrought iron to be used in lieu of a solid fence or block wall.~~
 - ~~4. When a block wall is acceptable, the standard details for the wall openings shall be modified as follows.~~
 - ~~a. Wall openings shall be constructed with rebar placed in the openings.~~
 - ~~b. The rebar shall be oriented vertically so as to not offer a step to get over the wall.~~
 - ~~c. The rebar shall be spaced four inches apart.~~
 - ~~d. The District may require more openings or larger openings in order to compensate for the less than optimal opening size and rebar orientation and spacing.~~

B.E. Open Fences

Open fences, which includes most pipe rail fences and 3 or 4 strand barbed/barbless wire fences, are subject to District approval and are generally considered to be the preferred fencing type within a floodplain. ~~—To qualify as open fencing, the fencing cannot occupy more than 10% or less of the flow area obstructed by the fence. Three or 4 strand wire fences are the only type of fence or wall allowed in a Floodway within the primary channel without an engineering analysis. —With respect to open fences, the following standards must be met:~~

- ~~1. Meets the provisions of Sections A through C and B of this policy.~~
- ~~1.2. Fence posts or vertical wires or stays shall be placed no closer than 6 feet apart for stranded wire fence~~
- ~~2.3. Fence posts shall be placed no closer than 8 feet apart for pipe rail type fence~~
- ~~3.4. Fence posts may not be placed in the primary channel of a regulatory wash~~
- ~~4.5. Not allowed in the primary channel if the purpose of the fence is to contain livestock~~

~~An engineering analysis demonstrating no adverse impact may be provided to the District for approval in lieu of meeting the standards above.~~

F. Wrought Iron Fences

~~Wrought iron fences are subject to District approval. Since the bars of wrought iron fences are typically in a vertical orientation, they are prone to catching debris carried by floodwaters. In order to construct a wrought iron fence, the following standards must be met:~~

- ~~1. Meet the provisions of Sections A through C of this policy.~~
- ~~2. Elevate the bottom of the wrought iron fence at or above the BFE, or~~
- ~~3. If not elevated at or above the BFE, setbacks from property lines for wrought iron fence aligned perpendicular to the direction of flow are as follows:~~
 - ~~a. At least 5 feet where flow depths are 1 foot or less~~
 - ~~b. At least 15 feet where flow depths are greater than 1 foot but less than 3 feet.~~
 - ~~c. At least 25 feet where low depths are 3 feet or greater.~~
- ~~4. If not elevated at or above the BFE, setbacks from property lines for wrought iron fence aligned parallel to the direction of flow are as follows:~~
 - ~~a. Zero (0) feet where flow depths are 1 foot or less~~
 - ~~b. At least 5 feet where flow depths are greater than 1 foot but less than 3 feet.~~
 - ~~c. At least 10 feet where flow depths are 3 feet or greater.~~
- ~~5. Any portion of a wrought iron fence not meeting the above setback requirements shall be elevated such that the lowest part of the fence is elevated at or above the BFE.~~

6. Wire mesh or other types of screening material is prohibited below the BFE.

An engineering analysis demonstrating no adverse impact may be provided to the District for approval in lieu of meeting the standards above.

C.G. Woven Wire Fences

Woven wire fence, which includes chain-link fence, field fence, and chicken wire fence can be deceptively hazardous in floodplains, and are subject to District approval ~~and are deceptively hazardous in floodplains.~~ While they are not solid obstructions to flow like a wall, they easily catch debris carried by floodwaters ~~and,~~ As such they may divert and ~~obstruct~~ flow just like a wall. ~~Hydrodynamic pressure on the trapped debris also applies forces that to fences that they were are not designed to withstand, causing them to fail.~~ In order to construct a woven wire fence, the following standards must be met:

1. Meet the provisions of Sections A through C of this policy.
 2. Elevate the bottom of the woven wire fence at or above the BFE, or
 3. If not elevated at or above the BFE, Wwoven wire fence aligned perpendicular to the direction of flow shall be set back as follows:
 - a. At least 20 feet from the upstream property boundary and at least 10 feet from the downstream property boundary where flow depths are 1 foot or less
 - b. At least 30 feet from the upstream property boundary and at least 15 feet from the downstream property boundary where flow depths are greater than 1 foot but less than 3 feet.
 - a.c. At least 50 feet from the upstream property boundary and at least 25 feet from the downstream property boundary where low depths are 3 feet or greater a minimum of 50 feet from the upstream and 25 feet from the downstream property line unless the fence is elevated at or above the Base Flood Elevation.
 4. If not elevated at or above the BFE, Wwoven wire fence aligned parallel to the direction of flow shall be set back from any property boundary a-as follows:
 - a. At least 5 feet where flow depths are 1 foot or less
 - b. At least 10 feet where flow depths are greater than 1 foot but less than 3 feet.
 - c. At least 15 feet where flow depths are 3 feet or greater.
minimum of 15 feet from the property line unless the fence is elevated at or above the Base Flood Elevation
- ~~1. Single strands of wire may be placed below the bottom of the woven wire fence at 6 inch intervals, except as noticed in item 5 below. If the fence is elevated 1 foot above grade, a single strand is allowed, and one additional strand is allowed for each additional 6 inches that the fence is elevated.~~
- ~~2. Woven wire fences shall not be placed within the channel of a regulatory wash. A woven wire fence across a regulatory wash must span the wash from bank to bank with the bottom of the fence elevated at or above the Base Flood Elevation. Nothing is allowed below the bottom of the fence where it crosses a regulatory wash unless a report sealed by an Arizona registered civil engineer demonstrates that, when loaded with debris, the fence will not adversely impact an adjacent property.~~

An engineering analysis demonstrating no adverse impact may be provided to the District for approval in lieu of meeting the standards above.

D.H. Walls and Solid Fences and Walls Wwithout Flood Openings (50 Feet or More from Property Boundaries)

Subject to District approval, with consideration for natural drainage, in order to construct a solid fence/ or wall without flood openings ~~50 feet or more from property boundaries and~~ without an engineering study, the following standards must be met:

1. Meet the provisions of Sections A through C of this policy.
- ~~1.2.~~ 2. The fence/wall shall be offset from all property boundaries by a minimum of 50 feet.

- ~~2.3.~~ The total flow obstruction shall not exceed 50% of the extent of the floodplain impacting the property as measured perpendicular to the direction of flow, considered cumulatively with all other manmade obstructions to flow on the property (i.e. structures, fill, other fences/walls, elevated driveways, etc.).
- ~~3.4.~~ For properties smaller than 1 acre, less than 50% of the total area of the property subject to flooding is enclosed or obstructed.
- ~~4.5.~~ For properties larger than 1 acre, no more than 20,000 square feet of the subject property is enclosed.
- ~~5.6.~~ The fence/wall is not placed across a defined wash or drainage swale (hereafter drainage path).

E.I. Walls and Solid Fences and Walls Wwith Flood Openings (25-50 Feet from Property Boundaries)

Subject to District approval, with consideration for natural drainage, in order to construct a solid fence/ or wall within 25-50 feet of a property boundary without an engineering study, the following standards must be met (see also ~~Exhibit D~~ Figures 005-2 and 005-3):

- 1. Meet the provisions of Sections A through C of this policy.
- ~~1.2.~~ The solid fence/ or wall must be offset from all property boundaries by a minimum of 25 feet.
- ~~2.3.~~ The solid Ffences/ or walls must contain flood openings that comprise at least 50% of the total fence/wall length. ~~In this case, the fflood openings shall be at grade, and the~~ consist of any of the following: ~~(See Exhibit D)~~
 - a. Alternating Ppanels of Ssolid fFence/wall and flood openings provided by panels of Wwrought firon Ffence Panels, subject to the following minimum standards (See Figure 005-2):
 - i. At least 50% of the linear length of the wall shall be wrought iron panels,
 - ii. Wrought iron panels shall be relatively evenly distributed along the entire length of the wall, and preferentially located in low areas or drainage paths,
 - iii. TThe bottom horizontal member of the wrought iron fence panel must be at least six inches above grade (or four inches above grade if the fence/wall provides is a pool enclosure),
 - i.iv. and tThe solid portions of the wrought iron fence located below flood level, BFE shall occupy 20% or less of the flow area for an assumed 2 foot flow depth. (See Exhibit D, Sheet 1), or
 - b. FA solid fence/ or wall with flood openings provided by Bottom Holes, subject to the following minimum standards (See Figure 005-3):
 - i. The bottom of all openings shall be at natural grade on the outside face of the wall,
 - ii. TThe height of the bottom holes top of all openings shall be at least equal to the 1 percent annual chance flood depth or above the BFE. If pet containment within the fence/wall is desired, bottom holes flood openings may be fitted with horizontal bars (3/8 inch max dia.) spaced no closer than 6 inches vertically (to be replaced with vertically oriented bars with 4 inches vertical of horizontal spacing if fence/wall provides is a pool enclosure). (Ssee Exhibit DFigure 005-3 Detail C, Sheet 2).
 - iii. WWhere 1 percent annual chance flood depths are the BFE is six inches or less, bottom holes flood openings shall be a minimum of one full course of block high or (a minimum of 8 inches), whichever is greater, above natural grade and be a minimum of two blocks wide (a minimum of 32 inches).
 - iv. WWhere 1 percent annual chance BFE flood depths are greater than six inches, bottom holes flood openings shall be a minimum of two courses of block high (or a minimum of 16 inches) above natural grade, or to the base flood elevation BFE, whichever is higher greater, and be a minimum of two blocks wide (or a minimum of 32 inches, whichever is greater).
- 3.4. Only Wrought iron fence panels may be placed across Where the solid fence or wall crosses existing defined drainage paths only wrought iron or open type fences are allowed. The bottom horizontal member of the wrought iron fence crossing the defined drainage path shall be elevated above the defined drainage path to the height of the BFE measured at the bank of the defined drainage path or

above the ~~drainage path 100-year flood surface elevation BFE~~ within the defined drainage path, whichever is higher. There shall be no vertical posts within the defined drainage path.

- ~~4.5.~~ For the purpose of facilitating passage of flood flow through adjacent lots, the flood openings on one property shall be generally aligned with the flood openings (if used) on adjacent properties.

The pertinent hydraulic features of this acceptable fence/wall are summarized ~~on the attached Exhibit D~~ Figures 005-2 and 005-3, and are for hydraulic design purposes only; structural design of the fence/wall is the responsibility of the applicant.

F.J. Elevated Walls and Solid Fences and Walls (Within 25 Feet of Property Boundaries)

Subject to District approval, with consideration for natural drainage, in order to construct a fence/wall on the property boundaries without an engineering study, the following standards must be met.:

1. Meet the provisions of Sections A through C of this policy.
- ~~1.2.~~ The bottom of the solid fence/ or wall is must be elevated at or above the 1 percent annual chance flood depth BFE along the entire length of the fence/wall within 25 feet of a property boundary;
3. Vertical posts/pillars supporting the fence/wall shall be:
 - a. Spaced no closer than 8 feet apart (measured from center to center).
 - b. If masonry, no more than 16 inches wide
 - a-c. If solid fence, no more than 6 inches wide.;
4. If masonry, submittal of a sealed report or design by a structural engineer is required demonstrating that the wall is structurally sound. This report does not need to address the impact to or from floodwaters, but is necessary to demonstrate that the structural design for the large openings is sufficient to maintain the structural integrity of the wall.
- ~~2.~~ Where the solid fence or wall crosses existing defined drainage paths only wrought iron or open type fences are allowed. The bottom of the wrought iron fence crossing the defined drainage path shall be elevated above the defined drainage path to the height of the BFE measured at the bank of the defined drainage path or above the drainage path BFE, whichever is higher. There shall be no vertical posts within the defined drainage path. The bottom of the fence/wall crossing the defined drainage path is elevated above the bank of the defined drainage path or above the 1 percent annual chance flood water surface elevation within the drainage path, whichever is higher;
- ~~3.~~ If the fence/wall is elevated one foot or more above natural grade, a single strand of barbless wire may be placed below the solid fence with a minimum spacing of 6 inches between the strand of wire and the ground and/or the bottom of the fence/wall.
- ~~4.5.~~

G.K. Walls and Solid Fences and Walls that Do Not Satisfy the Standards of this Policy

Proposed fences/walls that do not ~~satisfy-meet~~ the standards described above shall ~~be supported by~~ require the submittal of an engineering study completed by an Arizona registered civil engineer for District review and approval that addresses the following (at a minimum):

1. The study must demonstrate that the fence/wall does not adversely affect any adjacent property by showing that:
 - a. The fence/wall does not increase the 1 percent annual chance flood depth by more than 0.1 feet, as measured at property boundaries,
 - b. The fence/wall does not increase the 1 percent annual chance flood velocity by more than 1 foot per second or 10%, whichever is less, as measured at property boundaries,
 - c. The fence/wall does not increase the potential for erosion on any adjacent property, and
 - d. The fence/wall does not divert flow, meaning that flood water enters and exits the subject property in substantially the same location and under identical flow conditions after the fence/wall is ~~present-constructed~~ as it did before the fence/wall was constructed
2. The site plan must include a detail of the fence/wall design, ~~and include~~ a detail of any flood openings and the total number and location of the flood openings.

3. The site plan must be sealed by the engineer of record
4. ~~As a condition of~~ the FPUP ~~will be conditioned upon shall be~~ the requirement that an as-built certification letter from an Arizona-registered civil engineer be provided to the District upon completion of the work, confirming that the fence/wall was constructed in accordance with the FPUP, the engineering study, and the site plan.

APPROVED BY:

Suzanne Shields
Director

Date

Original Policy Approved: 11/5/2007
Date(s) Revised: 11/2/2015

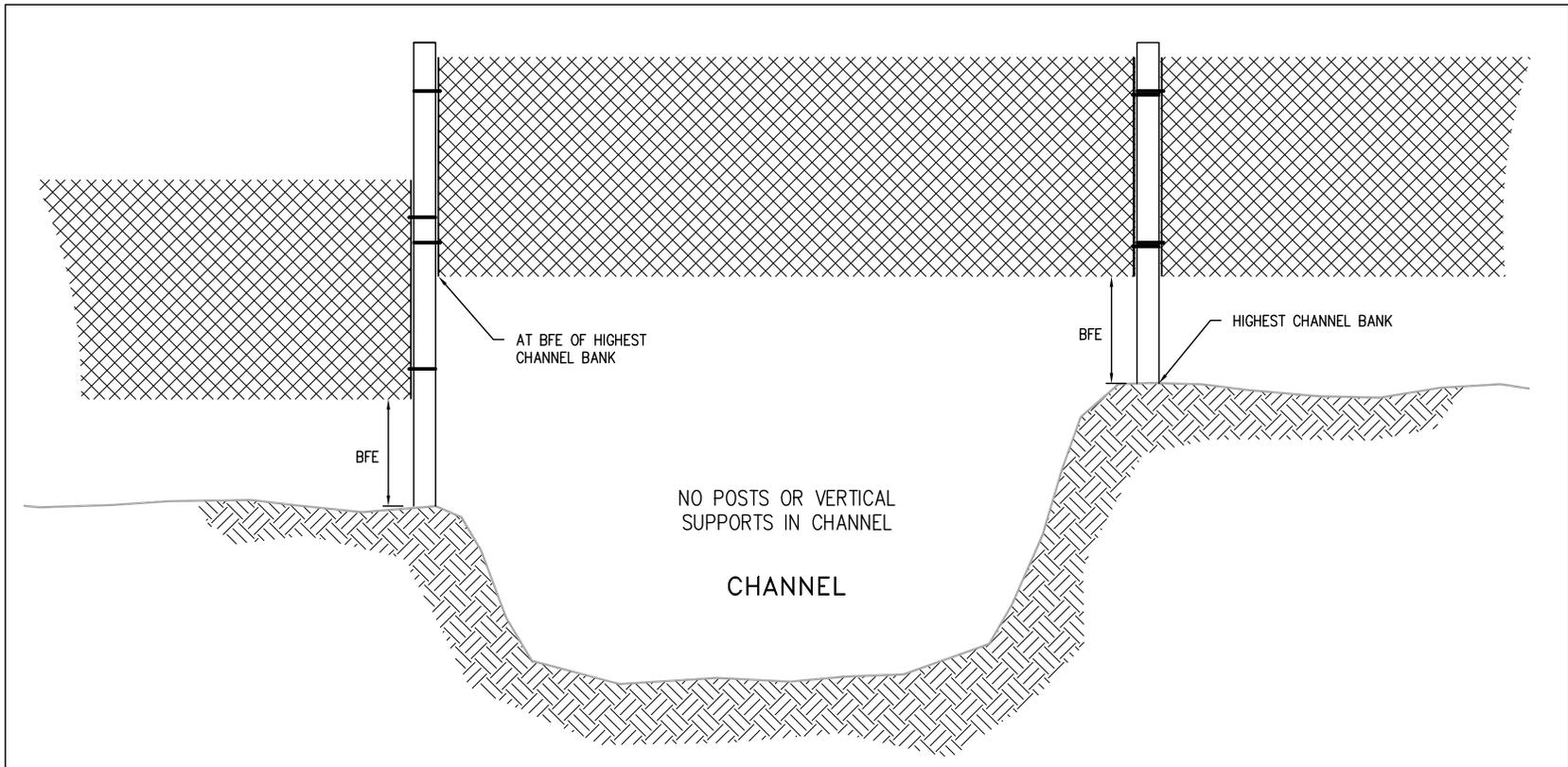


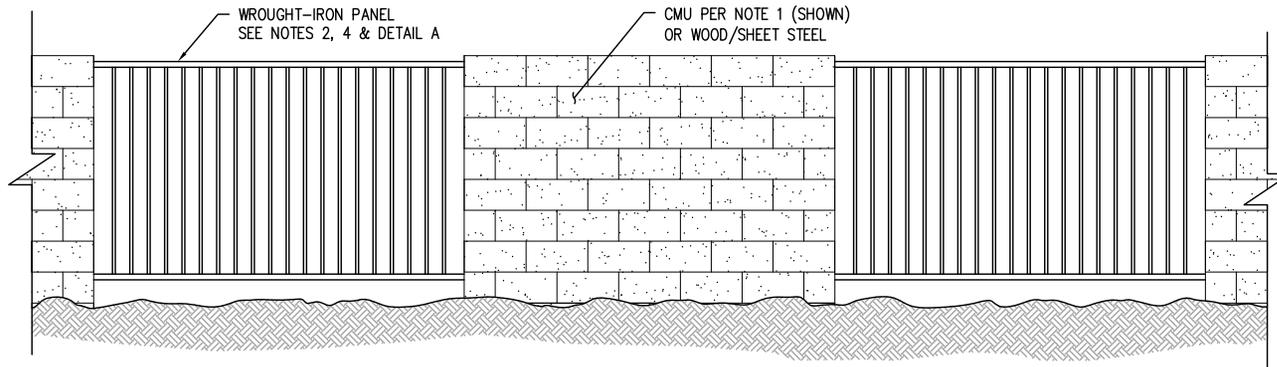
FIGURE 005-1
FENCE/WALL ELEVATION OVER CHANNELS

SCALE: N.T.S.

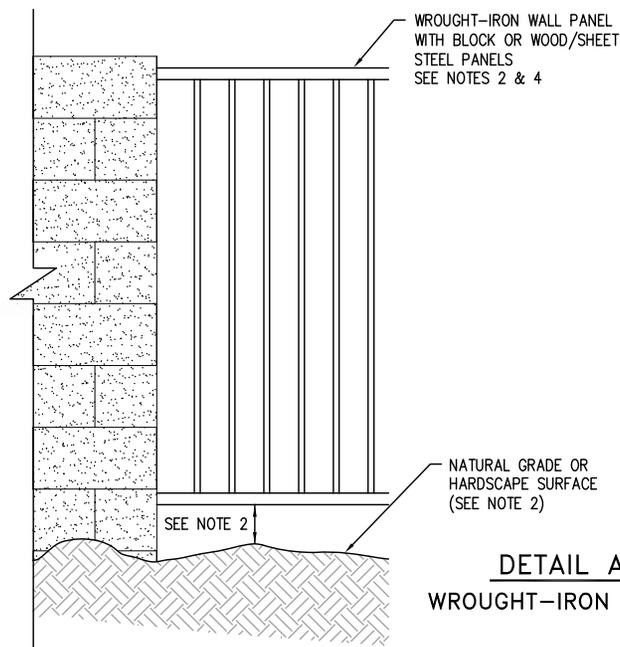
DRAWN BY: sak

DATE: Sept. 2019





SCHEMATIC ELEVATION
 SHOWN: 50% OF WALL/LENGTH CONSISTS OF
 WROUGHT-IRON PANELS (NOTE 5)



DETAIL A
 WROUGHT-IRON PANEL

NOTES:

1. BASED ON STD 8"x8"x16" CMU BLOCK.
2. BOTTOM OF HORIZONTAL MEMBER IS MIN. 6" ABOVE NATURAL GRADE, OR, IF FENCE ENCLOSES A SWIMMING POOL, 4" ABOVE GRADE, WHICH MUST BE A HARDSCAPE SURFACE AT NATURAL GRADE.
3. SOLID PORTIONS OF WROUGHT-IRON PANEL TO OBSTRUCT NO MORE THAN 20% OF 100-YR FLOOD FLOW AREA, ASSUMING A 2 FT. FLOW DEPTH.
4. BLOCK WALL TO BE OFFSET A MIN. OF 25 FT. FROM PROPERTY BOUNDARY.
5. WALL DETAILS ADDRESS HYDRAULIC REQUIREMENTS ONLY. ADDITIONAL ANALYSIS MUST BE PERFORMED BY APPLICANT TO DETERMINE DETAILS FOR STRUCTURAL STABILITY OF WALL.
6. PROPERTY OWNER MUST COVENANT FLOOD OPENINGS AND WROUGHT IRON FENCE SHALL BE KEPT CLEAR OF DEBRIS OR BLOCKAGE AT ALL TIMES.
7. DETAILS PRESENTED DO NOT APPLY TO WALL CROSSING WASHES.

NOT FOR CONSTRUCTION

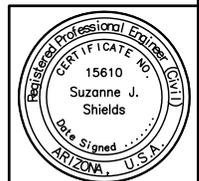
STANDARD DETAILS FOR WALLS/FENCES IN FLOODPLAINS

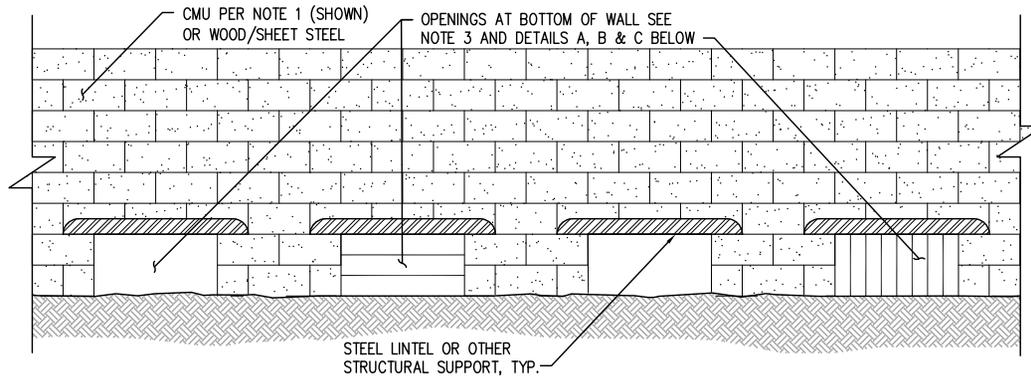
FIGURE 005-2
 FLOOD OPENINGS COMPOSED OF WROUGHT IRON FENCE PANELS

SCALE: N.T.S.

DRAWN BY: sak

DATE: Sept. 2019



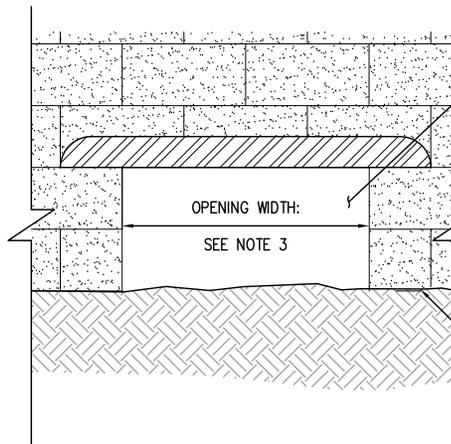


NOTES:

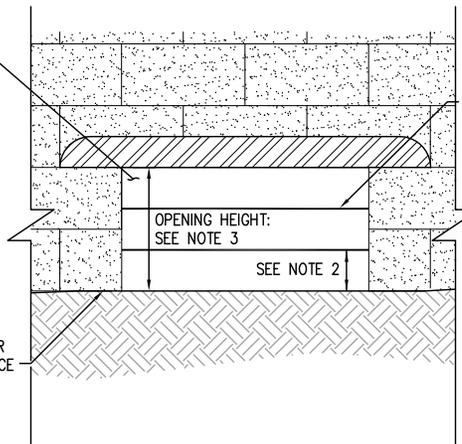
1. BASED ON STD 8"x8"x16" CMU BLOCK.
2. BOTTOM OF HORIZONTAL MEMBER IS MIN. 6" ABOVE NATURAL GRADE, WITH MIN. 6" SPACING ON CENTER, OR, IF FENCE ENCLOSES A SWIMMING POOL, 4" ABOVE GRADE, WHICH MUST BE A HARDSCAPE SURFACE AT NATURAL GRADE.
3. OPENINGS TO BE MIN. 2 BLOCKS (32") WIDE, OPENING HEIGHT IS MIN. 2 BLOCKS (16") HIGH OR 100-YR FLOOD STAGE, WHICHEVER IS GREATER. BLOCK WALL TO BE OFFSET A MIN. OF 25 FT. FROM PROPERTY BOUNDARY.
5. WALL DETAILS ADDRESS HYDRAULIC REQUIREMENTS ONLY. ADDITIONAL ANALYSIS MUST BE PERFORMED BY APPLICANT TO DETERMINE DETAILS FOR STRUCTURAL STABILITY OF WALL.
6. PROPERTY OWNER MUST COVENANT FLOOD OPENINGS AND WROUGHT IRON FENCE SHALL BE KEPT CLEAR OF DEBRIS OR BLOCKAGE AT ALL TIMES.
7. DETAILS PRESENTED DO NOT APPLY TO WALL CROSSING WASHES.

SCHMATIC ELEVATION

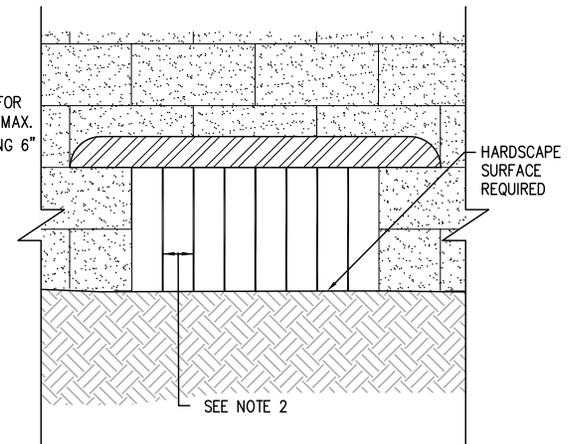
SHOWN: 50% OF WALL/LENGTH CONSISTS OF FLOOD OPENINGS (NOTE 5)



DETAIL A
FLOOD OPENING WITHOUT BARS



DETAIL B
FLOOD OPENING WITH HORIZONTAL BARS



DETAIL C
FLOOD OPENING WITH VERTICAL BARS (FOR POOL ENCLOSURES ONLY)



FIGURE 005-3
FLOOD OPENINGS LOCATED IN WALL/FENCES IN FLOODPLAINS

SCALE: N.T.S.

DRAWN BY: sak

DATE: Sept. 2019



FLOODPLAIN MANAGEMENT PRACTICES FOR FENCES / WALLS IN REGULATORY FLOODPLAINS

TYPE OF FENCE, WALL (see below)	FLOOD HAZARD AREA IN WHICH FENCE / WALL IS CONSTRUCTED				
	FLOODWAY FRINGE (Ord. 2005 FC-2 16.08.370)	FLOODWAY (Ord. 2005 FC-2 16.08.360)	PRIMARY CHANNEL	SHALLOW SHEET FLOW (Ord. 2005 FC-2 16.08.640)	PONDING AREA (FEMA Zone AH, areas with Limited Velocity)
	Conditions for Permitting				
A	Allowed	Allowed	Allowed unless the purpose of the fencing is to contain livestock	Allowed	Allowed
B	Allowed	Allowed with limited cross fencing	No, this usually involves livestock	Allowed	Allowed
C	Case by case review of design required	Case by case review of design required	Case by case review of design required	Case by case review of design required	Case by case review of design required
D	Allowed if bottom of fence elevated to or above 100-year flood height	Case by case review of design required.	Not Allowed	Allowed if bottom of fence elevated to or above 100-year flood height	Allowed
E	Allowed if bottom of fence elevated to or above 100-year flood height	Not Allowed	Not Allowed	Allowed if bottom of fence elevated to or above 100-year flood height	Allowed
F	Case by case review of design required	Not Allowed	Not Allowed	Case by case review of design required	Allowed if bottom of fence elevated to or above 100-year flood height

TYPE OF FENCE, WALL

A	"Open" barbed or barbless wire. For floodplain management purposes barbed or barbless wire will be considered "open" if there is no more than one horizontal strand per foot of height and no more than one vertical wire, stay, or post per six feet of fence length.
B	"Open pipe or rail fencing (e.g., corrals). For floodplain management purposes pipe fencing will be considered "open" if the horizontal pipes or rails occupy <= ten percent (10%) of the flow area obstructed by the fence, and posts are spaced no closer than 8 feet.
C	Collapsible fencing.
D	Other wire, pipe, wrought iron, or rail type fencing (e.g., field fence) which does not meet the "open" requirements described above.
E	Chain link fencing.
F	Continuous wood or steel sheet fencing or masonry (block) walls.