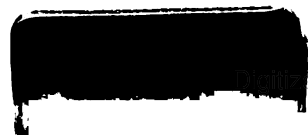

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>





-USCGA-MD-724496-D

#41156

(DRAFT) ENVIRONMENTAL STATEMENT

DEPARTMENT OF TRANSPORTATION

U. S. COAST GUARD

- 1. Name of Action: Administrative Action
- 2. Brief description of action indicating what states (and counties) particularly affected:

Approval of location and plans of a high level fixed bridge across the Patapsco River from Hawkins Point, Baltimore City to Sollers Point, Baltimore County, Maryland.

- 3. Summary of environmental impact and adverse environmental effects:

The proposed bridge will require the dredging of 80,000 cubic yards of material from the river and disposal on upland and adjoining containment areas. Two public parks are affected: Fort Armistead an historic site on the western approach and Fleming-Turner Station Park an undeveloped Baltimore County Park. The 7.6 acres of land used from Fort Armistead Park was authorized by Congress 1969 (PL 91-83) to be transferred to the State of Maryland for highway use. Highway construction activities have commenced. The affect on Fleming-Turner Station Park is the taking of 0.33 acres of aerial easment. Construction work on the portion of the structure taking the aerial easment has commenced under a permit issued prior to 1969.

- 4. List alternatives considered:

- 1. Not build the bridge
- 2. Construct a tunnel

NEPA COLLECTION
Transportation Library
Northwestern University Library
Evanston, IL 60201

APR 7 1972



DEPARTMENT OF TRANSPORTATION

UNITED STATES COAST GUARD

(DRAFT) ENVIRONMENTAL IMPACT STATEMENT

PURSUANT TO SECTION 102(2)(c)

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

SUMMARY OF (DRAFT)

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED BRIDGE ACROSS PATAPSCO RIVER
FROM
HAWKINS POINT, BALTIMORE CITY TO SOLLERS POINT,
BALTIMORE COUNTY, MARYLAND

The Baltimore Harbor Outer Bridge is (1) an essential part of a directional expressway system for through traffic between points north and east of Baltimore City and south and southwest of the City, and (2) the link which completes the Circumferential Baltimore Beltway, thereby furnishing alternate routes between New England and Washington and points south. It is also a vital part of the three projects for which the \$220.0 Million Bridge and Toll Revenue Bond Issue was marketed by the State of Maryland in October, 1968.

Previous to the decision by the Governor and the State Legislature to change the Baltimore Harbor Outer Crossing to a Bridge, a tunnel was proposed for the crossing (Plate 1). Permits were issued in 1969 by the Corps of Engineers (Appendix A); and the Department of Water Resources (Appendix B) and the Maryland Port Authority (Appendix C) to allow construction of a tunnel along the identical alignment now proposed for the Outer Bridge. Involved in this construction was the removal of 2.0 million cubic yards of material from the bottom of the harbor and disposal of the dredged material at Pooles Island in Chesapeake Bay. Further, mechanical ventilation of the tunnel was required to remove accumulations of automotive emissions from the facility. As seen in Appendix D, the accumulation of pollutants in the existing tunnel has frequently exceeded the toxic threshold levels, and this has been the rule rather than the exception for tunnels in many locations because of the tendency for air pollutants to concentrate in tunnels.

The proposed bridge will accommodate four lanes of traffic, while the tunnel alternate would have had but two lanes. The bridge would extend from an existing approach fill at Hawkins Point, in Baltimore City, to an existing approach fill southeast of Sollers Point in Baltimore County. No filling or intrusion of marshlands is involved in this construction.

The bridge is located in an area zoned for heavy industrial usage. Residential dwellings in the vicinity of the bridge are approximately a mile from the bridge abutments (see Plate 1). The industrial usage of the area imposes no problem with respect to ambient noise levels. There is therefore no acoustic noise problem created in the area by the proposed bridge traffic.

There are two major stationary sources of air pollution in the vicinity of the bridge. These sources, as well as the ambient air quality in the general area have been analyzed to determine the effect on the air quality of (1) the bridge traffic, and (2) the proposed location of the toll booths. It has been determined that the ambient air quality is not significantly affected by the bridge vehicular traffic, and that the proposed location of the toll booths in the east bridge approach is superior to any other alternative. Further, the alternative of constructing a tunnel in this location would pose far more serious problems from an air pollution viewpoint than does the proposed bridge.



BALTIMORE HARBOR OUTER CROSSING
LOCATION MAP



The proposed bridge construction would have but slight and only transitory effect on water quality in the Patapsco River. The construction of 11 piers in water will require excavation of 80,000 cubic yards of material. This material will be disposed of in upland and adjoining containment areas which will eliminate entirely the possibility of contamination of other waters by the river bottom material from the pier excavation.

Two public parks are affected by the proposed bridge. Fort Armistead Park, an historical site on the west side of the bridge approach, although obtained from the Federal Government as a recreational park, has not been developed by the City for that purpose. In 1969, Federal legislation (PL 91-83) was passed by the Congress and signed into law by the President on October 10, 1969 (Appendix E) authorizing transfer of 7.6 acres of this land to the State for highway use to construct the Outer Harbor Crossing approaches. The construction of a bridge rather than a tunnel will make available a significant portion of this acreage for park usage. Also, disposing of the dredged materials in Area A (Exhibit 1) will add more recreational acreage and present a link to the existing causeway beneath the bridge which offers the potential of a recreational joint use area.

The other park, Fleming-Turner Station Park, is located in Baltimore County. The east approach, consisting of a Bridge across Bear Creek, extends along the front of this park and has minimal effect on it, taking but 0.33 acres of aerial easement along the far western edge to provide for the bridge traversing the park. Studies have shown that the approach bridge will have no detrimental effect on these parks; rather, it will allow joint use of recreational facilities and enhance accessibility into the area to facilitate greater use of these amenities.

No waterfowl or wildlife refuges are affected by the proposed bridge construction.

Consideration of the alternative of building a bridge in lieu of the tunnel originally proposed clearly demonstrates the superiority of the bridge from the viewpoint of creating minimal damage to the environment. Construction of the bridge will reduce dredging and disposition to only four percent of the amount required for tunnel construction, thereby greatly eliminating possible water quality degradation. Further, upland and adjacent disposal areas will be utilized for the excavated material. Air pollution from vehicular sources will be minimized because of the use of a four-lane bridge in lieu of a two-lane tunnel. Many vehicular tunnels now experience severe toxicity problems from air pollution because of the difficulty of providing satisfactory ventilation, especially during periods of peak traffic volumes, while dispersion of vehicular emissions from a high open bridge is usually excellent.

There are a number of other environmental advantages which the bridge offers over the tunnel. These include reduced congestion, reduction in danger from explosions, and greater driver and passenger safety.

As a long range productive facility, the bridge is unique in its potential for adding to the general good of the traveling as well as general public. Finally, there is a minimal commitment of natural resources or effect on natural resources which are irrevocable or irretrievable.

In summary, the construction of this bridge represents a beneficial commitment of the State's resources to serve the public in a variety of constructive ways in terms of land use, potential industrial and economic development, safety and convenience to the traveling public and in providing an alternative four-lane traffic facility vastly superior to the originally approved two-lane tunnel.

(DRAFT)
ENVIRONMENTAL IMPACT STATEMENT

PROPOSED BRIDGE ACROSS PATAPSCO RIVER
FROM
HAWKINS POINT, BALTIMORE CITY TO SOLLERS POINT,
BALTIMORE COUNTY, MARYLAND

1. Description of Bridge

The proposed Baltimore Harbor Outer Crossing Bridge will accommodate 4 lanes of traffic with 28 foot wide roadways in each direction, separated by a 2-foot median barrier, and flanked by concrete parapets. The roadway decks will be reinforced concrete and will be cast of light weight aggregates where it is most economical. Openings through the concrete parapets will provide drainage of the roadways.

Progressing outward from each abutment continuous spans of steel girders will be employed with approximate length of 150 or 300 feet, as shown on the plans accompanying the application for approval (Appendix F).

It is proposed to cross the Fort McHenry shipping channel by a continuous truss bridge having a main span of 1,200 feet flanked by 720-foot spans. The main span will permit a horizontal clearance of 1,100 feet between fenders to accommodate a future 1,000-foot wide shipping channel having a 50-foot depth below mean low water and a vertical clearance of 185 feet above mean high water. If required in the future a 60-foot depth can be provided over the present 800-foot width of channel.

2. Bridge is Part of Larger Project

The bridge is part of the Baltimore Harbor Outer Crossing project, which together with the Parallel Chesapeake Bay Bridge and the Baltimore Harbor Tunnel Approach connection to Interstate Route 95, will be paid for from the proceeds of the \$220,000,000 Bridge and Tunnel Revenue Bonds (Series 1968) and such additional revenue bonds as may be required.

The Baltimore Harbor Outer Crossing project will extend from the Baltimore Beltway and the proposed Arundel Expressway, in the vicinity of Governor Ritchie Highway in Anne Arundel County to the Patapsco Freeway at a point in the vicinity of the intersection of North Point Boulevard and Wise Avenue in Baltimore County. This project will provide a directional expressway for through traffic between points north and east of Baltimore and south and southwest of the City. It will complete the circumferential Baltimore Beltway, thereby making available a direct route for traffic between the densely populated and industrial areas of Dundalk and Sparrows Point and the rapidly growing areas of Anne Arundel County as well as an alternate route in the expressway system between New England and Washington and points south.

Of most importance, however, will be the relief afforded the traffic congestion at the existing Baltimore Harbor Tunnel. At present, the existing Baltimore Harbor Tunnel is carrying 21.6 million vehicles per year, and is severely congested for more than 400 hours per year. The only alternative routes now available are surface streets in the City of Baltimore, which are presently severely congested, noisy, and dangerous and the Circumferential Baltimore Beltway, which is approximately 2 miles longer for Interstate travelers who use the Outer Harbor Crossing to reach I-95 between Washington and New York. The alternate routes through the City and via the Beltway do not have the capacity to adequately provide the relief available with the Outer Harbor Crossing.

3. The Probable Impact of the Bridge on the Environment

i. General: The 4-lane bridge is being proposed as an alternate to a 2-lane tunnel which has been designed for this location. The bridge will extend from an existing fill at Hawkins Point, in Baltimore City, to an existing fill immediately southwest of Sollers Point, in Baltimore County. These fills were placed as approaches to a tunnel and were extended beyond the entrance ramps to the tunnel as a means of constructing the open ramps, cut and cover sections, and ventilating shafts which are adjuncts to the tunnel. The bridge will be constructed on the same alignment selected for the tunnel in order to take advantage of the overall economy afforded the project by these fills. There is no filling of marshlands involved. However, the existing fills will be adjusted to meet the grade of the bridge approach spans. This will entail the placing of an additional quantity of fill material in the vicinity of the bridge abutments to accommodate the approach roadways. (Exhibit 1)

ii. Human Environment: The area in which the bridge will be built is zoned heavy industrial. It has very few existing dwellings. The nearest residential communities are, Turner Station, south of Dundalk in the Sollers Point area, and a small community of dwellings along Hawkins Point Road in the vicinity of its junction with Marley Neck Road. The closest dwelling is in Turner Station and it is approximately one mile from the north abutment. The effect of the bridge on dwellings, either beneficial or adverse will be minimal except from the standpoint of easy access to both sides of Patapsco River. The total project including bridge and approaches is 10.3 miles in length and displaces only 9 residences in its entire extent.

Air pollution from vehicular traffic on the proposed bridge will have little effect on ambient air quality near existing habitations. For example, the results of the air quality study detailed in Appendix G shows that in the range of 3000 feet from the bridge, the increase in CO in the environment will be less than 0.02 parts per million, or 0.04% of the national air quality standards under peak traffic conditions. Analysis with other types of emission produces results of similar magnitude.

iii. Air Quality Study: A detailed evaluation of the effect of anticipated bridge traffic on ambient air quality in the vicinity of the proposed facility has been made and is contained in Appendix G. It shows that peak traffic will occur in 1977, shortly after the time that the new air emission standards will have a substantial effect on reducing pollutant emissions from vehicular traffic. With peak traffic of 1,500 vehicles per hour (see Table 2, Appendix G) emissions from the vehicles will, in general, have little appreciable effect on the area or on passengers within automobiles on the bridge. A study of prevailing winds in relation to the only two major stationary sources of air pollution in the industrial area on either side of the bridge indicates that the proposed location of the toll booth facilities on the Sollers Point side of the bridge approaches is most beneficial in minimizing the effect of increased automotive pollution emissions due to queuing at the toll plaza.

In the following Tables Nos. 1 through 3, there are summarized the results of the air quality studies presented in Appendix G. In Table 1 the effect of 1977 peak hour bridge traffic on ambient air quality conditions is compared with pertinent National Standards. These show that based upon dispersion analyses, the contribution by bridge traffic of pollutants is several orders of magnitude below threshold toxicity limits at both 100 meters and 1,000 meters from the toll plaza.

In Table 2 a comparison is given of the gross bridge traffic pollution emissions with the two major stationary polluters in the area. These data show that the only substantial contribution made to the gross pollution of the area is from bridge traffic hydrocarbons, which would double the amount of hydrocarbons in the area. This, however, is a small contribution in view of the data contained in Table 1, which shows that at 100 meters from the bridge in the direction of prevailing winds, the total hydrocarbons added to the atmosphere are at 1/800 of National Standards. With respect to other pollution emissions, the gross bridge traffic pollution emissions are but 0.6 per cent of the total daily pollution emitted by the stationary sources.

In Table 3 the effect of various configurations of the toll plaza location on emissions and the consequent effect on ambient air quality are shown. The last two columns given in Table 1 are repeated on the first two lines of Table 3. Also shown in Table 3 are the results of an analysis of utilization of one-way toll collection. This data is based upon the assumption that during the peak hour 60 per cent of the traffic would utilize the one-way collection facility. Also shown are the results of assuming separate collection facilities for each traffic direction; and finally, the emission dispersions without interposition of any toll plaza.

TABLE 1

EFFECT OF BRIDGE TRAFFIC ON AMBIENT CONDITIONS
AND COMPARISON WITH NATIONAL STANDARDS

Pollutants		National ^{1/} Standards	Ambient Conditions 1970 Sollers Point	Toll Plaza 1977	
				100 Meters	1000 Meters
CO	Avg.	9 ppm	Not Available	0.0690 ppm	0.0135ppm
	Max.	35 ppm			
HC	Avg.	0.24 ppm	Not Available	0.00323ppm	0.00043ppm
	Max.				
NO ₂	Avg.	0.05 ppm	0.040 ppm ^{2/}	0.0044 ppm	0.00084ppm
	Max.	2.50 ppm	0.0730 ppm ^{2/}		
SO ₂	Avg.	0.03 ppm	0.0235 ppm	0.00392ppm	0.000075ppm
	Max.	0.14 ppm	0.3041 ppm		
Particulates	Avg.	75 ug/m ³	69 ug/m ³	1.618ug/m ³	0.306ug/m ³
	Max.	260 ug/m ³	179 ug/m ³		

^{1/} "National Primary and Secondary Ambient Air Quality Standards"
Environmental Protection Agency, Federal Register Vol. 26
No. 84 Part II, April 30, 1971.

^{2/} Data collected through period January 1971 to August 197.

TABLE 2

COMPARISON OF BRIDGE TRAFFIC POLLUTION EMISSIONS
WITH MAJOR STATIONARY SOURCES

(Pounds Per Day)

Source	Air Pollution Emissions						Total
	CO	HC	NO ₂	SO ₂	Particulates	:	
Bridge	2360.7	170.6	308.9	31.7	64.5		2936.4
Toll Plaza	1397.5	129.4	146.1	18.5	26.1		1717.6
Total Bridge	3758.2	300.0	455.0	50.2	90.6		4654.0
Bethlehem Steel	498,032	52.1	15,197.0	170,958.0	76,340.0		760,579.1
Glidden Company	-	208.0	4,160.0	15,808.0	17,488.0		37,664.0
Total Stationary Sources	498,032	260.1	19,357.0	186,766.0	93,828.0		798,243.1
Additional Emissions from Bridge Traffic as Percent of Stationary Sources	0.75%	115%	2.35%	0.027%	0.096%		0.58%

Note 1: Total length of bridge: 8640 feet. Total emissions per lineal foot of bridge = 0.34 lbs/d
 Note 2: Total length of toll plaza: 2000 feet. Total emissions per foot of toll plaza = 0.85 lbs/d

TABLE 3

**ANALYSIS OF EMISSIONS FROM VARIOUS CONFIGURATIONS OF TOLL PLAZA
IN RELATION TO BRIDGE APPROACHES**

Alternatives	Distance from Toll Plaza Meters	CO ppm	HC ppm	NO ₂ ppm	SO ₂ ppm	Particulates µg/m ³
Toll Plaza at Sollers Point (Two Way Toll Collection)	100	0.0690	0.0032	0.0044	0.0039	1.618
	1000	0.0135	0.00043	0.00084	0.000075	0.306
Toll Plaza at Sollers Point or Hawkins Point (One Way Toll Collection)	100	0.0414	0.0019	0.0026	0.0023	0.9708
	1000	0.0081	0.00026	0.00050	0.00005	0.1836
Toll Plaza at Sollers Point and Hawkins Point (Separate Toll Collection at each Plaza)	100	0.0345	0.0011	0.0022	0.00195	0.8090
	1000	0.0067	0.00055	0.00042	0.0000375	0.0255
No Toll Plaza Facility	100	0.0236	0.00084	0.00146	0.000213	0.890
	1000	0.0045	0.00016	0.000815	0.000083	0.169

In every case given above, whether at 100 meters or 1,000 meters on the leeward side of the bridge, the dispersion analysis shows that the additional pollution from vehicular traffic will have little perceptible effect on ambient air quality and should cause no detrimental effect to the air quality in the general area when peak hour traffic conditions occur.

Thus, after evaluating the effects of the anticipated bridge traffic on ambient air quality, we arrived at the following conclusions:

1. Analysis of prevailing wind directions in relation to the two major stationary pollution sources in the industrial area on either side of the bridge indicates that the proposed location of the toll booth facilities on the Sollers Point side of the bridge approaches is the most beneficial from the viewpoint of minimizing the effects of increased automotive pollution emissions.
2. The ambient air quality in the vicinity of the bridge and toll plaza should not be significantly affected by the automotive emissions. At a distance of 3,000 feet from the two-way toll plaza, the increase in pollution levels in the environment vary from 0.04 per cent to 0.18 per cent of national air quality standards.
3. Separation of the toll collection facilities by direction, collection of one-way tolls only, or imposition of no tolls in order to reduce the impact from the bridge traffic on ambient air quality do not significantly improve the ambient air quality.

iv. Water Quality: Eleven bridge piers will be constructed in the water. This construction will require the removal and disposal of about 80,000 cu. yds. of material from the Patapsco River bed. It is expected that temporary turbidity problems may occur during construction. However, significant adverse water quality effects will be avoided. Excavation will be performed by clam shell or hydraulic methods or both at the option of the contractor. If a clam shell operation is selected the contractor will be required to place the excavated material in scows to be towed to the disposal areas. If he employs hydraulic methods, the excavated materials will be pumped directly to the disposal areas.

Disposal areas will be located at the west end of the bridge. These locations are shown on Exhibit 1. Area A will be filled between the existing causeway and the shoreline of Fort Armistead Park. This filling will make available approximately 5 acres of land that can be utilized for recreational purposes. Area B is landward of the mean high water shoreline and is located on private property. Dikes are existing or will be reinforced to contain all liquids a sufficient length of time to permit solids to settle out. A satisfactory effluent free of solids will be returned to the river. Contaminants which have been found in the river bed are concentrated in the upper most layers of the river bottom. This volume of material will represent not more than 15 percent of the total volume of material to be excavated and disposed of. Pollution of river water from the disposal areas selected will not be a significant problem.

Underwater activities in addition to excavation will include backfilling with granular material to prepare a working level, driving piles, setting cofferdams, placing tremie seals, unwatering cofferdams and constructing the remainder of the piers in the dry. When pier construction has progressed above the river surface cofferdams will be removed. Work will be performed so as to minimize underwater turbulence.

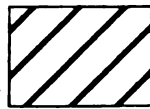
v. Public Parks: This project affects two public parks. Ft. Armistead Park is located on the western approach of the bridge in Baltimore City and Fleming-Turner Station Park is situated adjacent to the east approach of the bridge in Baltimore County.

Ft. Armistead Park

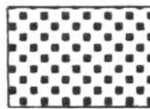
In order to accommodate the western approach to the Outer Harbor Crossing, it was necessary to acquire 7.59 acres along the northwestern edge of the park for right-of-way. See Exhibit 2. This transfer of Ft. Armistead property from Baltimore City to the State for use as an approach required an Act of Congress. Ft. Armistead, an historical site, was earlier deeded to the City by the Federal Government for use as a park. The deed contained a reverter clause which provided that if the property ceased to be used as a park, title would revert to the Federal Government, therefore, requiring an Act



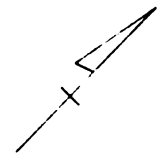
ACQUIRED FROM FORT ARMISTEAD PARK
FOR TUNNEL



REDUCTION IN AREA RESULTING FROM BRIDGE.
AVAILABLE FOR PARK USAGE.



TO BE FILLED FROM PIER EXCAVATION.
AVAILABLE FOR PARK USAGE.



PATAPSCO RIVER

PROPOSED BRIDGE

EXISTING CAUSEWAY

FORT ARMISTEAD
PARK

EXHIBIT 2

of Congress to obtain a release of the reverter in order to enable the City to sell this section of the park to the State for highway purposes. With the approval of all local public agencies Public Law 91-83 was passed by Congress and approved by the President on October 10, 1969. (Appendix E)

Sufficient reasons existed before the Baltimore Harbor Outer Crossing project was initiated for the Park Board and the City of Baltimore to convey a portion of this land to the State for highway purposes. The park property had ceased to be used as a recreational facility for the following reasons:

1. Lack of police surveillance.
2. Lack of sanitary facilities.
3. Remoteness and isolation of location.
4. Inadequate access.
5. Lack of funds.
6. Erosion along north shore line.
7. Vandalism.
8. Inability to transfer because of reverter clause.

The taking of a small portion of this property and its purchase out of toll project funds will enhance the value of this tract for the following reasons:

1. The City Department of Recreation and Parks has derived income from sale of the land to the State and from sale of embankment material to the contractor performing the work on the approach embankments.
2. The project has resulted in the rebuilding of Hawkins Point Road by the City, therefore providing a boulevard to the park from Hawkins Point Road.
3. As a result of the agreement between the State and the Department of Recreation and Parks an access road, including a paved parking area overlooking the Harbor, will be constructed by the State Highway Administration as part of the conditions for the land transfer. Relocated Hawkins Point Road together with the new traffic circulation in the park will encourage use of the park and make easily available necessary police surveillance.

4. The bridge will provide a scenic focal point from the park overlook; and the traffic on the bridge together with continuous lighting on the structure will tend to relieve the isolation of the area.
5. The location of the bridge project embankment has eliminated the serious beach erosion condition existing prior to construction and has resolved the uncertain riparian interests that existed between the Department of Recreation and Parks and the Maryland Port Authority holding.
6. The construction of a bridge rather than a tunnel will make available a substantial portion of the acquired 7.59 acres for park use after construction is completed.
7. The construction of the new causeway has provided an area in which fill excavated from the bridge piers will be placed. This filling will make available approximately five additional acres of land for park purposes. See Exhibits 1 and 2.
8. The bridge project will provide improved access from Baltimore County via Quarantine Road and Ft. Smallwood Roads.

It is therefore clear that the proposed Outer Harbor Crossing will greatly enhance Ft. Armistead Park as both a recreational facility and in the event the City wishes to preserve the fort as as an historic site. Further, the bridge will improve accessibility to the park, which heretofore was extremely limited.

Fleming-Turner Station Park

This Baltimore County neighborhood park of approximately 22.6 acres is located on and around the site of the Fleming Elementary School. (See Exhibit 3) It is located on the western shore of Bear Creek on the east end of the Lyons Home development. The former school building is reportedly used for community programs. Because of the water pollution in the area, swimming in Bear Creek at the park site has been prohibited. Thus, the park has limited utility for recreational purposes, being used mostly as a picnic ground. The exposed shoreline now in use offers no shelter for boating.



CREEK

BEAR

PROPOSED APPROACH STRUCTURE 7

FUTURE STRUCTURE

LYONS HOMES

The proposed and future approach bridges carrying the project over Bear Creek are located sufficiently close to the shoreline so that park frontage could be extended out to the piers, thereby increasing the usable land area.

The project will provide improved access to the park from the Curtis Bay-Glen Burnie area via the Main Street Interchange.

The only point at which the approach actually touches the existing park land is on its far western point where 4 piers are located on park property. This affects an area of only 0.03 acres for the pier footings plus an aerial easement of 0.33 acre for the structure traversing park property.

It should be pointed out with respect to both of the above parks that negotiations for extending the alignment now shown were carried on by Baltimore City and Baltimore County long before the inception of Section 4-(f) of the Department of Transportation Act as amended by Public Law 90-495 (Federal Aid Highway Act of 1968). Section 4(f) is not applicable to this project since it is a Revenue Bond facility and not funded by Federal aid. Also, FHWA, the approval authority for 4(f) statements, is not an approval authority for this project. Nonetheless, it was determined that there was no feasible and prudent alternative for the use of such land and that the program of improvement included all possible planning to minimize harm to these parks as required by the amended law. For instance, at Fleming-Turner Station Park it would have been more economical to place the approach roadway on embankment to the shoreline of Bear Creek, but structure was selected to minimize harm to the park. Spans of 90' and 100' with vertical clearances of 17' to 30' will allow easy access through and under the structure and present the opportunity of joint use beneath the structure for recreational purposes. Thus, the planning procedures utilized in developing the alignment and acquiring the land necessary for the bridge approach construction actually will serve to enhance the utilization of these lands by the general public, and any potential detrimental affect to the use of these lands for park purposes has been ameliorated.

vi. Wildlife and Waterfowl Refuges: The nearest wildlife and waterfowl refuges are the Eastern Neck Island National Wildlife Refuge and Remington Farms, a privately owned refuge; both are in Kent County on the Eastern Shore of Maryland. Since these refuges are approximately twenty (20) miles from the bridge site and the project passes through essentially industrial areas, it is not expected that the bridge will have any known impact on wildlife behavior or breeding, feeding and nesting grounds.

4. Alternatives to Constructing a Bridge at the Proposed Location

It is appropriate to consider the effect of adopting the alternative of not constructing an Outer Harbor Crossing. It should be stated at the outset that the basic consideration of the State in deciding to move ahead with the project was to relieve the gross congestion now suffered in the existing 4-lane Harbor Tunnel and the major traffic arteries in Baltimore City. There is little possibility that this facility could have been constructed as a toll facility only on the basis of its earning capacity. Rather, it was proposed by the State in recognition of the fact that although the crossing could not, of itself, be justified on the basis of pure economics, the need for improved service to the public was paramount. This decision was made in 1968 in the face of the prospect that by 1978 the completion of proposed Interstate 95, a free facility through Baltimore City would reduce anticipated traffic volumes in the existing Harbor Tunnel and the proposed Outer Harbor Crossing by nearly one-third. It was recognized that a critical need for the Outer Harbor Crossing would develop between 1973 and 1978.

Accepting the alternative of no Outer Harbor Crossing would increasingly exacerbate the growing problem of handling traffic on east-west arteries in Baltimore City, particularly truck traffic through the center of the City in the area of the Inner Harbor, where a tremendous effort is under way to revitalize the downtown and adjacent harbor area of the city. The growing volume of traffic in this area and the increased pollution and noise has created a critical situation which threatens the very life of the Inner Harbor plan. Although the Outer Harbor Crossing will not solve this problem, it will at least assist in ameliorating the stifling effect of lack of sufficient bypass capacity around the south of the City.

In substance, it can be stated that the State is using the "umbrella" of its highly successful toll facilities package to provide a much-needed interstate and regional traffic facility which could not, by itself, be justified in its early years as a toll revenue producing project. It is because the State recognizes the value of this facility to the viability of its transportation network, and is aware of the need to enhance the capacity of the City of Baltimore to continue to revitalize its downtown and inner harbor commercial centers, that it is strongly recommending the construction of a bridge for the Outer Harbor Crossing, rather than no crossing; and its advantages over a tunnel are documented in detail here.

An alternative to constructing a bridge at this specific location is to construct a tunnel. The alternative of constructing a tunnel has been thoroughly explored. Bids taken by the State Roads Commission in July 1970 for a 2-lane tunnel at this location indicated that the total cost of providing such a facility would be approximately \$68.1 Million and further studies indicated to expand a tunnel crossing at some future date, to a 4-lane facility would cost approximately \$140.2 million based on present costs. It is estimated that the proposed 4-lane bridge will cost approximately \$51.3 Million. From these studies it can be seen that a bridge will offer an ultimate financial benefit of at least \$88.9 Million. In addition to the sizable difference in construction costs, maintenance and operating costs for a 4-lane bridge are estimated to be \$400,000 per year less than those estimated for a 2-lane tunnel.

Other advantages offered by a bridge over a tunnel are: (1) the bridge can handle at least two and one half times the traffic volume during peak hours; (2) congestion due to vehicular failures would be reduced; (3) the danger from trucks carrying explosive or inflammable cargoes would be greatly reduced; (4) the bridge will be a much safer facility, and crossing will be pleasant and secure because of provision of a median divider which will prevent the possibility of head-on or sideswipe collisions; (5) a greater degree of diversion of traffic from the existing Harbor Tunnel by drivers having a fear of claustrophobia and those who would be attracted by the open aspect and sightseeing attraction of the high level bridge; (6) the effects of reaching toxic levels from automotive emissions are virtually nonexistent on the proposed bridge, while the danger of reaching and possibly surpassing threshold toxicity from emission concentrations in the tunnel are a constant threat; (7) the bridge will require less park land from Fort Armistead Park than the tunnel; and (8) will have lower operating and maintenance costs, fewer operating problems and fewer interruptions to free traffic flow.

The degree of possible ecological damage to the environment which might occur with the construction of a tunnel will be greatly reduced if a bridge is approved for this location. Construction of the two lane tunnel would require the excavation of 2.0 million cubic yards of material taken from the harbor bottom along the tunnel alignment, and disposed of in the Chesapeake Bay in the Pooles Island area.

Permits had already been obtained from the Corps of Engineers to perform this work. ~~On the other hand, the bridge alternate would involve~~ the construction of 11 piers in water, requiring a total excavation of 80,000 cubic yards (less than 4 percent of the excavation required for the tunnel) and disposal of this material in upland and adjoining containment areas, which would eliminate the possibility of contamination of other areas of the Bay with Baltimore Harbor bottom materials.

5. The Relationship between Local Short-Term Uses of Man's Environment and the Maintenance of Long-Term Productivity

The basic purpose of construction of this bridge is to provide a long-term productive facility for the immediate area, the State and the northeast seaboard. The goal in planning this project is to create a facility that fulfills the needs of regional and national traffic service, is compatible with planned land use in the area and enhances future possible land use development. The project will have a positive effect on man's environment and offers the potential for accelerating the development of the industrial areas in the City and two County areas bordering Baltimore Harbor.

6. Commitments of Resources

The commitment of natural resources to the construction of the bridge are minimal, since only the excavation for the piers is involved. The elements that are required for the bridge construction cannot be classified as irreversible or irretrievable commitments of resources. In the unlikely event that the facility be no longer needed in the transportation network, the structure can be removed and the area returned to its original state.



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MARYLAND 21203

NAKOP-P(Patapsco R. - Md. St. Rds. Comm.)2

25 September 1968

Maryland State Roads Commission
300 West Preston Street
Baltimore, Maryland 21201

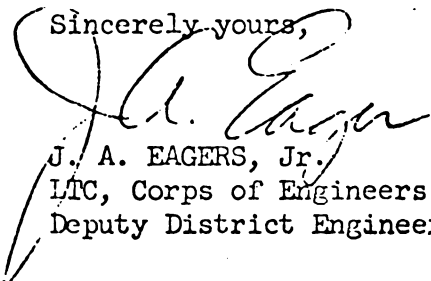
Gentlemen:

In response to your application of 15 September 1967, there is inclosed for your use a Department of the Army permit to construct a highway tunnel under the Patapsco River between Sollers Point, Baltimore County, and Hawkins Point, Baltimore, Maryland, signed by direction of the Chief of Engineers on 11 September 1968, and by direction of the Secretary of the Army on 16 September 1968.

Attention is invited to the law under which the permit is issued, which requires that the work must be in accordance with the plans which are a part of the permit. Accordingly, no changes in the location or plans of the work shall be made, unless prior approval of the District Engineer is obtained.

You are requested to keep this office informed of the progress of the work in accordance with condition (9) of the permit.

Sincerely yours,



J. A. EAGERS, Jr.
LTC, Corps of Engineers
Deputy District Engineer

Incl
As stated

cc: Mr. David H. Fisher
Mr. A. L. Grubb
Mr. H. H. Bowers
J. E. Greiner Company
Attn.: Mr. B. W. LeSueur

DEPARTMENT OF THE ARMY

INSTRUMENT

NOTE:-It is to be understood that this instrument does not give any property rights either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining State assent to the work authorized. (see Cummings v. Chicago, 188 U.S., 410.)

PERMIT

WHEREAS by Section 10 of an Act of Congress approved 3 March 1899, entitled "An Act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes," it is provided that it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of the Army; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army prior to beginning the same (30 Stat. 1151; 33 U.S.C. 403);

AND WHEREAS application has been made to the Secretary of the Army by the MARYLAND STATE ROADS COMMISSION for authority to construct a highway tunnel under the Patapsco River between Sollers Point, Baltimore County and Hawkins Point, Baltimore, Maryland, in accordance with the plans hereto attached;

NOW THEREFORE, This is to certify that the said plans are recommended by the Chief of Engineers and are authorized by the Secretary of the Army under the provisions of the aforesaid statute, upon the following conditions:

(1) The work shall be subject to the supervision and approval of the District Engineer, Corps of Engineers, in charge of the locality, who may temporarily suspend the work at any time if, in his judgement, the interests of navigation so require.

(2) Any material dredged in the prosecution of the work herein authorized shall be removed evenly and no large piles, ridges across the bed of the waterway, or deep holes that may have a tendency to cause injury to

navigable channels or to the banks of the waterway shall be left. Depositing or dumping of any material excavated in connection with this installation shall be in accordance with plans submitted to and approved by the said District Engineer prior to commencement of excavation.

(3) There shall be no unreasonable interference with navigation by the work herein authorized.

(4) If inspections or any other operations by the United States are necessary in the interests of navigation, all expenses connected therewith shall be borne by the permittee.

(5) No attempt will be made by the permittee or the owner to forbid the full and free use of all navigable waters at or adjacent to the work or structure.

(6) If future operations by the United States require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army, it shall cause unreasonable obstruction to the free navigation of said waters, the owner will be required, upon due notice from the Secretary of the Army, to remove or alter the structural work or obstructions caused thereby without expense to the United States, so as to render navigation reasonably free, easy and unobstructed; and if, upon the expiration or revocation of the permit, the structure, fill, excavation or other modification of the water course hereby authorized shall not be completed, the owners shall, without expense to the United States, and to such extent and in such time and manner as the Secretary of the Army may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the water course. No claim shall be made against the United States on account of any such removal or alteration.

(7) The United States shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the Government for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any damage.

(8) If the display of lights and signals on any work hereby authorized is not otherwise provided by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the owner.

(9) The permittee shall notify the said District Engineer at what time the work will be commenced, and as far in advance of the time of commencement as the said District Engineer may specify, and shall also notify him promptly in writing, of the commencement of the work, suspension of work, if for a period of more than one week, resumption of work, and its completion.

(10) The compensatory dredging to be performed adjacent to the northeast side of Anchorage No. 3 (Riverview Anchorage No. 1) and shown on the plans attached hereto, shall be completed to the satisfaction of the said District engineer prior to the accomplishment of any work in Anchorage No. 7 (Quarantine Anchorage).

(11) The permittee shall submit to the said District engineer, in writing, a statement of the methods and order of procedure to be followed in the construction of the tunnel, prior to the commencement of any work thereon, and shall throughout the progress of construction, notify the said District engineer, in writing 10 days in advance, of any operations that may cause interference with the free movement of navigation.

(12) Construction operations shall be conducted so as to maintain at all times an unobstructed channel at a location and of appropriate width and depth as directed by the District engineer.

(13) During the period of construction the permittee shall install and maintain such special lights, buoys and signals, in addition to those provided under the provisions of paragraph (8) as, in the opinion of the said District engineer may be necessary for the safety of navigation.

(14) Should it become necessary to cause obstruction to navigation, the permittee shall, at its own expense, cause navigation interests to be notified in advance of the proposed obstruction by publication in at least two prominent daily newspapers and in "Notice to Mariners" of the United States Coast Guard, as well as by circular letter to all persons, companies, or corporations owning or operating vessels regularly navigating the waterway involved, to the satisfaction of the said District engineer. If the work of construction is prosecuted intermittently, the notices herein required shall be given in advance in each instance, allowing a reasonable time, but not less than five days prior to the proposed change in status of the work.

(15) If, during the progress of the work, any plant, machinery, appliances or material is sunk, lost or thrown overboard, or misplaced, the permittee shall remove the same with utmost dispatch. The permittee shall give immediate notice with description and location of such obstructions to the said District engineer, and when so required by the said District engineer shall mark or buoy such obstructions until the same are removed.

(16) The permittee shall repay promptly to the United States the cost of all inspections, surveys, gauging and observations deemed necessary by the said District engineer in connection with the work hereby authorized, and to repay the cost of any work or operations done by the United States to insure the safety of navigation which may be made necessary

through the failure of the permittee to carry out with due diligence the work prescribed in the conditions herein set forth.

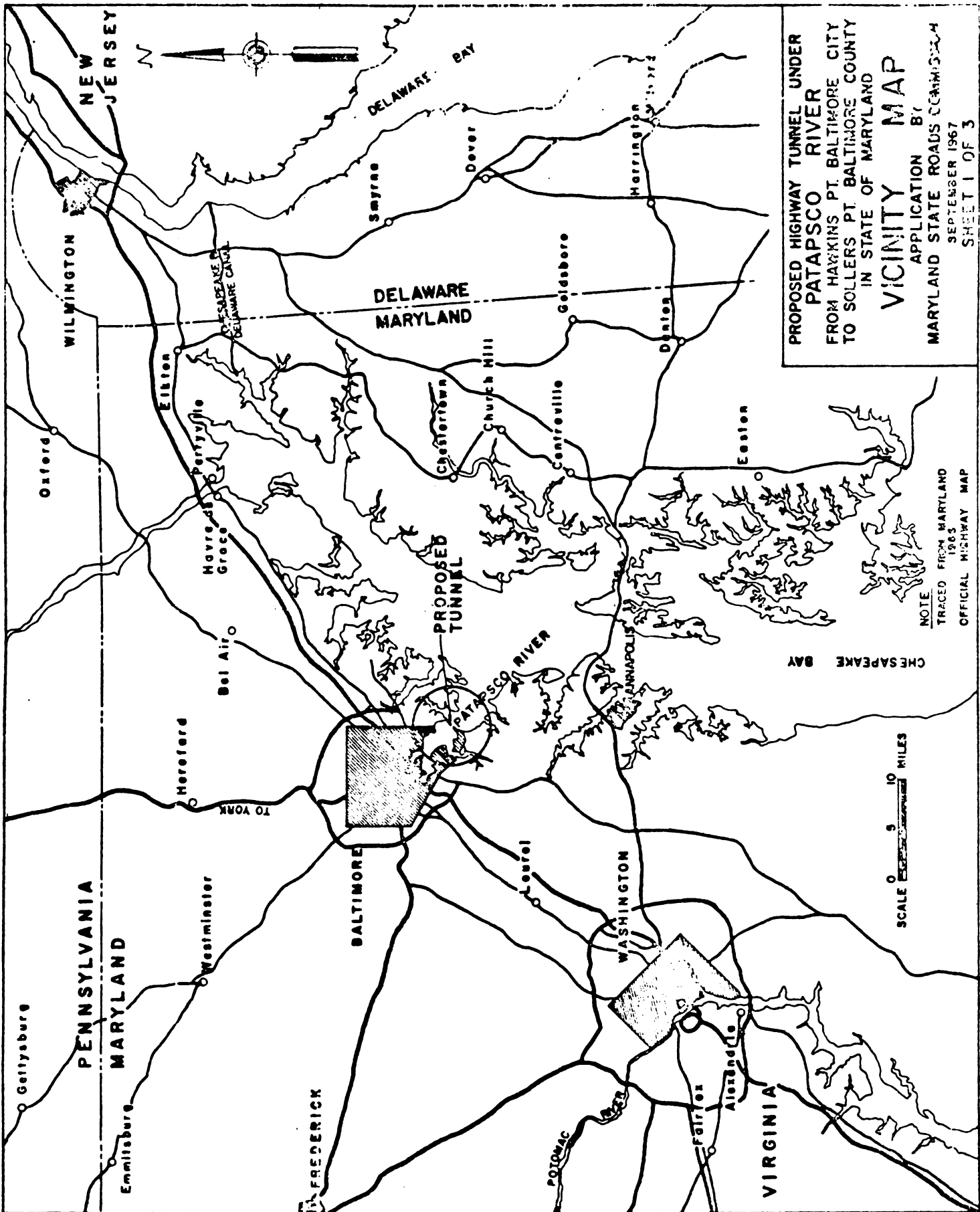
(17) If the structure or work herein authorized is not completed on or before the 31st day of December, 1973, this permit, if not previously revoked or specifically extended, shall cease and be null and void.

IN WITNESS WHEREOF I have hereunto set my hand
by direction of the Chief of Engineers this — 11th — day
of — September — 1968

S.P. Koich Brig Gen
for CHARLES C. NOBLE
Brigadier General, USA
Director of Civil Works

IN WITNESS WHEREOF I have hereunto set my hand
by direction of the Secretary of the Army this 16th day
of — September — 1968

R. A. Hertzler
R. A. HERTZLER
Chief, Office of Civil
Functions



PROPOSED HIGHWAY TUNNEL UNDER
PATAPSCO RIVER
 FROM HAYKINS PT. BALTIMORE CITY
 TO SOLLERS PT. BALTIMORE COUNTY
 IN STATE OF MARYLAND
VICINITY MAP
 APPLICATION BY
 MARYLAND STATE ROADS COMMISSION
 SEPTEMBER 1967
 SHEET 1 OF 3

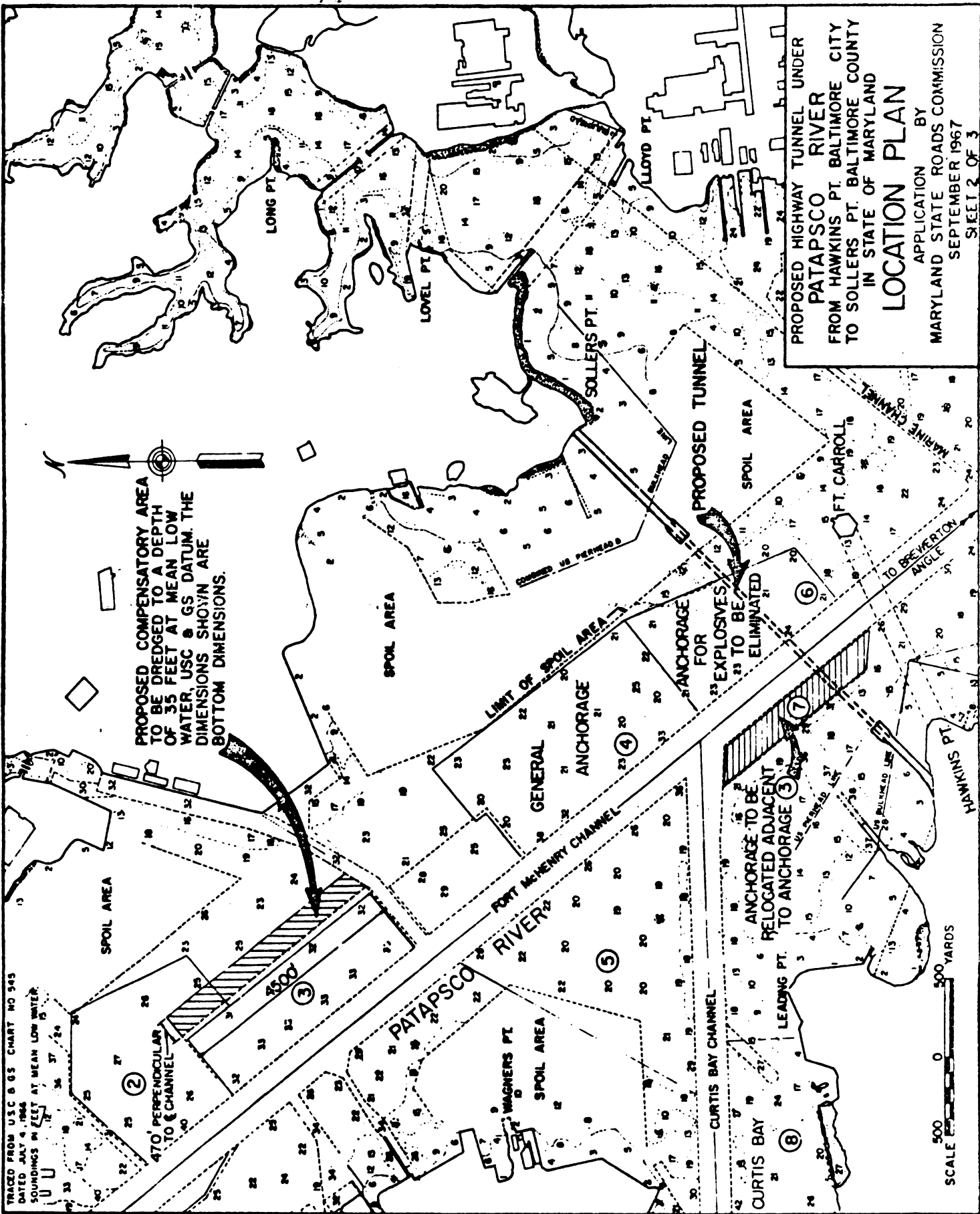
NOTE
 TRACED FROM MARYLAND
 1963
 OFFICIAL HIGHWAY MAP

SCALE 0 5 10 MILES

TRACED FROM U.S.C. & G.S. CHART NO. 545
 DATED JULY 4, 1946
 SOUNDINGS IN FEET AT MEAN LOW WATER



PROPOSED COMPENSATORY AREA
 TO BE DREGGED TO A DEPTH
 OF 35 FEET AT MEAN LOW
 WATER, USC & GS DATUM. THE
 DIMENSIONS SHOWN ARE
 BOTTOM DIMENSIONS.

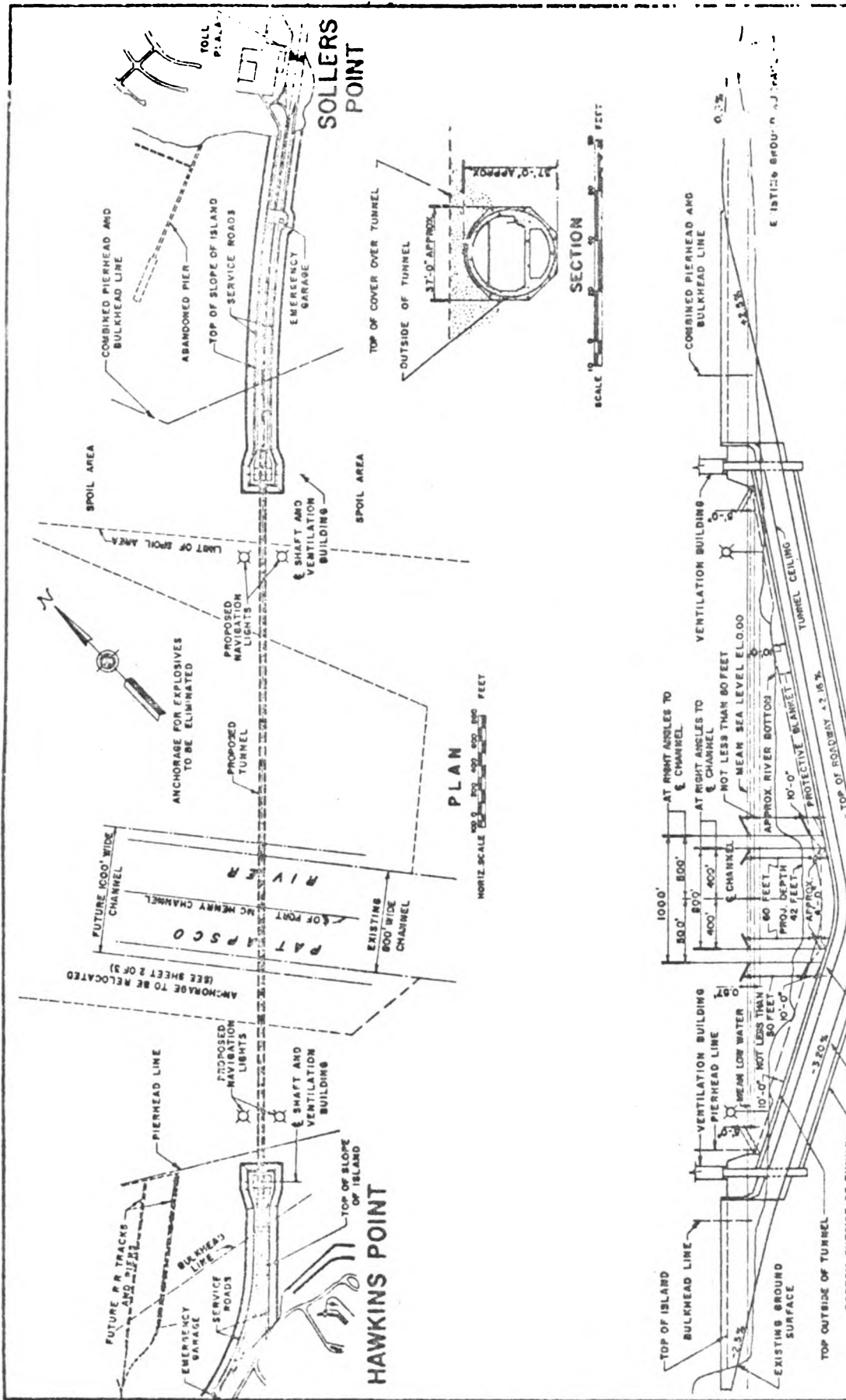


PROPOSED HIGHWAY TUNNEL UNDER
 PATAPSCO RIVER
 FROM HAWKINS PT. BALTIMORE CITY
 TO SOLLERS PT. BALTIMORE COUNTY
 IN STATE OF MARYLAND

LOCATION PLAN

APPLICATION BY
 MARYLAND STATE ROADS COMMISSION
 SEPTEMBER 1967
 SHEET 2 OF 3

SCALE 0 500 YARDS



**PROPOSED HIGHWAY TUNNEL UNDER
 PATAPSCO RIVER
 FROM HAWKINS PT. BALTIMORE CITY
 TO SOLLERS PT. BALTIMORE COUNTY
 IN STATE OF MARYLAND
 PLAN & PROFILE
 APPLICATION BY
 MARYLAND STATE ROAD & TRANSPORTATION DEPARTMENT
 SEPTEMBER, 1968
 SHEET 3 OF 4**

REVISED 2-7-68
 REVISED 6-4-68

LEGEND
 - - - - - BULKHEAD LINE
 - - - - - PIERHEAD LINE
 - - - - - COMBINED PIERHEAD AND BULKHEAD LINE

PROFILE
 VERT. SCALE 1" = 20 FEET
 HORIZ. SCALE 1" = 50 FEET



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MARYLAND 21203

NABOP-P(Md. State Roads Comm.)27

RECEIVED

15 January 1970

JAN 19 1970

Maryland State Roads Commission
300 West Preston Street
Baltimore, Maryland 21201

CHIEF ENGINEER

Contract No. DACW31-70-C-0023

Gentlemen:

Reference is made to your application of 22 July 1969, for permission to dredge approximately 2,000,000 cubic yards of material in Patapsco River between Hawkins Point, Baltimore City and Sollers Point, Baltimore County, Maryland; and to deposit the dredged material on the established dumping ground in Chesapeake Bay off Pooles Island, Maryland. There is inclosed a Department of the Army permit issued this date authorizing the dredging and dumping operations, subject to certain conditions contained therein.

Attention is invited to conditions a, b and d, in connection with which the following information pertaining to the dredging and dumping is afforded you:

a. Except as otherwise authorized, no material shall be deposited except in the presence of an inspector to be appointed by the District Engineer. The inspector's salary and expenses in connection therewith plus overhead charges, will be reimbursed to the Government in accordance with condition (d) of the permit. Accommodations satisfactory to the District Engineer must be furnished inspectors where necessary. The number of inspectors appointed, both for dredging and dumping, will depend on the amount of work to be done.

b. No work shall be done on Sundays or legal holidays without the prior written consent of the District Engineer.

c. Forty-eight hours notice shall be given of the proposed date of commencement of the work, in order that an inspector or inspectors may be provided if necessary.

d. Before placing any material on the dumping area, unless otherwise authorized, the permittee must mark said area by four lighted buoys to be placed and maintained by him at locations designated by the District Engineer and under permit from the U. S. Coast Guard. The location is to be checked by a representative of this office prior to the disposal of any material thereon.

Distribution -

Original - Secretary's File (SRC)

cc: Mr. D. H. Fisher, Mr. W. E. Woodford, Program Coordinator,
J. E. Greiner Company, Inc.

A-9

15 January 1970

With the approval of the District Engineer, cooperation may be had with others dumping under similar conditions. A specific location for the deposit of material on the dumping area will be assigned when a Supervisor of the Harbor of Baltimore permit is issued for a particular dredging operation.

e. Unless otherwise authorized, no dumping shall be done on the dump except within the area marked by said buoys, nor at night when less than three buoys are lighted, nor in the absence of an inspector nor in water less than 22 feet deep.

f. The towing of loaded or empty mud scows in a dredged ship channel is prohibited wherever it is possible to proceed outside the channel.

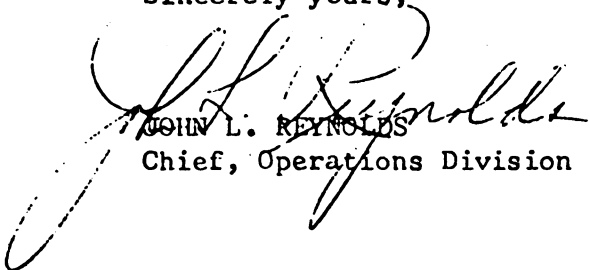
g. Channels must be crossed as few times and as nearly at right angles as possible.

h. In the event it becomes necessary, because of an emergency, to deposit material at a location other than that authorized, the permittee will mark the site and immediately notify the District Engineer of its location and all circumstances involved in the incident.

In addition to the foregoing, it will be necessary that your contractor obtain from this office, prior to commencement of dredging operations, a Supervisor of the Harbor of Baltimore permit to transport the dredged material across the navigable waters within the State of Maryland. Application forms are inclosed and should be filled out and submitted to this office by your contractor, when known.

In connection with the work authorized under your Department of the Army permit, there is inclosed a copy of a self-explanatory letter dated 15 September 1969, received from the Regional Coordinator, Northeast Region, Office of the Secretary, Department of the Interior.

Sincerely yours,


JOHN L. REYNOLDS
Chief, Operations Division

Incls
As stated

DEPARTMENT OF THE ARMY

Contract No. DACW31-70-C-0023

NOTE.—It is to be understood that this instrument does not give any property rights either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining State assent to the work authorized. (See *Cummings v. Chicago*, 188 U.S., 410.)

PERMIT

NABOP-P(Md. State Roads Comm.)27

U. S. Army Engineer District, Baltimore.
Corps of Engineers.

P. O. Box 1715, Baltimore, Md. 21203.

15 January, 1970

Maryland State Roads Commission
300 West Preston Street
Baltimore, Maryland 21201

Referring to written request dated 22 July 1969,

I have to inform you that, upon the recommendation of the Chief of Engineers, and under the provisions of Section 10 of the Act of Congress approved March 3, 1899 (30 Stat. 1151; 33 U.S.C. 403), entitled "An act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes," you are hereby authorized by the Secretary of the Army.

to dredge approximately 2,000,000 cubic yards of material, the dredged material to
(Here describe the proposed structure or work.)

be deposited on the established dumping ground in Chesapeake Bay off Pooles Island, Maryland,

in Patapsco River

(Here to be named the river, harbor, or waterway concerned.)

at between Hawkins Point, Baltimore City and Sollers Point, Baltimore County,

(Here to be named the nearest well-known locality—preferably a town or city—and the distance in miles and tenths from some definite point in the same, stating whether above or below or giving direction by points of compass.)

Maryland,

in accordance with the plans shown on the drawing attached hereto titled: "Proposed
(Or drawings; give file number or other definite identification marks.)

Dredging For Tunnel Under Patapsco River From Hawkins Pt. Baltimore City To Sollers Pt. Baltimore County In State Of Maryland - Location Plan - Application By Maryland State Roads Commission - July 1969 - Sheet 1 of 1,"

subject to the following conditions:

A-11

(a) That the work shall be subject to the supervision and approval of the District Engineer, Corps of Engineers, in charge of the locality, who may temporarily suspend the work at any time, if in his judgment the interests of navigation so require.

(b) That any material dredged in the prosecution of the work herein authorized shall be removed evenly and no large refuse piles, ridges across the bed of the waterway, or deep holes that may have a tendency to cause injury to navigable channels or to the banks of the waterway shall be left. If any pipe, wire, or cable hereby authorized is laid in a trench, the formation of permanent ridges across the bed of the waterway shall be avoided and the back filling shall be so done as not to increase the cost of future dredging for navigation. Any material to be deposited or dumped under this authorization, either in the waterway or on shore above high-water mark, shall be deposited or dumped at the locality shown on the drawing hereto attached, and, if so prescribed thereon, within or behind a good and substantial bulkhead or bulkheads, such as will prevent escape of the material in the waterway. If the material is to be deposited in the harbor of New York, or in its adjacent or tributary waters, or in Long Island Sound, a permit therefor must be previously obtained from the Supervisor of New York Harbor, New York City.

(c) That there shall be no unreasonable interference with navigation by the work herein authorized.

(d) That if inspections or any other operations by the United States are necessary in the interest of navigation, all expenses connected therewith shall be borne by the permittee.

(e) That no attempt shall be made by the permittee or the owner to forbid the full and free use by the public of all navigable waters at or adjacent to the work or structure.

(f) That if future operations by the United States require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army, it shall cause unreasonable obstruction to the free navigation of said water, the owner will be required upon due notice from the Secretary of the Army, to remove or alter the structural work or obstructions caused thereby without expense to the United States, so as to render navigation reasonably free, easy, and unobstructed; and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners shall, without expense to the United States, and to such extent and in such time and manner as the Secretary of the Army may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable capacity of the watercourse. No claim shall be made against the United States on account of any such removal or alteration.

(g) That the United States shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the Government for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

(h) That if the display of lights and signals on any work hereby authorized is not otherwise provided for by law, such lights and signals as may be prescribed by the U.S. Coast Guard, shall be installed and maintained by and at the expense of the owner.

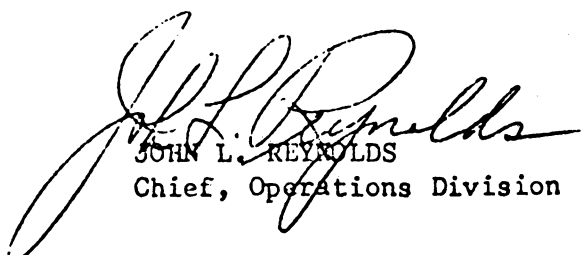
(i) That the permittee shall notify the said district engineer at what time the work will be commenced, and as far in advance of the time of commencement as the said district engineer may specify, and shall also notify him promptly, in writing, of the commencement of work, suspension of work, if for a period of more than one week, resumption of work, and its completion.

(j) That if the structure or work herein authorized is not completed on or before 31st day of December, 1973, this permit, if not previously revoked or specifically extended, shall cease and be null and void.

(k) That the permittee shall comply promptly with any regulations, conditions, or instructions affecting the work hereby authorized if and when issued by the Federal Water Pollution Control Administration and/or the State water pollution control agency having jurisdiction to abate or prevent water pollution. Such regulations, conditions, or instructions in effect or prescribed by the Federal Water Pollution Control Administration or State agency are hereby made a condition of this permit.

By authority of the Secretary of the Army:

Issued for & in behalf of
Colonel W. J. Love
District Engineer


JOHN L. REYNOLDS
Chief, Operations Division



UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
NORTHEAST REGION
JOHN F. KENNEDY FEDERAL BUILDING
ROOM 2003 J & K
BOSTON, MASSACHUSETTS 02203

September 15, 1969

Your reference:
NABOP-P (Md. State Roads Comm.)27

Mr. John L. Reynolds
Chief, Operations Division
U. S. Army Engineer District, Baltimore
P. O. Box 1715
Baltimore, Maryland 21203

Dear Mr. Reynolds:

We have reviewed the subject applications and offer the following comments:

The Baltimore Harbor area and the Pooles Island Deep disposal site are both located within coastal waters and are therefore subject to the Water Quality Standards adopted by the State of Maryland and approved by this Department. The Chesapeake Bay is extremely valuable for recreation, shellfish and finfish harvest, and migrating and wintering waterfowl.

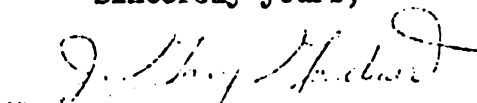
Laboratory tests of bottom muds taken from Baltimore Harbor indicate the presence of oils, greases and heavy metals such as cadmium, copper, and zinc. However, the actual chemical and/or mechanical release of these substances into the surrounding waters during dredging and spoil dumping activities can only be determined by monitoring techniques as work progresses. Increasing the availability of these substances through the dredging/spoil disposal operations could be damaging to the Bay's resources. For example, it is known that shellfish accumulate heavy metals, and that grease or oil can be harmful or even lethal to waterfowl.

We cannot endorse disposal of the spoil materials indefinitely within the waters of the Chesapeake Bay; however, the Pooles Island area appears to offer the least damaging feasible alternative until the diked area is completed. We recommend that great care be exercised during both the dredging and overboard spoil disposal operations to minimize dispersion of the materials within the surrounding waters. We further recommend that the disposal be

coordinated with the Maryland Departments of Game and Inland Fisheries and Chesapeake Bay Affairs.

To determine what materials, if any, are being released to the waters of the Chesapeake Bay the Federal Water Pollution Control Administration will periodically monitor the waters of Baltimore Harbor and those in the vicinity of the disposal site. Results will be made available to the appropriate State and Departmental agencies to determine what actions may be necessary. Should the monitoring indicate a violation of the adopted Water Quality Standards, it will be necessary that all work cease until alternative methods can be instituted which will protect the quality of the waters of the Chesapeake Bay.

Sincerely yours,



Mark Abelson
Regional Coordinator

COMMISSION
MAURICE SIEGEL
CHAIRMAN
J. HENRY SCHILPP
R. LAMAR GREEN
ROBERT J. MCLEOD
DON A. EMERSON



P. W. MCKEE

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES

RECEIVED

STATE OFFICE BUILDING
ANNAPOLIS, MARYLAND 21401

JUL 23 1969

CHANNEL IMPROVEMENT PERMIT
NUMBER: BC-69-CI-1

CHIEF ENGINEER

EFFECTIVE DATE OF PERMIT:
JUL 21 1969

July 21,
1969

PERMIT FOR WATERWAY CONSTRUCTION

In compliance with Article 96A, Annotated Code of Maryland, PERMISSION IS HEREBY GRANTED State Roads Commission, 300 W. Preston Street, Baltimore, Maryland 21201, the Applicant, to dredge at the site of the proposed Baltimore Harbor Outer Tunnel under the Patapsco River, and to dispose of the dredged material in the Pooles Island Deep east of Pooles Island. The dredging is to be located at the proposed Baltimore Harbor Outer Tunnel from Hawkins Point in Baltimore City to Sollers Point in Baltimore County. This dredging is to be done in accordance with plans dated May, 1969, submitted in connection with the new Baltimore Harbor Tunnel by the Applicant.

This Permit is granted after hearing held June 10, 1969 and is subject to the following conditions:

1. This Permit is valid only for use by the Applicant and may not be transferred to another without written permission from this Department.
2. This Permit becomes null and void if the privilege granted by this Permit is not exercised within one year from this date, except that this time limit may be extended for good cause at the discretion of this Department.
3. This Permit is further subject to all laws and regulations now in effect or that may be subsequently adopted by this Department and may be revoked if it becomes at variance with the policy and laws of the State, or that the Applicant may fail to comply with the provisions of this Permit.

4. The location and type of all structures, and the location of all dredging and filling is to be in strict accordance with the plans submitted by the Applicant and made a part of this Permit, unless written approval for such changes is granted by this Department.
5. The Applicant must take all reasonable steps to minimize the silt pollution and disturbance to the stream during construction.
6. Blasting or use of explosives will not be permitted without prior notification of such use to the Maryland Marine Police.
7. All banks and bare areas resulting from the construction will be protected by appropriate vegetation or other protective works.
8. The Applicant will be responsible for correcting any undercutting, meandering or degrading of the channel or banks resulting from the construction.

SPECIAL CONDITIONS:

1. THE APPLICANT SHALL USE THE DISPOSAL AREA DESIGNATED BY THE BOARD OF PUBLIC WORKS AND THE U. S. ARMY, CORPS OF ENGINEERS.

PWM:JFF:pls

DEPARTMENT OF WATER RESOURCES

Paul W. McKeef

 Paul W. McKeef, Director

ACCEPTANCE CLAUSE

1. This Permit and its Conditions are Accepted By:

Walter E. Woodford, Jr. (Walter E. Woodford, Jr., Chief Engineer)
 Acting as Authorized Agent For:

State Roads Commission

2. Permission is hereby granted to representatives of the Department of Water Resources to enter in or upon the subject premises at any reasonable time for the purpose of conducting inspections pursuant to the provisions of the Water Resources Law as contained in Article 96A of the Annotated Code of Maryland, as amended.

Accepted By: *Walter E. Woodford, Jr.* (Walter E. Woodford, Jr., Chief Engineer)
 Acting as Authorized Agent For:

State Roads Commission

Date: July 15, 1969

Witnessed By: *Walter H. [unclear]*

Pier No. 2, Pratt Street,
Baltimore 2 Maryland

Serial No. 501

APPROVED

JAN 13 1970

APPLICATION FOR PERMIT

BY *Robert W. [Signature]*

Baltimore, Md. December 3, 1969

Application is hereby made to the Director of Engineering of the Maryland Port Authority under the terms and conditions set forth herein by State of Maryland
State Roads Commission
300 West Preston Street
Baltimore, Maryland 21201

to construct a highway tunnel under the Patapsco River between Hawkins Point, Baltimore City, and Sollers Point, Baltimore County, Maryland. Also to dredge approximately 2,000,000 cubic yards of material for the construction of the highway tunnel. Dredged material to be deposited at the Pooles Island Dumping Grounds. Dredged depths range from 40 ft. to 110 ft. below Mean Low Water.

[1 of 3, dated September, 1967

[3 of 3, dated September, 1967

All as shown on accompanying drawings numbered [1 of 1, dated July, 1969]

dated, and subject to said terms and conditions.

The Applicant will bear the whole expense of all work done under this permit, and all of said work will be performed in accordance with the rules and regulations of the Maryland Port Authority and will be commenced

on or after the 29th day of December 1969, and

completed on or before the 28th day of December 1972, unless the time is extended in writing by the Director of Engineering. The Applicant shall give written notice to the Maryland Port Authority of the dates of commencement and completion of the work.

The Applicant shall give written notice to the Director of Engineering of any change in the work involving increased cost, magnitude or location, so that an adjustment can be made in the inspection charge, or if necessary a new permit issued.

The Applicant shall furnish to the Maryland Port Authority three sets of plans showing location, character and extent of the work, ownership of the property involved, and ownership of all abutting properties. One set of these plans will be approved and returned to the Applicant if and when the Permit is granted.

The Applicant shall prosecute the work hereunder diligently and without undue obstruction of piers, wharves, bulkheads and navigation.

The Applicant shall keep and maintain any and all structures and installations built hereunder in good order and repair, to the satisfaction of the Director of Engineering, and in strict compliance with all applicable laws, ordinances, rules and regulations of the Maryland Port Authority, the Mayor, & City Council of Baltimore, State of Maryland, United States of America or any of their agencies.

The Applicant shall indemnify and save harmless the Maryland Port Authority, its officers, agents and servants against and from all damages, losses, costs, and expenses which they may suffer or to which they may be put by reason of anything done under this permit, or by reason of non-compliance with any or all of the terms and conditions thereof.

The Director of Engineering shall have the right to revoke this permit at any time the public interests may so require.

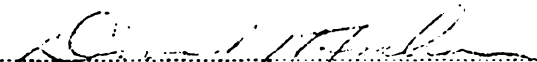
It is further expressly understood and agreed by the Applicant or Applicants that all of the duties and obligations assumed under this consent and permit shall extend to and be binding upon the heirs, personal representatives, successors and assigns of the Applicant or Applicants, jointly or severally.

The Applicant will pay to the Maryland Port Authority a Construction Inspection Charge for any work, at \$1.00 per \$1,000.00 of the contract price. If no contract has been awarded at the time of the issuance of the permit, the estimated cost of the work will be the basis of said inspection charge, provided, however, that the minimum Inspection Charge, in any event, shall be \$10.00. The Inspection Charge for the original work shall be \$.....**Gratis**..... and said payment shall be made before issuance of the permit.

The Applicant shall also pay to the Maryland Port Authority, in advance, the annual charge of~~XXXXX~~..... Dollars, (\$.....~~XXXXX~~.....) for the privilege hereby granted.

(Signature of Applicant)

ATTEST:


.....

David H. Fisher
Chairman-Director

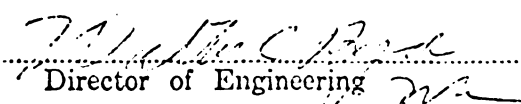
(Business Address of Applicant) A. W. Smith
Secretary

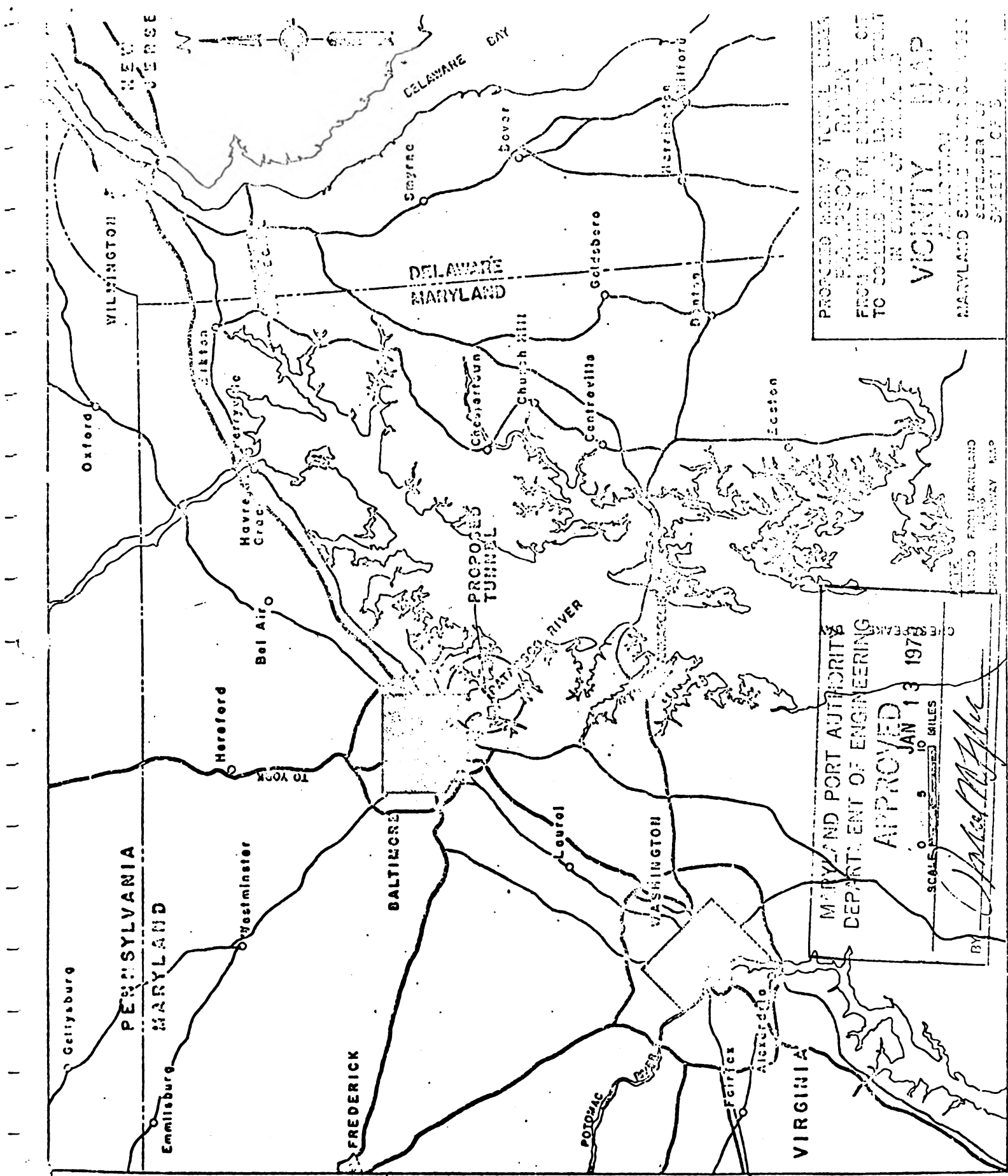
.....
300 West Preston Street
.....
Baltimore, Maryland 21201
.....

PERMIT

NOW, THEREFORE, pursuant to the authority vested in the Maryland Port Authority by Article 62-B of the Annotated Code of Maryland (1951 Edition), and also the transfer of General Powers under Harbor, Docks and Wharves as detailed in the City Charter of Baltimore City (1949 Edition), to the said Maryland Port Authority by the Mayor and City Council of Baltimore by agreement between the heretofore principals as provided under this Act, I hereby consent to, and permit the aforesaid Applicant to construct or perform the work as described in the foregoing application, under and subject to the terms and conditions set forth therein.

IN WITNESS WHEREOF, I Walter C. Bover....., Director of
Engineering have executed this permit this 13th..... day of January 19 70..

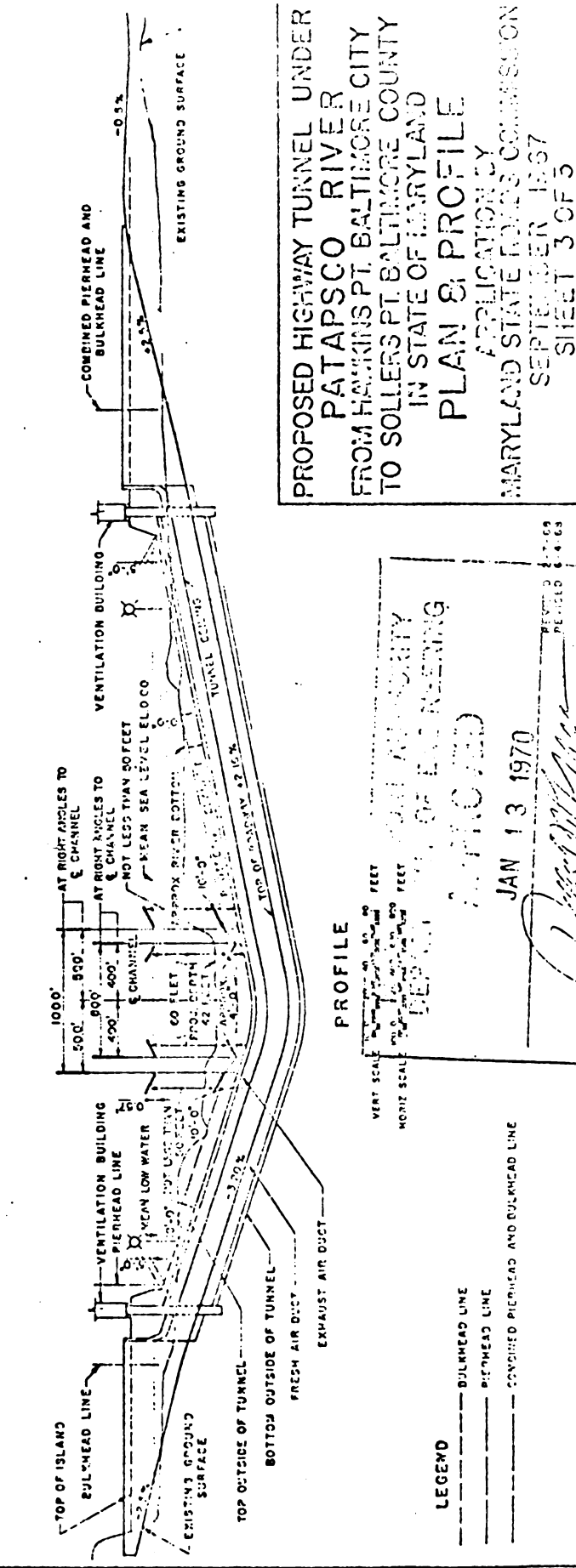
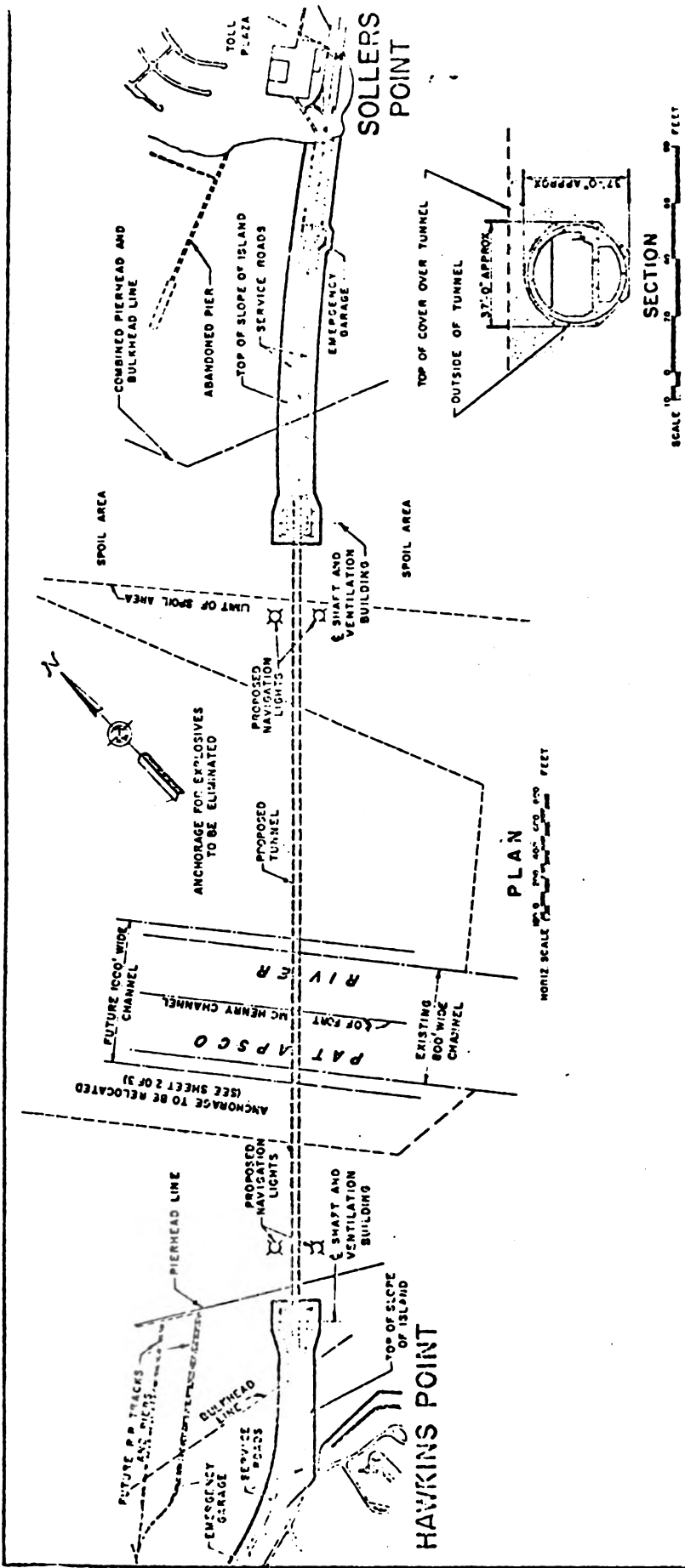
.....

Director of Engineering



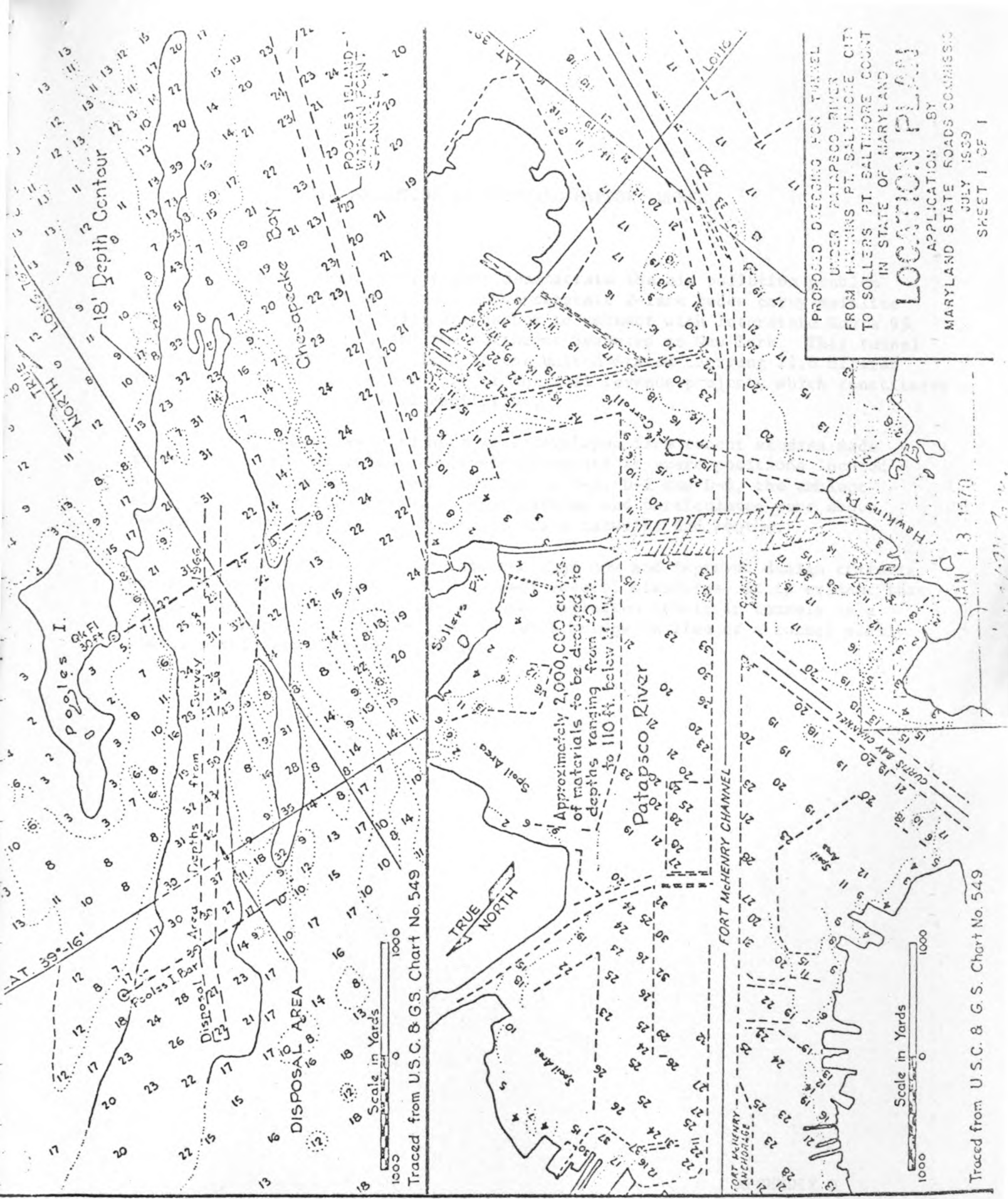
PROPOSED HIGHWAY TUNNEL UNDER
 ROUTE 2000 BRIDGE
 FROM WASHINGTON TO ENROUTE CUT
 TO COLLEGE PARK BRIDGE
 IN STATE OF MARYLAND
VICINITY MAP
 PREPARED BY MARYLAND STATE HIGHWAY DEPARTMENT
 SEPTEMBER 1977
 SHEET 1 OF 5

MARYLAND PORT AUTHORITY
 DEPARTMENT OF ENGINEERING
APPROVED
 JAN 13 1978
 SCALE 0 5 10 MILES
 BY *Charles M. Miller*

PROPOSED HIGHWAY TUNNEL UNDER
 PATAPSCO RIVER
 FROM HAWKINS PT. BALTIMORE CITY
 TO SOLLERS PT. BALTIMORE COUNTY
 IN STATE OF MARYLAND
 PLAN & PROFILE
 APPLICATION BY
 MARYLAND STATE ENGINEERS COMMISSION
 SEPTEMBER 1967
 SHEET 3 OF 5



APPROVED
 JAN 13 1970
 MARYLAND STATE ENGINEERS COMMISSION
 REGISTERED PROFESSIONAL ENGINEER
 PERMIT NO. 127-03
 PERIOD 4-4-63



PROPOSED DREDGING FOR TUNNEL
 UNDER PATAPSCO RIVER
 FROM HAWKINS PT. BALTIMORE CITY
 TO SOLLERS PT. BALTIMORE COUNTY
 IN STATE OF MARYLAND

LOCATION PLAN

APPLICATION BY
 MARYLAND STATE ROADS COMMISSION
 JULY 1939
 SHEET 1 OF 1

Approximately 2,000,000 cu yds.
 of materials to be dredged to
 depths ranging from 20 ft.
 to 110 ft. below M.L.W.

Scale in Yards
 0 1000

Scale in Yards
 0 1000

Traced from U.S.C. & G.S. Chart No. 549

Traced from U.S.C. & G.S. Chart No. 549

JAN 13 1970

AIR POLLUTION IN EXISTING HARBOR TUNNEL

The following four tables demonstrate the air pollution problem experienced in vehicular tunnels. Two separate 2-lane tubes carry mainline vehicular traffic under Baltimore Harbor to connect with Interstate Route 95 between Washington, D.C. and the Northeast Seaboard to New York. This tunnel is one of the heaviest travelled in the United States carrying 21.6 million vehicles in 1970. It is also one of the toll revenue projects which constitutes the Maryland Bridge and Toll Facilities.

The data presented here were developed from recent studies made to determine the air pollution levels prevalent at guard positions located in the tunnel. As can be seen from Tables D-1, D-2 and D-4, the ambient air quality for carbon monoxide, hydrocarbons and particulates were above Federally prescribed safety limits at guard catwalks and booths.

Although it would be expected that new and improved design criteria would be utilized in new tunnels to meet Federal standards, it is evident that the problem of maintaining low vehicular pollution levels in tunnels is a difficult one; thus, the construction of a bridge in lieu of a tunnel vastly improves this environmental problem.

TABLE D1

HARBOR TUNNEL CARBON MONOXIDE MEASUREMENTS IN PPM

<u>Traffic Conditions</u>	<u>Booth</u>	<u>Catwalk</u>	<u>Exhaust*</u>
Heavy	74	71	-
Medium	69	67	62
Light	60	58	64
Two Way	72	72	69

*CO Monitor read 60-100 ppm during this period.

References:

- Federal Limit, Primary - 9 (8 hour period only once per year)
- Secondary - 35 (1 hour period only once per year)
- Intake Air 6
- Empty Tube 10

NOTE: Data taken from "Harbor Tunnel Project Report" prepared by Thiokol Chemical Corporation, for Maryland State Highway Administration, dated July 16, 1971.

TABLE D2

HYDROCARBON MEASUREMENTS IN PPM

<u>TRAFFIC CONDITIONS</u>	<u>Locations</u>	
	<u>CATWALK</u>	<u>BOOTH</u>
Heavy	0.63	0.58
Medium	0.45	0.46
Light	0.53	0.62
Two Way	0.55	0.50

REFERENCES: Federal Limit 0.24 (3 hour conc. only once per year)
Tunnel Intake Air - less than 0.05

NOTE: Data taken from "Harbor Tunnel Project Report" prepared by Thiokol Chemical Corporation, for Maryland State Highway Administration, dated July 16, 1971.

TABLE D3

NO₂ AND SO₂ MEASUREMENTS IN PPM

BOTH POLLUTANTS WERE BELOW DETECTABLE LIMITS FOR
HEAVY, MEDIUM AND LIGHT TRAFFIC

DURING TWO-WAY TRAFFIC IN THE BOOTH AND ON THE CATWALK NO₂
WAS MEASURED AT 0.055 and SO₂ AT 0.008

<u>REFERENCES:</u>	Federal Limits:	NO ₂	0.05 (annual arithmetic mean)
	(Primary)	SO ₂	0.03 (annual arithmetic mean)
	(Secondary)	SO ₂	0.14 (24 hour conc. only once per year)
	Tunnel Intake Air:	NO ₂	less than 0.005
		SO ₂	less than 0.008

NOTE: Data taken from "Harbor Tunnel Project Report" prepared by Thiokol Chemical Corporation, for Maryland State Highway Administration, dated July 16, 1971.

TABLE D4.
PARTICULATES MEASUREMENTS IN MICROGRAMS/CUBIC METER

<u>TRAFFIC CONDITIONS</u>	<u>Locations</u>	
	<u>CATWALK</u>	<u>BOOTH</u>
Heavy	1010	900
Medium	940	785
Light	900	670
Two Way	1310	1060

References:

Federal Limits: 75 (annual geometric mean)
 260 (24 hour conc. only once/year)

Tunnel Intake Air 35

NOTE: Data taken from "Harbor Tunnel Project Report" prepared by Thokol Chemical Corporation, for Maryland State Highway Administration, dated July 16, 1971.



Public Law 91-83
91st Congress, H. R. 10420
October 10, 1969

An Act

83 STAT. 132

To permit certain real property in the State of Maryland to be used for highway purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That notwithstanding the requirements of the proviso in section 3 of the Act of March 4, 1923 (42 Stat. 1450), the mayor and city council of Baltimore, Maryland, are authorized to convey approximately eight acres, of the approximately forty-five and five-tenths acres conveyed under authority of such Act, to the State of Maryland: *Provided, however,* That the conveyance of such real property to the State of Maryland shall be upon the condition and limitation that such property shall be limited to use for highway purposes and upon cessation of such use shall revert to the Mayor and City Council of Baltimore and again become subject to the conditions and restrictions of the conveyance by the United States under authority of such Act and the proviso of section 3 of such Act. Any consideration received from the State of Maryland for such conveyance shall be used for the development of the remaining real property for park purposes.

Maryland.
Land convey-
ance.

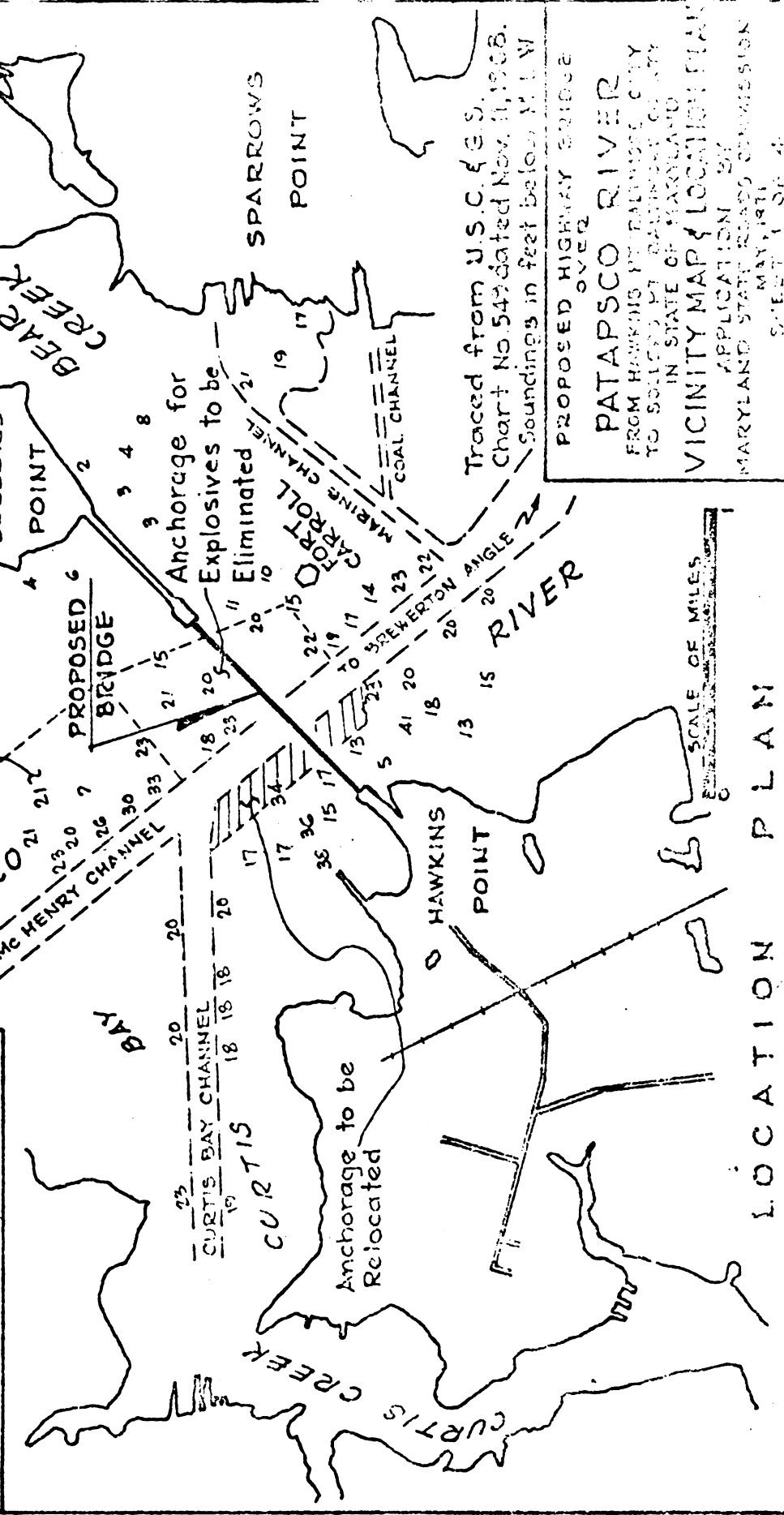
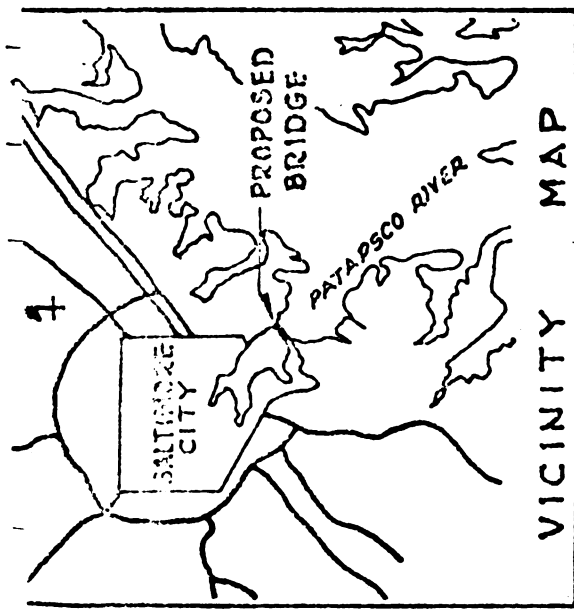
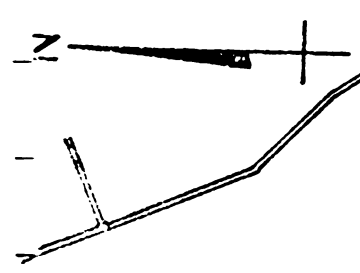
Approved October 10, 1969.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 91-451 (Comm. on Armed Services).
SENATE REPORT No. 91-435 (Comm. on Armed Services).
CONGRESSIONAL RECORD, Vol. 115 (1969):

Aug. 11: Considered and passed House.
Sept. 29: Considered and passed Senate.

Ft. Mc Henry Channel
 Horiz. Cl. 1,000 ft.
 Vert. Cl. 185 ft.



Traced from U.S.C. & G.S.
 Chart No. 547 dated Nov. 11, 1908.
 Soundings in feet below M.L.W.

PROPOSED HIGHWAY BRIDGE
 OVER

PATAPSCO RIVER

FROM HAWKINS POINT BRIDGE CITY
 TO SOLTERS POINT BRIDGE CITY
 IN STATE OF MARYLAND

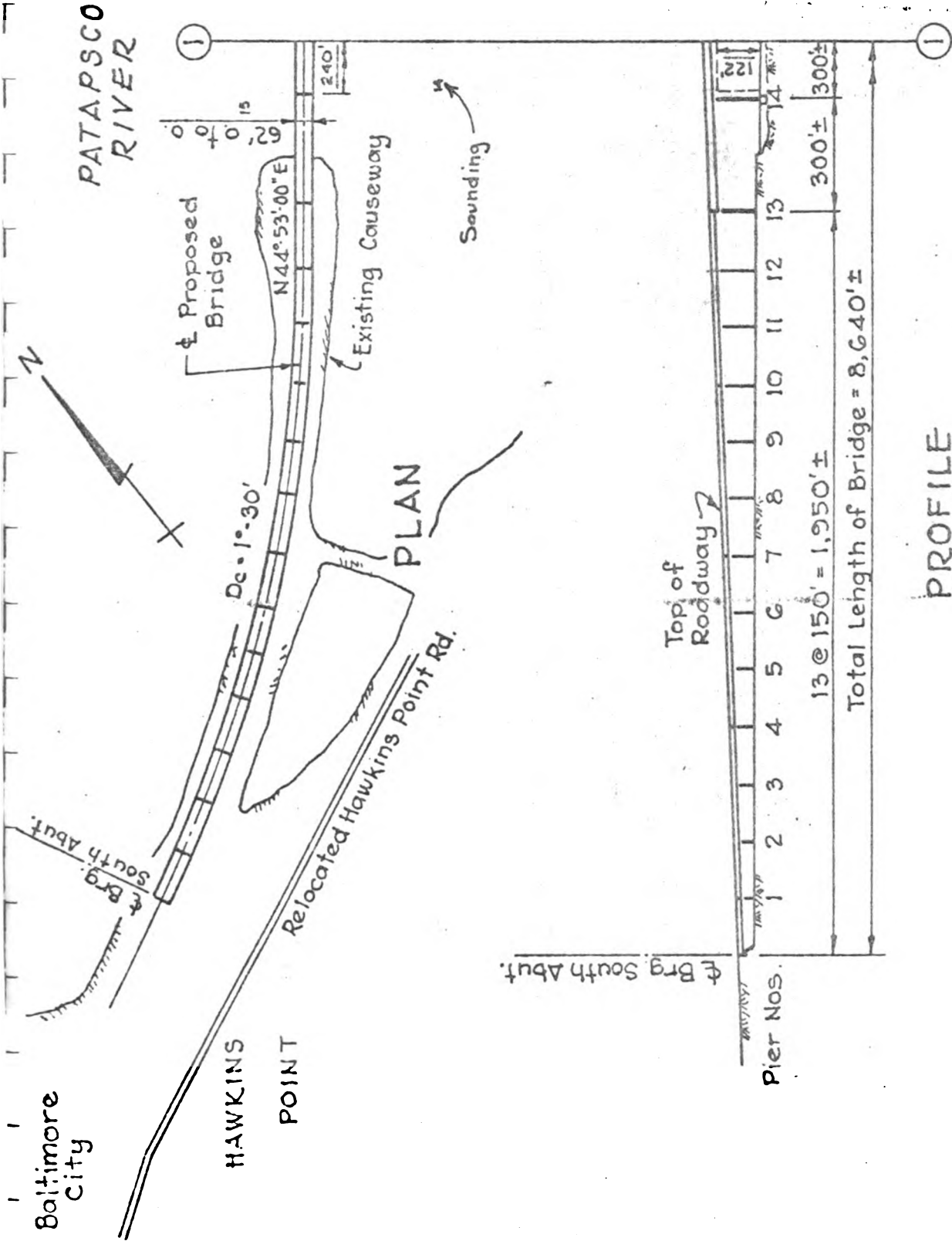
VICINITY MAP & LOCATION PLAN

APPLICATION BY
 MARYLAND STATE ROADS COMMISSION
 MAY 1911

SHEET 1 OF 2

LOCATION PLAN

APPENDIX F



PROPOSED HIGHWAY BRIDGE
OVER

PATAPSCO RIVER

FROM HAWKINS PT BALTIMORE CITY
TO SOLLERS PT. BALTIMORE COUNTY
IN STATE OF MARYLAND

PLAN & PROFILE

APPLICATION BY
MARYLAND STATE ROADS COMMISSION

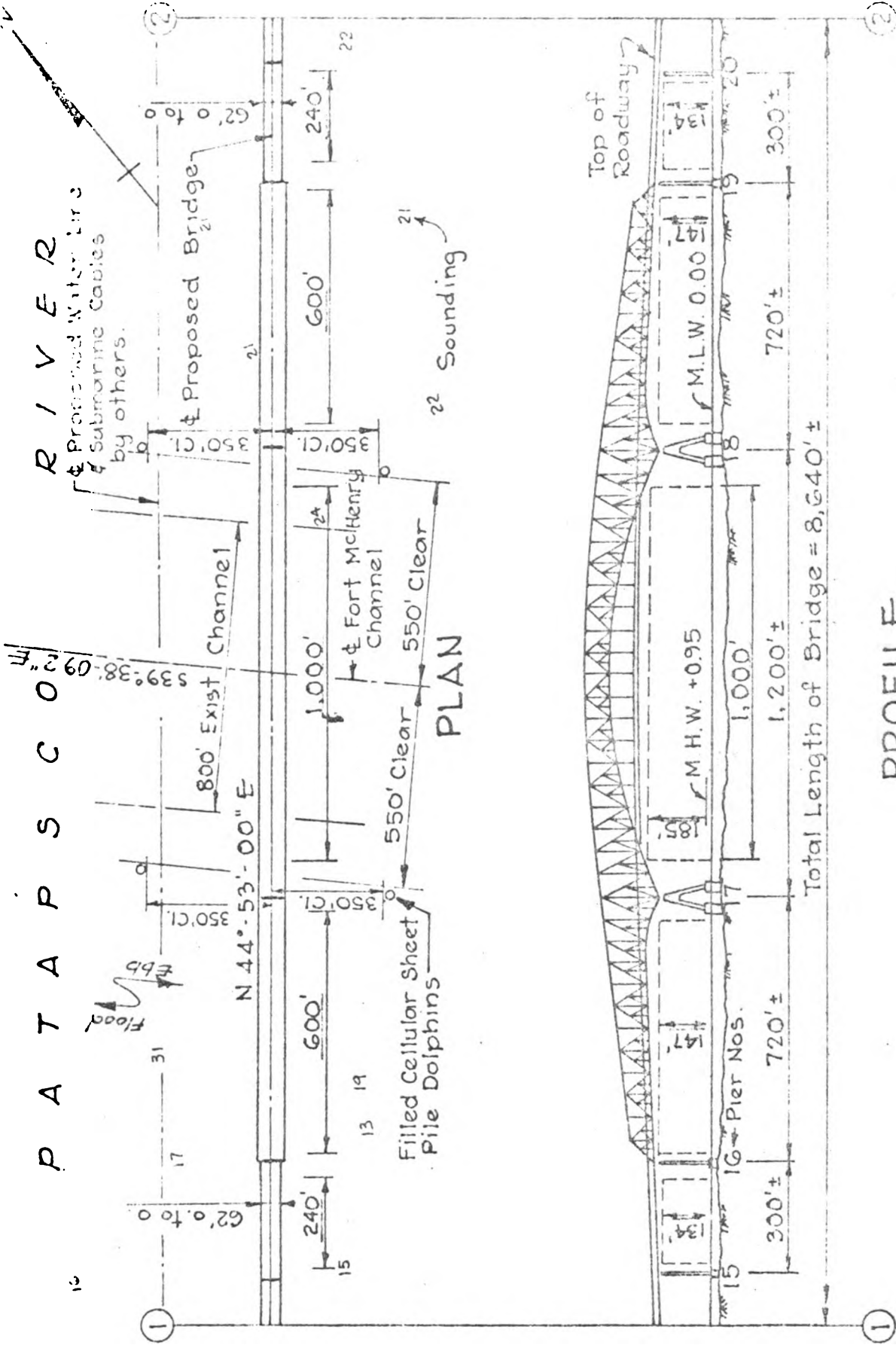
MAY 1934

APPENDIX E

NOTE:
Elevations refer to M.L.W. ↑
Clearance noted are above M.H.W.
Soundings in feet below M.L.W.

SCALE IN FEET

100 0 100 200 300



PROFILE

NOTE

Elevations refer to M.L.W.
 Clearances noted are above M.H.W.
 Coordinates in feet below M.L.W.

SCALE IN FEET
 1" = 100'
 1" = 200'

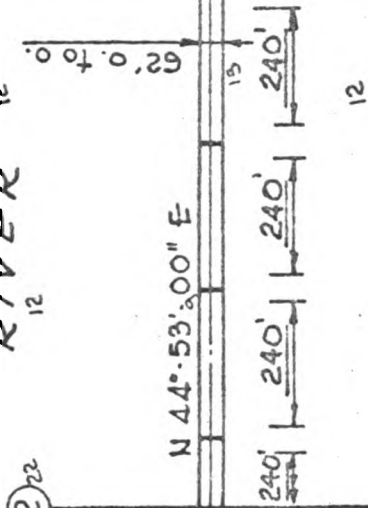
Revised 10/13/71 - Dolphins added
 PROPOSED HIGHWAY BRIDGE

PATAPSCO RIVER
 FROM HANKINS PT BALTIMORE CITY
 TO SOLICERS PT BALTIMORE COUNTY
 IN STATE OF MARYLAND
 PLAN & PROFILE
 APPLICATION BY
 MARYLAND STATE ROAD COMMISSION
 MAY 1971
 SHEET 2 OF 4

APPENDIX F

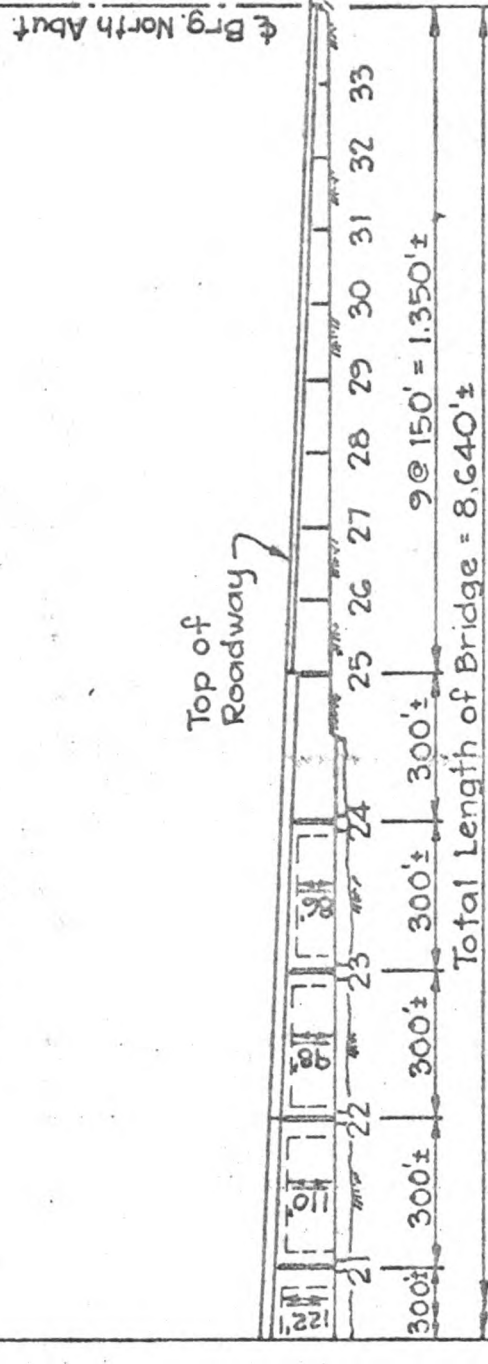
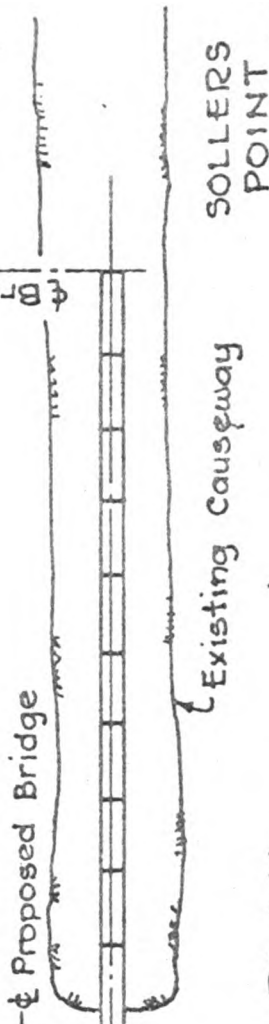
PATAPSCO RIVER

②²²



11" Sounding

PLAN



PROFILE

NOTE:

Elevations refer to M.L.W.
Clearances noted are above M.H.W.
Soundings in feet below M.L.W.

SCALE IN FEET
100 0 100 200 300

PROPOSED HIGHWAY BRIDGE
OVER
PATAPSCO RIVER,
FROM HAWKINS PT BALTIMORE CITY
TO SOLLERS PT BALTIMORE COUNTY
IN STATE OF MARYLAND
PLAN & PROFILE
APPLICATION BY
MARYLAND STATE ROADS COMMISSION
MAY 1971
SHEET 4 OF 4

APPENDIX F

AIR QUALITY ANALYSIS

This study presents an evaluation of existing air quality at the Outer Harbor Crossing location and quantitative data on the impact of the bridge vehicular traffic on ambient air quality conditions.

In this study, air pollution sources in the area, dispersion of emissions from these sources from a meteorological viewpoint, and their effect on the atmospheric environment, will be discussed.

I. Air Pollution Sources In the Area

The project area is located close to Baltimore's central business district. It extends from Sollers Point on the east bank and to Hawkins Point on the west bank of the Patapsco River. These areas are among the most desirable locations for industrial activities in the Baltimore Metropolitan area.

Two large stationary air polluters are situated in the area. One is the Glidden-Durkee Division of SCM Corporation at Hawkins Point, and the other one is the Bethlehem Steel Plant at Sparrows Point. The locations of these sources are shown on Plate 1, and their emissions are listed in Table G-1.

The other existing sources of air pollution in the area are the emissions resulting from automobiles. The largest present contributors of this kind are the vehicles which enter and park in the Bethlehem Steel complex. When the proposed bridge is completed an additional source of air pollution will develop from vehicular traffic using the new 4-lane crossing of the Patapsco River.

Traffic forecasts on the bridge for the first 20 years of the project life are listed in Table G-2.

Assuming a peak hour two-way traffic volume of approximately 1500 vehicles per hour with an operating speed of 40 miles per hour, traffic density on each side of the toll plaza will average about 38 vehicles per mile of approaches. This same traffic passing through the 2000 foot length of toll plaza^{1/} where it is necessary to decelerate, stop and pay tolls, then accelerate to the normal operating speed, will double the traffic density in this length of the facility. This will amount to about 76 vehicles per mile or 28 vehicles in the 2000 foot length of toll plaza.

^{1/} The toll plaza on the east side of the bridge is 2000 feet in length. The bridge length west of the plaza is 8640 feet. See Appendix F for plan and profile of bridge.

TABLE G-1

1970 DAILY EMISSIONS FROM STATIONARY MAJOR POLLUTERS IN AREA

<u>Location</u>	<u>Name</u>	<u>Pounds Per Day</u>					<u>Particulates</u>
		<u>CO</u>	<u>HC</u>	<u>NO_x</u>	<u>SO₂</u>		
Hawkins Point ^{1/} (West Side of Bridge Approach)	Glidden-Durkee Division, SCM Corp.	---	208	4,200	15,800	17,500	
Sollers Point ^{1/} (East Side of Bridge Approach)	Bethlehem Steel Company	498,000	52	15,200	171,000	79,300	

^{1/} Data on Hawkins Point obtained from Baltimore City Health Department

^{2/} Data on Sollers Point obtained from Baltimore County Health Department

TABLE G-2

ESTIMATED TRAFFIC GROWTH

Proposed Bridge Over Patapsco River

<u>Year</u>	<u>Average Daily Traffic (Two Way)</u>	<u>Design Hourly Volume (Two Way)</u>
1975	11,000	1,100
1977	15,000	1,500
1980	8,230 ^{1/}	820 ^{1/}
1985	9,600	960
1990	11,500	1,150
1995	13,400	1,340

Note: Truck traffic assumed at 7 per cent
of total two-way traffic.

^{1/} It is anticipated that the completion of I-95 through
Baltimore City will divert traffic from this facility.

The impact on ambient air quality from internal combustion engines will be higher in the toll plaza than on the remainder of the bridge crossing. Cars will have an average cruising speed of 40 mph on the bridge, while at the toll plaza they will come to a momentary complete halt and then accelerate to cruising speed. Emissions in the toll plaza area were studied for predicted traffic in 1977, which is the time of expected peak hourly traffic volume.

It is predicted^{2/} that 1977 traffic will have the following proportions of vehicular age: 11.6 per cent older than 9 years; 22 per cent older than 7 years; and 78 per cent less older than 7 years. In addition, 7.8 per cent of the total registration will be new 1977 models. By applying the National emission control regulations to the different car models, total emissions for maximum daily two-way traffic in the toll plaza and the bridge were computed and are listed in Table G-3.

II. Atmospheric Dispersion In The Area

Temperature variations and surface winds are the principal elements which affect dispersion of pollutants in the air.

Surface winds in Baltimore vary on the average of 7 to 10 miles per hour over the year. The winds prevail from the northwest during the winter months, and during the summer they tend to prevail from southwest. When the wind direction is from southwest, it will disperse the emissions from Glidden-Durkee plant toward the proposed bridge. By using the Binormal Continuous Plume Dispersion Equations^{3/} for the worse dispersion conditions (very light wind on a clear night), ground level effects on ambient air from the toll plaza were computed. The results are given in Table G-4.

III. Existing Ambient Air Quality In The Area

It was necessary to analyze present air pollution levels in the project area in order to estimate the impact of the proposed bridge traffic on ambient air quality.

The closest air sampling station in Sollers Point is about a mile northwest of the toll plaza and is operated by the State of Maryland Health Department. Sulphur dioxide, nitrogen oxide and suspended particulates are the only pollutants recorded at this station. The data collected from this station is given in Table G-5.

^{2/} "1971 Automobile Facts and Figures" by Automobile Manufacturers Association, Inc.

^{3/} Turner, D. Bruce, Workbook of Atmospheric Dispersion Estimates, U. S. Printing Office, Revised 1970.

TABLE G-3

TOTAL EMISSIONS FOR MAXIMUM DAY

<u>Pollutants</u>	<u>Toll Plaza lbs/day</u>	<u>Bridge and Approaches Less Toll Plaza lbs/day</u>	<u>Total Bridge & Toll Plaza lbs/day</u>	<u>Emissions lbs/day Per Foot of Length</u>		
				<u>Toll Plaza</u>	<u>Bridge & Toll Plaza</u>	
CO	1397.50	2360.71	3758.21	0.698	0.239	0.937
HC	129.44	170.55	299.99	0.0647	0.018	0.083
NO ₂	146.12	308.92	455.04	0.0731	0.031	0.104
SO ₂	18.52	31.71	50.23	0.0093	0.0032	0.013
Particulates	26.06	64.46	90.52	0.013	0.0065	0.0195
<u>Total Pollutants</u>	<u>1717.64</u>	<u>2936.35</u>	<u>4653.99</u>	<u>0.8581</u>	<u>0.2977</u>	<u>1.1565</u>

TABLE G-4

DISPERSION FROM TOLL PLAZA

Distance From Tollway (Meters)	CO ppm	HC ppm	NO ₂ ppm	SO ₂ ppm	Particulates ug/m ³
100	6.90 x 10 ⁻²	2.249 x 10 ⁻³	4.430 x 10 ⁻³	3.92 x 10 ⁻⁴	1.618
200	10.05 x 10 ⁻²	3.233 x 10 ⁻³	6.368 x 10 ⁻³	5.66 x 10 ⁻⁴	2.328
300	7.35 x 10 ⁻²	1.743 x 10 ⁻³	3.434 x 10 ⁻³	3.04 x 10 ⁻⁴	1.882
400	5.10 x 10 ⁻²	1.661 x 10 ⁻³	3.270 x 10 ⁻³	2.90 x 10 ⁻⁴	1.196
600	2.85 x 10 ⁻²	0.950 x 10 ⁻³	1.840 x 10 ⁻³	1.632 x 10 ⁻⁴	0.672
800	1.80 x 10 ⁻²	0.605 x 10 ⁻³	1.190 x 10 ⁻³	1.056 x 10 ⁻⁴	0.434
1000	1.35 x 10 ⁻²	0.429 x 10 ⁻³	0.844 x 10 ⁻³	0.750 x 10 ⁻⁴	0.306
1500	0.75 x 10 ⁻²	0.246 x 10 ⁻³	0.484 x 10 ⁻³	0.430 x 10 ⁻⁴	0.176
2000	0.33 x 10 ⁻²	0.107 x 10 ⁻³	0.212 x 10 ⁻³	1.876 x 10 ⁻⁵	0.077
4000	0.18 x 10 ⁻²	0.0595 x 10 ⁻³	0.1174 x 10 ⁻³	1.164 x 10 ⁻⁵	0.043
5000	1.275 x 10 ⁻³	0.041 x 10 ⁻³	0.0808 x 10 ⁻³	0.716 x 10 ⁻⁵	0.0294

TABLE G-5

EXISTING AMBIENT AIR QUALITY IN THE PROJECT AREA

<u>Pollutants</u>		<u>Ambient Conditions 1970 Sollers Point</u>
CO	Avg.	Not Available
	Max.	Not Available
HC	Avg.	Not Available
	Max.	Not Available
NO ₂	Avg.	0.040 ppm ^{1/}
	Max.	0.0730 ppm ^{1/}
SO ₂	Avg.	0.0235 ppm
	Max.	0.3041 ppm
Particulates	Avg.	69 ug/m ³
	Max.	179 ug/m ³

^{1/} Data collected through period
January 1971 to August 1971.

A comparison between Table G-5 and the National Air Quality Standards given in Table G-6 indicates that air quality in the vicinity of the toll plaza can be classed as fair, based on the three indices given. This can be explained on the basis that despite the close proximity of the two specific sources of air pollution on the flanks of the bridge, prevailing winds disperse these stationary emissions to the extent that ambient levels are substantially below toxicity threshold levels.

An analysis of wind data taken at Friendship International Airport shows that during the last 10 years there were no winds from the southeast direction during the 3 hour average periods of wind measurement. This phenomenon virtually eliminates the possibility that emissions from Bethlehem Steel Company will dominate air quality in the vicinity of the toll plaza. When wind blows from the southwest, emissions from the Glidden plant will have some effect on the air quality at the toll plaza, but the relatively long distance of the plant from the bridge and toll plaza maximizes the dispersion of the pollution from this plant.

IV. Effect of Proposed Bridge Traffic on Ambient Air Quality

In Table G-7 selected data from Table G-4 and G-5 are compared. Ambient quantities of NO₂, SO₂ and particulates are compared with the incremental effect of these pollutants from peak volume bridge traffic at distances of 100 and 1000 meters from the toll plaza. For NO₂, SO₂ and particulates the bridge traffic adds approximately 1/17th, 1/80th and 1/110th of the respective existing pollutants to the atmosphere, assuming that maximum hourly traffic is coincident with maximum pollution in the area. For distances of 1000 meters from the bridge, under the same conditions the increment of pollution from the bridge becomes 1/87th, 1/4000th and 1/580th of the maximum NO₂, SO₂, and particulates in the atmosphere.

In Table G-8 a comparison is made of the bridge traffic pollution emissions on a maximum day with average emissions by the two major stationary polluters in the area. Total emissions from the bridge are shown to be only 0.6% of the total emissions from the stationary sources. It is expected that within the next several years, possibly before the bridge is opened, the pollution from these stationary sources will have been substantially reduced.

In Table G-9 the effects on emissions by various configurations of the toll plaza in relation to the bridge are shown. These data show that the removal of tolls would reduce emissions by amounts varying from one-third to as much as 1/20th at 100 meters from the bridge, but this differential is greatly increased at 1000 meters. However, in all cases the absolute magnitude of the pollutional emissions are small enough to warrant the conclusion that the toll plaza configuration is not a significant factor. Of greater significance is its location on the eastern shore on the leeward of prevailing winds. Its long distance from the Glidden source and its upwind location from the Bethlehem complex justifies the conclusion that the toll plaza is in the best possible location to minimize the pollutional effects from the stationary sources.

TABLE G-6

NATIONAL AIR QUALITY STANDARDS^{1/}

<u>Pollutant</u>	<u>For Human Health, Level Not To Exceed:</u>	
Carbon Monoxide	9 ppm	(8 hour conc. only once/year)
	35 ppm	(1 hour conc. only once/year)
Particulate Matter	75 micrograms/ cubic meter	(annual geometric mean)
	260 micrograms/ cubic meter	(24 hour conc. only once/year)
Hydrocarbons	0.24 ppm	(3 hour conc. only once/year)
Nitrogen Oxides	0.05 ppm	(annual arithmetic mean)
Sulphur Dioxide	0.03 ppm	(annual arithmetic mean) (24 hour conc. only once/year)
Photochemical Oxidants	0.08 ppm	(1 hour conc. only once/year)

^{1/}"National Primary and Secondary Ambient Air Quality Standards"
Environmental Protection Agency, Federal Register Vol. 36
No. 84 Part II, April 30, 1971

TABLE G-7

EFFECT OF BRIDGE TRAFFIC ON AMBIENT CONDITIONS
AND COMPARISON WITH NATIONAL STANDARDS

Pollutants		Ambient Conditions 1970 Sollers Point	Toll Plaza 1977	
			100 Meters	1000 Meters
CO	Avg.	Not Available		
	Max.		0.0690 ppm	0.0135ppm
HC	Avg.	Not Available		
	Max.		0.00323ppm	0.00043ppm
NO ₂	Avg.	0.040 ppm ^{1/}		
	Max.	0.0730 ppm ^{1/}	0.0044 ppm	0.00024ppm
SO ₂	Avg.	0.0235 ppm		
	Max.	0.3041 ppm	0.00392ppm	0.000075ppm
Particulates	Avg.	69 ug/m ³		
	Max.	179 ug/m ³	1.618ug/m ³	0.306ug/m ³

^{1/} Data collected through period January 1971 to August 1971.

TABLE G-8

COMPARISON OF BRIDGE TRAFFIC POLLUTION EMISSIONS
WITH MAJOR STATIONARY SOURCES

(Pounds Per Day)

Source	Air Pollution Emissions						Total
	CO	HC	NO ₂	SO ₂	Particulates		
Bridge ^{1/}	2360.7	170.6	308.9	31.7	64.5		2936.4
Toll Plaza ^{2/}	1397.5	129.4	146.1	18.5	26.1		1717.6
Total Bridge	3758.2	300.0	455.0	50.2	90.6		4654.0
Bethlehem Steel	498,032	52.1	15,197.0	170,958.0	76,340.0		760,579.1
Glidden Company	-	208.0	4,160.0	15,808.0	17,488.0		37,664.0
Total Stationary Sources	498,032	260.1	19,357.0	186,766.0	93,828.0		798,243.1
Additional Emissions from Bridge Traffic as Percent of Stationary Sources	0.75%	115%	2.35%	0.027%	0.096%		0.58%

Footnote 1: Total length of bridge: 8640 feet. Total emissions per lineal foot of bridge = 0.34 lbs/day
Footnote 2: Total length of toll plaza: 2000 feet. Total emissions per foot of toll plaza = 0.35 lbs/day

TABLE G-9

ANALYSIS OF EMISSIONS FROM VARIOUS CONFIGURATIONS OF TOLL PLAZA
IN RELATION TO BRIDGE APPROACHES

Alternatives	Distance from Toll Plaza Meters	CO ppm	KC ppm	NO ₂ ppm	SO ₂ ppm	Particulates µg/m ³
Toll Plaza at Sollers Point (Two Way Toll Collection)	100	0.0690	0.0032	0.0044	0.0039	1.618
	1000	0.0135	0.00043	0.00084	0.000075	0.305
Toll Plaza at Sollers Point or Hawkins Point (One Way Toll Collection)	100	0.0414	0.0019	0.0026	0.0023	0.9708
	1000	0.0081	0.00026	0.00050	0.00005	0.1836
Toll Plaza at Sollers Point and Hawkins Point (Separate Toll Collection at each Plaza)	100	0.0345	0.0011	0.0022	0.00195	0.8090
	1000	0.0067	0.00055	0.00042	0.0000375	0.0255
No Toll Plaza Facility	100	0.0236	0.00084	0.00146	0.000213	0.890
	1000	0.0045	0.00016	0.000215	0.000083	0.169

V. Conclusions

After evaluating the effects of the anticipated bridge traffic on ambient air quality, we arrived at the following conclusions:

1. Analysis of prevailing wind directions in relation to the two major stationary pollution sources in the industrial area on either side of the bridge indicates that the proposed location of the toll booth facilities on the Sollers Point side of the bridge approaches is the most beneficial from the viewpoint of minimizing the effects of increased automotive pollution emissions due to queuing.
2. The ambient air quality in the vicinity of the bridge and toll plaza should not be significantly affected by automotive emissions. As an example, in the range of 3,000 feet from the two-way toll plaza, the increase in CO in the environment will be less than 0.02 ppm or 0.04% of the National Air Quality Standards.
3. Separation of the toll collection facilities by direction, collection of one-way tolls only, or imposition of no tolls in order to reduce the impact from the bridge traffic on ambient air quality will not significantly improve the ambient air quality of the area. Further, physical limitations due to the lack of space preclude furnishing additional toll plaza facilities on the west side of the bridge facility. One-way tolls would be impractical because the availability of free competing routes would result in serious loss of revenues. Separate toll collection facilities for each traffic direction would be impractical because it would result in locating one of the toll collection facilities very close to Glidden-Durkee plant, which is in the prevailing wind direction. Finally, since the financing of the facility is predicated upon obtaining tolls and limiting free passage from connecting roads adjacent to the bridge approaches, the construction of a toll-free facility would be impractical.
4. Beginning in 1975, emissions from the two major stationary sources in the project area will be reduced to substantially lower levels to meet present Federal and local government air quality standards. Therefore, it can be expected that ambient air quality in the project area in 1977, when maximum traffic will occur, will be improved by one or two orders of magnitude, and as is demonstrated by the data presented here, the addition of automobile emissions from the bridge traffic will have a negligible detrimental effect.
5. Beginning in 1976, the new Federal standards on automotive emissions will become fully effective. It is predicted^{4/} that in 1985 only 8.1 per cent of the total cars on the road will not have 1976 emission controls. On the basis of retirement of older model cars, it is estimated that in 1985, total carbon monoxide and hydrocarbon emissions on the bridge will be 70 per cent less than they would have been with 1977 peak traffic volumes.

^{4/} "1971 Automobile Facts and Figures" by Automobile Manufacturers Association, Inc.

