RECONNAISSANCE REPORT

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GREAT LAKES NAVIGATION SYSTEM REVIEW

APPENDIX D- CHICAGO SANITARY & SHIP CANAL

Great Lakes - St. Lawrence River System

US Army Corps of Engineers®
Great Lakes &
Ohio River Division

Great Lakes Navigation System Review Study
Appendix D- Chicago Sanitary and Ship Canal

U.S. Army Corps of Engineers
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GREAT LAKES NAVIGATION SYSTEM REVIEW
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1. STUDY AUTHORITY

This study is being conducted under the authority of Section 456 of Water Resource Development Act of 1999, which reads in part as follows:

" In consultation with the St. Lawrence Seaway Development Corporation, the Secretary shall review the Great Lakes Connecting Channel and Harbors Report dated March 1985 to determine the feasibility of undertaking any modifications of the recommendations made in the report to improve commercial navigation on the Great Lakes navigation system, including locks, dams, harbors, ports channels, and other related features.'

2. STUDY PURPOSE

As part of the Great Lakes Navigation Study (GLNS), the purpose of this appendix to the reconnaissance study is to determine if any modifications to the Chicago Sanitary Ship Canal (CSSC) could result in improvements to commercial navigation on the Great Lakes navigation system and warrant Federal participation. In order for the water resource problems to warrant Federal participation, the reconnaissance report must demonstrate that problems identified are significant, and in accordance with current regulations and policies. The purpose of this appendix was to determine whether the planning process should proceed further, into a more detailed feasibility phase, based on a preliminary appraisal of Federal interest, costs, potential benefits, and possible environmental impacts of several different solution for the CSSC Navigation improvements.

3. LOCATION OF THE PROJECT

The CSSC originates in Chicago, Cook County, IL where it connects with the South Branch of the Chicago River. It continues southwest through Du Page and Will Counties until it converges with the Des Plaines River at Joliet, IL. The CSSC became part of the Illinois Waterway in 1933, and runs for approximately 31 miles from River Mile (RM) 290.0 to RM 321.5. The Calumet-Sag Channel (CSC) connects with the CSSC at RM 303.5 and runs for approximately 16 miles until RM 320.5 where it connects with the Little Calumet River. Plate D-1 is a map of the Study Area.

The CSSC and the CSC are located in the following Congressional Districts: IL-2 (Jackson), IL-3 (Lipinski), IL –13 (Biggert) and IL-11 (Weller).

4. EXISTING RELATED STUDIES, REPORTS AND WATER PROJECTS

a. Aquatic Nuisance Species Dispersal Barrier Demonstration Project: This demonstration project is an electric dispersal barrier to limit range expansion of non-native aquatic nuisance species via the Chicago Sanitary and Ship Canal. The dispersal barrier will initially test the effectiveness of an electric barrier on the round goby. The demonstration project is located on the Sanitary and Ship Canal at river mile 296.25. The barrier construction was completed in 2001. The effectiveness of the barrier will be monitored for up to five years.

b. Cal-Sag Channel Modifications: The Calumet – Sag Modification project was authorized by the River and Harbor Act of 1946 to allow full size tows to operate between the Chicago Sanitary and Ship Canal and Turning Basin No. 5 in the Calumet River. The modification consisted of three parts. Part I is completed; Part II has been deauthorized; and Part III has been placed in the deferred for restudy category. Part III of the authorization provides for enlarging the Chicago and Sanitary and Ship Canal from above Lockport to the Calumet-Sag Canal. The Canal was authorized to be widened to an ultimate channel width of 225 feet, with a usable depth of 9 feet; provided that the right–of-way are furnished, spoil deposited, and bridges rebuilt in the conformity of the ultimate channel width.

5. PLAN FORMULATION

a. General:

The CSSC and the CSC are waterways that belong to a larger grouping of navigation features which combined are monitored and reported under the title of Port of Chicago, by the USACE, Water Resources Support Center. The Port of Chicago, IL consists of the Chicago Harbor, Chicago River- Main, North and south Branch, CSSC, CSC, Lake Calumet, IL and Calumet Harbor and River, IL and IN.

The CSSC and the CSC are two man made channels which connect the Great Lakes (at the southwest end of Lake Michigan, at two different points in Chicago) with the Illinois Waterway and thereby, the Mississippi River and the Gulf Ports, and vice versa. The Chicago District Corps of Engineers has undertaken a review of these two channels as a part of the GLNS due to the level of commerce in these waterways participating in Great Lakes commerce. The Department of Transportation, Maritime Administration was a strong proponent of their inclusion in the study (Attachment D-4).

The CSSC was built by the Chicago Sanitary District (now the Metropolitan Water Reclamation District or MWRD) between 1892 to 1900. The CSSC secured the reversal of the Chicago River. The CSSC connects the South Branch of the Chicago River (in the Bridgeport area of Chicago) with the lower Des Plaines River at Joliet, IL. The CSSC became part of the Illinois Waterway after 1933, since that time the Corps of Engineers has operated the lock at Lockport on the CSSC.

The CSC was dug by Chicago Sanitary District (now MWRD) between 1911 and 1922. The CSC connected the Little Calumet River with the CSSC. This effectively reversed the flow of the Calumet River and the lowest reaches of the Little Calumet River; the Calumet River now flows south away from Lake Michigan.

In the early 1960's the Corps of Engineers widened the CSC to its current width of 225 ft. from the original width of 60 ft. In subsequent years, through the 1970's narrow road and rail crossings along the CSC were eliminated or widened. Also in the period through 1975 many slips for barges and tows were constructed on the CSSC downstream of the juncture with the CSC.

The CSC channel from its junction with the CSC (river mile 303.5) to its junction with the Des Plaines River (river mile 290) has significant barge congestion. The channel is approximately 160 feet wide through this area. Providing navigation improvements in this area would have a significant benefit to improve navigation between the Illinois Waterway and the Great Lakes.

b. <u>Description of existing conditions:</u>

The purpose of this section is to present the profile of existing conditions within the study area. The profile includes the natural, environmental, and human resources of the area, as well as the development, economy, and trends of the region. The profile provides a frame of reference for discussion of the problem and needs of the area and the impacts of the various alternative plans considered to meet these needs.

(1). **Hydrologic and Hydraulic Characteristics**.

The Chicago Sanitary and Ship Canal is the only aquatic connection between the Mississippi River and the Great Lakes drainage basins. The canal, opened in 1900, was constructed to replace the smaller I&M Canal to better facilitate shipment of goods between the Great Lakes and Midwestern waterways and to carry the wastewater away from Chicago's source of drinking water.

Today there are five entrances into the waterway from Lake Michigan: The North Shore Channel at Wilmette, the Chicago River at Chicago Harbor, Calumet River at Calumet Harbor, the Grand Calumet River at Indiana Harbor and the Little Calumet River via Burns Ditch at Burns Small Boat Harbor.

(2). **Navigation** .

This appendix focuses on the CSSC and the CSC. These waterways belong to a larger grouping of navigation features which combined are monitored and reported under the title of Port of Chicago, by the USACE, Water Resources Support Center. The Port of Chicago, IL consists of the Chicago Harbor, Chicago River- Main, North and south Branch, CSSC, CSC, Lake Calumet, IL and Calumet Harbor and River, IL and IN.

Barge traffic on the CSSC from the Lockport, IL eastward splits into two separate systems- one Northward through the central part of Chicago and the other toward Lake Michigan – south of Chicago. The northern route travels from the CSSC through Will, Du Page and Cook Counties to the South Branch of the Chicago River, the Chicago River, through the Chicago Lock and into Lake Michigan. The southern route travels from the CSSC to the CSC, the Little Calumet River, through O'Brien Lock, into the Calumet River and ending at the Calumet Harbor on Lake Michigan.

The both the CSSC and the CSC are authorized depth of 9 feet deep but the CSSC was constructed at depths of 28 feet. The CSSC is 160 feet wide and the CSC was widened to 225 feet in the 1960's. Both waterways are an important corridor for commercial navigation to transport building material, chemicals, coals, petroleum and other goods between the Illinois River and Lake Michigan Ports. The 1999 freight movement on the CSSC and the CSC was approximately 25,000 tons. A more detailed analysis of barge traffic can be found in the economic appendix, attachment 6.

Barge Fleeting is a vital component of commercial river navigation on the CSSC and the CSC. Typically, barges are placed in fleeting areas to await loading or unloading at nearby terminals. Sometimes fleeting areas are merely used as staging areas where towboats leave full barges heading one direction on the river and take empties back to the other or vice versa. Without the use of fleeting areas, commercial river navigation would be much less efficient. Currently there are 10 fleeting areas above Lockport Lock in the Lemont and Lockport area. They have capacity to hold approximately 390 barges.

(3) **Climate.**

The climate in northeastern Illinois is continental, with a wide variation in temperatures from summer to winter. The average summer temperature is 71°F while 25° F is the average winter temperature. Average precipitation is around 32-36 inches per year including an annual average snowfall of 39 inches.

(4) **Environmental Description.**

WATER QUALITY

Historically poor water quality inhibited development of a robust aquatic community (native and invasive) in the canal system. Today, improvements in wastewater treatment, reduction in combined sewer overflows and use of instream and sidestream aeration stations have significantly improved water quality in the canal system. Improvements to water quality are expected to continue.

Three major wastewater treatment plants discharge to the Chicago Canal System, the North Shore treatment plant, the Stickney Plant and the Calumet Plant. The north shore plant discharges 254 million gallons per day (Mgal/d), the Calumet plant 255 Mgal/d, and the Stickney Plant about 783 Mgal/d.

TERRESTRIAL COMMUNITIES

Between Chicago and Lockport, the CSSC runs for about 31 miles. Waterfront land use is almost entirely, industrial or vacant, with a few marinas. Industries include stone quarries, stone crushing plants, and oil terminals. The Cal-Sag channel runs about 16 miles between Little Calumet River and the CSSC. Waterfront land use between Route 45 and Route 83 is almost entirely forest preserve or vacant land, with industrial use near the CSSC, just west of Route 83. Waterfront land use east of Route 45 is predominately industrial or vacant.

AQUATIC COMMUNITIES

The CSSC was cut through native limestone. Aquatic habitat is fairly homogeneous, with sheer limestone walls extending to the bottom in 25 feet of water. The bottom of the canal is essentially flat with little siltation, there is some rock or cobble on the bottom that may have fallen from the sides. The nearly perpendicular walls of the man-made canal offer little or no littoral zone for foraging aquatic waterfowl. The walls have subsided at various locations along the reach and may provide limited littoral habitat for fish in the canal. During a survey dive near river mile 302, the diver noted that the walls of the canal seemed to be covered with zebra mussels.

HAZARDOUS, TOXIC AND RADIOACTIVE WASTE INVESTIGATION

No hazardous, toxic or radioactive wastes (HTRW) were identified in the proposed project areas during site visits, aerial photographic review, database searches and interviews with residents, and government officials.

THREATENED AND ENDANGERED SPECIES

The federally endangered Hine's emerald dragonfly is known to be supported in several sites neat the project area. These sites include Waterfall Glen Forest Preserve, Black Partridge Forest Preserve, Keepataw Forest Preserve and Romeoville Prairie Nature Preserve. The habitat of the dragonfly in not anticipated to be affected by any alternatives proposed for the canal.

(5). **Archeological and Historical Properties**.

The CSSC is completely man-made. The banks of the Canal consist primarily of limestone debris and excavated overburden that was placed on the banks during its construction.

(6). **Social and Economic Setting.**

The CSSC originates in Chicago, Cook County, IL where it connects with the South Branch of the Chicago River. It continues southwest through Du Page and Will Counties until it converges with the Des Plaines River at Joliet, IL. The median income for the area range from $40,200 in Cook to $62,800 in Du Page County. The communities along the CSSC have experienced increased population. The 2000 census population for the counties along the CSSC and the CSC are:

	Total Population	% change from 1990
Cook County	5,376,741	+ 5.3%
Du Page County	904,161	+15.7%
Will County	502,266	+40.6%

c. <u>Problems and Opportunities</u>:

Improvements to the waterborne trade between the Great Lakes and the Mississippi River through the Illinois Waterway is one of the alternative that needs to be investigated as part of the Great Lakes Navigation Study. There are about 8,500 river barges operating through the CSSC and the CSC to the several major ports, Burns Harbor and Indiana Harbor in Indiana and Calumet and Chicago Harbor in Illinois. These ports are served by barge on a year round basis and connect Inland Waterway destinations/origins providing a water mode service for Seaway commodities as well as domestic commodities. The Illinois Waterway barge traffic generally carries between 42 and 50 millions tons of cargo each year.

The CSSC channel from its junction with the CSC (river mile 303.5) to its junction with the Des Plaines River (river mile 290) has navigation infrastructure limitations such as low bridge air draft, narrow channel and high traffic volume. This reach has significant congestion created by the narrow and curving canal, the use of canal banks for fleeting, and the concentrated customer and barge and tow service industry in the reach. The specific problems are discussed in the following paragraphs.

(1). **Lemont Reach – Congested and Narrow Area**

The Lemont reach of the CSSC, identified as the 12.5 mile navigation reach between the Lockport Lock (RM 291.0) and the confluence with the CSC (RM 303.5), is very difficult and dangerous to navigate for numerous reasons. Among the factors contributing to a risk and safety concern is the original narrowness of the rock cut channel of 160 feet wide in this reach. This reach being a rock cut, there is no natural widening of the canal for 10 miles from roughly mile 293.6 several miles upstream of the Lockport Lock (291) to mile 303.4, the confluence with the Calumet Sag Channel. This ten-mile reach incorporates a large bend in the waterway between river mile 296 and 299. It is on the upstream end of this bend - which travelling downstream redirects traffic from a West-Southwest direction to a South direction - that the most intense tug and barge mooring, fleeting, docking and servicing activity is located. This intense activity is continues for approximately five miles, from river mile 299 through the Calumet Sag Channel juncture. In a 2.5- mile reach, 299 – 301.5, there are 7 slips that have been constructed for barge and tow marine services. It is in this area where the fleeting and congestion is most severe.

(2). **Low Bridge**

An additional factor contributing to risk and delays in this reach is the low clearance for the Burlington Northern Santa Fe RR Swing Bridge at river mile 300.6. This bridge does not operate as a swing bridge and is effectively fixed with a vertical clearance of 19.1 ft. Because of this severe vertical clearance, not only are larger line tows prevented from upstream navigation, but also harbor tows, which will navigate this reach, must have telescoping pilothouses to operate. This down pilothouse condition temporarily reduces the sight lines and increases the risk for the pilot of the tow and surrounding vessels and structures. Another impact from this vertical constraint is that light barges and stacked covered barges must at times be ballast or have their covers reconfigured in order to clear the bridge. Further, on a number of occasions each year, commercial vessels (i.e., Corps heavy crane barges, heavy equipment barge loads) and passenger vessels (touring and cruise vessels) are stymied from further navigation between the Mississippi and the Great Lakes and vice versa, due to this lowest bridge clearance. The actual bridge structure, which is a center hub rotating swing design, is not operable, and is discussed in detail in the Structural Analysis of Railroad Bridge (Attachment D-1). The low bridge constraint has been addressed by the industry via the telescoping pilot house tows, the termination of the line tow utilization before the bridge, the ballasting of 1-2% of the barges for clearance, and the rerouting of large equipment items along next best watercourse or transit options.

(3). **Mooring, Fleeting and Docking Activities**

The navigation servicing activity claims much space in the navigation channel of the CSSC. Barges and tows are moored in the channel on one bank or the other, frequently two abreast. If two abreast, the remaining channel width is reduced to 90 feet, limiting any tow to two conventional 35 foot barge widths wide. The tow captain is required to navigate this 10 mile narrow reach, around a river bend, among moored and fleeting barges, among regular delays for oncoming traffic tows and operator's fleet activities, and among tow boats and recreational boaters navigating the same waters.

(4). **Time of Transit**

Discussions with significant long time intense business users of this segment of the waterway have indicated that a straight through passage (e.g., best possible existing conditions) can be expected to require from 45 to 120 minutes to complete. An extremely delayed passage can be expected to require from 4 - 12 hours to complete. It is not uncommon for tows to sit 3, 4, and 5 hours.

(5). **Risk and Safety**

a). Collisions. The Illinois River Carriers Association (IRCA) identified recent collisions or allusions in the subject reach as high risk and safety attributes. The Coast Guard files on reported incidents contained three reports from the past three years which resulted in damage to structure and / or cargo, and which could be directly attributable to the congestion, narrowness, and space constraints in the Lemont reach.

The Coast Guard issued a Public Notice, dated August 22,2000, providing guidelines for safe fleeting in the reach from RM 303 to RM 299. The Notice indicated that this area is very narrow, has several inlets where barges are mooring along the canal and that tows use the opposite channel wall as a guide to safely pass this area with doublewide moorings. The deteriorated canal wall crumbling into the canal along with the doublewide moored barges restrict the channel.

b). Chemical Spill Concerns. Fortunately, there has not been any serious incidents involving chemical spills into the waterway. However, there are several large waterside facilities within this congested segment, which do a freight movement business in petroleum and chemicals (e.g., anti freeze, benzene, glycol styrene). The high level of chemical business existing on the waterways should heighten the concerns for risk and safety as an argument to provide some relief to the difficult navigation challenges facing the users of this area.

c). Flood Control Water Diversions. MWRD has some control over the CSSC water levels in order to prevent catastrophic flooding in downtown Chicago. More than 15 times a year on average the Lockport pool is drawn down in anticipation of heavy rains to provide additional flood water storage within the waterway banks. During these draw downs river navigation is slowed or halted, depending on how near to the open sluice gates or operating Lockport Controlling Works the tow is located. The closer to the lock the greater the threat to navigation. At times, the draw down is so great that tows near the lock touch bottom and safety maneuvers must ensue to not loose any barges from the tow. Members of the Illinois River Carrier's Association (IRCA) have related how powerful and threatening the hydraulic forces created by this process can be, especially since often the tow captains have not received prior warning of the drawdowns.

d). Other Traffic and Other Problems. The use of this waterway by recreational boaters is viewed as a small but potentially growing and serious problem for commercial navigation in the study waterway segment. Recently an incident involving a speed boater racing along the CSSC in the location of the restrictive RR bridge did damage to barge equipment docked along the side of the waterway. Damage was caused by the huge wakes created by the speeding craft in the narrow channel. With talk of increasing the number of small boat harbors along the CSC or CSSC, the captains are concerned that pleasure boaters, should their numbers increase, will only contribute to the current congestion and delay prone navigation challenges. Finally, probably due to the effects of barge mooring along the waterside and captains not quite squeezing through without canal side bumping, a portion of the stone CSCC wall just downstream of the CSC juncture, (descending right wall) has crumbled and fallen into the canal creating a navigation hazard which has contributed to one barge being sunk as discussed previously. Although the tow captains have learned to avoid this reach, this condition adds another element of danger contributing to risks and another reason for delays in navigation over this reach.

d. <u>Future Without Project Conditions:</u>

Obviously, the need to widen the CSSC channel has been seen as a solution to this navigation traffic bottleneck for many decades now. The lands surrounding the canal have filled in, and the level of waterside users has increased both in numbers and size. Finding a solution to the congestion problems will become more difficult as the lands along the CSSC continue to develop.

Will county has experienced significant population growth in the last decade and this trend is expected to continue. The use of CSSC by recreational boaters is anticipated to become a growing and serious problem for commercial navigation in the study waterway segment.

e. <u>Alternative Plans Considered:</u>

The Calumet-Sag modifications, authorized by the River and Harbor Act of 1946 provides for a widening the CSSC to 225 feet from the Cal-Sag Junction to Lockport; replacing three highway bridges in this reach and two in Joliet; and replacing the existing emergency dam in

Lockport. This authorization was deferred for further study in 1972. Since then several of the bridges have been replaced.

There are a number of alternative besides widening the entire reach between Lockport Lock and the Cal-sag Junction that could provide some relief from the congestion. These alternatives have been developed based on discussions with the users and through administrative and regulatory authorities.

(1). **Provide Additional Mooring/Anchorage Areas**

Providing additional mooring/anchorage areas would be a direct response to the growth in mooring along the canal banks which has proven the biggest difficulty to tow captains and to a more time saving delivery of products. A few suggestions have been recommended to increase the supply of fleeting opportunities.

a). Three-Mile Wall: Many operators believe making available mooring/anchorage along the 3 mile wall, on the north bank of the CSC directly upstream of the juncture, would alleviate much of the congestion in the CSSC canal. The land use for this property is designated "corporate use channel maintenance & access" by the owner: MWRD. The land in the vicinity immediately off the bank is Cook County Park District, Forest Preserve land. This use extends for nearly three miles upstream from the junction. The bank is rock cut and is suitable for tie-off (e.g., dead men, cable and chain). For a three-mile length, this reach would have an estimated capacity for 75 standard 200-foot length barges allowing for 10 foot spacing between each. Many of the tanker barges are larger size, of 290 by 50 dimensions. Use by the larger tank barges would reduce the overall capacity but would not impair the overall goal of the additional area - to relieve obstruction in the narrow CSSC caused by fleeting

The cost estimate for providing docking facilities on the CSC just east of the junction of the CSSC and the CSC was original assumed to be one mile long. The other assumptions on which the estimate was based on include: barges were 200 feet long and 35 feet wide by 12 feet deep; mooring piers are to be 6 feet in diameter by 15 feet deep and socketed into rock; Pier spacing are to be 150 feet on center; and because of the rock conditions at the bank edge, rock anchors were used as tie backs. A mile long docking facility can dock 25 to 50 barges depending on whether they are parked singly or paired. The construction costs was estimated at $1,041,000 for construction. The estimate includes a fifty- percent contingencies for unknown conditions. Total project cost was estimated at $1,208,000 which includes the cost of engineering and design plus construction management. Expanding this estimate out to the 2.8 miles of wall not yet being used to total cost estimate is $3,381,000 (holding engineering and design and construction management costs constant). Details of the estimate are included in attachment D-2

b). Widen the CSSC: There remain areas along the banks of the CSSC proximate to the areas of congestion which could be widened by 50 to 60 feet from the Lemont RR bridge to the Romeo Highway Bridge. Widening in certain area would allow for fleeting outside the current channel. And it would also potentially allow for a passing area, where one tow could pull aside to let another vessel or tow pass without having to delay at the extreme upstream or downstream end of the 10 mile long Lemont narrows. Reviewing the information available from

MWRD resulted in two lengths within the strategic location that are shown as vacant. One location is a half mile stretch just downstream of the restrictive RR bridge in Lemont, RM 300 – 300.5. The second location is a 1.2-mile reach at the downstream portion of the bend in the canal, RM 296.2 to 297.3. Widening of one or both of these canal areas to permit passing, or/and to accept fleeted barges, which would otherwise be in the narrow canal, or/and to permit for a tow turning maneuver, would serve to relieve the congestion in the area. Using a 25 barge per mile accommodation factor the two sites would provide 1.7 miles of mooring potential for 42 at single width and 84 at double width.

c) <u>Quarry Utilization</u>. A third opportunity revolves opening a large existing flooded quarry in Lemont for commercial navigation utilization. An abandoned quarry located from approximately RM 301.1 to 301.4, which is ¾ of a mile upstream of the restrictive Lemont RR bridge, has been identified as a possible site. This quarry site is the largest of a group of eight abandoned and flooded quarry sites or pockets between the CSSC and the I & M canal waterway. A number of the smaller quarry sites are under consideration by the Village of Lemont for recreational or/and conservation use. The quarry site is approximately 2000 ft in length and 800 ft in width, covering approximately 37 acres. Based on square footage the utilization capacity of the quarry site is estimated to be approximately 140 standard size barges Alternatively, a portion of the quarry site could be used for a turning basis or a passing notch. The location of the site is in the most heavily congested area of the 10-mile Lemont narrow reach. The land bridge separating the quarry from the CSSC is approximately 175 feet in width**.**

(2). **Provide Additional turning Basin or Passing Cut**

This opportunity was included in the previous discussion on additional mooring/anchorage area. If there are reasons to refrain from proceeding with mooring/anchorage areas, the same three areas mentioned above could be dedicated to improve the navigation environment in the bottleneck area by their use as a maneuvering basin or a passing notch.

(3). **Remove the Vertical Restriction from the Burlington Northern Santa FE RR Bridge (LEMONT RR BRIDGE)**

The navigation constraints caused by the vertical limitations of the Lemont RR bridge have been discussed in the problem identification section of this appendix. Should this constraint be relaxed via raising the bridge or returning it to a swing operation, the impact would be to permit all tows requiring no more than 24.4 ft. vertical clearance to navigate clear through the CSC to the Great Lakes. This would be roughly a 5-ft. improvement over the existing vertical limits from this single bridge constraint. They would not be able to use the CSSC into the Chicago Harbor Lock due to many additional vertical constraints along the CSSC beginning at river mile 312 of the CSSC. Additionally, the need to ballast barges that are not continuing up the CSSC beyond river mile 312 would be removed. The cruise ship or promotional vessels (e.g., the “Niagara Prince”) wanting to navigate through Lockport lock would be allowed. The large commercial crane barges and large equipment and parts movers (e.g., the Corps Crane Barge “Hercules”) would also gain access through the currently vertically constricted portion of the waterway allowing connections between the Great Lakes, the Illinois and Mississippi Rivers, and the Gulf ports, and beyond. An additional benefit would be the safety enhancement of not having to lower the pilothouse thereby maintaining maximum field of vision for the tow captain. This drawback in made more tangible since, in this area, distances between structures are so short that navigation radar is useless.

The cost estimate to make the Burlington Northern Railroad Bridge Operational consists of two parts. Part one was for providing rotational parts, motors, axles, and gears to refurbish the rotating drum wheels, tracks and trunion. It was assumed that a 6 months lead on the parts, new and refurbished, would be nine months. The Second part of the estimate is in regard to the lifting mechanism that would be required to lift the deflected ends when closing the bridge. The rails would require a locking mechanism to be sure the rails are properly aligned when the bridge is in the closed position. The lifting mechanism was missing and a new one has to be provided at both ends of the bridge. The cost estimate was based on a device using gears, toggles, linkages, and wedge to raise or lower the bridge ends. Two electric motors are required. The source of the mechanism was taken from the American Civil Engineers Handbook, 5th edition by Merriman and Wiggins. The construction cost to make the entire bridge operable so that the bridge will swing open and closed is $2,600,000. The estimate includes a fifty- percent contingencies for unknown conditions. Total project cost was estimated at $3,016,000 which includes the cost of engineering and design plus construction management. Details of the cost estimate are included in Attachment D-3.

The Bridge Alteration Act (1941), commonly called the Truman-Hobbs Act, provides authority to require bridge modification or replacement if a bridge causes an unreasonable obstruction to navigation, and it seta the apportionment of costs among the bridge owner, the federal government, and non-Federal sponsor (if any). The bridge owner must bear the part of the cost attributable to direct and special benefits accruing to the owner; the remainder is apportioned between the U. S. and non-Federal sponsor (in any) according to the cost sharing that would apply at the waterway involved. The bridge owner is required to absorb the cost of betterment and an apportionment of costs representing the expired service life of the obstructing bridge. The cost allocation for modification of the Burlington Northern Bridge has not been determined.

f. <u>Evaluation of Alternatives</u>**:**

There are three significant components to the evaluation model: a profile of the existing condition navigation traffic, an estimate of the associated cost for the traffic profiled and the imputation of a travel time frequency schedule. The scenarios presented are referenced to navigation records for usage of the CSSC for the year 1999.

Under baseline conditions, the average monthly travel time is shown to compute to 182.2 minutes. Multiplying this average travel time estimate by the number of annual trips yields the total annual transit time in minutes. This evaluation model is intended to capture savings from plans that would reduce congestion or restrictions, and thus decrease the travel time required through the subject reach. The object is to estimate the anticipated time saving as dollar benefits. The yearly dollar benefits are computed based on subtracting the time saving scenario amounts from the baseline time imputed amounts. The present dollar benefits for four timesaving scenarios: 15, 30, 45, and 60 minutes were developed. The annual value of time saved in the four scenarios presented range from $168,000 to $618,000.

There are many reasons for delays in navigation transit time in the study area. Some reasons for delays are the arrival rate of towboats, the departure rate of towboats, the speed of barge turnover, the limitations of available space, recreational vessels, high winds, fog, diverted flows through the lock (i.e., draw downs), and service-fleeting-docking congestion. The heaviest traffic seasons are two: in the spring from March to mid-May, and the fall from September through November.

The benefits to trip time savings attributable to the with project conditions result from freeing up space and reducing congestion. The other sources for delays in transit time would not be affected. Under perfect conditions, if all trips were transited in the minimum 45 minutes, the annual time saving benefits over baseline conditions are estimated by the model to be $1,718,500. For estimating purposes, 50% of the perfect condition benefit estimate, or, $860,000 annual time saving benefits was assumed. Estimated timesaving may be applied to the potential mooring/anchorage areas: the 3-mile wall, the canal expansion, and the quarry site conversion. Additional economic analysis is contained in the Economic Appendix, attachment 6.

1. Quarry Site Benefits. The capacity of the quarry site has been estimated to accommodate 137 barges, which is 86% of the barges along the canal banks identified in the barge inventory. Consideration should also be given to the location of the quarry site, which is in the heart of the congestion. Therefore it is estimated that the quarry site would provide 86% of the maximum potential benefit from decongestion, and there should be no diminishment due to location considerations. The annual benefit for the conversion of the quarry site for additional mooring purposes is estimated to be $741,000.

2. 3-Mile Wall Benefits. The capacity of the 3-mile wall site has been estimated to accommodate approximately 105 barges assuming that a two-barge width will be utilized This mooring would provide mooring for is 66% of the barges along the canal banks identified in the barge inventory. Consideration should also be given to the location of the 3-mile wall site, which is at the extreme upstream end of the congestion. This location is a few miles distance from the heart of the congestion centered around the Lemont RR bridge. Furthermore, this location will induce traffic at the juncture of the CSC and CSSC, where turning tows are common. Therefore, due to distance and interference with juncture traffic, a site location diminishment factor of 50% is to be applied to this site capacity decongestion benefit estimate. The annual benefit for the utilization of the 3-mile wall for site for additional mooring purposes is estimated to be $284,000.

3. Canal Widening Benefits. A 74 barge capacity is estimated for benefit estimation purposes for the 2-male canal widening at certain areas. Compared to the barge inventory from the aerial photograph, which enumerated 159 barges on the waterway banks, this represents 46% of the barges along the canal banks. This location is also a few miles distance from the heart of the congestion centered around the Lemont RR bridge. However, this location will not induce traffic at the juncture of the CSC and CSSC, where turning tows are common. The annual benefit for the utilization of the canal-widening site for additional mooring purposes is estimated to be $298,000.

4. Benefits Estimates for Re-operation of the Lemont RR Bridge: The benefits from this proposal are difficult to establish. Industry contacts have indicated that they have accommodated to the vertical bridge constraints and are operatively accustomed to it. A review of

the Coast Guard incident reports reveals that the bridge downstream of Lockport Lock at river mile 276 is producing far more incidents then the Lemont RR bridge at river mile 300.6. If operational, it could be expected to reduce the need for ballasting operations greatly. Assuming ballasting takes place solely for the Lemont RR bridge passage, the timesaving costs are estimated to be $34,000 average annual savings. Saving due to not having to use the telescoping pilot house tows and allowing the line barges to navigate further upstream along the CSSC and through the CSC (if not taller than 24.4') have not been quantified. Additional benefits of allowing passage for commercial cruise ships, equipment barges and other tall vessels have not been quantified. This proposal can be flushed out further in another study phase. One consideration for giving it pause is that the Lemont RR Bridge is functional, and any plan to make it again operational as a swing bridge would entail cost for both operations, which would be labor intensive, as well as disruption cost to the RR timetables. All in all the industry did not appear to think this plan would be their number one priority for the problems identified in this study area.

These benefit estimates are not comprehensive, as they do not account for increases in safety and reduction in collision damage that would ensue. The benefit estimate were based on existing conditions. Forecasts of changes in navigation will be done in the feasibility phase. They should be considered as the principal quantifiable component of the potential benefits from these plans.

The proposal with the greatest apparent impact would be the quarry site conversion because of its size and its central location. Because the 3-mile wall site is roughly twice the size of the canal expansion site this would probably have the next greatest level of beneficial impact. An estimate of the benefits associated with these sites should consider both their size and their location.

More specifications on the plans considered as well as some details on the plan cost estimates are currently available for two proposals: re-operation of the Lemont RR bridge and providing for pin moorings along the 3 Mile Wall. These cost estimates are incomplete as they do not include lands, easements, relocations and rights of way, but do include a fifty- percent contingency, and estimates for engineering and design and construction management. The cost estimate available for re-operation of the Lemont RR bridge is $3,016,000 (Attachment D-3). The cost estimate for mooring piers along 1 mile of the 3 Mile Wall is $1,208,000 which was expanded to a total cost of $3,381,000 for the 2.8 miles of wall that is not being utilized.

The annualized available cost estimates, at the discount rate of FY01 .06375, over a 50-year project life, are $255,883 for the 3-Mile Wall and $201,436 for the Lemont RR bridge. Available quantified benefit estimates for these two plans are $284,000 and $34,000, respectively. The resultant benefit and cost ratio for these two plans are 1.26 and .17, respectively.

Summary of Average Annual Benefits by Category
Lemont Reach, Chicago Sanitary and Ship Canal

Alternative	First Cost	AAEC	AAEB	Net Benefit	BCR
Quarry site	N/A	N/A	$ 741,000	N/A	N/A
3 mile wall	$ 3,381,000	$ 225,883	$ 284,000	$ 58,117	1.26
Canal widening	N/A.	N/A.	$ 298,000	N/A.	N/A.
Lemont RR bridge	$ 3,016,000	$ 201,436	$ 34,000	$ (167,436)	0.17

6. FEDERAL INTEREST

Based on the discussions above, it is apparent that a least one solution for providing navigation improvements in the CSSC would produce substantial economic benefits and that those benefits would likely exceed costs. Since navigation is a high priority in Administration budgeting, there is a strong Federal interest in conducting a feasibility study of the CSSC navigation improvements. .

7. COST SHARING

The cost sharing provisions of WRDA 1986 require non-Federal participation (50 percent) in the costs for preauthorization feasibility studies, except for studies of waterways included within the definition of the “Inland Waterway System”. Studies on Inland Waterways are exempt from non-Federal cost sharing.   By action of Congress, construction (including PED) for PL 95-902 defined waterways or other waterways may be 100 percent Federal, the Inland Waterway Trust Fund may be used to fund all or part of the construction, and the waterway may be made subject to waterway fuel taxes. The CSSC and the Calumet Sag Channel are part of the Illinois Waterway System and thus are part of the inland waterway system as defined in Public Law 95-902, as amended. The feasibility study cost for the Chicago and Sanitary Ship Canal should be 100 percent Federally funded.

8. VIEWS OF OTHER RESOURCE AGENCIES

The Department of Transportation, Maritime Administration was a strong proponent of including the Chicago connection in the GLNS. They consider the CSSC a critical waterway for regional commerce and National Defense. A copy of their August 25, 2000 letter supporting this study is included as attachment D-4.

On 3 August 2001, a meeting was held with the U.S. Coast Guard, the Illinois River Carriers Association, and the Corps of Engineers (Chicago and Rock Island Districts). The Coast Guard indicated that the area between the Cal-Sag Junction and Lockport lock in very congested. Their files reported three incidents in the past three years which resulted in damage to structure and/or cargo, and which could be directly attributable to the congestion, narrowness, and space constraints in the Lemont reach of the CSSC. The Coast Guard supports the study to improve navigation of the CSSC.

9. POTENTIAL ISSUES AFFECTING INIITIATION OF FEASIBILITY PHASE

There are no known issues affecting the initiation of the Feasibility phase but the environmental evaluation will consider the Aquatic Nuisance Species Dispersal Barrier Demonstration Project. The barrier is located in the vicinity of the congested area at river mile 296.25. The dispersal barrier will initially test the effectiveness of an electric barrier on the round goby. The barrier construction was completed in 2001. The effectiveness of the barrier will be monitored for up to five years. Alternatives developed will consider the results of this demonstration project and its effect on the nuisance species.

10. PROJECT AREA MAP

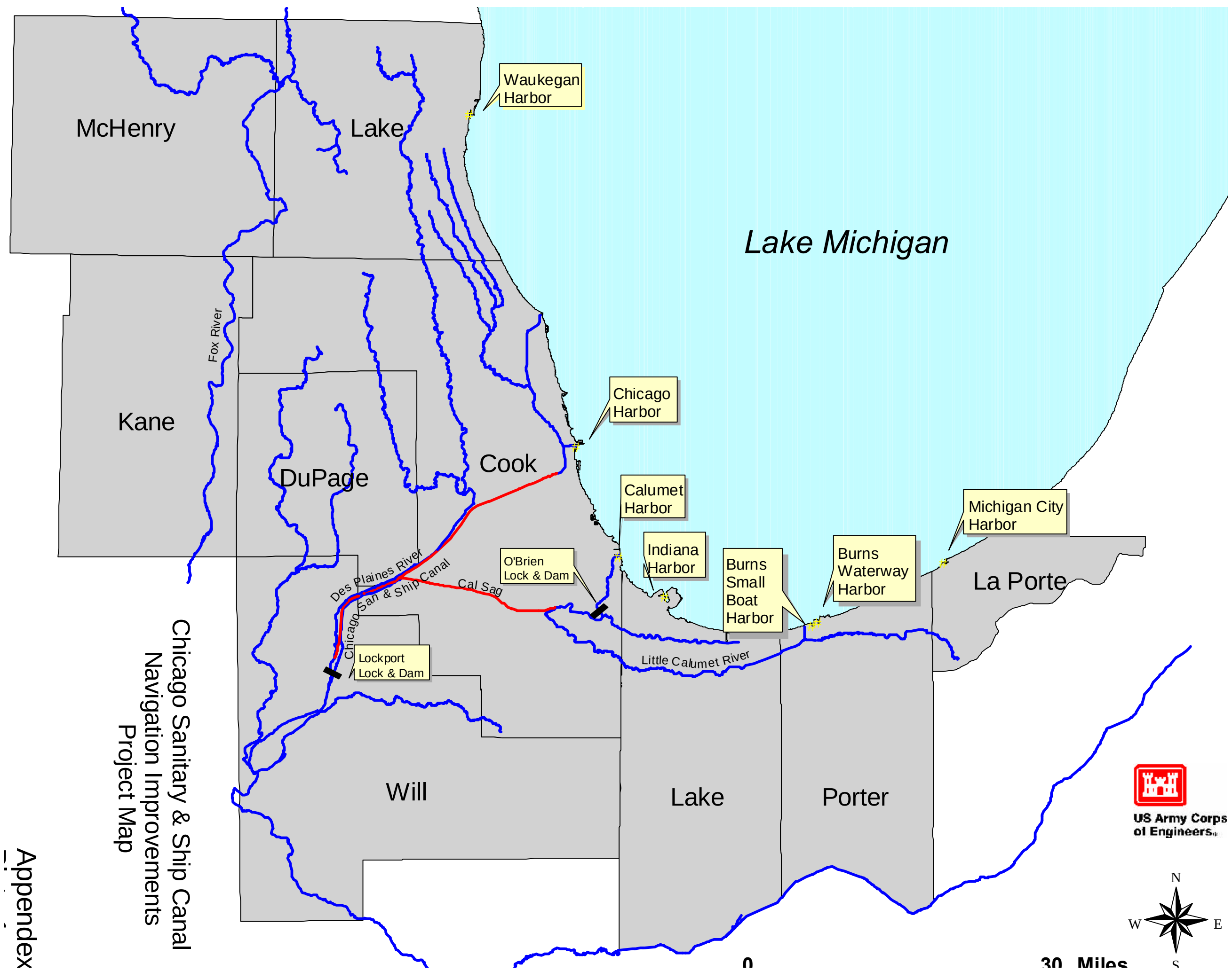
Plate 1 is a map of the study area showing the CSSC, the Calumet Sag Channel, and the connection to the Lake Michigan Harbors.

11. RECOMMENDATIONS

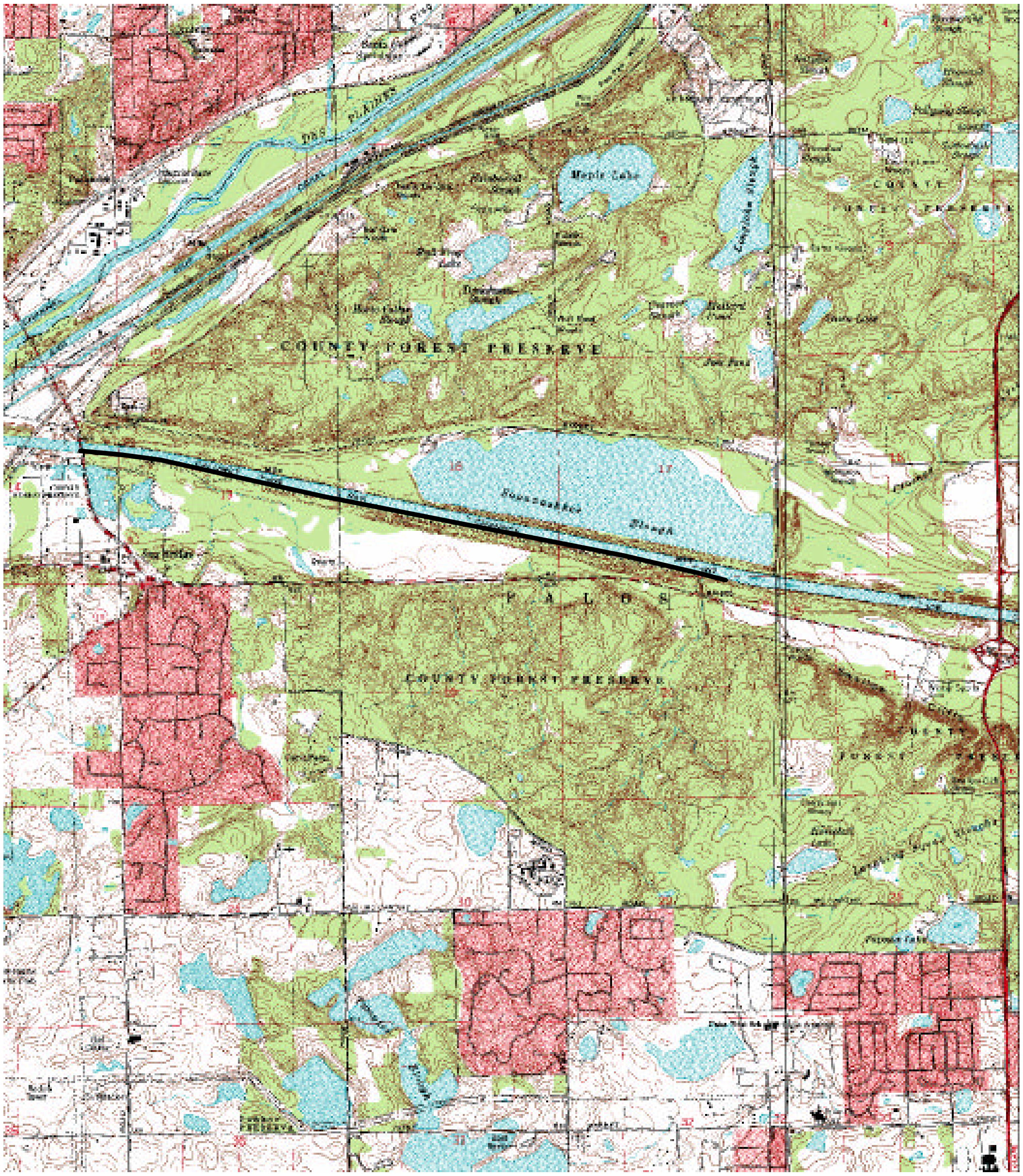
Based on previous studies and this analysis, there are sufficient indications that a viable and implementable plan can be developed that will meet the necessary Federal interest criteria. It is recommended that this reconnaissance report be approved and Chicago District proceed to the feasibility phase on the Chicago Sanitary and Ship Canal navigation improvements at full federal expense.

Chicago Sanitary & Ship Canal
Navigation Improvements
Project Map

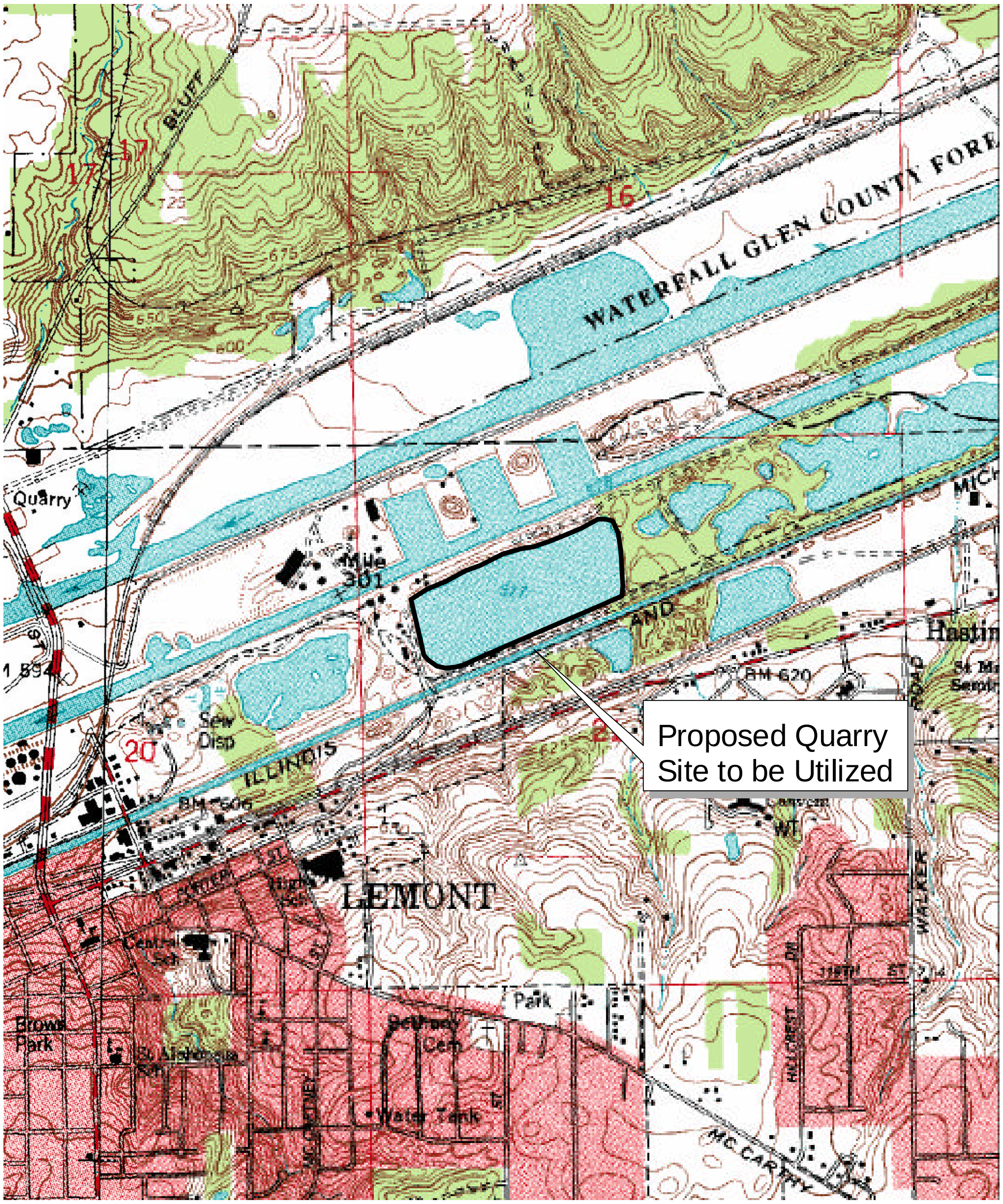
Appendex



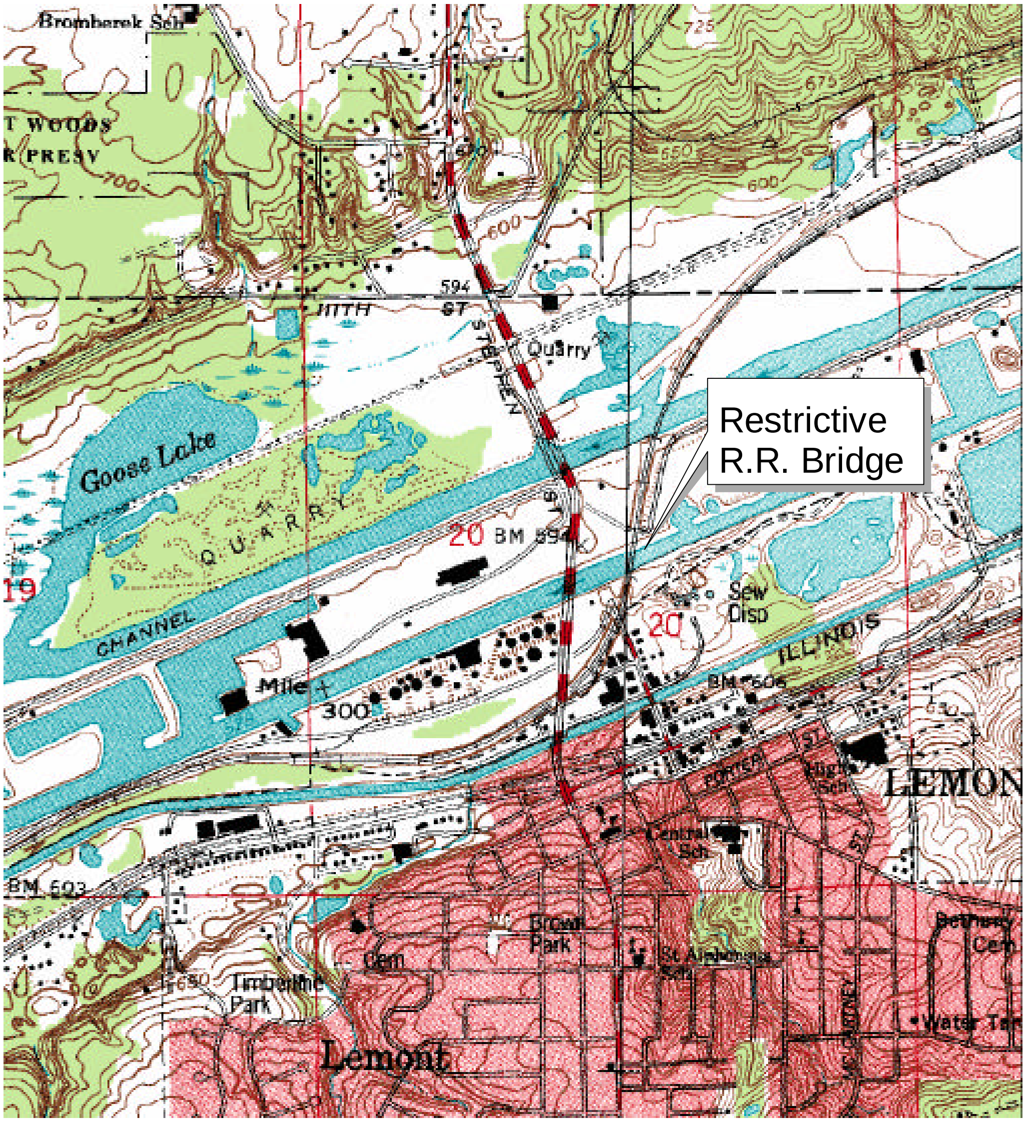
Chicago Sanitary & Ship Canal Navigation Improvements
3-Mile Wall Location



Chicago Sanitary & Ship Canal Navigation Improvements
Quarry Alternative



Chicago Sanitary & Ship Canal Navigation Improvements
Restrictive Railroad Bridge



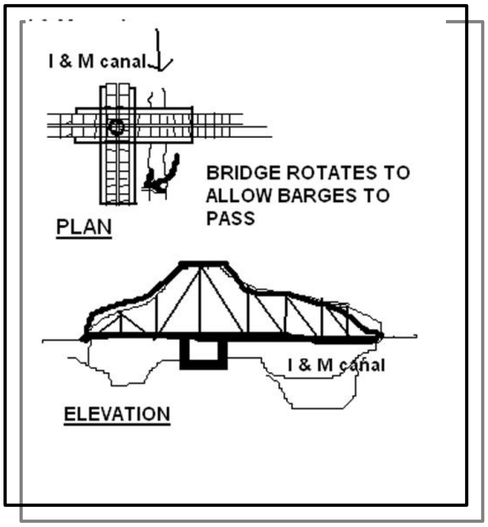
ATTACHMENT D-1

STRUCTURAL ANALYSIS OF RAILROAD BRIDGE

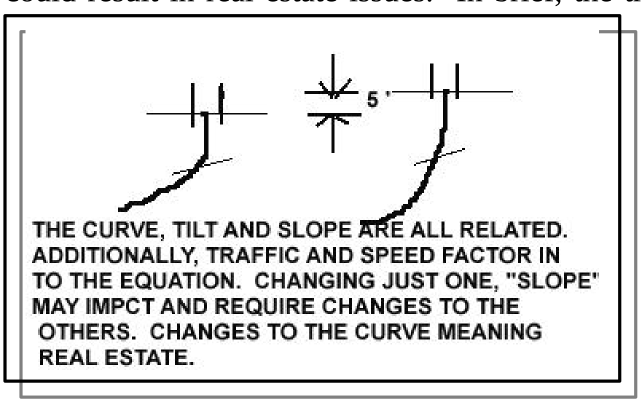
1.0 Problem

Barge traffic, and hence commerce is currently being limited on the Chicago Sanitary and Ship canal, by among other things, a railroad bridge. The bridge is of the swing type, wherein the bridge rotates, or swings, to an alignment paralleling the waterway, when traffic requires. The swing function has been disabled. The bridge is counterweighted to balance over its fulcrum, or turning hub drum.

sketch 1



Today, with larger barges the clearance is insufficient. Potential users are turned away by the blockage. A five-foot raise is needed. The problem as presented offers two options. Either make the bridge operational again, or permanently raise the bridge 5 feet. Before discussing these options, a caveat may exist, regarding the raise option. To effect the raise, the track for several hundred feet must be raised, so as not to create too severe a slope. The problem, as observed, is a track curve exists close to the bridge. The curve has a tilt, or super elevation if it were a highway (a banked track for car races). If the track slope changes, the tilt would also change. As a metaphor, recall driving on highways, when the speed limit changed from 70 to 55, traversing curves affected driving. It very well may mean, the curve itself would have to be changed. The curve change could result in real estate issues. In brief, the track changes should be factored in, if the raise solution is recommended.



sketch 2

LOOKING ALONG THE TRACK TOWARD THE RAILROAD BRIDGE

2.0 Photos

The following photographs were taken at the bridge inspection. The swing function of the bridge being no longer operational (parts were removed), time was spent trying to imagine the mechanisms involved, when the bridge was able to rotate. First, the photographs, then the theory how the rotation was accomplished.

photo 1

LOOKING TOWARD THE NEARBY CURVE

photo 2

SHOWING THE HUB DRUM

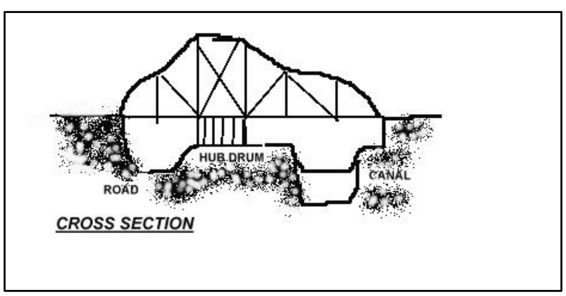


photo 3

photo 4

ROAD
SHOWING BRIDGE
SUPERSTRUCTURE

photo 5

SHOWING HUB DRUM
ROLLERS, AND
PERMANENT
GEAR BASE

photo 6

SHOWING
INSIDE OF HUB
DRUM

photo 7

SHOWING BRACKET

photo 8

CONDITION AT SUPPORT

Photo 5 shows a large permanent gear, at the base. A series of rollers, each 18-inch diameter provides the rolling mechanism, for the hub drum and bridge proper. The method of power has been removed. Photo 6 showing the inside of the large hub drum gave no clue that the power came from inside, but it does show the framing engaging the rest of the bridge. However, three brackets were observed along the hub drum perimeter. Each with a support bracket and a hole for a shaft. The best theory is a motor was mounted on the bracket with a driving shaft. The shaft engaging a smaller gear which fit into the permanent large gear. The motors then could turn the shafts, in turn the small gear, with the result the bridge rotates.

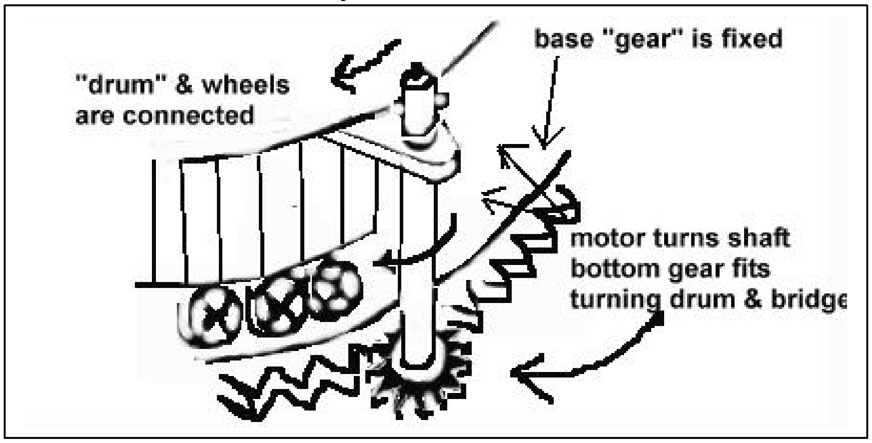
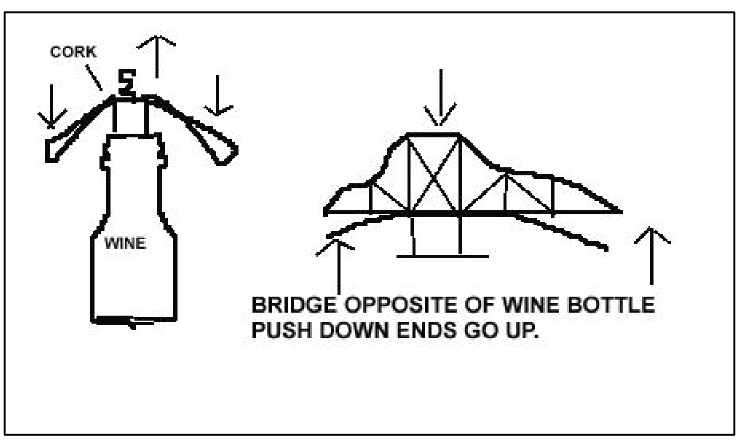


Photo 8 shows the end supports for the bridge (deck & superstructure). The problem that has no obvious solution, is what power, or means, dealt with the following condition. As the bridge moves off its supports, the ends became free, or cantilevered. The result would be deflection. Considering the weight, probably several inches, at each end. The question, or problem, " How, or what raised the deflected ends back onto the supports? " Contrary to the center, there were no obvious clues, as to how the ends were raised. Mr. Loikets, the project estimator, had an old book showing that one method used with swing bridges, was a wedge type attachment to the bridge deck. This seems logical, as the one turning power method, would be used to overcome the end-lifting problem. The one question being would the wedge method be used on a bridge as large, and heavy as this one? At the inspection, no observation was made of the bridge deck ends (looking for signs of wedge detachment).

Another theory offered was a downward force at the hub drum could lift the ends. The metaphor being an opener for a wine bottle. In that case, the ends are pushed down, and the center raises. This theory had little evidence for validation, as the center would rise; yet the rollers and hub drum appear to be in only one position. It was observed that the top chord of the bridge contained flat bars with turnbuckles, where one wouldn't expect that type member. The implication being movement in the chord was expected perhaps just deflection.



3.0 CONCLUSIONS

Comparing the options of a permanent 5-foot raise and the return to operation, each would have to deal with the center, hub drum. Returning the drum to rotational operation appears far easier than the task of raising the huge bridge. Aspects such as the raising of the track and / or the cost of operation (perhaps including people) over a longer period, on guess would appear to favor the fixed cost of raising. In dealing with the supports, returning to operation is more complex, than mere raising. First, the method. The principal of using a wedge, so that the one means of power (rotation) looks like a good start. The other option, being some form of hydraulic jack which would create a system (raise then turn), appears not only more complicated, but more likely for problems. The wedge principal could be utilized, in say, modification of the abutment to include a form of ramp, as opposed to a wedge. In conclusion, there is no obvious answer. A thorough study, developing and comparing the options appears to be a valid course.

Dec-01

Chicago Sanitary and Ship Canal Navigation Improvements

Docking Facility for one mile of berthing with 25 piers

Description	Plant	Labor	Materials	Supplies	Subtotal
Mobilization	$15,000	$10,000			$25,000
Rock Excavation	$24,491	$62,490	$5,500		$92,481
Reinforcing Steel	$2,406	$44,411	$19,906		$66,723
Formwork	$336	$11,218	$1,320		$12,874
Concrete	$6,891	$27,906	$43,540		$78,337
Subtotal					$275,415
Mark-up				25%	$68,854
Subtotal Prime					$344,269
Rock Anchors	70 ea.	$5,000	/anchor		$350,000
Subtotal Prime & Subcontractor					$694,269
Contingencies				50%	$347,135
Total Constrcution Costs					$1,041,404
E&D				8%	$83,312.28
S&A				8%	$83,312.28
Total Project Costs					$1,208,028

2.8 mile Fleeting Facility with 75 piers

Description					Subtotal
Construction costs	2.8 miles	$1,041,000			$2,914,800
E&D					$83,312
S&A					$83,312
Total Project Costs					$3,081,425
			Say		$3,081,000

Dec-01

Chicago Sanitary and Ship Canal Navigation Improvements

Rehabilitation of R. R. Bridge Project Estimate

Description	Size	No.	Hours	Rate	Amount
Swing Bridge					
Project Installation 36 weeks X 40 hrs per week = 1,440 hours					
Plant	Size	No.	Hours	Rate	Amount
Welder	400 amp	1	1,440	$4.26	$6,134
Compressor	250 cfm	1	1,440	$6.73	$9,691
Hydraulic Jacks 300 ton	6	1	1,440	$5.00	$7,200
Flatbed Truck	20 m	1	1,440	$35.00	$50,400
Subtotal					$73,426
Small Tools					$13,770
Total Plant					$87,196
Labor					
Foreman		1	1,440	$50.00	$72,000
Operator		1	1,440	$46.65	$67,176
Millwright		4	1,440	$44.42	$255,859
Welder		1	1,440	$44.42	$63,965
Total Labor					$459,000
Materials		Qty		Unit Price	
40" dia pinion w/keyways	ea.	3		$48,000	$144,000
Pinion shaft 6 1/2"	ea.	3		$11,000	$33,000
7.5 hp Hydraulic motor	ea.	3		$60,000	$180,000
Refurbish wheels	LS.				$50,000
Refurbish trunion	LS.				$1,000
Replace Structural parts					$5,000
Motor to Shaft Couple 4"x16"	ea.	3		$6,000	$18,000
Compressor					$10,000
Total Materials					$441,000
Supplies					
Timber for Cribbing					$8,000
Total Cost w/o profit					$995,196
Mark-up OH Profit bond				25%	$248,799
Swing Bridge rehab					$1,243,995

Rehabilitation of R. R. Bridge Project Estimate (continued)

Lifting Mechanism	Qty		Unit Price	Amount
Materials				
Electric Motors	2		$25,000	$50,000
Drive Shaft	2		$5,000	$10,000
Worm Gear	2		$12,000	$24,000
Worm Wheel	2		$53,000	$106,000
Short Toggle	4		$4,600	$18,400
Linkage	4		$2,500	$10,000
Linkage Pins	8		$300	$2,400
Long Toggle	4		$5,000	$20,000
Axle	4		$7,500	$30,000
Short Toggle	4		$4,600	$18,400
Linkage to Wedge	4		$2,500	$10,000
Linkage Pins	8		$300	$2,400
Wedge	4		$1,500	$6,000
Support Framing				$20,000
Total Materials				$327,600
Labor				
Foreman	1	240	$50.00	$12,000
Operator	1	240	$46.65	$11,196
Millwright	4	240	$44.42	$42,643
Welder	1	240	$44.42	$10,661
Equipment	1	240	$50.00	$12,000
Total Labor				$88,500
Subtotal L9ifting Mechanism				$416,100
Power				$60,000
Subtotal				$1,720,095
Contingencies			50%	$860,000
Total				$2,580,095
	Say			$2,600,000
E&D			8%	$208,000
S&A			8%	$208,000
Total Project Costs				$3,016,000

U.S. Department of Transportation
Maritime Administration
Great Lakes Region

August 25, 2000

Daniel E. Steiner, P.E.
Chief, Planning Division and Navigation Account Manager
U.S. Army Corps of Engineers
Great Lakes and Ohio River Division
P. O. Box 1159
Cincinnati, Ohio 45201-1159

Dear Mr. Steiner,

As way of introduction, Craig Middlebrook, Deputy Administrator, St. Lawrence Seaway Development Corporation, phoned recently to tell me about the Corps sponsored Great Lakes Navigation System Review project. This is a very timely project since the Department of Transportation has been holding Maritime Transportation System (MTS) review meetings around the country. During the early phases of MTS, the U.S. Coast Guard Ninth District initiated the Great Lakes Waterway Management Forum as the regional version of National MTS. This "Forum" membership is made up of U.S. and Canadian government and marine industry representatives with sole purpose of improving the Great Lakes waterways for all users - recreational as well as commercial. I am sure that the "Forum" members would like to help you with your new project.

The Maritime Administration (MARAD), Great Lakes Region staff – all three of us – are willing and able to provide technical assistance to you during your study project. MARAD's role is to promote waterborne commerce – U.S. shipbuilding – and U.S. maritime employee training – in domestic and international trade. The enclosed MARAD Annual Report describes our ship financing programs, national defense, and promotional activities. Our region responsibility includes monitoring and assisting the maritime industry in the Great Lakes as well as on the Ohio, Missouri, Upper Mississippi River and Illinois Waterway. A number of Great Lakes vessel operators are our customers through the Title XI Ship Financing and Capital Asset Fund Programs.

Recent DOT Listening and Dialogue Sessions with other Federal agencies and the maritime industry seem to run on a strong theme for the urgent need to improve the infrastructure of the American waterways. The general perception of the maritime industry is that the Nation is loosing ground in the maintenance and support for waterway improvements. This includes, specifically, dredging harbors and disposing of sediment, and the updating of connecting channels and locks to meet the needs of today's vessels as well as the potential benefit for larger vessels in the future.

The vessel efficiency issue is difficult to fully understand by those that are not directly involved in day to day operations. But, briefly, all vessels are designed to carry as much revenue producing cargo as possible and operate 24 hours a day – 7 days a week – and every day that the waterway is open. In some cases, there are vessels operating year-round within certain portions of the Great Lakes and Inland Waterways. In other cases, large vessels operate during shorter seasons due to their trade patterns in the Upper Lakes or through the Seaway. In every case, these vessels rely on the most efficient use of the waterways full dimensions – length – beam and depth. Some operators fine-tune their vessel loading to daily weather conditions and water level reports at loading and discharge ports. If winds are blowing water into a distant discharge port – they may load on a few more revenue producing tons. Other operators, such as those operating in the Seaway, are somewhat restricted by a longer-range draft forecast and limits set by the U.S. and Canadian Seaway authorities. The most efficient vessel operation is finely tuned to the maximum use of the waterways. Anything less – is unacceptable.

The general perception from the maritime representatives at DOT meetings is – the U.S. is failing to keep up with the waterway demand. According to the An Assessment of the U.S. Marine Transportation System – a Report to Congress – September 1999 - global maritime trade is predicted to grow 3.5 percent annually

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through year 2020. Vessel operators are expressing concern about existing water capability – let alone any increasing demand on existing waterway infrastructure.

This issue is even more important in the existing trade throughout the Great Lakes region. Many Great Lakes harbors have project depths of less than connecting channels or lock depth. This historical design criteria restrains efficient vessel operation and commercial development. We recommend studying those commercial harbors that have project depths of less than Seaway or SOO Lock depth to determine their present commercial needs. Perhaps a limited number of ports can be selected for a case study. Two ports that come to mind are Green Bay, WI and Waukegan, IL. Both ports have impressive growth potential if they only had deeper harbors. According to the SLSDC, their goal is to achieve a 27 foot draft in the in the next few years. In addition, the Lake Carriers Association recently expressed interest in achieving a 29.5 foot draft throughout the Upper Lakes. Certainly, there is maritime industry support for improved waterways.

We recommend that you consider a review of the world and regional vessel fleet dimensions as it relates to the projection for future harbor and lock design. The recent increased allowable vessel size through the Seaway has created new vessel construction and reconstruction of existing vessels. Canadian vessel owners have converted several Seaway vessels to fit the modern dimensions of 740' LOA 78' Beam and 26' 3" draft. These "wider" vessels can carry substantially more due to their new "cubic" capacity. In addition, recent new vessel buildings by ocean vessel owners have increased carrying capacity by building shorter but wider ocean vessels capable of transiting the 78' locks. This improvement in vessel efficiency and shipyard activity was accomplished by a review of the existing locks and without any new construction cost. The review of proposed Second Lock at Sault Ste. Marie, MI. should also include the same concept, or perhaps, a larger "Son of POE Lock" and its impact on the Upper Lakes shipbuilding industry. There is a general rule-of-thumb that "a larger lock will create larger and more efficient vessels". This analysis may also contribute to an improved cost-benefit ratio for the proposed Second Lock if you consider new shipbuilding and improved cargo carrying capacity impact on the Great Lakes region.

One of our "unfinished projects" is the review of waterborne trade through the Chicago connection via the Illinois Waterway and Lake Michigan. According to COE statistics, there are about 8,500 river barges operating through the Chicago waterways to just two major port in Indiana – Burns Harbor and Indiana Harbor. These two ports are served by barge on a year-round basis and connect Inland Waterway destinations/origins providing a water mode service for Seaway commodities as well as domestic commodities. The Illinois Waterway barge traffic generally carries between 42 to 50 millions tons of cargo each year. Recently, the U.S. Coast Guard has published regulations for barges to transit beyond Chicago into Lake Michigan as far as Muskegon, Michigan and Milwaukee, Wisconsin. While this expanded operating capability has been slow developing, the traffic between Chicago and Northern Indiana ports continues to be strong and growing in importance. This route also has its share of infrastructure limitations such as low bridge air draft, narrow channel, and high traffic volume. We recommend that this waterway connection be included in your study effort.

These are just a few of the ideas that we may be able to help you investigate in your study project. Please feel free to contact us at any time if you have any questions. We look forward to providing technical assistance to you and your staff.

Yours truly,

Al Ames
Region Director

Cc: Craig Middlebrook – SLSDC
Bonnie M. Green – MARAD
RADM James D. Hull – USCG Ninth District