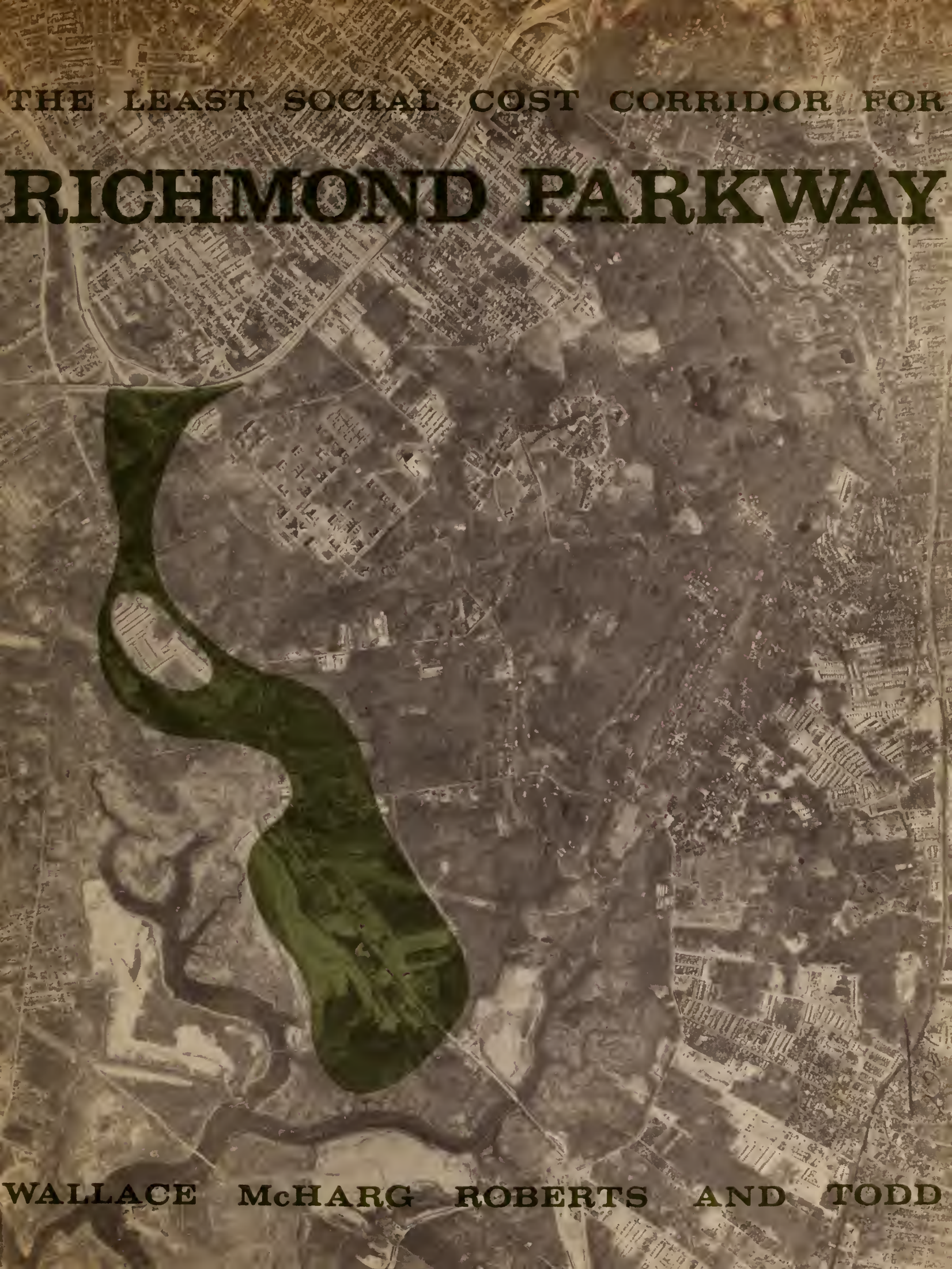
THE LEAST SOCIAL COST CORRIDOR FOR

RICHMOND PARKWAY



WALLACE McHARG ROBERTS AND TODD

THE CITY OF NEW YORK

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May 6, 1968

The Honorable John V. Lindsay
Mayor of the City of New York
City Hall
New York, New York

Dear Mr. Mayor:

My Department has commissioned a new study relating to the placement of Section I of the Richmond Parkway. The purpose of this study is not to propose a new route, it is not a traffic nor an engineering study. What does it show? It introduced a collection of objective data about the natural and human environment in the area through which the Parkway is proposed. It is an original approach to the problem, employing factors hitherto neglected in the planning of highways. This is a study of the effect the Richmond Parkway would have on the environment through which it passes.

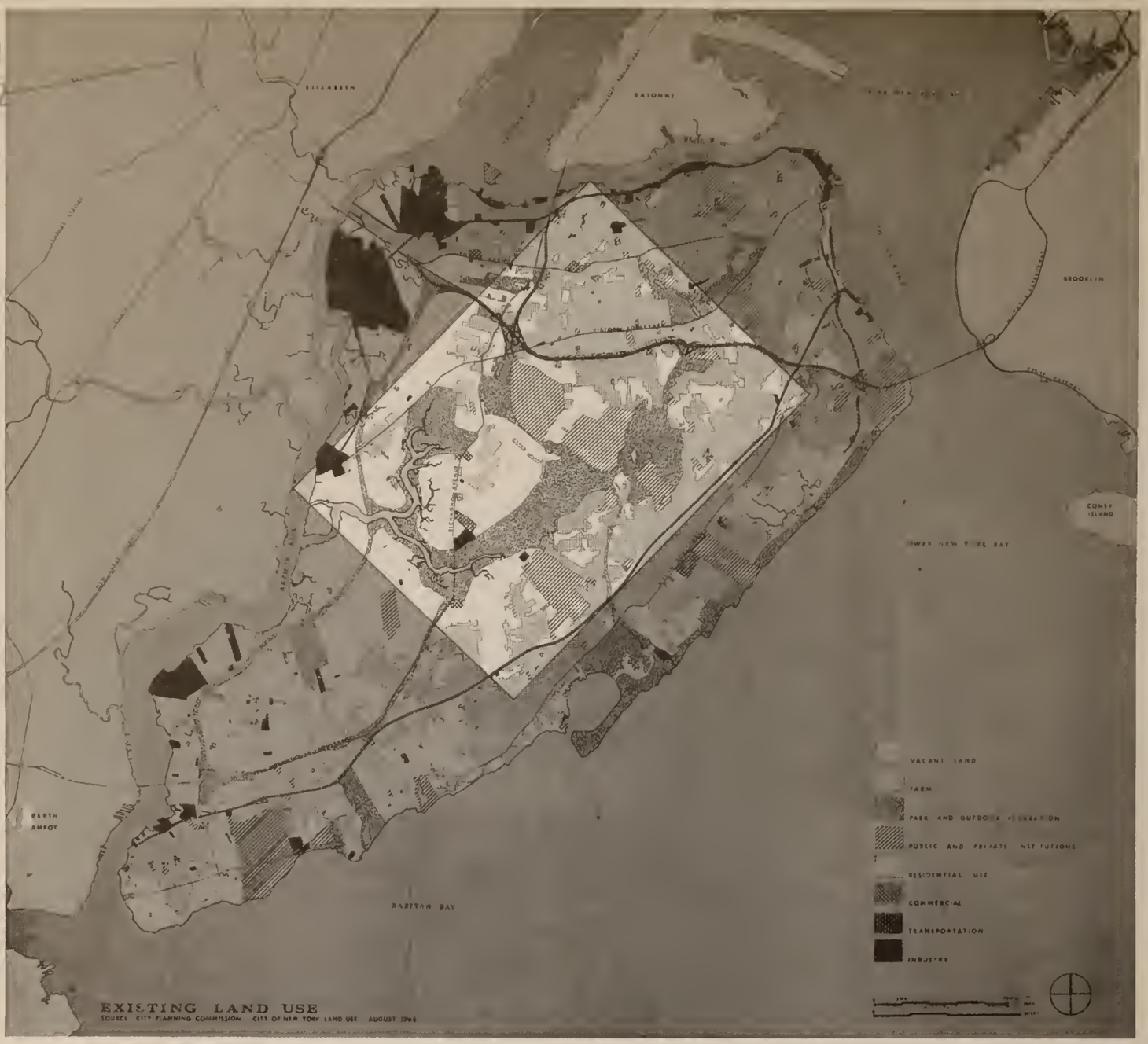
We have intuitively felt for a long time that the proposed road through the Greenbelt would violate certain social and natural values to an extent that would justify the adoption of alternative alignments. This study corroborates our intuition on the basis of the objective information which follows. This study indicates that the alignment known as Alternate 4 comes closest to the ideal route because it most closely follows the corridor in which the lowest social and natural values are found. The placement of the Richmond Parkway in any other section of the study area would result in permanent loss of the values found there.

I hope that this study will arouse the interest of those in whose hands the decision rests. I hope that it will be a precedent: it represents a rational method for examining environmental factors as aspects of highway planning. I hope it can make an effective contribution to the process of decision making.

In my personal opinion this report supports the position we have taken over the years. It verifies our regard for the Staten Island Greenbelt as an area of extraordinary natural and social value, the center of a developing borough. I believe in a great and beautiful Richmond: an attraction for tourists, a haven for residents, a home for institutions of learning and culture, a magnet for business and commerce. Let us have our roads, and highways too. Let us build them now. But let us place them where they will inflict the least harm and provide the greatest benefit, both now and in the future.

August Heckscher

AUGUST HECKSCHER



THE STUDY AREA

THE METHOD

There can be no doubt about the importance of highways, they are essential components of the economy. Yet, as the number of automobiles and trips increases with population and prosperity, so does the magnitude of the remedy in terms of the magnitude of highway proposals. As might be expected under these circumstances, proposals increasingly encounter opposition from the public as these conflict with existing social values. Indeed, if traffic congestion can be likened to an embolism, and highway proposals seen as the recommended therapy, it is now clear that the remedy often appears, for large sectors of the public, to be more deadly than the malady. This view is increasingly being voiced by citizens throughout the land as opposition mounts against highway proposals, often viewed as menacing to resources, unresponsive to values of community or landscape. So, in San Francisco and New Orleans, Philadelphia and Washington, citizens fight desperately to protect treasured resources, community integrity, precious parks, historic buildings and spaces.

One reason for the widening opposition to highways is clear, it lies in the inadequacy of the route selection method. The obvious deficiency derives from its origins. Devised for interstate highways in rural areas, it concentrates upon construction costs and minimizes social values and consequences to these. As a result, the cost benefit formula is based upon allocation of benefit values for minute-miles saved by both vehicle and passenger but there is no similar concern for the loss of social values resulting from the highway construction. The physical costs of construction are calculated with great precision, the assumed benefits are as precisely calculated, but the matter of social costs and benefits is omitted from the calculations. Indeed, the highway planner is not permitted to consider social values in his deliberations and can only evaluate these as modifications rather than determinants. This being so it should come as no surprise that opposition to highway alignments is fierce and increasing. It is the inevitable result of the incapacity of the route selection method to reflect the most important costs of all, the effect of the highway upon social values.

Highway route selection must be made more responsive to public values but this requires that the method and the criteria employed be made explicit. In order for this to occur it is necessary that a method be developed which can identify social and biophysical processes as values which provide both opportunities and limitations to highway corridors. It is necessary that the values which the residents of a community hold for their homes and parks, schools and churches, historic buildings and places must be included in the route selection method along with the orthodoxy of criteria. This done the public could be assured that their espoused values were recognized in the process of route selection and they would be spared the apprehension which the proposal of a highway often provokes. It is to this problem, the evaluation of social and biophysical processes, as a value system, and its employment in route selection, that this study is addressed.

The method proposed here is an attempt to remedy deficiencies in route selection method. It consists, in essence, of identifying both social and natural processes as social values. We will agree that land and building values do reflect a price value system, we can also agree that for institutions which have no market value there is still a hierarchy in values so that the Capitol is more valuable than an undifferentiated house in Washington, Independence Hall more precious than a house in Philadelphia's Society Hill or Central Park more valuable than any other in New York. So too with natural processes. It is not difficult to agree that different rocks have a variety of compressive strengths and thus offer both values and penalties for building; that some areas are subject to inundation during hurricanes and other areas are immune; that certain soils are more susceptible to erosion than others. Additionally, there are comparative measures of water quantity and quality, soil drainage characteristics. It is possible to rank forest quality, both in terms of species, age and health, so too can marshes be ranked in order of value. Wildlife habitats, scenic quality, the importance of historic buildings, recreational facilities, can all be ranked. For example, if destruction or despoliation of existing social values were to be caused by proposed highway alignment, that alignment value would be decreased by the amount of the social costs. The physical costs of construction are social costs too. Therefore we can conclude that any alignment which transects areas of high social values and also incurs penalties in heightened construction costs will represent a maximum social cost solution. The alternative is always to be sought -- an alignment which avoids areas of high social costs and incurs the least penalties in construction costs. The latter might well be described as the least social cost solution.

However, there is one very important qualification which must be recognized. While in every case there should be little doubt as to the ranking within a category, there is no possibility of ranking the categories themselves. For example, it is quite impossible to compare a unit of wildlife value with a unit of land value or to compare a unit of recreational value with one of hurricane danger. All that can be done is to identify natural and social processes and superimpose these. By so doing we can observe the maximum concurrence of either high or low social values and seek that corridor which transects the areas of least social value in all categories. Exact resolution of this problem seems intractable. Economists have developed price values for many commodities but there seems no prospect that institutions, scenic quality, historic buildings, and those other social values considered, can be given exact price values. While recognizing this deficiency, it is possible to state that the recognition of social values, and their ranking within categories, does mark a significant advance in the subject of route selection.

This method was first developed to discern an alignment for I-95 between the Delaware and Raritan Rivers in New Jersey. Here the problem involved is not only the least social cost alignment, but also that corridor which would provide the maximum social benefit. Highways often result in more intense land uses, particularly adjacent to intersections, and this is a legitimate credit attributable to highway construction. In the case of the Richmond Parkway, the matter of traffic is not in dispute, nor is any intersection proposed in the section under consideration. Thus, the subject of the alignment of maximum social benefit is limited to the convenience of the trip and the experience of the travellers. The former consideration is not significantly variable whatever the route of the section and only the experience of the passenger remains as an important factor in selecting the alignment of the maximum social value. In this particular investigation then the identification of the alignment of minimum social cost becomes much more important than that of the maximum social value.

Proponents of the parkway conception have often selected areas of great natural beauty and transected these with a highway in order to provide a scenic experience for the driving public. This conception is valid where, as in the Blue Ridge Parkway, beautiful landscapes are abundant and no significant social loss is incurred. Where resources of scenery, recreation, wildlife habitats and historic buildings are precious, and will be destroyed if a highway is constructed, then this conception is invalid. Such is the case in Staten Island. A much better example can be found in the very first modern highway in the world. The Bronx River Parkway was used, not as a device to exploit existing scenic values, but to use the parkway concept to rehabilitate a dirty river, an unkempt landscape, provide a continuous scenic experience and create a new public resource and new public values. **Where resources are scarce and valuable it is preferable to use the public investment in highways to rehabilitate landscapes rather than to destroy precious existing resources.**

When it is contemplated to introduce highways into areas of natural beauty, it is important to observe that, not only do they reduce social values by the despoliation and disruption to natural processes, and accomplish a discontinuity and loss of integrity to institutions which they transect, but they are also the source of many toxic and noxious effluents -- hydrocarbons, carbon monoxide, lead, dust, the offense of noise and, at night, lights. They are a source of danger and an intrusion into the very values which beautiful landscape best provides -- the opportunity for tranquillity and introspection. The method then seeks to locate the highway corridor of the least social cost and the maximum social benefit which might well be described as that of the maximum social utility.

To accomplish this, a number of factors were identified and each ranked in three categories. In the case of social values, the highest value is indicated on the maps by the darkest tone, the intermediate value by the lighter tone and the lowest by the absence of any tone. Physiographic obstructions are ranked similarly with the maximum obstruction shown darkest as representing a prospective social cost identical to the loss of a social value, intermediate physiographic obstruction is a lighter tone and least obstruction is white.

The first group of factors were some of those orthodox criteria normally employed by engineers -- slope, bedrock geology, soil foundation conditions, soil drainage and susceptibility to erosion. The degree of opportunity or limitation afforded by these factors will be reflected directly in the cost of highway construction. The next category of factors concerns danger to life and property and includes areas vulnerable to flood inundation from hurricanes. The remaining categories are evaluation of natural and social processes including: historic values, water values, forest values, wildlife values, scenic values, recreation values, residential values, institutional values and land values. Each factor, with its three grades of values, was photographed as a transparent print. The first group were superimposed upon each other and from this a summary map was produced which revealed the sum of physiographic factors influencing highway route alignment. Each subsequent parameter was then superimposed upon the preceding until all parameters were overlayed. **The darkest tone then represents the sum of social values and physiographic obstructions to a highway corridor; the lightest tone reveals the areas of least social value** representing the least direct cost for highway construction. The highway should be located in that corridor of least social value and cost, connecting points of origin and destination. Moreover, it should provide new values, not only of convenience, but also of scenic experience, as a product of public investment.

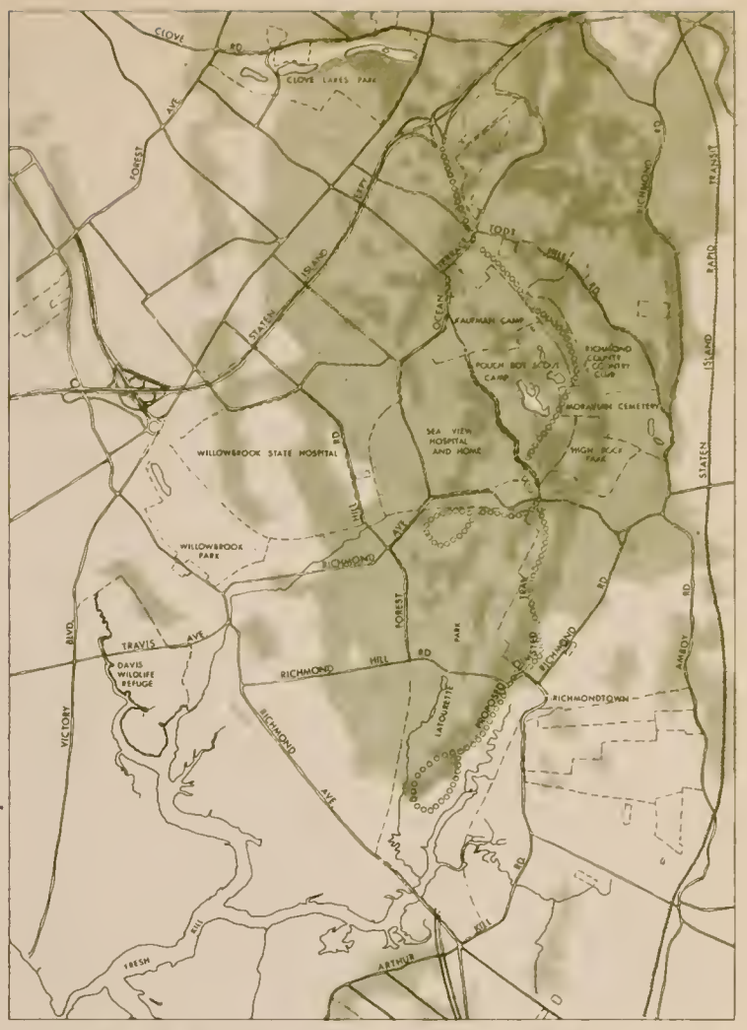
SLOPE

The Richmond Parkway will be built with a maximum gradient of 3%. If the alignment transects slopes in excess of this cut and fill will be incurred. Thus existing slopes of less than 3% represent a least cost opportunity for highway construction while greater slopes represent penalties and costs.

ZONE 1: Areas with slopes in excess of 10% represent the greatest obstruction to the highway. These exist as escarpments within the Serpentine Hill.

ZONE 2: Areas with slopes less than 10% but in excess of 2 1/2% are obstructive to the highway as these can entail high costs in regrading along the alignment.

ZONE 3: Areas with slopes less than 2 1/2% are ideally suited to the highway alignment.



Source: Borough of Richmond Topographic Survey, June 1912.

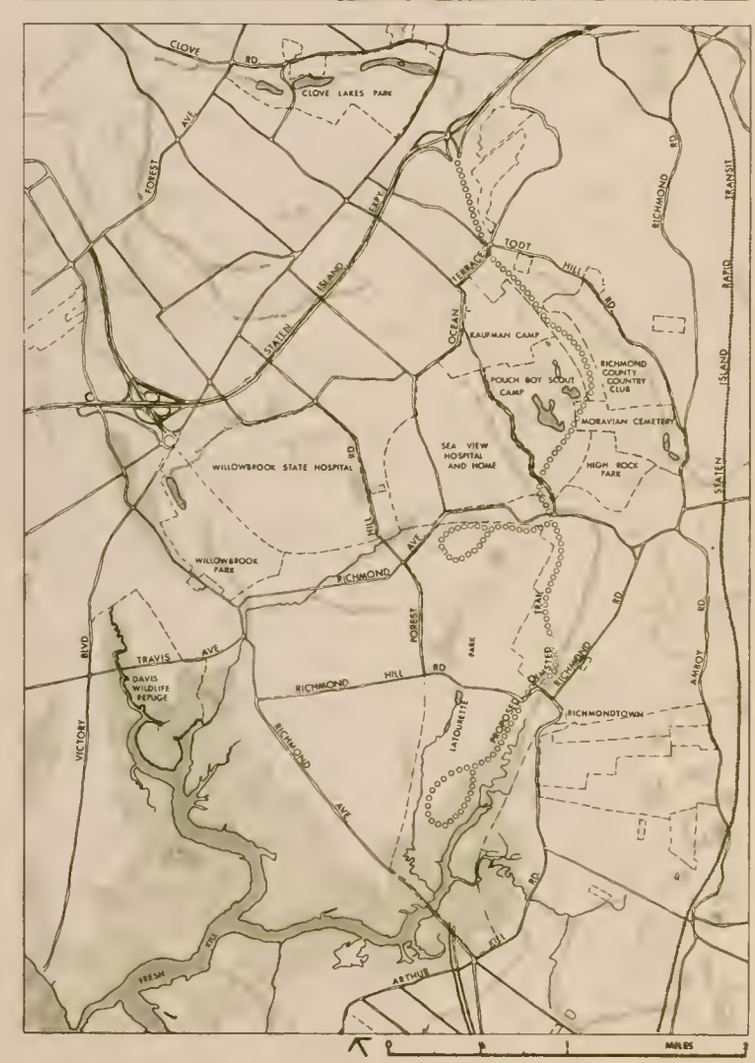
SURFACE DRAINAGE

Highway construction has an adverse effect upon natural surface drainage with the highway acting either as a dam or a drain. In addition, the more dense the natural drainage network the greater the cost of construction for bridges, culverts, drainage and other works.

ZONE 1: Those surface water features, streams, lakes, and ponds, which represent a major obstruction to the highway construction.

ZONE 2: Natural drainage channels and areas of constricted drainage, obstructive to highway construction necessitating construction of culverts and other works. The dense network of these in the south-eastern part of the study area is characteristic of the terminal moraine in this glaciated area.

ZONE 3: Absence of surface water or pronounced drainage channels represents the least obstruction to the highway.



Source: Borough of Richmond Topographic Survey, June 1912.

BEDROCK FOUNDATION

Foundations constitute an important component of cost in highway construction. Geological formations can be ranked in terms of compressive strength from maximum to minimum – crystalline rock, sedimentary rock, gravel, sand, muck. The poorer the foundation conditions normally the higher will be construction and thus social costs.

ZONE 1: Areas identified as Marshlands on geology maps are the most obstructive to the highway as these have an extremely low compressive strength. Even where these have been filled the foundation conditions remain very poor. The cost of preparing a firm roadbed in these areas is inordinately high.

ZONE 2: The Cretaceous sediments (sands, clays, and gravels) in the south-eastern part of the study area and the band of shale along the Willowbrook expressway provide fairly adequate foundation conditions for the highway.

ZONE 3: The most suitable foundation conditions are available on crystalline rocks (Serpentine and Diabase) which have the highest compressive strength in the area.

Source: New York City Folio, No. 83, U.S.G.S., 1901.

SOIL FOUNDATION

While the compressive strength of rock is a vital consideration, the relative characteristics of soils are also important. Sanitary landfill, hydraulic fill, swamp muck provide the least stable foundations, while gravel and sandy loams provide the best conditions.

ZONE 1: Silts and clays are a major obstruction to the highway as these have poor stability and low compressive strength. In the study area these exist in low lying areas in the form of Alluvium, Swamp Muck, Tidal Marshlands, and Made Land.

ZONE 2: Sandy loams and gravelly sandy to fine sandy loams which exist in small patches at the edge of Tidal Marshlands in the area are of fair quality in terms of stability and compressive strength.

ZONE 3: Gravelly sand or silt loams and gravelly to stony sandy loams which cover most of the study area present the least obstruction to the highway.

Source: Extrapolated from Surficial Geology, New York City Folio, No. 83, U.S.G.S., 1901. (B. Paschall, Soil Scientist, S.C.S.)

SUSCEPTIBILITY TO EROSION

Highway construction causes large areas of bare soil to be affected by erosion with adverse effects upon surface water processes and plant life. Erodible soils are also unsuitable for embankments. Route selection through soils less susceptible to erosion will incur less social costs.

ZONE 1: All slopes in excess of 10% and gravelly sandy to fine sandy loam soils are subject to erosion if disturbed. Therefore, the presence of these in the area represents a major obstruction to the highway.

ZONE 2: Gravelly sand or silt loam soils and areas with slopes in excess of 2 1/2% on gravelly to stony sandy loams are an obstruction to the highway as these are moderately susceptible to erosion.

ZONE 3: Other soils with finer texture and flat topography in the north-western part of the study area offer the least obstruction to the highway.

Source: Extrapolated from Surficial Geology, New York City Folio, No. 83, U.S.G.S., 1901 (B. Paschall, Soil Scientist, S.C.S.) and Borough of Richmond Topographic Survey, June 1912.

SOIL DRAINAGE

The stability of a highway is contingent upon effective drainage. When the alignment transects areas with a high water table or soils with poor drainage this incurs costs for remedial works.

ZONE 1: Salt marshes, brackish marshes, swamps, and other low lying areas with poor drainage represent a major obstruction to the highway as the water table in these areas is very high.

ZONE 2: Intermittent streams; non-urbanized watersheds of perennial streams; the major aquifer in the area, which takes the form of a band northwestward of New Springville, and is essential for the maintenance of the marshes along the Main Creek.

ZONE 3: Aquifers of secondary importance and watersheds of streams which have been urbanized.

Source: Howard W. Higbee, Geopedologist, February 1968.

COMPOSITE-PHYSIOGRAPHIC OBSTRUCTIONS

TIDAL INUNDATION

The area under study is threatened by Tropical and Extra Tropical Storms at the average of one every year. At least 20% of the incident storms are of severe intensity. Major hazard to life and property is represented by the tidal inundation which follows in the wake of these storms. Highways are vulnerable to this hazard.

ZONE 1: The area of highest recorded inundation recorded during Hurricane "Donna", September, 1960.

ZONE 2: The area of Standard Project Hurricane surge within which the probability of flooding is high.

ZONE 3: Areas above flood line.

Source: U.S. Corps of Engineers, Beach Erosion Control Study, May 1965.

LAND VALUES

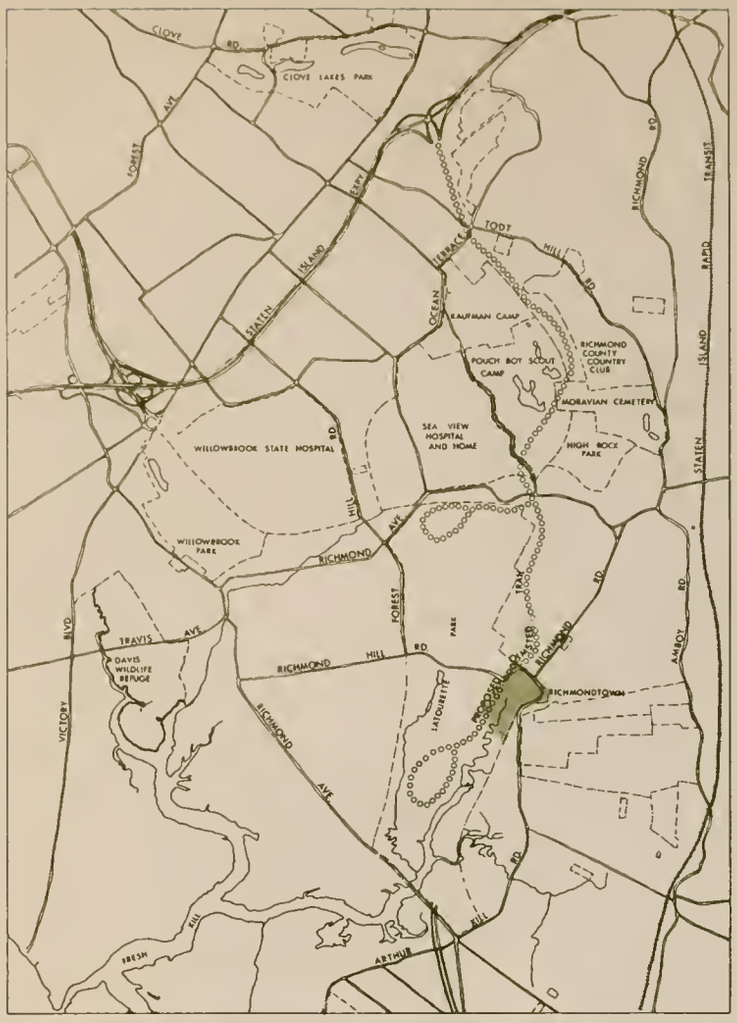
The higher the land value the higher the highway cost. Areas of lowest land value provide an opportunity for highways and incur the lowest social costs. In the area land values range from approximately $25,000 for a 60' x 100' lot around Todt Hill to approximately $7-8,000 for a 40' x 100' lot south of Arthur Kill Road. This represents a range of land values from $2.00 to $4.15 per square foot. Commercial properties generally have still higher values. Parkland and institutional lands are attributed a value which represents their value if developed.

ZONE 1: Land having a value of $3.50 a square foot and over; Parklands; Institutional Lands; Commercial Districts along Richmond Avenue and Forest Avenue.

ZONE 2: Land having value in excess of $2.50 a square foot.

ZONE 3: Land having value less than $2.50 a square foot and less.

Source: Barbara J. Martin, Licensed Real Estate Broker, Staten Island



HISTORIC VALUES

Historical landmarks represent social values to a community. It is their existence and study which provides continuity and expression of a cultural tradition. In the study area are several historic buildings and places including an Indian Site on Richmond Creek and the Richmondtown Restoration Village, of regional importance.

ZONE 1: Richmondtown Historic Restoration Area.

ZONE 2: Historic Landmarks -- houses, churches, schools, cemeteries, etc. -- in North Richmondtown, along Richmond Road north of Grant City, along Richmond Avenue in New Springville and other isolated sites.

ZONE 3: Absence of historic sites.

Source: A. U.S.G.S. Maps and Aerial Photos
B. State of New York Department of Conservation, Bulletin No. GW-32, 1953.

WATER VALUES

Water represents a very high value mainly for recreation and as scenic value, although it may in the future be used for domestic and industrial purposes.

ZONE 1: Lakes and ponds -- the group near Ohrbach Lake and the chain of these within the Clove Lakes Park; perennial streams; and existing marshes.

ZONE 2: Areas with fair internal drainage which exist along lower slopes are also characterized by fairly high water table. Thus, these represent a cost to highway construction.

ZONE 3: Areas with good internal soil drainage and low water table are the least obstructive to the highway.

Source: A. Land Marks Preservation Commission, New York City
B. Staten Island Historical Society

FOREST VALUES

The forest resources in the study area have retrogressed significantly, but nonetheless they still remain an important value for Staten Island and New York City.

ZONE 1: Existing forests and marshes of high quality represent the highest value together with the scarce Lowland ecological association, a unique resource.

ZONE 2: All other existing forests and marshes.

ZONE 3: Unforested lands.

Source: A. Photogrammetic Interpretation
B. Field Survey by Dr. A. Reid, Ecologist

WILDLIFE VALUES

The recorded fauna of 40-50 years ago shows a vast array of birds, mammals, reptiles, amphibians and fishes native to Staten Island. The present wildlife population is a mere fraction of that abundant richness, and is fast disappearing as are the unprotected wildlife habitats -- forests, marshes and streams. Habitats can be ranked in terms of environmental quality for distinct groups of species.

ZONE 1: Best quality habitats for water-associated and field and forest species. These are related to high quality forests and marshes, non-urbanized streams, ponds and lakes.

ZONE 2: All remaining areas which provide habitat for water-associated species, and second quality habitat for field and forest species, related to existing forest cover.

ZONE 3: Habitat areas of poor quality.

Source: A. Photogrammetic Interpretation
B. Proceedings of the Staten Island Association of Arts and Sciences and of the Staten Island Institute of Arts and Sciences
C. State of New York Conservation Department, Division of Fish and Game

SCENIC VALUE

Despite undifferentiated urbanization over the past few years, Staten Island still retains a unique diversity of scenic experiences. The ridges of Serpentine Hill dominate the entire New York Harbor, the steep escarpments provide dramatic viewpoints, the valleys offer enclosure and serenity, the hummocks and promontories, characteristic of the terminal moraine run in a wide belt along the south-east and provide a uniquely rich landscape quality. All of these elements exist in the study area.

ZONE 1: Scenic elements including ridges, promontories, escarpments, hummocks and enclosed valleys.

ZONE 2: Non-urbanized areas with high scenic value.

ZONE 3: Urbanized areas with low scenic value.

Source: Field Reconnaissance

RECREATION VALUE

Recreational opportunity is high in Staten Island mainly represented by institutions in the study area. These resources have been ranked in three categories.

ZONE 1: Existing public open space and institutional lands. It includes the Greenbelt and the proposed Olmsted Trail.

ZONE 2: Non-urbanized areas which possess a high recreation potential.

ZONE 3: Area with low recreation potential and urbanized areas.

Source: A. City of New York Land Use Map, 1966
B. Field Reconnaissance

RESIDENTIAL VALUE

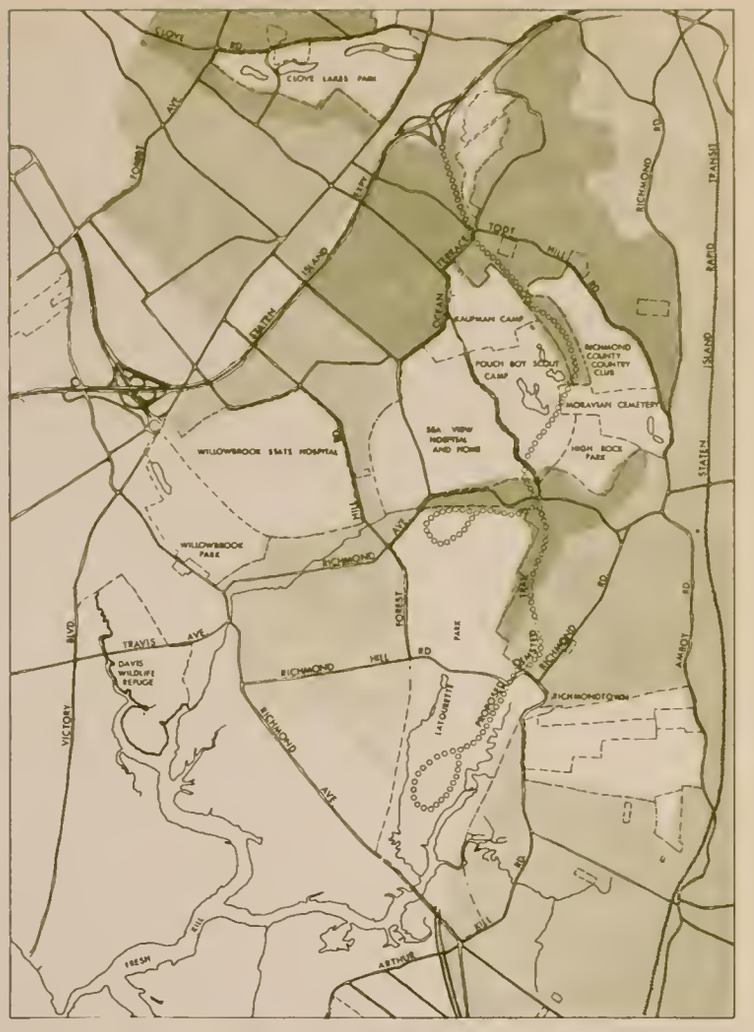
There are areas in every community which have higher value for residence than do others as a result of the presence of natural amenity and certain cultural factors. Fair market value has been used to determine the residential value. In the study area the residential values range from over $100,000 on Todt Hill to less than $20,000 in Travis.

ZONE 1: Residential market value: over $50,000.

ZONE 2: Residential market value: $25,000 — $50,000.

ZONE 3: Residential market value: less than $25,000.

Institutional lands are excluded from consideration of residential values.



Source: Barbara J. Martin, Licensed Real Estate Broker, Staten Island.

INSTITUTIONAL VALUE

Existing institutions can be rated as to their relative value to the community. For example, the Staten Island Community College and the Sea View Hospital and Home are of high value as they serve the region rather than a neighborhood. Parklands too can be rated in terms of quality and their value to the community.

ZONE 1: Richmondtown Historical Restoration area; the upper part of Latourette Park; High Rock Park; Kaufman and Pouch Camp Areas; Clove Lakes; Davis Wildlife Refuge; Sea View Hospital and Home; Willowbrook State Hospital and Staten Island Community College.

ZONE 2: Willowbrook Park; the lower part of Latourette Park; Richmond County Country Golf Club; cemeteries, neighborhood parks and schools.

ZONE 3: All non-institutional land use areas.

Source: New York City Planning Commission, Office of Staten Island Planning

THE COMPOSITE OF ALL SOCIAL VALUES

Each of the social values have now been superimposed. The first group of physiographic factors have been summarized as a composite (page 8). From this, two alternate physiographic corridors are apparent taking the form of a Y beginning at the intersection of Forest Hill and Old Mill Roads. The eastern corridor runs at the base of the Serpentine Hill escarpment, skirting Richmondtown to the north, and encounters the steep escarpment which can be only negotiated at the Richmond County Country Club. The western physiographic corridor is a broad belt paralleling Richmond Avenue to Willowbrook Park.

When the next factor of tidal inundation is examined it is seen to set western limits to the western corridor. Land values are highest in the Greenbelt but relatively low to the west save for the exception of a commercial area on Richmond Avenue. Each subsequent superimposition of social values gives primacy to the Greenbelt from Todt Hill to Latourette Park until the final summation shows the highest concentration of social values and physiographic obstruction concentrated in the eastern sector. If the area of highest social value is clear, so too is that of the lowest value reflected in a broad band in the western physiographic corridor paralleling Richmond Avenue to the southern limit of Willowbrook Park and thence across Richmond Avenue west and parallel to it. The western limits of the zone of lowest social value are established by the Davis Wildlife Refuge, the physiographic constraints offered by the sanitary landfill and marshes along the Main and Richmond Creeks.

In sum, if the values identified and ranked are correct, the composite map on the facing page represents the sum of social values, physiographic opportunities and constraints. **The darker the tone the greater the social cost of highway construction, the lighter the tone the less the social cost.** The Greenbelt looms as the concentration of highest social value and physiographic obstruction; a path of least social cost is visible to the west.

In the following pages the various highway alignments will be examined against the composite map of social values.


CLOVE RD
CLOVE LAKES PARK
FOREST AVE.
EXPY
STATEN ISLAND
OCEAN TERRACE
TODT HILL RD.
RICHMOND RD.
STATEN ISLAND RAPID TRANSIT
KAUFMAN CAMP
POUCH BOY SCOUT CAMP
RICHMOND COUNTY COUNTRY CLUB
MORAVIAN CEMETERY
HIGH ROCK PARK
SEA VIEW HOSPITAL AND HOME
WILLOWBROOK STATE HOSPITAL
HILL RD.
WILLOWBROOK PARK
RICHMOND AVE.
FOREST PARK
TRAIL
OLMSTED
PROPOSED
LATOURETTE
RICHMONDTOWN
AMBOY RD.
TRAVIS AVE.
BLVD
VICTORY
DAVIS WILDLIFE REFUGE
RICHMOND HILL RD.
RICHMOND AVE.
KILL
FRESH
ARTHUR
0
½
1
MILES
2

PROPOSED PARKWAY ROUTE (VOLLMER OSTROWER ALIGNMENT)

This Parkway proposal corridor selects the area of the highest social values in all categories and would therefore represent the maximum social cost. It would destroy important institutional, scenic, recreation and wildlife resources -- glacial ponds, high quality forests and ecological diversity. Dramatic physiographic features would be obliterated. In addition to all of these losses, the intrusion of noise, dust, hydrocarbons, lead and carbon monoxide would constitute further offense to man, plants and animals alike.

LOCKWOOD, KESSLER & BARTLETT ALIGNMENT NO. 3

This alternative also selects the areas of highest social value and would therefore incur high social cost. It is an improvement over the Parkway to the extent that it saves the destruction of upper Latourette Park and the Lake Ohrbach scenic ridges but this is accomplished at the expense of Seaview Hospital and Home and the Kaufman Camp. The integrity of these institutions would be seriously impaired.

LOCKWOOD, KESSLER & BARTLETT ALIGNMENT NO. 4

As social values are at a maximum to the east, in the area of the Greenbelt, any corridor west of this will produce less social costs. Consequently route #4 represents a dramatic reduction in social costs. Its alignment represents the eastern limit of the least social cost corridor between Forest Hill and Old Mill Roads and the southern boundary of Willowbrook Park. North of this point route #4 enters areas of high social value represented by major institutions, land and recreational value and minor forest, wildlife, scenic and water values. It closely corresponds to the least social cost area for much of its length.

LOCKWOOD, KESSLER & BARTLETT ALIGNMENT NO. 5

Corridors 4 and 5 share a common section to the north and it is this area which departs to the east of the least social cost corridor. Where 4 and 5 are separate, the latter runs along the western limit of the least social cost area as route 4 limits the eastern boundary. There is little basis for making any distinction as to the relative merits of these alternatives at this scale of examination. The important decision is the location of the least social cost corridor within which the most propitious alignment can be selected.

SUMMARY EVALUATION

The method is explicit in the identification and ranking of physiographic opportunities and limitations to a highway corridor. It is equally explicit as to social values. As can be seen clearly the maximum concurrence of physiographic limitations and social values exists as a solid mass in the middle of the study area. This is the Staten Island Greenbelt. The presence and concurrence of these values is seen as a resistance to highway transection, their paucity as an opportunity. When the proposed alignments are examined in these terms, it is seen that the Vollmer Ostrower Alignment would violate the highest social values and will incur the highest social costs. Route #3 is as culpable, whereas route 4 and 5 in large part conform to the least social cost corridor. A propitious alignment can be found within the area defined by routes 4 and 5 in their lower section, but to the north, the least social cost corridor follows in a band to the west of the shared 4 and 5 alignments. It is in this sector, between Richmond Avenue and the Davis Wildlife Refuge that the least social cost alignment should proceed.

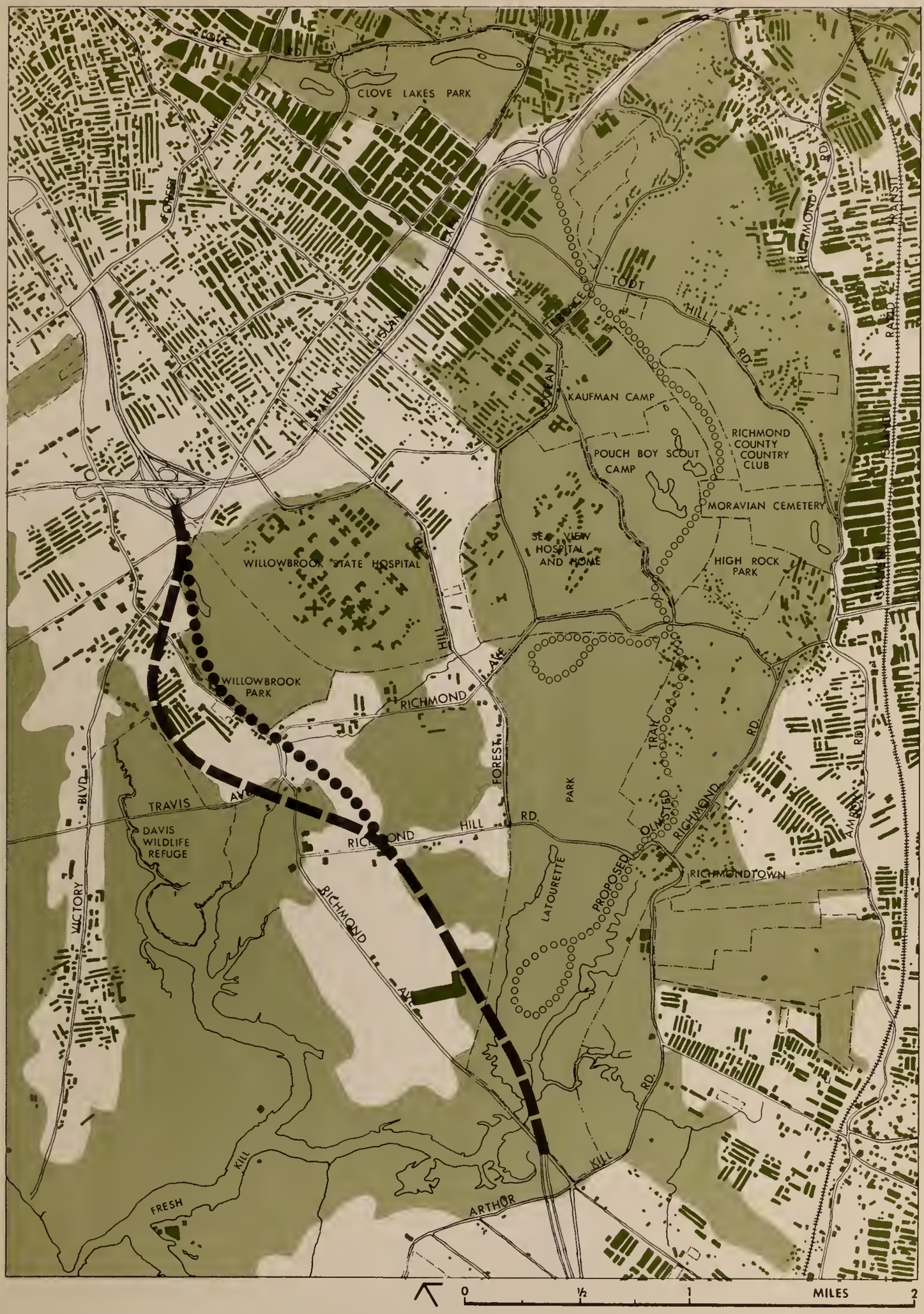

CLOVE RD
FOREST AVE
EXPY
STATEN ISLAND
OCEAN TERRACE
TODT HILL RD
RICHMOND RD
RICHMOND TRANSIT RAPID
STATEN ISLAND
RICHMOND COUNTY COUNTRY CLUB
SEA VIEW HOSPITAL AND HOME
HIGH ROCK
WILLOWBROOK STATE HOSPITAL
WILLOWBROOK PARK
NO. 5
NO. 4
NO. 3
FOREST
PROPOSED PARKWAY
TRAIL
OLMSTED
RICHMOND HILL RD
RICHMOND AVE
RICHMONDTOWN
AMBOY RD
VICTORY BLVD
TRAVIS AVE
LATOURETTE PARK
KILL
FRESH KILL
ARTHUR KILL
0
½
1
MILES
2

MINIMUM SOCIAL COST ALIGNMENT

The area free from color tone on the facing map is the area of least social cost within which is revealed the least social cost corridor. Existing structures are superimposed on the map and the location of the two alternative minimum social cost alignments can be seen as a response to these local social values.

The least social cost alignment is identical to route 4 for half of its length, but in the northern section can proceed in one of two alternate paths. One of these bounds the Davis Wildlife Refuge, the other parallels Richmond Avenue, and bounds Willowbrook Park to the east.

The photograph shows the recommended corridor. It presents an opportunity to rehabilitate this landscape and create a new scenic experience, to provide new social values while resisting the temptation to destroy existing previous resources.


CLOVE LAKES PARK
KAUFMAN CAMP
POUCH BOY SCOUT CAMP
RICHMOND COUNTY COUNTRY CLUB
MORAVIAN CEMETERY
HIGH ROCK PARK
WILLOWBROOK STATE HOSPITAL
WILLOWBROOK PARK
DAVIS WILDLIFE REFUGE
RICHMONDTOWN
PROPOSED OLMSTED PARK
LATOURETTE
RICHMOND HILL RD.
TRAVIS AVE.
VICTORY BLVD.
FRESH KILL
ARTHUR KILL
0
½
1
MILES
2

This modest study cannot accomplish all of the remedies necessary to ensure that the highway route selection process is responsive, not only to traffic and engineering factors, but also to social values held by the community. It has been undertaken in too brief a period and at too gross a scale to be responsive to the particular opportunities which the landscape provides the sensitive designer. It is a broad brush evaluation concerned with magnitudes rather than particularities. Nonetheless, with all of its limitations, it does make social values explicit and from this hierarchy it does clearly reveal the corridor of least social cost.

The study was commissioned by the New York City Department of Parks, who wish to express their gratitude to the Kaplan Fund for the generous support which made this study possible.

The project was conducted under the direction of Ian L. McHarg and was performed by Mr. Narendra Juneja, assisted by Messrs. Charles R. Meyers, Jr. and Derik F. Sutphin of

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Grateful acknowledgement is made to the sources listed in the report and to Mr. George Pratt and his staff at the Staten Island Institute of Arts and Sciences for providing information.

The photographs on the front and back cover (Lockwood, Kessler & Bartlett, Inc., New York) and page 20 (Thomas Airways, New York) were provided by the City of New York Department of City Planning, Office of Staten Island Planning.

May, 1968

Printed by the Speed Copy Co., Philadelphia, Pa.