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OCT 02 2013

CESWG-CDR (1145)

MEMORANDUM FOR Galveston District Regulatory and Navigation Branch Personnel

SUBJECT: Standard Operating Procedure – Department of the Army Permit Evaluation Setbacks Along the Gulf Intracoastal Waterway

1. Purpose. This memorandum provides a standard operating procedure (SOP) for evaluation of Department of the Army (DA) permits along the Gulf Intracoastal Waterway Navigation Channel (GIWW). It is the intent of this SOP to provide a rapid and repeatable procedure for evaluating the construction of structures and/or the deposition of dredge and fill along the GIWW in order to preserve the Government's ability to maintain such waterway, and provide a margin of safety to those who use such waterway by maintaining established setbacks from the GIWW.
2. Applicability. This SOP applies to all DA permit applications pursuant to Section 10 of the Rivers and Harbor Act of 1899, and/or Section 404 of the Clean Water Act, received after the date of this memorandum, where the project site is within or along the GIWW.
3. Definitions.
 - a. The GIWW is a shallow-draft navigation channel that is federally maintained with the project depth dimension equal to or less than 16 feet mean low water, which includes advanced maintenance and allowable over-depth.
 - b. Authorized dimensions are the depth and width of the channel authorized by Congress to be constructed and maintained by the U.S. Army Corps of Engineers. These authorized channel dimensions are generally based on maximizing net transportation savings in consideration of the characteristics of vessels using the channel and include consideration of safety, physical conditions, and vessel operating characteristics.
 - c. Advance maintenance is dredging to a specified depth and/or width beyond the authorized channel dimensions in critical and fast shoaling areas to avoid frequent re-dredging and ensure the reliability and least overall cost of operating and maintaining the project authorized dimensions. For maintenance dredging of existing projects, Major Subordinate Commanders (MSC) (Division Commanders) are authorized to approve advance maintenance based on written justification. For

new navigation projects, advance maintenance is approved as part of the feasibility report review and approval process based on justification provided in the feasibility report.

- d. Overdepth is a construction design method for dredging that occurs outside the required authorized dimensions and advance maintenance (as applicable) to compensate for physical conditions and inaccuracies in the dredging process and allow for efficient dredging practices.
- e. Waterfront structures include any structure placed below the mean high water line of a waterway. The term structure shall include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other obstacle or obstruction.
- f. Work shall include, without limitation, any dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States.
- g. Fill means material placed in waters of the United States where the material has the effect of replacing any portion of a water of the United States with dry land; or changing the bottom elevation of any portion of a water of the United States. Fill materials include, but are not limited to; rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and materials used to create any structure or infrastructure.
- h. A setback is defined as the distance from a federally authorized channel, landward, to a proposed structure (i.e., the distance that a structure must be "set back" from the edge of the channel). All setbacks are measured from the near bottom edge of the channel to the nearest point of the structure, whether that point is fixed or floating.
- i. Maintenance is defined in Nationwide Permit 3 (NWP 3) as the repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized

modification, authorizes maintenance of structures or fill without prior notification to the U.S. Army Corps of Engineers. In addition, NWP 3 authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. DA permit conditions require the applicant to maintain the activity authorized by the permit in good condition and in conformance with the terms and conditions of this permit. If an applicant wishes to cease to maintain the authorized activity or should desire to abandon it they must obtain a modification of their DA permit, which may require restoration of the area.

- j. Redevelopment is the re-building or re-assembling of any structure that is no longer functional or serviceable in its original capacity, specifically pertaining to its framing and structural components. This would include beams, girders, joists, stringers, and/or pilings.
- k. A mooring facility is a collection of devices that is fixed in navigable waters to which a vessel can be made fast including buoys, chains, ropes, piles, spars and dolphins.
- l. General Permit means a DA authorization that is issued on a nationwide or regional basis for a category or categories of activities when those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impacts. (See 33 CFR 325.2(e) and 33 CFR part 330)
- m. Letter of Permission means a type of individual permit issued in accordance with the abbreviated procedures of 33 CFR 325.2(e).
- n. Individual permit means a DA authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR part 325, and a determination that the proposed structure or work is in the public interest pursuant to 33 CFR part 320.

4. General. The following setbacks are designed to ensure that no structures or fill encroach beyond the top edge of the navigation channel, including appropriate side slopes, and there is sufficient clearance for dredging the navigation channel to its full width and depth, including side slopes. Additionally, considerations are made for safe passage of commercial vessels through the GIWW. Absent unusual circumstances, the following guidelines will apply:

a. Standard Setback. The Standard Setback is designed to establish a distance from the near bottom edge of the GIWW where structures or fill should not extend past. Other work, such as dredging, will be evaluated on a case-by-case basis. The Standard Setback for the GIWW is no closer to the near bottom edge of the GIWW Federal channel than 100 feet. This 100-foot setback is calculated by summing the 12-foot project depth + 2-foot advanced maintenance depth + 2-foot over-depth equaling a 16-foot deep channel. The 16 feet is then multiplied by 3 (side slope ratio) and added to a 52-foot (safety factor) equaling a 100-foot setback from near bottom edge of the channel. This will allow for full maintenance dredging of the federal project with allowable over-depth and appropriate side slopes (generally a 3:1 slope), and give dredging contractors adequate room to conduct operations without endangering docks and other structures. Additionally, these setbacks allow for the safe passage of vessels appropriately sized to navigate the GIWW. Reference Annex A - Standard Setback for the GIWW.

b. Standard Setback Exceptions. During the development of this SOP, 5 areas of navigation concern were identified through coordination with U.S. Army Corps of Engineers Area Offices, U.S. Coast Guard, Texas Department of Transportation, Texas General Land Office, Gulf Intracoastal Canal Association, and numerous towing vessel operators. The 5 areas of concern include Bends, Bridges, Mooring Facilities, Waterfront Structural Congestion/Encroachment areas, and Land Encroachment.

(1) Bends in the GIWW Navigation Channel. Bends can be especially dangerous for vessels, especially those pushing barges. Large vessels negotiating turns, particularly when currents are swift, require additional clearance to safely navigate through bends in the GIWW. During coordination, 29 bends were identified as areas of concern. For these bends, where the angle of deflection of the centerline of the GIWW channel from straight is 30 degrees or more, the setback is expanded to 150 feet on the inside of the bend and 150 feet on the outside of the bend from the near bottom edge of the Federal channel for 500 feet in length of the centerline of the channel, going both directions from the point of intersection at the channel bend. In certain cases, existing waterfront structures restrict the setback to 100 feet. Those locations are listed in Paragraph 3 of Annex B - Setback Design for Bends in the GIWW.

(2) Bridges over the GIWW Navigation Channel. Bridges and the associated fender systems can be dangerous for vessels, especially those pushing barges. Large vessels negotiating the bumpers and pilings, particularly when currents are swift, require additional clearance to safely navigate through the bridges along the GIWW. During coordination, 11 bridges were identified as areas of concern. For these bridges, the setback is expanded starting at the intersection of the base of the bridge and the pre-established 100-foot setback. The expanded setback flares at an approximate 16 degree angle towards the near shore bank for 1,000 feet. The setback will be limited to the bank and will parallel opening of inlets. For the purpose of this SOP, bridge and causeway structures are considered synonymous. Additional information may be found in Annex C- Setback Design for Bridges in the GIWW.

(3) Mooring Facilities in the GIWW Navigation Channel. Mooring Facilities consist of the designated mooring basin and the associated mooring buoys. Waterfront structures constructed in vicinity of the mooring facility could present an impediment to vessel movements and moorings. During coordination, 10 mooring facilities were identified as areas of concern. For these mooring facilities, the setback is expanded to the near bank for the entire length of the mooring facility. Additional information may be found in Annex D - Setback Design for Mooring Facilities on the GIWW.

(4) Waterfront Structure Congestion/Encroachment in the GIWW. Waterfront structure encroachments can be dangerous for vessels, especially when numerous encroachments have created congested areas. There are four occurrences along the GIWW where waterfront structures were issued a DA permit and constructed within this Standard Setback. Accordingly, an adjustment to the setback is instated for these locations in order to maintain safe navigability and protect the existing waterfront structures. The adjusted setback is geographically tied to reinforced bulkheads in each location. To maintain safe navigability, the reduced setback distance is added to the opposite side of the channel. Additional information, as well as the locations of the existing congestion areas, may be found in Annex E - Waterfront Structure Congestion Exemptions and Setback Design for the GIWW.

(5) Land Encroachments into the GIWW Navigation Channel. Land encroachments into the GIWW can be dangerous for vessels, especially those pushing barges. Large vessels negotiating the land encroachments, particularly when currents are swift, require additional clearance to safely navigate around the land encroachment. Accordingly, the setback is expanded from the 100-foot standard to 150 feet on the opposite side of the land encroachment to provide additional clearance. The GIWW will be analyzed land encroachments no less than every decade to determine whether erosion/accretion has created natural encroachments that may require adjustment to the SOP. Any encroachments resulting from activities performed without the required DA permit or not in compliance with the terms and conditions of

an issued DA permit will be addressed pursuant to the enforcement policies and procedures prescribed in 33 CFR part 326. Currently, only one land encroachment exists, a natural accretion on land owned by the Corps, and can be referenced in Annex F - Setback Design for Land Encroachments on the GIWW.

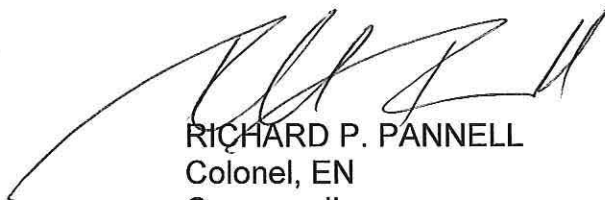
5. Proposed Department of the Army Permits Evaluation Procedure. The U.S. Army Corps of Engineers Regulatory program regulations, specifically 33 CFR 320.4, require permit decisions in navigable waters balance the inherit right to reasonable private land use with the rights and interests of the public. When the activity is in the area of a federal project, such as the GIWW, the activity must be evaluated to ensure that they are compatible. In the case where a permit proposal will create undue interference with access to, or use of, a navigable water, the authorization may be denied after a thorough case-by-case evaluation. In addition to an evaluation of the proposed impact to the aquatic environment and any other relevant factors of the public interest, proposed DA permits for structures and /or fill along the GIWW will be evaluated for their impacts to safety and navigation based on the setback established at the proposed site. The following procedures will be implemented for permit applications located along the GIWW.

1. Standard Setback. DA permit applications proposed shoreward of the setback will be evaluated using a permit type commensurate with the proposed impact. DA permits with proposed structure and/or fill located on or within the standard setback will be evaluated using an individual permit, including letter of permission if applicable. DA permits for proposed work, i.e. dredging, within the Standard Setback areas of the GIWW will be evaluated using the permit type commensurate with the proposed impact.
2. Standard Setback Exceptions. DA permit applications proposed shoreward of the setback lines will be evaluated using an individual permit, including letter of permission if applicable. General permits shall not be used to evaluate DA permits within Standard Setback Exemption areas. DA permits for structures and/or fill proposed within the Standard Setback Exemptions will be considered to create undue interference with, access to, or use of, navigable waters and authorization may be denied by the district engineer pursuant to 33 CFR 325.8(b). DA permits for proposed work within the Standard Setback Exemption areas of the GIWW will be evaluated using an individual permit, including letter of permission if applicable.
3. General Permits. In accordance with the policy and procedures of the Nationwide Permit Program, 33 CFR 330.2(d), and Processing of Department of the Army Permits, 33 CFR part 325.2(e)(2), the district engineer will use discretionary authority to suspend and/or modify, all general permits, including Nationwide General Permits, Programmatic General Permits and Regional General Permits eligible for use in the GIWW. All eligible general permits will be modified to include a regional general condition requiring pre-construction notification if the proposed

work is along the GIWW. Furthermore, the use of general permits in Standard Setback Exemption areas will be suspended.

6. Existing Structures and Non-reporting Nationwide Permits. Previously authorized existing piers, docks, fill or other waterfront structures will not be required to be removed. However, if these structures and/or fill are damaged or destroyed beyond repair by a storm, act of nature, or other sudden event, the evaluation of their replacement shall be conducted in accordance with this SOP. The change in purpose and need, redevelopment and/or expansion of existing piers, docks, fill or other waterfront structures, (e.g., the conversion of commercial seafood docks to a residential marina), shall be subject to the setback SOP and any required regulatory permit action. The general and routine maintenance and repair of existing piers, docks, fill or other waterfront structures located in the GIWW setback may be authorized under NWP 3 provided the work does not increase the footprint of the existing structure and does not result in additional encroachment into the setback. Activities along the GIWW performed without the required DA permit or not in compliance with the terms and conditions of an issued DA permit will be addressed pursuant to the enforcement policies and procedures prescribed in 33 CFR part 326

7. Application. This SOP, as well as all setbacks graphics and applicable documents will be downloadable from the Galveston District's Regulatory and Navigation webpage.



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Colonel, EN
Commanding

ANNEX A - STANDARD SETBACK FOR THE GIWW

1. Specifications: The setback template design is based on the authorized project dimensions of the GIWW. The reference point to graphically depict and create all measurements for the setback is based on the channel toes due to the theoretical nature of the top of slope. The setback is placed parallel to the channel toes at a 100 foot offset based on the following attributes:
 - a. The distance between the authorized channel toes.
 - b. Authorized overdepth of 16 feet for the entire channel.
 - c. An assumed standard side slope ratio of 3:1 from the channel toe to the theoretical top of slope.
 - d. A 52 foot safety buffer measured outwards from the theoretical top of slope.

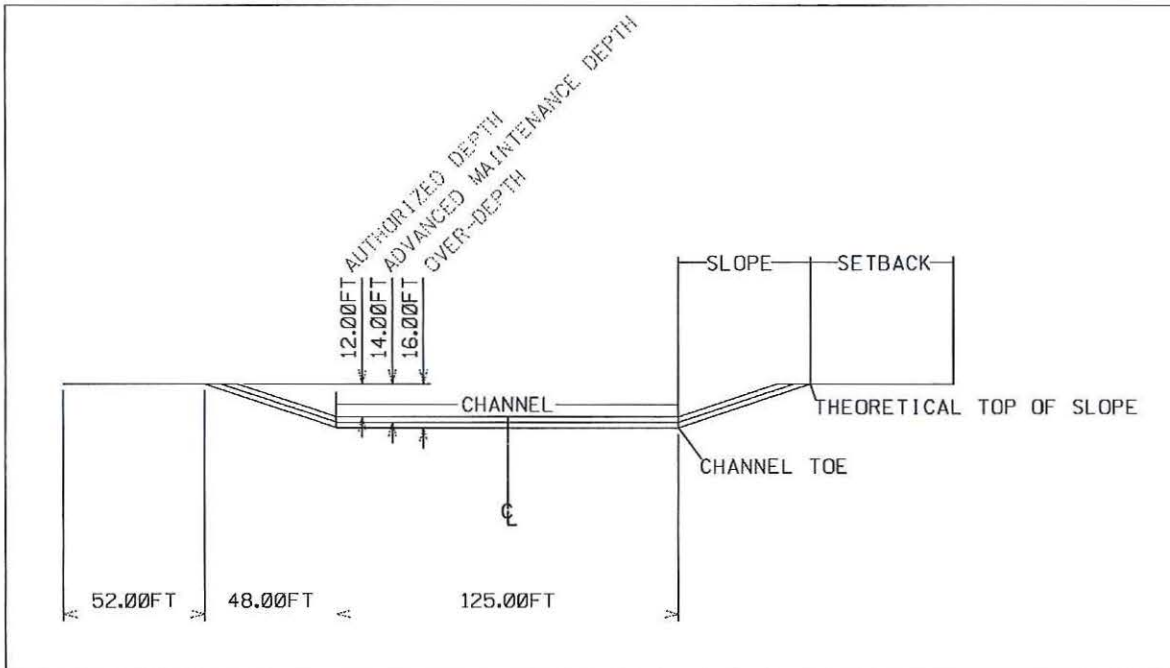


Figure: A: Setback Template for Typical Channel Dimensions

2. Justifications:
 - a. Distance between channel toes: The setback includes the distance between the channel toes in order to maintain safety for both navigating vessels and maintenance operations to include, but not limited to, dredging activities.
 - b. Overdepth of 16 feet: A constant 16-foot overdepth is assumed for the entire length of the GIWW in order to protect future dredging projects. The

current depth of the GIWW will not be included in the calculations because of the varying depths throughout due to shoaling conditions and maintenance dredging availability.

c. Side Slope Ratio: A consistent side slope ratio of 1ft vertical to 3ft horizontal is assumed for the entire length of the GIWW based on the average side slope of the project design (2:1, 3:1, and 5:1).

d. 52 foot Safety Buffer: The safety margin accounts for safe dredging operations as well as barge and recreation boat traffic.

3. Constraints:

a. Where the setback dimension limits surpass the bank of the channel, the setback will be constrained to the channel bank.

b. Identified encroachments were analyzed on a case by case basis. Where feasible, the setback was adjusted to bring the existing structures into compliance. Where not feasible, the permit applicant will not be authorized to rebuild to the same specifications if destroyed or damaged. However, no structures will be required to be removed.

ANNEX B - SETBACK DESIGN FOR BENDS IN THE GIWW

1. Specifications: Where the deflection of the centerline of the GIWW channel from straight is 30 degrees or more, the setback is expanded to 150 feet on the inside of the bend and 150 feet on the outside of the bend from the channel toes of the GIWW for 500 feet in length of the centerline of the channel, going both directions from the point of intersection (PI) at the channel bend. All deflections are measured using the centerlines of the channel. All setbacks are measured from the channel toes (near bottom edge of the channel) (see Figure B)

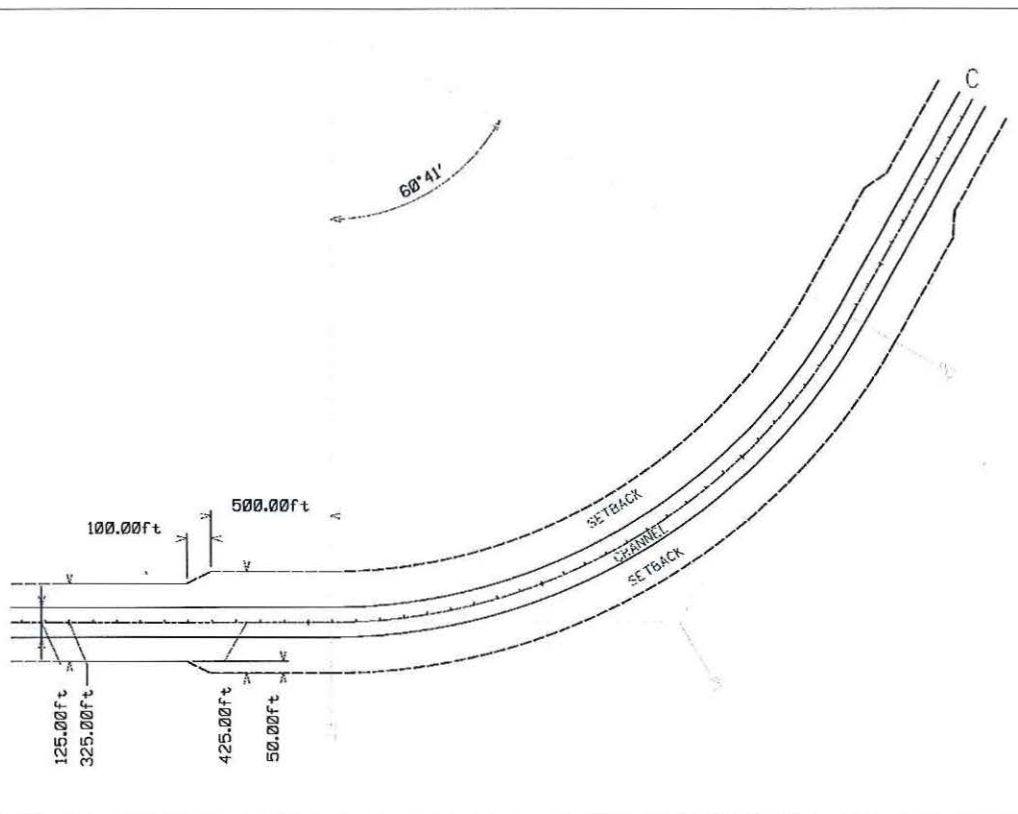


Figure B: Setback Curve Design Template

2. Justifications: The increased setback distance was determined by adding the average width of a standard barge, approximately 50 feet, to the established setback distance on both the inside and outside of the channel. The additional safety factor of 500 feet prior to the point of intersection provides vessels with stacked barges an adequate distance to prepare for the bend during swift current conditions.
3. Constraints: The setback is constrained to the bank where the established setback surpasses the channel bank. The following identified locations containing marine construction permitted and constructed prior to this SOP:

- a. The north side of the GIWW in vicinity of Mile 393 (the Wiggles). The additional setback is exempted from $28^{\circ}58'19.33''\text{N}$; $95^{\circ}16'52.83''\text{W}$ to $28^{\circ}57'31.00''\text{N}$; $95^{\circ}17'29.99''\text{W}$ on the north side of the channel. The additional setback is in effect on the South side of the channel for the entirety of the hazard.

- b. The north side of the GIWW in vicinity of two curves located in vicinity of Mile 419 and Mile 420. The additional setback is exempted from $28^{\circ}46'5.21''\text{N}$; $95^{\circ}37'27.00''\text{W}$ to $28^{\circ}45'54.04''\text{N}$; $95^{\circ}37'51.88''\text{W}$ and from $28^{\circ}45'50.44''\text{N}$; $95^{\circ}38'7.60''\text{W}$ to $28^{\circ}45'43.42''\text{N}$; $95^{\circ}38'40.90''\text{W}$ on the north side of the channel. The additional setback is in effect on the south side of the channel for both curves.

ANNEX C - SETBACK DESIGN FOR BRIDGES IN THE GIWW

1. Specifications: The additional set back begins at the intersection of the base of the bridge and the setback off of the GIWW and then flares at an approximate 16 degree angle away from the bridge towards the bank of the channel for 1000 feet. In instances where the approximate 16 degree flare intersects the bank of the channel the additional offset will be limited to the bank and will not continue onshore. The additional offset will discontinue at 1000 feet from the originating point and returns to the original setback at a perpendicular angle as measured from the channel. (Figure C1)

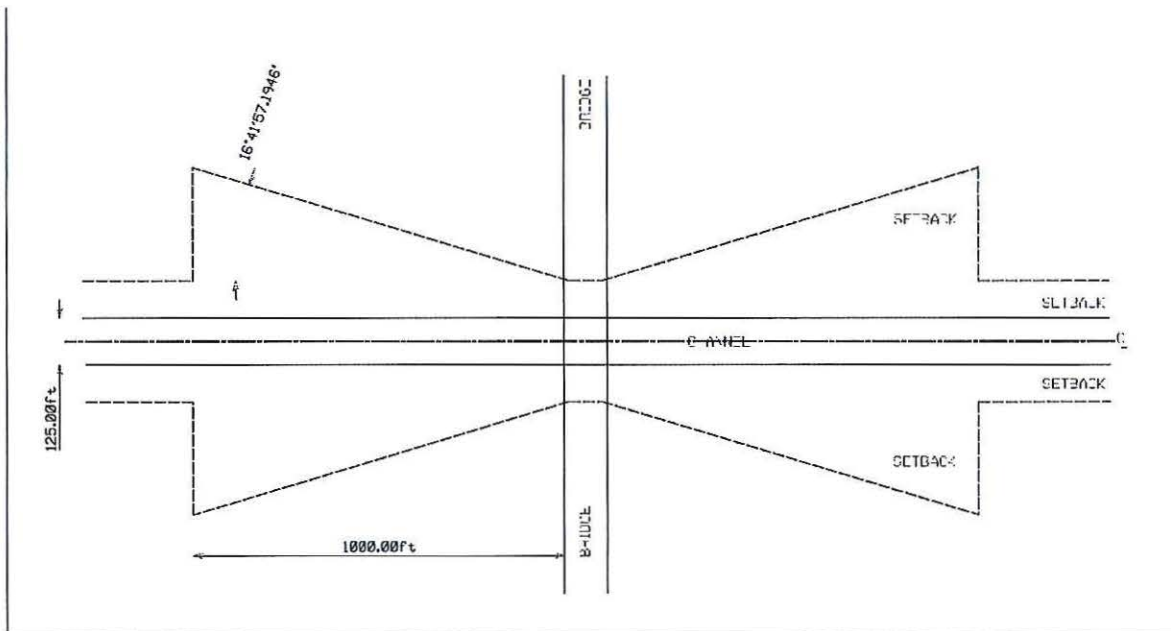


Figure C1: Setback Bridge Design Template

2. Justification:
 - a. Derivation of the 16 degree angle: The 16 degree flare was chosen in an effort to standardize all bridge crossings for the setback policy update. The setback angle of the approach to the bridge located at $29^{\circ}49'24.64''\text{N}$; $93^{\circ}57'52.00''\text{W}$ (Figure C2) at the entrance to the Texas section of the GIWW was previously designed at an approximate 16 degree flare. Analysis has determined that the deflection angle is sufficient for navigation because of the freedom of maneuver it affords vessels on their approach.

- b. Derivation of the 1,000 foot additional setback distance: The 1,000-foot additional offset was chosen in an effort to standardize all bridge crossings for the setback policy update. The additional setback distance is based off of the approach to the bridge located at $29^{\circ}49'24.64''\text{N}$; $93^{\circ}57'52.00''\text{W}$ (Figure C2) at the entrance to the Texas section of the GIWW which was previously designed as a 1,000 foot flare. Analysis has determined that the deflection angle is sufficient for navigation because of the freedom of maneuver it affords vessels on their approach.

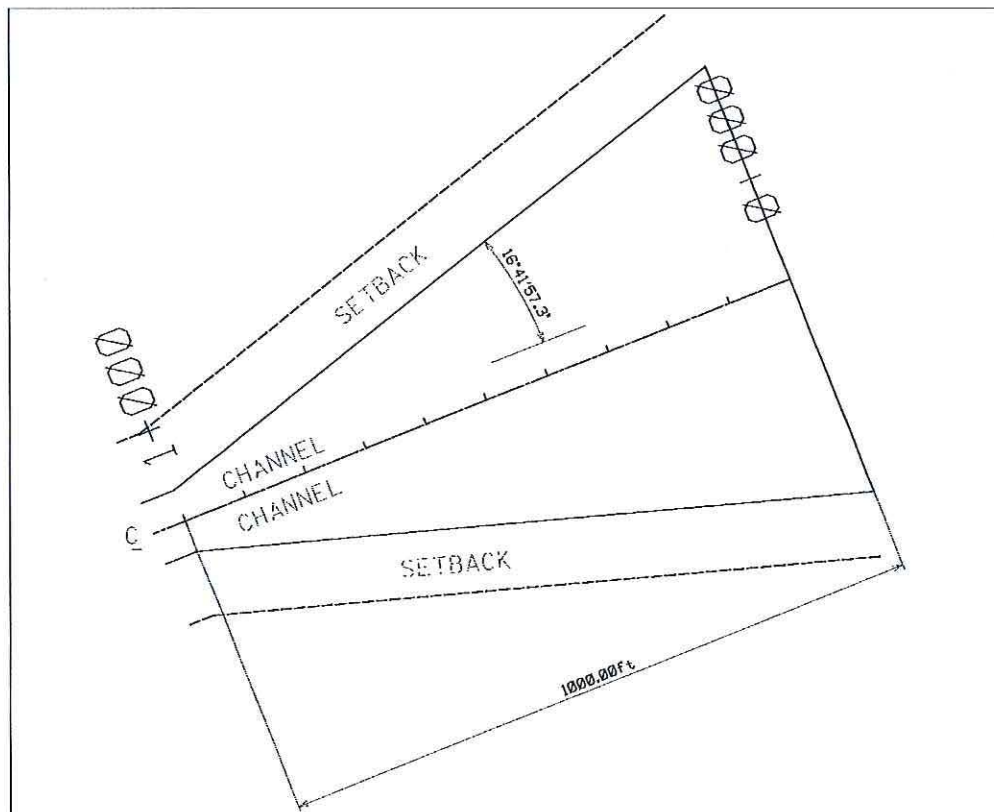


Figure C2: Flare Design at $29^{\circ}49'24.64''\text{N}$; $93^{\circ}57'52.00''\text{W}$

3. Constraints:

- a. The setback is constrained to the channel bank where the setback dimensions surpass the channel bank.
- b. The setback will parallel the openings to inlets within the setback flare design. Marine structures constructed within the inlets are not considered to be encroachments as per this policy.

ANNEX D - SETBACK DESIGN FOR MOORING FACILITIES ON THE GIWW

1. Specifications: The setback is affected by authorized mooring facilities for the GIWW. The additional setback distance will vary based on each mooring basin design but will be consistent in that the setback will encompass the entire area between the mooring basin and GIWW bank as depicted in Figure D.

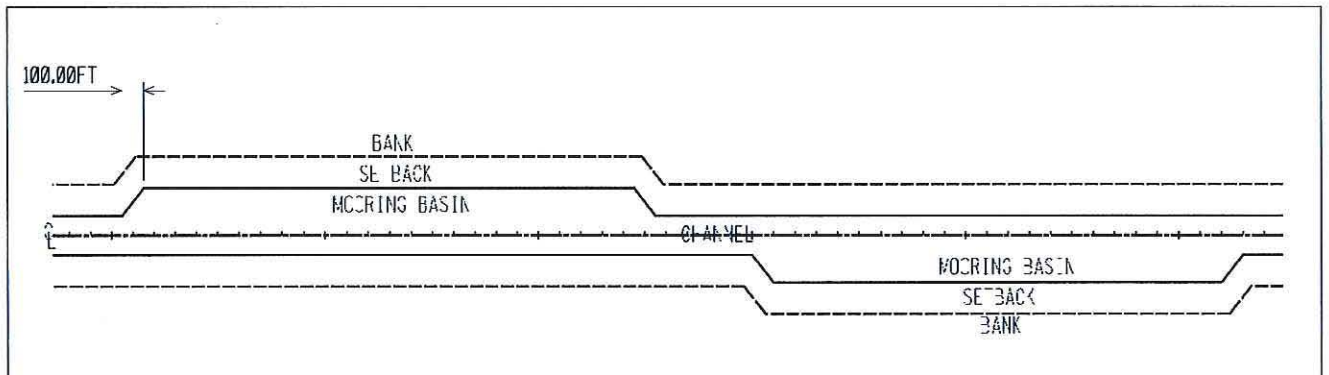


Figure D: Setback Mooring Facilities Template

2. Justifications: The area between the mooring basin and the GIWW channel bank must be undeveloped in order to continue maintenance operations on the mooring facilities. In addition to normal wear and tear, barges and buoys in the mooring facilities are subjected to the adverse effects of weather that cause deterioration of the materials and eventual material failure. A barge could become disconnected from the mooring buoy in the event that a mooring buoy system fails creating a hazard to navigation in the channel in addition to a hazard to any structure or vessel located between the mooring basin and the channel bank. Therefore, structures in between the mooring basin and channel bank will not be permitted in order to maintain the highest level of safety possible.
3. Constraints: The setback will be constrained by the channel bank adjacent to the mooring facility.

ANNEX E - WATERFRONT STRUCTURE CONGESTION EXEMPTIONS AND SETBACK DESIGN FOR THE GIWW

1. Specifications: Setbacks affected by encroachments and congestion are aligned geographically to a reinforced bulkhead in the area to bring existing structures in compliance with the setback. However, the amount of the setback distance reduced by tying to a bulkhead was added to the opposite side of the channel in order to maintain a constant setback distance throughout the affected area. This adjustment also allows for future channel alignment updates/changes while simultaneously maintaining a sufficient setback. Site-specific exceptions to the setback policy resulting from congestion are as follows:

- a. Congestion located between USACE Stationing 670+000 to 684+000:
 - i. The southern setback limit is constrained to the reinforced bulkhead located at $28^{\circ}46'26.46''\text{N}$; $95^{\circ}36'38.21''\text{W}$. Reference Figure A.
 - ii. The setback is offset 28.696 feet to the North of both the southern and northern setback line. Reference Figure E1.
 - iii. Southern setback line extents: $28^{\circ}47'23.80''\text{N}$; $95^{\circ}34'44.38''\text{W}$ to $28^{\circ}46'19.52''\text{N}$; $95^{\circ}36'51.19''\text{W}$
 - iv. Northern setback line extents: $28^{\circ}47'26.57''\text{N}$; $95^{\circ}34'46.18''\text{W}$ to $28^{\circ}46'29.58''\text{N}$; $95^{\circ}36'39.35''\text{W}$



Figure E1: Recreation Congestion 670+000-684+000

- b. Congestion located between USACE Stationing 976+000 to 981+300
 - i. The Southern setback limit is constrained to the bank due to the authorized mooring facility
 - ii. The setback is offset 49.042' feet to the south of the northern setback line. Reference Figure E2.
 - iii. Northern setback line extents: $28^{\circ}26'31.89''\text{N}$; $96^{\circ}24'11.12''\text{W}$ to $28^{\circ}26'13.44''\text{N}$; $96^{\circ}25'5.56''\text{W}$



Figure E2: Recreational Congestion 976+000 to 981+300

- c. Congestion located between USACE Stationing 981+300 to 687+200
 - i. The northern setback limit is constrained to the reinforced bulkhead located at $28^{\circ}26'2.03''\text{N}$; $96^{\circ}25'39.61''\text{W}$. Reference Figure E3.
 - ii. The setback is offset 38.77 feet to the north of both the southern and northern setback line. Reference Figure E3.
 - iii. Southern setback line extents: $28^{\circ}26'9.99''\text{N}$; $96^{\circ}25'5.46''\text{W}$ to $28^{\circ}46'19.52''\text{N}$; $95^{\circ}36'51.19''\text{W}$
 - iv. Northern setback line extents: $28^{\circ}26'13.00''\text{N}$; $96^{\circ}25'6.73''\text{W}$ to $28^{\circ}25'50.97''\text{N}$; $96^{\circ}26'5.84''\text{W}$



Figure E3: Recreation Congestion 981+300 to 687+200

- d. Congestion located between USACE Stationing 1261+200 to 1264+900
 - i. The northern setback limit is constrained to the reinforced bulkhead located at $27^{\circ}58'2.82''N$; $97^{\circ}5'21.92''W$. Reference Figure E4.
 - ii. The setback is offset 33.37 feet to the north of both the southern and northern setback line. Reference Figure E4.
 - iii. Northern setback line extents: $27^{\circ}58'7.95''N$; $97^{\circ}5'18.07''W$ to $27^{\circ}56'57.16''N$; $97^{\circ}6'8.05''W$
 - iv. Southern setback line extents: $27^{\circ}58'6.57''N$; $97^{\circ}5'15.21''W$ to $27^{\circ}56'55.46''N$; $97^{\circ}6'4.97''W$



Figure E4: Recreation Congestion 1261+200 to 1269+500

2. Justifications: The setback is established at a reinforced bulkhead in order to tie the line into a semi-permanent terrain feature that can be geographically referenced when conducting regulatory analysis.
3. Constraints: All structures permitted prior to the update of the setback policy will be regulated by established bulkheads determined above.

ANNEX F - SETBACK DESIGN FOR LAND ENCROACHMENTS ON THE GIWW

LAND ENCROACHMENT

1. Specifications: One area of the setback on GIWW, along the Bolivar Peninsula, was affected by land encroachment. To address this, an additional average barge width of 50 feet is added to the south of the channel in order to compensate for the land encroachment. The additional 50 feet begins after the development located at $29^{\circ}25'43.78''\text{N}$; $94^{\circ}42'51.14''\text{W}$ and ends at $29^{\circ}25'51.67''\text{N}$; $94^{\circ}42'41.06''\text{W}$ which is approximately 500 feet after the area of concern. Reference Figure F.



Figure F: Land Encroachment $29^{\circ}25'50.07''\text{N}$; $94^{\circ}42'48.42''\text{W}$

2. Justifications: Waterfront structures within the updated setback would severely degrade the navigability of the channel by limiting navigable width that is already constrained by the land encroachment.
3. Constraints: No constraints were identified.