

**RECOMMENDATIONS AND GUIDELINES ON SHORELINE  
DEVELOPMENT AND HAZARDS TO NAVIGATION**

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## **DISCLAIMER**

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# **RECOMMENDATIONS AND GUIDELINES ON SHORELINE DEVELOPMENT SAFETY ISSUES**

## **INTRODUCTION**

This guidebook addresses recommendations regarding encroachment into the Gulf Coast Intracoastal Waterway (GIWW). Encroachment of hazards to navigation creates operational inefficiencies that impede commerce. The shippers who rely on the waterway for movement of goods are impacted greatly. In order to address the problems of location and construction of structures along the waterways, it is necessary to address two major categories of stakeholders: those who build the structures and those who permit the structures prior to their construction.

## **PROJECT BACKGROUND**

The Texas Department of Transportation (TxDOT) initiated Project 0-6225 for the purpose of investigating and determining hazards to navigation (encroachments) in the Texas portion of the GIWW that originate from shore (defined by Section 10 of the Rivers and Harbors Act approved March 3, 1899 (33 U.S.C. 403)), with the goal to make recommendations for mitigating these hazards in the future.

Under the 1975 Texas Coastal Waterways Act, TxDOT is the state agency charged with fulfilling the non-federal sponsorship of the GIWW in Texas by providing the safe, effective, and efficient movement of goods along the Texas portion of the GIWW and acting as member of the Texas Coastal Coordination Council of the Texas Coastal Management Program. This project provided TxDOT with criteria to evaluate shoreline proposals along the GIWW and, therefore, to protect the navigation corridor for commercial traffic for the industries vital to the Texas economy that rely on the GIWW for the transport of raw materials and finished products.

## **IMPACT OF THE STUDY**

The impact of this project was to begin to develop and permit “smart” development with regard to navigation. Smart development includes development that allows navigation along the GIWW not only along the 125-ft channel but also along all of the navigable water capable of use for commercial navigation. Hopefully, there will be better cooperation between governmental agencies on permitting development and a focus on the agglomeration, clustering, and density of development on the waterway. Additionally, there should be increased cooperation between developers, governmental agencies, and the barge industry in maintaining the GIWW for its primary use of moving goods effectively and efficiently to promote and support Texas and United States commerce.

## **RECOMMENDATIONS/GUIDELINES FOR PERMITTERS**

This guidebook contains a section that provides guidance for permittees, and it elaborates on each recommendation. The research team has two major recommendations for governmental bodies that permit structures in and along the Gulf Intracoastal Waterway:

- The first recommendation is to develop better cooperation and coordination among the agencies.
- The second recommendation is to give more attention to the accumulated effects of permitted development on commercial navigation.

## **RECOMMENDATIONS/GUIDELINES FOR DEVELOPERS AND STRUCTURE TYPE**

This guidebook contains a section that provides guidance for developers and type of structure. The research team recommends that information provided in this guidebook be provided to land developers along the GIWW by TxDOT, the Texas General Land Office, the U.S. Army Corps of Engineers (USACE), and the local counties and municipalities as land developers seek permits and develop plans. Many of the recommendations came from the industry via the Gulf Intracoastal Canal Association (GICA) newsletter in 2009 as well as various comments and interviews. Recommendations in quotations represent material directly from industry, with which the project team concurs. The research team recommends that developers use their deed restriction mechanism and that municipalities use their zoning authority to maintain planned restrictions on the waterway.

## **OTHER RECOMMENDATIONS AND GUIDANCE**

This guidebook contains recommendations regarding traffic congestion along the GIWW. The final section of this guidebook provides concluding remarks related to TxDOT Project 0-6225 and shoreline development issues.

## **RECOMMENDATIONS AND GUIDELINES FOR PERMITTERS**

The permitting process for developing waterfront property is explained here. The U.S. Army Corps of Engineers is given authority to regulate certain activities in the nation's waterways under Section 33 of the Code of Federal Regulations (CFR) Part 320. The waterways are protected for navigation under Section 10 of the Rivers and Harbors Act of 1899, which states that it is unlawful to build any structure in or over the waterway except on plans approved by the Corps where there is an absence of overriding public interest (Part 320.4). Specifically:

“Section 10 of the Rivers and Harbors Act approved March 3, 1899 (33 U.S.C. 403) (hereinafter referred to as section 10), prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The instrument of authorization is designated a permit. The authority of the Secretary of the Army to prevent obstructions to navigation in navigable waters of the United States was extended to artificial islands, installations, and other devices located on the seabed, to the seaward limit of the outer continental shelf, by section 4(f) of the Outer Continental Shelf Lands Act of 1953 as amended (43 U.S.C. 1333(e)).”

See 33 CFR Part 322 regarding a permit needed for any construction in the waterways.

The permitting process can include a pre-application consultation for major applications. The Corps' district engineers have the authority to establish local procedures and policies including appropriate publicity programs that will allow potential applicants to contact the district engineer to request consultation (CFR Section 325.1 Application of Permits under the Regulatory Program of the Army Corps of Engineers). In Galveston, the Permit Service Center (PSC) is designed to provide assistance and advice to applicants located within the Coastal Management Program Boundary along the entire Texas coast.

All applicants generally use the standard Form 4345, but local variations can be made to the form to facilitate coordination of federal, state, and local agencies. In the case of Texas, Form 4345 is a Joint Permit Application Form (JPAF) that lists all required documents for the permits and provides additional information on permitting within the Texas Coastal Management Area, including project plans. These documents include:

- Letter to Applicant,
- Statement of Compliance with the Texas Coastal Management Plan,
- Texas State Water Quality Certification of Section 404 Permit,
- Water Quality Certification Checklist for Tier I (Small Projects),
- Water Quality Certification Questionnaire for Tier II Projects,
- Texas Commission on Environmental Quality Letter and Enclosures,
- Railroad Commission of Texas Letter,
- U.S. Environmental Protection Agency Letter,
- Memorandum from the U.S. Army Corps Concerning Water Quality Certification, and
- Consistency with Coastal Zone Management Act for Nationwide Permits in Texas.

The applicant must include in the content of the application information to satisfy the requirements of the above forms including a complete description of the activity with drawings, sketches, etc.; the location, need, and purpose of the proposed activity; scheduling of the activity; names and addresses of adjoining property owners; and location and dimensions of the adjacent structures. All applications must be signed. When an application is received it is reviewed for completeness and, if complete, public notice of the project is issued. If the application is not complete, a request for additional information from the applicant is made within 15 days of receipt (CFR Section 325.2 Processing of applications under the Regulatory Program of the Army Corps of Engineers).

In Texas, when the public notice is issued, all documents required by the state under the Joint Permit Application are sent to the appropriate state agencies. The Corps in Texas has joint evaluation monthly meetings with state and federal resource agencies and applicants who sign up to come and talk, and to discuss proposed projects, many of which are in the coastal zone projects area. Not all incoming applications are discussed at this forum, only those listed on the schedule at the request of the project proponent. Therefore, the coastal issues on proposed projects are often known prior to formal public notice. After the Corps reviews the application initially, it then solicits reviews and recommendations from all Texas state agencies.

Many structures along the GIWW, however, are authorized by the Corps with a Regional General Permit (RGP) or a Letter of Permission (LOP). The level of detail for these two types of permits may vary from that required for a more complicated standard permit. The public notice process is utilized during the review of a standard permit but not a RGP or LOP.

The Texas General Land Office (GLO) administers the Coastal Management Program in the state of Texas. In the Texas Administrative Code, the provision dealing directly with waterfront structures is found in Title 31 Natural Resources and Conservation, Part 16 Coastal Coordination Council, Chapter 501 Coastal Management Program, Subchapter B Goals and Policies, Rule Section 501.24 Policies for Construction of Waterfront Facilities and Other Structures on Submerged Lands.



Rule Section 501.24 states under (a)(6)(A) that “piers, docks, wharves, bulkheads, jetties, groins, fishing cabins, and artificial reefs (including artificial reefs for compensatory mitigation) shall be limited to the minimum necessary to serve the project purpose and shall be constructed in a manner that does not significantly interfere with commercial navigation.” The GLO coordinates with the Army Corps of Engineers on issuing permits along the GIWW and should further coordinate with TxDOT as the local sponsor.

The GLO Permit Service Center is a resource for applicants during the permitting process. The GLO Permitting Assistance Center for the upper Texas coast resides on the Texas A&M University at Galveston campus and for the lower Texas coast resides on the Texas A&M University – Corpus Christi campus. The centers serve as a clearinghouse for coastal permitting activities on the lower Texas coast; act as a point of contact with the public to provide basic permitting assistance; offer information, guidance and application forms; establish and maintain the web site for the JPAF and permitting information; receive and review JPAF information for completeness; and forward completed applications to the proper agencies. Typically, they provide information, assistance, and guidance to the public on how to complete a permit application. Further, the online questionnaire maintained by the centers helps applicants determine which permits they may need. TxDOT needs to become more involved in this process to provide guidance to applicants.

The GLO also assists in coordinating all state forms for permits. It is the lead agency to coordinate and develop a long-term plan for the management of uses affecting coastal conservation (Section 33, Subchapter C, Section 33.052, Subsection b of the Texas Administrative Code). The GLO has its own permit application forms; however, for construction on the GIWW the joint permit application form noted above applies. The forms and documents for the state for permitting structures on the GIWW include Statement of Compliance with the Texas Coastal Management Plan (Consistency with the Texas Coastal Management Program), Texas State Water Quality Certification of Section 404 Permit, Water Quality Certification Checklist for Tier I (Small Projects), and Water Quality Certification Questionnaire for Tier II Projects. Both the Texas Commission on Environmental Quality (TCEQ) and the Railroad Commission have water quality authority on projects, depending on the nature of the project. Texas Parks and Wildlife Department requires a sand and gravel permit if appropriate to the project.

Most Texas counties rely on the Corps and GLO joint permitting process. Exceptions to this reliance on the joint permitting process include areas designated as flood plain areas and some local zoning requirements. If an area is designated as a flood plain, a county or municipality generally requires elevation permits or certificates for shore facilities, and the county or municipality may make recommendations on a given plan to the Corps. Further, cities have authority to create ordinances regarding construction of structures in their jurisdictions, as do navigation districts if the land is under their jurisdiction. In those applicable jurisdictions, additional permitting requests may be required.

In summary, a property owner submits an application to the U.S. Army Corps of Engineers, who reviews it as an individual case with input from the Texas General Land Office. Notification to the local/county governments is through the public notification process. The local municipality or county issues permits for the land-based building structures separately. Consideration of

density of development may occur at the local level but it is not coordinated with the Corps or the GLO. The industry and shippers are also made aware of development through the public notification process. Currently, TxDOT is not formally a part of this process. Cooperation is a key element to rational development along the waterway. To avoid the destruction of the common waterway by inappropriate use or overuse, wide-area review of development across local jurisdictions is needed. It is not clear in the process that the accumulated effects of development on navigation are fully addressed. Based upon this process and the findings of this project, including information derived from the GICA in a newsletter in 2009 and various comments and interviews, the following items are recommended as guidance to permittees and TxDOT.

1. *The Army Corps of Engineers should act along with TxDOT as coordinators for interagency cooperation, addressing the cumulative effects of development on the GIWW.* It is clear that there is a need to develop a corridor strategy for the GIWW by establishing a multi-jurisdictional approach. There is a clear need for a master plan to create zones of non-development in order to allow for strategic mooring locations for traffic, weather issues, and safe bridge approaches. The use of the Coastal Coordination Council may provide a venue to address this needed cooperation. The industry recommends, and the research team concurs, that TxDOT create and sanction a formal design review team that includes developers, public authorities, industry members, and other waterway users. This team would be required to develop a master plan and to review all future development plans having potential impact on navigational operations on the Gulf Intracoastal Waterway including “best practices.”

2. *A more aggressive review of the “public use” and “reduction in navigable capacity” criteria under the permitting regulations of USACE should be pursued in granting permits.*

According to a spokesman for USACE, comments about encroachment receive more weight in a permit’s evaluation if the comment comes from the Operations Division. TxDOT should work closely with the Operations Division of USACE to evaluate the cumulative and type of structure effects on the waterway and to develop preferred types of structures. The preferred structure recommendations (as discussed in the technical report) should include items described in the following sections.

- a. Structures that do not protrude at all into the canal or all waters that are navigable along the GIWW. The following photo presents a good example of structures along the waterway.



- b. Setbacks, buffer zones, and protective cells to avoid damage from vessel rakes (the part of a vessel not perpendicular to the keel). Note the house in the following photo. It is not protruding into the GIWW, however the setback is not far enough to avoid rake damage.



- c. Limits on future construction on both sides of the waterway.

- d. Limits on structures that impede channel access. Areas of egress and ingress into the GIWW have been shown to be the areas with the greatest number of incidents, as reported by the U.S. Coast Guard. Therefore, structures, and in particular marinas, should be designed to improve sight distance and better channel access. Recommended features include:
  - i. Downward lighting (here is an example of a dock with one light appropriately pointed downward and one inappropriately pointed upward),



- ii. Electronic alert systems, and
- iii. Guides parallel to the shore that assist movement in the channel for speed and direction.

- e. Sufficient undeveloped areas around bridges to allow for a safe approach for barges or other navigational vessels (the following photo is an example of a bridge approach that has been allowed to be overdeveloped).



- f. Limits on sharp edges that can puncture.
- g. Materials that help dissipate wave energy and are impact resistant.
- h. Radar reflective material and U.S. Coast Guard approved lighting on the structure.
- i. Structures that do not generate debris into the waterway due to constant interaction with the water.
- j. Structures for which these recommendations may apply—bulkheads, revetments, shoreline protection, groins, docks, boat sheds and lifts, piers, entrance channels, fishing piers, housing, commercial buildings, marinas, parking lots, fuel tanks, recreational areas, storm sewer outfalls, and fencing.

3. *The Texas General Land Office should take a more proactive role by coordinating with TxDOT and the barge industry.* The GLO should be more proactive in permitting by reviewing the impacts of structures on state commerce, mindful of the accumulative and locational effects of development, particularly with regard to the reduction of navigable capacity under Section 403 of Title 33 of the U.S. Code and:

“Texas Administrative Code, Title 31 Natural Resources and Conservation, Part 16 Coastal Coordination Council, Chapter 501 Coastal Management Program, Subchapter B Goals and Policies, Rule Section 501.24 Policies for Construction of Waterfront Facilities and Other Structures on Submerged Lands:

(a) Development on submerged lands shall comply with the policies in this section.

(4) Marinas, docks, piers, wharves, and other structures shall be designed and, to the greatest extent practicable, sited to avoid and otherwise minimize adverse effects on critical areas from boat traffic to and from those structures.

(5) Construction of docks, piers, wharves, and other structures shall be preferred instead of authorizing dredging of channels or basins or filling of submerged lands to provide access to coastal waters if such construction is practicable, environmentally preferable, and will not interfere with commercial navigation.

(6) Piers, docks, wharves, bulkheads, jetties, groins, fishing cabins, and artificial reefs (including artificial reefs for compensatory mitigation) shall be limited to the minimum necessary to serve the project purpose and shall be constructed in a manner that:

(A) does not significantly interfere with public navigation;

(B) does not significantly interfere with the natural coastal processes that supply sediments to shore areas or otherwise exacerbate erosion of shore areas; and

(C) avoids and otherwise minimizes shading of critical areas and other adverse effects.

Under TGLO authority:

Texas National Resources Code, Chapter 33, Subchapter A, Section 33.001(d) states the public interest in navigation in the intracoastal water shall be protected.”

4. *The county judges should be alerted.* The county judges should be made aware of the commerce impacts on Texas, and on their counties, of the placement and scope of construction of development along the waterway emphasizing the importance of waterborne freight to Texas.
5. *There needs to be a better mechanism for policing of permits after they are issued.* It is perceived by various stakeholders that there is no mechanism currently to determine if a structure was built according to its approved permit.

6. *Include input from industry representatives.* The water transportation industry (such as industry organizations and not merely another division of USACE in its Navigation and Operations Divisions) needs to have input in the permitting process.
7. *Provide guidebook.* A developer guidebook should be made available to each developer and property owner along the GIWW.
8. *Consider time limits for permits.* Time limits may be required on permits in order to better coordinate development along the waterway.



## **RECOMMENDATIONS AND GUIDELINES FOR DEVELOPERS**

1. *In their master plans for the community, developers must include undeveloped sections along the waterway that can be used for “strategic mooring” of commercial vessels to “hold up” or “push in” during inclement weather. The areas should also include “mooring buoys in strategic locations.”*
2. *Avoid placing any additional structures in the GIWW navigable waters where they could expose people or property to potential harm from barge traffic. All development should occur far enough from the waterway to provide land protection between barge traffic and any structures, mooring areas, or inhabited spaces. No vessel mooring areas should be placed in the GIWW navigable waters.*

3. *Setbacks should be planned on shoreline developments of at least 75 ft.* Some barges have bows with rakes that extend over the front of the vessel as much as 75 ft. Consider the use of deed restriction setbacks from the waterway or zoning laws to ensure no hazards to the traffic in the GIWW in perpetuity. Consider zoning laws and permitting restrictions to maintain enforcement over time. See the photo below for an example of a structure that is not in the GIWW but needs to be further set back.



4. *Do not provide marina access to the GIWW near the bridge approaches or bends in the waterway.*
5. *Avoid all further development near bridge approaches or bends in the waterway. The following photo shows a development that has no strategic mooring areas for use by barges.*



6. *Do not place lighting immediately adjacent to the waterway in a manner that could impact night vision of mariners.* The following picture shows a dock with a light appropriately pointed downward and one that is inappropriately pointed upward.



7. *Consider installation of barge-friendly bank erosion protection adjacent to new development. See this example of good construction.*



8. *Provide narrow, well-defined access points to the GIWW, with physical speed restrictions.*
9. *Install signage at appropriate marina locations warning of the hazards of interaction between barge and recreational traffic, and detailing proper procedures and rules of the road. Consider not only installation of signage but maintenance of the signage as well.*
10. *Consider disclosure to the buyer on every transfer of property on the GIWW as to the hazards and liability for navigation of certain structures and/or the lack of setbacks constructed on or near the waterway and the potential risks to the landowner. Further, prior to selling, renting or leasing marina properties, consider requiring an orientation or training that emphasizes safe operations relative to barge traffic. Brochures and videos would be part of this education, which may need to be coordinated with the Texas Parks and Wildlife Department.*

11. *At marina entrances, consider use of visual, automatically controlled traffic signals to warn recreational vessels of approaching barge traffic. Areas of egress and ingress into the GIWW have been shown to be the areas with the greatest number of incidents as reported by the U.S. Coast Guard. Additionally, consider nonvision-impairing lighting, electronic alert systems, and guides parallel to the shore to assist movement in the channel for speed and direction. Note that this area pictured is the type of entrance with concern.*



12. *In the construction of structures along the shoreline, consider limits on sharp edges that can puncture, materials that help dissipate wave energy and are impact-resistant, radar reflective material, and materials that do not generate debris into the waterway due to constant interaction with the water. Consider these aspects for all structures that may include but are not limited to: bulkheads, revetments, shoreline protection, groins, docks, boat sheds and lifts, piers, entrance channels, fishing piers, housing, commercial buildings, marinas, parking lots, fuel tanks, recreational areas, storm sewer outfalls, and fencing. Consider installation of U.S. Coast Guard approved obstruction lighting on jetties or other structures that may extend outward from the bank.*

## TRAFFIC RECOMMENDATIONS

Structure encroachment causes navigation hazards due to shoreline development. However, additional traffic congestion caused by increased development also impedes navigation of commercial traffic. Traffic patterns should be examined further to determine the best points of access to the GIWW.

Recommendations are listed below. The industry recommendations were derived from the GICA in a newsletter in 2009 and various comments and interviews:

1. *Require adequate police presence at specific locations along the GIWW to monitor safety, including regularly patrolling the areas with high levels of incidents at high-traffic times. (The Coast Guard is responsible for policing the waterway and already attempts to do this.)*
2. *Use deed restrictions to police property uses and construction that may impact the waterway before a problem in the waterway occurs.*
3. *Consider “no wake” zones in high-traffic areas to keep recreational vehicle speeds to safe levels. The USACE considers in permitting a given project establishing “no wake” zones in appropriate areas for navigation. However, commercial traffic should not be required to deal with navigation problems from areas of proposed further encroachment with “no wake” zones, as this is counterproductive to freight commerce in the GIWW.*
4. *Prohibit all jet ski traffic in confined land-cut portions of the GIWW.*
5. *All recreational boaters using the GIWW should be trained on the appropriate seamanship with regard to interactions with commercial vessels.*
6. *A reasonable restriction should be placed on recreational vehicles in the GIWW during peak season or on weekends and holidays. Any type of restriction must be accompanied by a visible, dedicated enforcement of the policy.*

## CONCLUDING REMARKS

Through the course of the research, certain recommendations that are not directly related to encroachment into the waterway of structures or traffic from increased development were made. Again some of the recommendations came from industry. They are mentioned here so that further study may be done to enhance the GIWW for commercial traffic:

1. *Consider mitigation initiatives, such as provision of additional dredge material placement sites and incorporation of erosion protection measures.* Although shore erosion may impact navigation in the waterway, erosion impact (which is not encroachment) is beyond the scope of this study. The use of dredge material needs to be thoroughly studied, as it may create additional encroachment in some areas and help with navigation in others. Coordination for the use of dredge material should be between the Texas General Land Office, the U.S. Army Corps of Engineers, and the Texas Department of Transportation.
2. *Mooring buoys and channel marking buoys must be better maintained.*
3. *Port access must be better handled (e.g., a better stand-by system).*
4. *Brazos Floodgates structure is not well designed for maneuverability.*
5. *Areas of shoaling such as in Matagorda Bay must be addressed.*
6. *The maintenance of the GIWW should be based on need rather than usage.* Usage is sometimes limited by necessity when what industry really needs is a wider/deeper channel.