

5454

Form 504
Rev. Dec. 1933
DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
R. S. PATTON, Director

DESCRIPTIVE REPORT

Air Photo
Topographic
~~Hydrographic~~

Sheet No. 5454

State New York

LOCALITY

New York City

Lower Manhattan

1936

CHIEF OF PARTY

J. C. Partington- Jr. H & G. B.

U. S. GOVERNMENT PRINTING OFFICE: 1934

5454

Applied to Chart 745 - June 1, 1937

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY

REG. NO. T 5454

TOPOGRAPHIC TITLE SHEET

The Topographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. 88 & 89

T5454

REGISTER NO. T 5454

State New York

General locality New York City

Locality Lower Manhattan

Scale 1:5000 Date of survey photographs Nov. 25, 1934 & March 27, 1935

~~Vessel~~ Aerial Photo Compilation Party # 25

Chief of party J. C. Partington

Surveyed by See Statistic Sheet of this Report-- Page 2

Inked by " " " " " " " "

Heights in feet above ---- to ground to tops of trees

Contour, Approximate contour, Form line interval ---- feet

Instructions dated March 14, 1934

Remarks:

STATISTICS

(9)

on

AIR PHOTO TOPOGRAPHIC SHEET, REGISTER NO. T-5454

PHOTOGRAPH NO.	DATE	TIME	TIDE			
			High Time	Ht.	Low Time	Ht.
105-113 (870 N-8)	Nov. 25, 1934	1:07 to 1:12 PM	10:54 AM 11:47 PM	4.3 3.5	4:42 AM 5:29 PM	0.3 0.0
126-127 (870 N-8)	Mar. 27, 1935	11:27 AM	0:41 AM 1:08 PM	4.5 3.5	7:34 AM 7:01 PM	0.5 0.6
427-431 (876 B-8)	Mar. 27, 1935	11:20 AM	1:16 AM 1:43 PM	4.2 3.2	8:09 AM 7:35 PM	0.5 0.6
435-437 (876 B-8)	Mar. 27, 1935	11:55 AM	1:16 AM 1:43 PM	4.2 3.2	8:09 AM 7:35 PM	0.5 0.6

2 photographs (no numbers or dates)

	By	Date	
		From	To
SCALE FACTOR (1.000)	R.C. Bolstad	(Previously determined)	
PROJECTION	W.E. Hackett ✓	12-	5-34
PROJECTION CHECKED	W.D. Ayers	12-	5-34
CONTROL PLOTTED	J.P.O'Donnell	5-	14-35
	F.R. Reynolds	5-	31-35
CONTROL CHECKED	J.G. Albert	5-	15-35
	F.R. Reynolds	5-	31-35
SMOOTH RADIAL LINE PLOT	J.B. Moreland	(not completed)	
	J.C. Partington	4- 1-36	4-18-36
RADIAL LINE PLOT CHECKED	R.S. Poor	As detail was traced	
DETAIL INKED	R.S. Poor	8-26-36	10-31-36
PRELIMINARY REVIEW OF SHEET	J.C. Partington	11-	2-36
	J.C. Partington	11-	3-36
AREA OF DETAIL INKED (land area)	5.75	Square Statute Miles	
AREA OF DETAIL INKED (shoals)	0.00	Square Statute Miles	

LENGTH OF SHORELINE (more than 200 m. from opposite shore) 34.0 Statute Miles
 LENGTH OF SHORELINE (rivers & sloughs less than 200 m. wide) 0.0 " "
 LENGTH OF STREETS, ROADS, RAILROADS, TRAILS 195.3 " "

GENERAL LOCATION New York CityLOCATION ManhattanDATUM North American 1927

STATION Park Row Building Latitude 40° 42' 40.516" = 1249.8 m. ✓
 New York System Plane Coord. Longitude 74 00 29.393 = 689.9 m. ✓
 Long Island Zone.

X = 1,997,736.40 ft
 Y = 176,964.34 ft

(Adjusted computations)

(2)

COMPILER'S REPORT

for

AIR PHOTO TOPOGRAPHIC SHEET, FIELD NO. 88 & 89, REGISTER NO. T-5458 & ~~T-5457~~

GENERAL INFORMATION

The Air-photo Field Inspection Report for Metropolitan New York attached to the descriptive report of AIR-PHOTO TOPOGRAPHIC SHEET, Field No. 90, Register No. T-5458, furnished the necessary information for the compilation of this sheet.

This sheet has been compiled from single lens photographs numbers 106 to 115 (870 N-8) taken on Nov. 25, 1934 at 1:07 to 1:15 P.M. at approximately two hours and 15 minutes after high water. Photographs numbers 126 to 127 (870 N-8) were taken on March 27, 1935 at 11:27 A.M. at approximately two hours and 40 minutes before high water. Photographs numbers 427-431 (876 B-8) were taken on March 27, 1935 at 11:20 A.M. at approximately two hours and 20 minutes before high water. Photographs numbers 432-437 (876 B-8) were taken on March 27, 1935 at approximately one hour and 50 minutes before high water. Photographs numbers 457 to 458 (876 B-8) were taken on March 27, 1935 at 10:30 A.M. at approximately one hour and 50 minutes after low water. One photograph having no number or date was also used in compiling this sheet to fill in the gap between photographs number 437 and 457.

The photographs were taken by the U.S. Army Air Corps at Mitchell Field, L.I., N.Y. with a special camera recently developed by the Fairchild Camera Corporation, 62-10 Woodside Ave., Woodside, New York City. Due to the fact that these photographs were among the first to be taken by this camera, Mechanical troubles were encountered which caused considerable trouble at first. This probably accounts for the irregular time interval between exposures which in turn affects the overlap. This is also probably the cause of excessive tilt on some pictures. The camera is known as the "K-7C" by the Army and as the "K-7A" by the Fairchild Corporation.

The Army plane was piloted by Lieut. Cullen at an altitude very close to 15,000 feet; the photographer was Sergeant Cates. A 24 inch cone (focal length 24") was used with this camera, producing the negatives on a scale of 1:7,500. Contact prints were furnished the field party for use in field inspection. The original negatives were used in the Washington office of the U.S. Coast and Geodetic Survey for enlarging a set of office prints on a scale of 1:5,000. The 1:5,000 prints were furnished the field party and were used in compiling this sheet.

CONTROL

(a) Sources.

Control for the compilation of this sheet was obtained from the following sources:

1. Triangulation, 1930-33 by R.W. Woodworth (Adjusted).
2. Triangulation, 1903-08, Greater New York.
3. Triangulation, 1932 by C.D. Meaney.
4. U.S. Engineers stations as described on Form 524 submitted with this report.
5. Triangulation, 1887, or 1899 (Chief of Party not known.)

(b) Errors.

Triangulation Station Manhattan, Edison Gas & Electric Co, North Twin Stack, 1932 as listed in the Geographic Positions of New York is in error ten seconds in longitude. The correct longitude is 73 58 24.200 instead of 73 58 34.800. This was proved by computing the position from the published azimuths from other stations.
Referred to Division of Geodesy. B.G.S.

The only error found in the position of the U. S. Engineers stations was "F. P. New York side Brooklyn Bridge". The coordinates of this flagpole are given by the U. S. Engineers as follows:

S 27475.5 Ft.	Origin is U. S. C & G. S. Station
W 11552.1 Ft.	Memorial Church.

The geographic position of this station as computed from the above co-ordinates is

Latitude	40 42 25.651	- 791.2M)	N. A. 1927 Datum.
Longitude	73 59 55.786	- 1309.0M)	

The above position differs from the radial plot by 7.4 meters in azimuth 240 degrees from north. The position of this flagpole as determined by the radial plot is shown on the sheet by a 2 1/2 mm. circle. It should be mentioned that the flagpole on the other side of the Brooklyn Bridge also was in error by approximately the same amount and in the same direction.

All other U. S. Engineers stations were found to agree with the radial plot by an amount of not more than 1.0 meters. All of the U. S. Engineers stations are shown by a 2 1/2 mm circle and are described on form 524. Other recoverable objects are shown by the same 2 1/2 mm circle but are not described on form 524.

Some of the U. S. Engineers stations which were found by the field inspection party are not shown on this compilation because they are not permanently marked. An effort has been made to show the most permanently marked stations at intervals of about one half mile along the waterfront.

COMPILATION(a) Method

The usual radial line plot was used for the compilation of this sheet.

The photographs appear to have little scale fluctuation and generally no great amount of tilt. In some cases the radials are drawn from the plumb point or the isocenter where this point differed considerably from the principal point. In cases where the radials are drawn from the isocenter the control points and radial points were dropped down to ground level before the radials were drawn. *

Most of the radial points along the waterfront are strongly established except in the vicinity of latitude 40 44 30, longitude 74 00 30, where there is insufficient overlap between photos 112 and 113, and in the vicinity of latitude 40 44 00, longitude 73 58 30 where there is no overlap between photos 437 and 457. In the latter area the radial points along the waterfront are strengthened by drawing radial lines from photos 476, 477 and 478 on Sheet T 5459.

© F.P. N.Y. Side Brooklyn Bridge, N.Y.E. is not described.

The weakness of the plot in the section at Lat $40^{\circ}44'$ Long $73^{\circ}58'30''$ is due to a break in the flight line and consequent lack of overlap

The accuracy of the plot in this area is accepted as adequate for charting in view of the check with U.S. Engineers Stations

The plot can be strengthened and corrected at any time that a short flight of 3 or 4 photographs with standard overlap are available

Method (cont.)

The centerlines of the following streets were tied in by field measurements to existing triangulation.

Second Ave.
Fifth Ave.

The U. S. Engineers stations were used as supplementary control and their positions accepted only after it was found that they agreed with the radial line plot.

Adjustment of Plot.

There were no unusual adjustments made in running this radial plot.

Due to the extremely weak radial plot in the vicinity of latitude 40 44 00 and longitude 73 58 30, there is considerable doubt as to the accuracy along the wharves in this area and as to the correct azimuth of 20th st and those streets directly to the south for about ten blocks. It is believed that the maximum error in this vicinity would be about 3 or 4 meters. The radial plot in this section was rerun several times and it was possible to get two locations for each point about 4 meters apart. Co-ordinates of U. S. E. stations at 20th and 24th sts docks were computed since these station were in the vicinity and the detail shown checks in fairly well with the computed positions. These stations are not shown on the compilations as they are not of a permanent nature. Also when a U. S. Engineers map scale 1:5000 was placed under the compilation it checks fairly well with the detail. However, neither of these checks actually proves whether or not the compilation is correct. It would have been particularly helpful had more streets had been tied in by measurement to the triangulation and it would have greatly increased the accuracy especially in those places the radial plot was weak.

The junction between this sheet and adjoiningⁱⁿ sheets is satisfactory.

Interpretation.

No attempt has been made to show the street railway systems. Only railroad tracks and elevated tracks have been shown.

The double full line is used to show first class roads and streets (curb to curb), and the double dashed line is used to show second class roads, poor motor road and walks in park areas.

All building along the waterfront have been shown, also municipal and government buildings in the interior. The stereoscope was freely used in interpreting the shapes of the buildings.

The usual graphic symbols were used and no difficulty was experienced in interpreting the photographic detail.

Information from other Sources.

In the vicinity of Williamsburg Bridge, A Working Computation Drawing of the streets by the Dept. of Public Works was obtained and the distances to the centerlines of these streets check in very well with those shown on this compilation.

Note The Bridge clearances shown on
Page 5 and Page 6 have been corrected
in need to agree with the U.S.E. hat of 1935.
The lower Engineers value is for extreme
conditions of load and temperature
The lower Engineer values are shown
on this compilation

B.G.F.

Names

A list of the geographic names shown on this sheet are given on Form M 234 included in this report.

Street names may be taken from Map of the City of New York, Board of Estimate and Apportionment.

LIST OF RECOVERABLE OBJECTS*

Ten

Twelve cards Form 524 are included with this report which describe the U. S. Engineers stations shown on this sheet.

The following stations were located by the radial plot for use as recoverable objects. They are not described.

NAME	LATITUDE	LONGITUDE	METHOD OF DETERMINATION
F. P. N. Y. side Williamsburg Bridge U. S. E.	40 42 1587.0m	73 58 726.5m	Comp. from Co-ods Checked Radial plot.
F. P. N. Y. side Manhattan Bridge U. S. E.	40 42 968.5m	73 59 724.5m	Radial Plot
F. P. N. Y. side Brooklyn Bridge U. S. E.	40 42 795.0m	73 59 1303.0M	Radial Plot
Siren	40 42 58.5M	74 00 1206.0m	Radial Plot
Standard Oil Bldg Twr.	40 42 584.5m	74 00 1129.0m	Radial Plot
Weather Signal Mast	40 42 601.5 m	74 00 1389.5m	Radial Plot
East Fog Bell	40 42 16.5m	74 00 951.5m	Spotted from field note
West Fog Bell	40 42 03.5m	74 00 1044.0m	" " " "

The two fog bells shown here are for charting purposes and since the radial plot was very strong in this vicinity it is believed that their accuracy is comparable to those located by the radial plot. No information was found in the Coast Pilot regarding these bells.

All of these objects are shown with a $2\frac{1}{2}$ mm circle.

BRIDGES

The information shown on the overlay was obtained from the Coast Pilot and from the List of Bridges, U. S. E. In regard to the Vertical Clearance there are several discrepancies between Chart 745, the Coast Pilot and List of Bridges, U. S. E. *See opposite page.*

Williamsburg Bridge.

Vertical Clearance	132 Ft above M. H. W.	Chart 745
	139 Ft " "	Coast Pilot
135.6 } 138.5 }	139 143 Ft " "	U. S. E.

Manhattan Bridge

Vertical Clearance	132 Ft. above M. H. W.	Chart 745
	135 Ft " "	Coast Pilot
133.9 } 140.1 }	135 139 Ft " "	U. S. E.

* Copy of this compilation referred to
Inspector N.Y. Field Sta. Compilation
to be corrected as indicated by his field inspection:

Information from Inspector N.Y. Field Sta.
as follows:

Note: With further reference to the charted detail mentioned on the opposite page:

The wreck south of Corlears Hook Park though not visible on the photos is not disproved. The other wreck is covered by chart letter 311, 1935

The inspector New York Field Station has furnished blueprints of the Department of Docks showing changes in the piers mentioned in next to last paragraph on the opposite page and these corrections have been applied to the compilation. The Blueprints are filed with the celluloid T 5454

B. G. Jones
2/19/36

Brooklyn Bridge

Vertical Clearance 128 Ft above M. H. W. Chart 745
131.5 Ft " " Coast Pilot
127.2 } 135 139 Ft " " U. S. E.
131.8 }

JUNCTIONS

All junctions satisfactory.

COMPARISON WITH OTHER SURVEYS

No comparison between this sheet and other surveys has been made due to the fact that no other surveys of this area are on hand at this office.

COMPARISON WITH CHARTS

The only chart available for a comparison is No 745 dated Jan. 23, 1935, scale 1:10,000. No attempt has been made to compare this compilation with the chart by actual measurement as it can be done in Washington Office much more satisfactorily by changing the scale of the compilation.

~~The~~ The landmark "Radio" was not found by the Field Inspection Party as designated on the chart. No trace of a tower or mast was in this vicinity nor could any information regarding a radio mast in this vicinity be gathered. Should be deleted from the Chart. ~~See opposite page~~

~~The~~ The position of landmark "Siren" evidently has been changed. The only siren in the vicinity is now located on the west side of a ferry lift as shown which is quite different than that shown on the chart. The position should be changed on the chart to agree with that on the compilation.

~~The~~ The wreck shown on the chart west of the N. Y. side of Manhattan Bridge was not spotted by the field inspection party, nor could it be seen on the photos. Hence it is not shown on the compilation. No information is available to ascertain whether it is there or not. The same is true of a wreck south of Corlears Hook Park.

~~See opposite page~~
Buildings along the waterfront are quite different in some places due to the fact that many have been torn down and replaced. Many of the docks on East River are in a dilapidated condition and should be shown with broken lines as they are no longer in use. These are indicated on the overlay.

RECOMMENDATIONS FOR FURTHER SURVEYS

~~Two~~ Two docks on the Hudson River are having sheds built over them and one is supposed to be torn out. These are indicated on the overlay. At the time the photos were taken the work was not completed and it is suggested that measurements of these sheds be taken to bring this section up to date. These correction were not made on the compilation.

~~See opposite page~~
No further survey is recommended at this time.

The probable error of this sheet is approximately 2 meters for positions of well defined objects for charting purposes and not more than 4 meters for other detail, except in area at Lat 40° 44' Long. 73° 58' See page 4 This report.

76350
(6)

6/14/35

gone chart letter 311, 1935

Submitted by

Raymond S. Poor

Raymond S. Poor, Draftsman U. S. C & G. S

REVIEW OF AIR PHOTO COMPILATION T-5454 (1934-35)
Scale 1:5,000

Comparison with Graphic Control Surveys

T-6380 (1934) - This survey (T-6380) covers only the very tip of the present compilation. The two surveys are in good agreement.

Comparison with Previous Topographic Surveys

T- 13 (1837)
T- 16 (1837)
T- 475 (1854-55)
T- 483 (1855)
T- 484 (1855-6)
T- 608 (1857)

The above surveys comprise all the previous topographic surveys of the area covered by the present air photo compilation, T-5454. The latest of these surveys is 1857. Since the shoreline of this area is practically all man made, these earlier surveys are of little value in making a comparison.

Contemporary Hydrographic Surveys - There are no contemporary hydrographic surveys in this area.

Comparison with Chart 745

See page 6 of this descriptive report, T-5454. The detail noted in question on page 6 is being field inspected and proper memoranda will be made opposite page 6 when the information is received from the field.

The compilation shows numerous minor corrections to buildings and piers.

Plane Coordinates

The plane coordinates system of New York State, Long Island Zone as shown was applied on the ruling machine in this office. Ruled by F. G. Erskine. Computations made in the Division of Geodesy and filed at the back of this report. Grid points plotted by *Sleiten* and checked by

General

The compilation and descriptive report are thorough and well executed.

The drafting is very good and the projection accurate. There is sufficient control throughout the plot which is well distributed.

Dec. 21, 1936.

Chas R. Bush for J. G. Jones

REVIEW OF AIR PHOTO COMPILATION NO.

Chief of Party: J. C. Partington

Compiled by: R. S. Poor

Project: H. T. 175

Instructions dated: 3/11/34

- ✓ 1. The charts of this area have been examined and topographic information necessary to bring the charts up to date is shown on this compilation. (Par. 16a, b, c, d, e, g and i; 26; and 64)

Yes

- ✓ 2. Change in position, or non-existence of wharfs, lights, and other topographic detail of particular importance to navigation which affect the chart, is discussed in the descriptive report. (Par. 26; and 66 g, n)

Yes

- ✓ 3. Ground surveys by plane table, sextant, or theodolite have been used to supplement the photographic plot where necessary to obtain complete information, and all such surveys are discussed in the descriptive report. (Par. 65; and 66 X, e) *None*

Yes

- ✓ 4. Blue-prints and maps from other sources which were transmitted by the field party contain sufficient control for their application to the charts. (Par. 28)

No blue prints or maps from other sources transmitted.

- ✓ 5. Differences between this compilation and contemporary plane table and hydrographic surveys have been examined and rectified in the field before forwarding the compilations to the office and are discussed in the descriptive report. *No Contemporary Plane Table or Hydro. Surveys.*

No data available in this office.

- ✓ 6. The control and adjustment of the photo plot are discussed in the descriptive report. Unusual or large adjustments are discussed in detail and limits of the area affected are stated. (Par. 12b; 44; and 66 c, h, i)

Yes

- ✓ 7. High water line on marshy and mangrove coast is clear and adequate for chart compilation. (Par. 16a, 43, and 44)

Yes

NOTE: Strike out paragraphs, words or phrases not applicable and modify those requiring it. Paragraph numbers refer to those in the Topographic Manual. Refer also to the pamphlet "Notes on the Compilation of Planimetric Line Maps from Five Lens Air Photographs."

8. The representation of low water lines, reefs, coral reefs and rocks, and legends pertaining to them is satisfactory. (Par. 36, ~~37~~, ~~38~~, ~~39~~, ~~40~~, ~~41~~)

None shown

9. Recoverable objects have been located and described on Form 524 in accordance with circular 30, 1933, circular letter of March 3, 1933, and circular 31, 1934. (Par. 29, 30, and 57)

Yes

10. A list of landmarks was furnished on Form 567 and instructions in the Director's letter of July 16, 1934, Landmarks for Charts, complied with. (Par. 16d, e; and 60)

Yes

11. All bridges shown on the compilation are accompanied by a note stating whether fixed or draw, clearance, and width of draw if a draw bridge. Additional information of importance to navigation is given in the descriptive report. (Par. 16c)

Yes

12. Geographic names are shown on the overlay tracing. The accepted local usage of new names has been determined and they are listed in the report, together with a general statement as to source of information and a specific statement when advisable. Complete discussion of place names differing from the charts and from the U. S. G. S. Quadrangles is given in the descriptive report, together with reasons for recommendations made. (Par. 64, and 66k)

Yes

13. The geographic datum of the compilation is *N.A. 1927* and the reference station is correctly noted. *N. A. 1927* *Adjusted.*

Yes

14. Junctions with adjoining compilations have been examined and are in agreement. (Par. 66j)

Yes

15. The drafting is satisfactory and particular attention has been given the following:

1. Standard symbols authorized by the Board of Surveys and Maps have been used throughout except as noted in the report. ✓

Yes

2. The degrees and minutes of Latitude and Longitude are correctly marked. ✓

Yes

3. All station points are exactly marked by fine black dots. ✓

4. Closely spaced lines are drawn sharp and clear for printing. ✓
Yes

5. Topographic symbols for similar features are of uniform weight. ✓
Yes

6. All drawing has been retouched where partially rubbed off. ✓
Yes

7. Buildings are drawn with clear straight lines and square corners where such is the case on the ground. ✓
Yes

(Par. 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48) ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

16. No additional surveying is recommended at this time.

See Report.

17. Remarks:

None

18. Examined and approved;

J. C. Partington
Chief of Party

19. Remarks after review in office:

Reviewed in office by: *Chas. R. Bush* *W. J. Jones*

Examained and approved:

C. H. Green
Chief, Section of Field Records

Fred. L. Peacock
Chief, Division of Charts
Section of Field Work.

L. O. Robert
Chief, Section of Field Work
Division of Charts

Arthur E.
Chief, Division of Hydrography
and Topography.

LANDMARKS FOR CHARTS

STRIKE OUT ONE

~~TOP SECRET~~
~~TO BE DELETED~~

~~CONFIDENTIAL~~

COPIES

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I recommend that the following objects which ~~have~~^{have not} been inspected from seaward to determine their value as landmarks, be charted on (*deleted from*) the charts indicated.

The positions given have been checked after listing.

~~J. C. Partington~~

Chief of Party.

[illegible]

This form shall be prepared in accordance with 1934 Field Memorandum, "LANDMARKS FOR CHARTS." The data should be considered for the charts of the area and not by individual field survey sheets. Information under each column heading should be given.

Remarks

Decisions

1	* Borough of Manhattan on local maps	
2		
3		
4		
5		
6		
7		
8	* Battery Park on local maps	
9		
10		
11		
12		
13		A
14		
15	New park under construction	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		

GEOGRAPHIC NAMES

Survey No.

T 5454

Name on Survey

	A	B	C	D	E	F	G	H	K	
	On Chart No. 745	On previous survey No.	On U. S. quadrangle Maps	From local information	Field notes	On local Maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List	
<u>New York City</u>	x			x	*					1
<u>Hudson River</u>	x		✓	x	x					2
<u>East River</u>	x		✓	x	x					3
<u>Williamsburg Bridge</u>	x			x	x					4
<u>Manhattan Bridge</u>	x			x	x					5
<u>Brooklyn Bridge</u>	x			x	x					6
<u>Corlears Hook Park</u>	x			x	x					7
<u>The Battery</u>	x		✓	x	*					8
<u>Chelsea Docks</u>	x									9
<u>Madison Square</u>					x					10
<u>Union Square</u>					x					11
<u>Gramercy Park</u>					x					12
<u>Washington Square</u>					x					13
<u>Tompkins Square</u>					x					14
<u>Roosevelt Park</u>				x						15
<u>H. Fish Park</u>					x					16
<u>W. H. Seward Park</u>					x					17
<u>Columbus Park</u>					x					18
<u>Foley Square</u>					x					19
<u>Bowling Green</u>					x					20
<u>Corlears Hook</u>	✓									21
										22
										23
										24
names approved 11/19/36										25
KTA.										26
										27

PLANE COORDINATES ON LAMBERT PROJECTION

State Long Island Station T.5454 Park Row Building
 $\phi = 40^{\circ} 42' 40.516''$ $\lambda = 74^{\circ} 00' 29.393''$
 Tabular difference of R for $1''$ of $\phi = 101.20117$

R (for min. of ϕ)		24 289 681.34	y' (for min. of ϕ)		172,863.96
Cor. for sec. of ϕ	-	4 100.27	Cor. for sec. of ϕ	+	4,100.27
R		24 285 581.07	y'		176,964.23
			$y'' (=2R \sin^2 \frac{\theta}{2})$	+	.11
θ (for min. of λ)		0.	y		176,964.34
Cor. for sec. of λ	-	19.22543			
θ		0 19.22543	$\frac{\theta}{2}$		0 .
θ''	For machine computation	19.22543		For machine computation	
			$\log \theta''$		1.28387606
$\log \theta''$		1.283 87606	$\csc 2$		9.69897000
S for θ		4.685 57487	S for $\frac{\theta}{2}$		4.685 57487
$\log \sin \theta$	$\sin \theta$		$\log \sin \frac{\theta}{2}$	$\sin \frac{\theta}{2}$	5.668 42093
$\log R$		7.385 34850		$R \sin \frac{\theta}{2}$	
$\log x'$		3.354 79943	$\log \sin^2 \frac{\theta}{2}$	$R \sin^2 \frac{\theta}{2}$	1.33684 186
x'	$R \sin \theta$	- 2 263.60	$\log R$	$2 R \sin^2 \frac{\theta}{2}$	7.385 34850
		2,000,000.00	$\log 2$		0.30103000
x		1,997,736.40	$\log y''$		9.023 02036
					.1054

$$x = 2,000,000.00 + R \sin \theta.$$

$$y = y' + 2R \sin^2 \frac{\theta}{2}.$$

y' = the value of y on the central meridian for the latitude of the station.

S = log of ratio for reducing arc expressed in seconds to sine.

(See log tables.)

R , y' , and θ are given in special tables.

Plane coordinates on Lambert projection

State L. Island Station Park Row Building

$\phi = 40^{\circ} 42' 40''.516$ $\lambda = 74^{\circ} 00' 29''.393$

Tabular difference of R for $1''$ of $\phi = 101.20117$

R (for min. of ϕ)	24,289,681.34	y' (for min. of ϕ)	172,863.96
Cor. for sec. of ϕ	- 4100.27	Cor. for sec. of ϕ	+ 4100.27
R	24,285,581.07	y'	176,964.23
		$y'' (= 2R \sin^2 \frac{\theta}{2})$	+ 0.11
θ (for min. of λ)	0° 0' 00''.00000	y	176,964.34
Cor. for sec. of λ	- 19.22543		
θ	- 19.22543	$\frac{\theta}{2}$	0° 09''.6
θ''	For machine computation		For machine computation
		$\log \theta''$	1.28387606
$\log \theta''$	1.28387606	$\log 2$	9.69897000
S for θ	4.68557487	S for $\frac{\theta}{2}$	4.68557487
$\log \sin \theta$	$\sin \theta$	$\log \sin \frac{\theta}{2}$	5.66842093
$\log R$	7.38534850	$R \sin \frac{\theta}{2}$	
$\log x'$	3.35479943	$\log \sin^2 \frac{\theta}{2}$	1.33684186
x'	$R \sin \theta$	$\log R$	7.38534850
	2,000,000.00	$\log 2$	0.30103000
x	1,997,736.40	$\log y''$	9.02322036

$$x = 2,000,000.00 + R \sin \theta$$

$$y = y' + 2R \sin^2 \frac{\theta}{2}$$

y' = the value of y on the central meridian for the latitude of the station

S = log of ratio for reducing arc expressed in seconds to sine

(see log tables)

R, y' , and θ are given in special tables

Geodetic positions from Lambert coordinates

State Long Island

Station _____

x	1,998,000	$R_b + A$	24,462,545.30
C	2	y	190,000
$x' (= x - C)$	-2000	$R_b + A - y$	24,272,545.30
	3.30103000		
	7.38511532		
tan θ	5.91591468	R	
θ	5.31442513		
	0.18436774	y	190 000
	1.41470755	y''	- .08
$\frac{\theta}{\ell} (= \Delta \lambda)$	25.9841	y'	189,999.92
λ (central mer.)	74° 00'		
$-\Delta \lambda$	- 25.9841	ϕ (by interpolation)	40° 44' 49.3254
λ	74 00 25.9841		

Station _____

x	2,008,000	$R_b + A$	24,462,545.30
C	2	y	190 000
$x' (= x - C)$	+ 8000	$R_b + A - y$	24,272,545.30
	3.90308999		
	7.38511532		
tan θ	6.51797467	R	
θ	5.31442512		
	0.18436774	y	190 000
	2.01676753	y''	- 1.32
$\frac{\theta}{\ell} (= \Delta \lambda)$	103.9364	y'	189,998.68
λ (central mer.)	74° 00'		
$-\Delta \lambda$	+ 1 43.9364	ϕ (by interpolation)	40° 44' 49.3131
λ	73 58 16.0636		

$$\tan \theta = \frac{x - C}{R_b + A - y}$$

$$\Delta \lambda = \frac{\theta}{\ell}$$

$$\lambda = \lambda \text{ (central mer.)} - \Delta \lambda$$

$$R = (R_b + A - y) \sec \theta$$

$$y'' = 2R \sin^2 \frac{\theta}{2}$$

$$y' = y - y''$$

C is constant added to x' in computation of coordinates

R_b is map radius of lowest parallel

A is value of y' for R_b ; in most cases it is zero

ϕ is interpolated from table of y'

State Long Island

Station _____

x	2,003,000	$R_b + A$	24,462,545.30
C	2	y	182,000
$x' (= x - C)$	+ 3 000	$R_b + A - y$	24,280,545.30
	3.47712125		
	7.38525844		
tan θ	6.09186281	R	
θ	5.31442513"		
	0.18436774	y	182,000
	1.59065568	y''	- 0.19
$\frac{\theta}{l} (= \Delta \lambda)$	38.9633	y'	181,999.81
λ (central mer.)	74° 00'		
- $\Delta \lambda$	+ 38.9633	ϕ (by interpolation)	40° 43' 30.2741
λ	73 59 21.0367		

Station _____

x	2,008,000	$R_b + A$	24,462,545.30
C	2	y	174,000
$x' (= x - C)$	+ 8 000	$R_b + A - y$	24,288,545.30
	3.90308999		
	7.38540150		
tan θ	6.51768849	R	
θ	5.31442512"		
	0.18436774	y	174,000
	2.01648135	y''	- 1.32
$\frac{\theta}{l} (= \Delta \lambda)$	103.8679	y'	173,998.68
λ (central mer.)	74° 00'		
- $\Delta \lambda$	+ 1 43.8679	ϕ (by interpolation)	40° 42' 11.2125
λ	73 58 16.1321		

$$\tan \theta = \frac{x - C}{R_b + A - y}$$

$$\Delta \lambda = \frac{\theta}{l}$$

$$\lambda = \lambda \text{ (central mer.)} - \Delta \lambda$$

$$R = (R_b + A - y) \sec \theta$$

$$y'' = 2R \sin^2 \frac{\theta}{2}$$

$$y' = y - y''$$

C is constant added to x' in computation
of coordinates

R_b is map radius of lowest parallel

A is value of y' for R_b ; in most cases it is zero

ϕ is interpolated from table of y'

State Long Island

Station _____

x	1,998,000	$R_b + A$	24,462,545.30
C	2	y	174,000
$x' (= x - C)$	- 2,000	$R_b + A - y$	24,288,545.30
	3.30103000		
	7.38540150		
$\tan \theta$	5.91562850		
	5.31442513		
θ	0.18436774		
	1.41442137		
$\frac{\theta}{\ell} (= \Delta \lambda)$	25.9670		
λ (central mer.)	74° 00'		
- $\Delta \lambda$	- 25.9670	ϕ (by interpolation)	40° 42' 11.2428 ²⁴²⁸
λ	74 00 25.9670		

Station _____

x		$R_b + A$	
C		y	
$x' (= x - C)$		$R_b + A - y$	
$\tan \theta$		R	
θ	{ ° ' "		
	"		
$\frac{\theta}{\ell} (= \Delta \lambda)$		y	
		y''	-
		y'	
λ (central mer.)	° ' "		
- $\Delta \lambda$		ϕ (by interpolation)	° ' "
λ			

$$\tan \theta = \frac{x - C}{R_b + A - y}$$

$$\Delta \lambda = \frac{\theta}{\ell}$$

$$\lambda = \lambda (\text{central mer.}) - \Delta \lambda$$

$$R = (R_b + A - y) \sec \theta$$

$$y'' = 2R \sin^2 \frac{\theta}{2}$$

$$y' = y - y''$$

C is constant added to x' in computation
of coordinates

R_b is map radius of lowest parallel

A is value of y' for R_b ; in most cases it is zero

ϕ is interpolated from table of y'