5759

Form 504
Rev. Dec. 1933

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
R. S. PATTON, DIRECTOR

DESCRIPTIVE REPORT

Air Photographic

Topographic | *Sheet No.* T- 5759
~~*Hydrographic*~~ |

State Maryland-Virginia

LOCALITY

Potomac River
Gunston Cove
~~Mark Boiwair~~ and Vicinity

Air photographs taken:

*193*7-8

CHIEF OF PARTY

T.M.Price Jr., Field Records Section

U.S. GOVERNMENT PRINTING OFFICE: 1934

Applied to Chart No. 560 July 24, 1941 g.H.S.

Form 537a
Ed. Nov., 1929

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO.

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. .....

REGISTER NO. T-5759 T5759

State Maryland-Virginia

General locality Potomac River

Locality Gunston Cove and Vicinity

Scale 1:10,000 Date of photos July 6, 1937 June 29, 1938, 19....

Vessel .....

Chief of Party T.M.Price Jr., Section of Field Records

Surveyed by .....

Inked by .....

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

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

Instructions dated ....., 19....

Remarks: Compiled on scale 1:10,000. Scale factor 1.00

Refer to next page for additional data

GPO

DATA RECORD T-5759

PHOTOGRAPHS

Nos.	Date	Time	Scale (approx.)	Altitude (Approx.)	Tide
2081-3	June 29, 1938	12:05 P.M.	1:10,000	6,900 ft.	Low
2088-9	"	12:20 P.M.	"	"	"
1715-8	July 8, 1937	4:00 P.M.	"	"	"

Camera: U. S. Coast & Geodetic Survey nine lens, F 8-1/4 in.
Negatives on file Washington Office

Stage of tide from field examination of photographs. Mean range from tables: 2.2 ft.

~~Stage of tide from field examination of photographs.~~ Spring range from tables: 2.5 ft.

SUPPLEMENTAL SURVEYS

Field Inspection by: T. M. Price, Jr., Nov. - Dec. 1938

The details on T-5759 are of the date of the photographs except for items which were located by supplemental surveys as discussed in detail on pages 5 and 6 following.

Chief of Party: T. M. Price, Jr., Section of Field Records,
Projection by: Ruling machine, December 7, 1938
Proj. Checked: Washington Office, December 7, 1938
Control plotted by: J. W. Giberman, December 9-10, 1938
Control Checked by: L. A. McGann, December 12, 1938
Radial Plot by: L. A. McGann, Dec. 14-19, 1938
Compiled by: L. A. McGann, Dec. 1938 - Feb. 1939
Smooth drafted by: C. R. Wittman - March-April, 1939

Reference Station: Duck, 1928. Datum N.A. 1927
Lat. 38-39-01.267 (39.1 meters)
Adjusted
Long. 77-06-47.210 (1141.6 meters)

Title: Maryland-Virginia
Potomac River
Gunston Cove and Vicinity

State Plane Coordinate System

Virginia (North)	Maryland
X = 2,396,069.6	X = 767,695.2
Y = 361,210.9	Y = 297,557.9

DESCRIPTIVE REPORT AND REVIEW FOR AIR PHOTOGRAPHIC SURVEY T-5759

GENERAL INFORMATION

Both the office and field surveys were executed by members of the Field Records Section of the Washington Office.

The Map Drawings were compiled by standard radial plot methods using nine lens photographs without templates.

The drafting was first done roughly on celluloid. The smooth drafting was then done on a blue line copy on bristol board. General information about the project as a whole is contained in the Seasons Report.

CONTROL

Triangulation: U.S.C.& G.S., from 1902 to 1934.
Traverse: U.S.G.S. in cooperation with Army, 1920 (position and description in U.S.G.S. Bulletin No. 709.

Recoverable stations of less than 3rd order accuracy: Radial plot locations of tidal B.Ms. at Marshall Hall. Descriptions available in Div. of Tides and Currents.

R.M.1, McLane, 1928 from angle and distance given in description.

Station McLane, 1928, mark was lost but position was recovered closely from R.M. 1. The station was used as control but because the mark is lost, R.M. 1 has been shown on the sheet instead of station.

The following stations, although shown on the sheet, were not looked for in the field and their actual existence at the present time is therefore not known: Middo, 1926, Pohick, 1926, Acco, 1926, Benvenue, 1902 Creek, 1928, Duck, 1928.

Certain 1902 intersection points, such as the numerous ones at Marshall Hall, may be still in existence although not shown on this survey. They have not been included on this survey because they have not been office adjusted, and it is doubtful if they can be accurately identified and recovered.

FIELD INSPECTION AND INTERPRETATION OF PHOTOGRAPHS

Field inspection of control and detail, Nov.-Dec., 1938. All control in the area was located on the photographs except the stations mentioned in the paragraph above. These could not be located easily because of trees and were not essential for the plot. A few stations established by the Army for training purposes exist in the area but are not shown on the sheet and have not been located on the photographs because of doubt as to the accuracy with which they were located.

On this survey all of the Virginia shoreline, except in the upper arms of the creeks was covered by detail field inspection from boat. The Maryland shoreline was inspected by truck, and at intervals only. The interior both on the Maryland and Virginia sides was inspected for detail by covering by truck a net-work of roads throughout the area. The only area of any extent not visited is the Military Reservation used as a rifle range at the head of Gunston Cove. This area which, however, contains little detail of importance and none that would be difficult to interpret.

Notes for locating the control on the photographs and sextant fixes of aids and obstructions are contained in notebooks Nos. 1, 2 and 3, Potomac River Project, Air Photographic Survey Files, Washington Office.

All notes on interpreting the detail of the photographs have been written directly on the field prints.

Discussion of streams in woods, contours, piles, houses and fences for which this survey is not complete is contained in subsequent paragraphs.

MEAN HIGH WATER LINE

The mean high water line is of the date of the photographs. The only exception to this is in the location of small sections of certain minor streams where obscured by woods. The location of these small sections has been taken from previous planetable surveys. (For further information regarding streams see page 687 this report).

The mean high water line can be readily interpreted from the photographs, except in marsh areas. On fast ground the mean high water line is either at the line of vegetation or 1-3 meters outside. The exact location at frequent intervals was sketched on the field photographs by estimation.

No changes in the mean high water line since the dates of the photographs were noted during the field inspection.

The mean high water line in the marsh areas at the heads of Pohick, and Accotink Bay and Dogue Creek is difficult both of interpretation from the photographs and delineation on the map. Furthermore, the M.H.W.L. in the marsh is often an indefinite line in nature.

These areas were given careful study in the field, and notes made directly on the field prints. It should be borne in mind that the photographs were taken at low water.

PLOT AND DRAFTING

Standard method of radial line plot without templates was used. Contol was sufficient for strong plot and no difficulties were experienced.

A Station Boundary Monument No. 54, 1929 could not be held but this was because of difficulty in locating it accurately on the photos.

In detailing it was necessary to employ an abundance of radial points because of the large changes of elevation which occur (river level to 150 ft.) and because it was sometimes necessary to trace beyond the center portion of the picture where displacements become great.

To assist in the selection of radial points and to aid in the adjustment in tracing between radial points, contour lines from previous topographic surveys were temporarily transfered to the celluloid in pencil and were found to be of great help.

The photographs of the 1700 series were slightly dulled by haze but those of the 2000 series were of excellent photographic quality. The forward overlap in the 1700 series was 55-60%, that for the 2000 series was 70-75%. For the stereoscopic identification and delineation of buildings and other small structures which have elevation, an overlap of about 80% with the nine-lens pictures apparently is required, and such overlap would materially facilitate tracing in hilly and developed country such as this.

Except as noted directly on the map drawing under its title, none but standard symbols were used in the drafting.

The detail at Fort Belvoir has been shown complete because this is not a fortified area and several maps, not confidential, already exist which show the same area in detail on a large scale.

BRIDGES

There are no bridges, overhead wires or pipes crossing over navigable waters on this sheet.

INFORMATION FROM OTHER SOURCES

The field inspection was for the dual purpose of interpreting the photographs and of surveying by ground methods changes since the photographs were taken. The detail of T-5759 is derived directly from the photographs and is of the date of the photographs except for the following:

(1) From former planetable surveys:

T-2623 (1902) 1:10,000

Certain portions of upper branches of Accotink Creek and Dogue Creek were hidden by woods on photos and were taken from this survey. There was agreement between the old survey and the new one at each end of the transferred portions.

T-4222 (1926) 1:10,000

Extent of Piles of old Whitestone Point pier could be discerned dimly but not sharply on the photos and were taken from this survey. This applies to the northeast side of the old pier where the piles could not be seen during field inspection, probably because they were submerged at the time.

1/4 mile northwest of station Gunston, 1902, a ruined pier was noted during field inspection, but T-4222 shows the pier extending further offshore. The later was used on the drawing because the outer piles may have been covered at the time of the field inspection.

Lat. 38°41.1', Long. 77°10.3' a ruined pier was noted during field inspection but its exact location could not be obtained on account of ice. Its position has been taken from this survey.

(2) From U. S. Army, Special Military Map, Fort Belvoir, 1:5,000 Revised to 1935.

The trails for about 1/2 mile north and west from the ruined pier at Whitestone Point were taken partly from the photographs and partly from the above source. There was agreement between the above survey and T-5759 at each end of the transferred portions.

(2a.) In July, 1939 there was received from Ft. Belvoir a copy of the above Spec. Mil't. Map showing corrections to roads and buildings to July, 1939. The most important changes to bldgs. + roads as shown on this map since the date of the photos was applied to the negatives of T-5759 in order to be on the completed copy. T.M.P. Aug, 1939.

(3) By Field Inspection Nov.-Dec. 1938. Sextant locations

(a) Large ruined pier 1/2 mile south of station Benvenue, 1902. Checked width by ground measurement. Outer ends of both lines of piles located by sextant 3 pt. fix.

(b) The piles at the entrance to Accotink Bay were located by sextant cuts, or sketched in from nearby piles so located.

COMPARISON WITH CONTEMPORARY SURVEYS

There are no contemporary topographic, graphic control or hydrographic surveys.

COMPARISON WITH PREVIOUS TOPOGRAPHIC SURVEYS

T-875 (1872) 1:20,000
T-947 (1864) 1:15,000
T-948 (1864) 1:15,000

The present survey is adequate to supersede the above surveys for the area covered by the present survey except for contours and property lines.

T-2623 (1902) 1:10,000
T-2700 (1904-5) 1:20,000
T-2638 (1903) 1:10,000
T-4222 (1926) 1:10,000

The present survey is adequate to supersede the above surveys for the area covered by the present survey except for:

(1) Where the above surveys show piers or piles and the present survey shows nothing, it indicates that no piers or piles could be seen either on the photograph or in the field examination. It is possible however that sunken piles still exist at these places (listed below), and sunken piles should be carried until disproved by hydrographic surveys.

(2) Contours

(3) Certain fence lines and property boundaries.

(4) Certain small streams of minor importance and certain intermittent streams. These were obscured by woods on the photos. Where the streams were of

importance, sections which could not be seen on the photographs were transferred from the above surveys as explained elsewhere.

NOTE:

(a) The fence lines extending out into the water as shown in three places on T-4222 are now gone.

(b) The places where piers or piles were shown on the above surveys and not on the present surveys, but junked piles should be carried forward to charts are as follows:

Lat. 38°41.8'	Long. 77°06.2'
38 41.9	77 06.7
~~38 40.8~~	~~77 08.5~~

(c) At Lat. 38°39.5', Long. 77°09.0' the representation of piles on the present survey should supersede that shown on T-4222.

(d) At Lat. 38°40.9', Long. 77°09.3', T-4222 shows 1 pier and 1 line of piles. The vicinity was visited in the field and only one line of piles as shown on the present survey was observed, and it is believed that this representation is adequate to cover present conditions for charting purposes.

COMPARISON WITH EXISTING MAPS OF OTHER ORGANIZATIONS

U. S. Army Special Military Map, Ft. Belvoir and Vicinity (1935) 1:5,000, 3 parts
U. S. Army - U.S.G.S. Terrain Map, Ft. Belvoir and Vicinity (1920) 1:20,000
U. S. A. - U.S.G.S. Quadrangle, Tactical Map, Ft. Humphreys and Vicinity (1924) 1:62,500
U.S.G.S., Indian Head, (Md.-Va.) Quadrangle (1923) 1:62,500

The present survey is adequate to supersede the above surveys in the common area except for contours, fence lines and property boundaries, certain minor and intermittent streams.

COMPARISON WITH CHARTS
Chart 560, 1:40,000, printing 6/3/38

(1) Various streams shown on chart are not on present survey.

and
These are minor streams or intermittents/of little importance and not discernable on photographs because of woods.

(2) In the numerous road differences the present survey should be accepted.

(3) In the numerous differences in houses and buildings, the present survey should be accepted. The present survey is not complete for houses or buildings because many are obscured by trees, but the chart shows many which are no longer in existence and the acceptance of the representation of buildings as on the present survey to supersede all previous surveys is recommended.

(4) Property line and fence lines are superseded by the present survey. The present survey, although not complete in this respect, shows all prominent divisions of this kind.

(5) For additional changes to the chart see attached chart section.

(6) Lat. 38°40.5', Long. 77°07.6', area of sunken piles shown on chart. Only a part of these (the piles which were above water) were seen in the field and shown on the present survey T-5759, but all should be carried forward until disproved by hydrographic surveys.

COMPARISON WITH COAST PILOT

No corrections.

LANDMARKS

Lights and Beacons

Whitestone Point Light, rebuilt 1920 (triangulation station Light, 1926). Comparison made with Light List, 1938. The only disagreement is that the name is spelled White Stone in the list. The bell is referenced on the survey by distance and direction as measured during the field inspection.

Objects

TANK (ELEVATED), aluminum color, at Fort Belvoir (triangulation Station Fort Humphreys, lrg. squat. tank, 1934)

Deletions

None

A list of landmarks on Form 567 will be submitted at one time for the entire project.

RECOVERABLE H. & T. STATIONS

There are no H. & T. stations described on Form 524 on this survey.

A recoverable H. & T. symbol has been used to indicate R. M. 1, McLane, 1928. The triangulation station is lost. R. M. 1 has been indicated on the drawing by using the angles and distances given in the description of station McLane, 1928.

JUNCTIONS

This survey joins with the following air photographic surveys:

T-5757, T-5758, T-5761, T-5760

Final junction has not been completed with any of these surveys at this time, but will be made as the above mentioned sheets are completed.

GEOGRAPHIC NAMES

Geographic names as submitted by the field inspection party with sources areattached on Form M-234 at the end of this report. The list as approved by the Washington Office for use on this survey is also attached.

ACCURACY

The probable error in the position of well defined detail is five meters; for poorly defined detail as dim trails, partly obscured small streams it is 10 meters.

ADDITIONAL WORK

This survey lacks contours; it shows part of, but not all of, the houses, and minor streams; it has indicated all of the piles

visible at M.H.W. but the probable error of such location is 5 meters.

Except for sunken piles, which must be carried forward from previous surveys, the present survey is complete and adequate for chart compilation.

Combined Report and Review by

T. M. Price, Jr., Field Records Section (In charge of Field Inspection and Office compilation, Potomac River)

Inspected by

B. G. Jones

Examined and approved:

T. B. Reed,
Chief, Section of Field Records

K.T. Adams
Chief, Division of Charts.

Fred L. Peacock
Chief, Section of Field Work.

Chief, Division of H. & T.

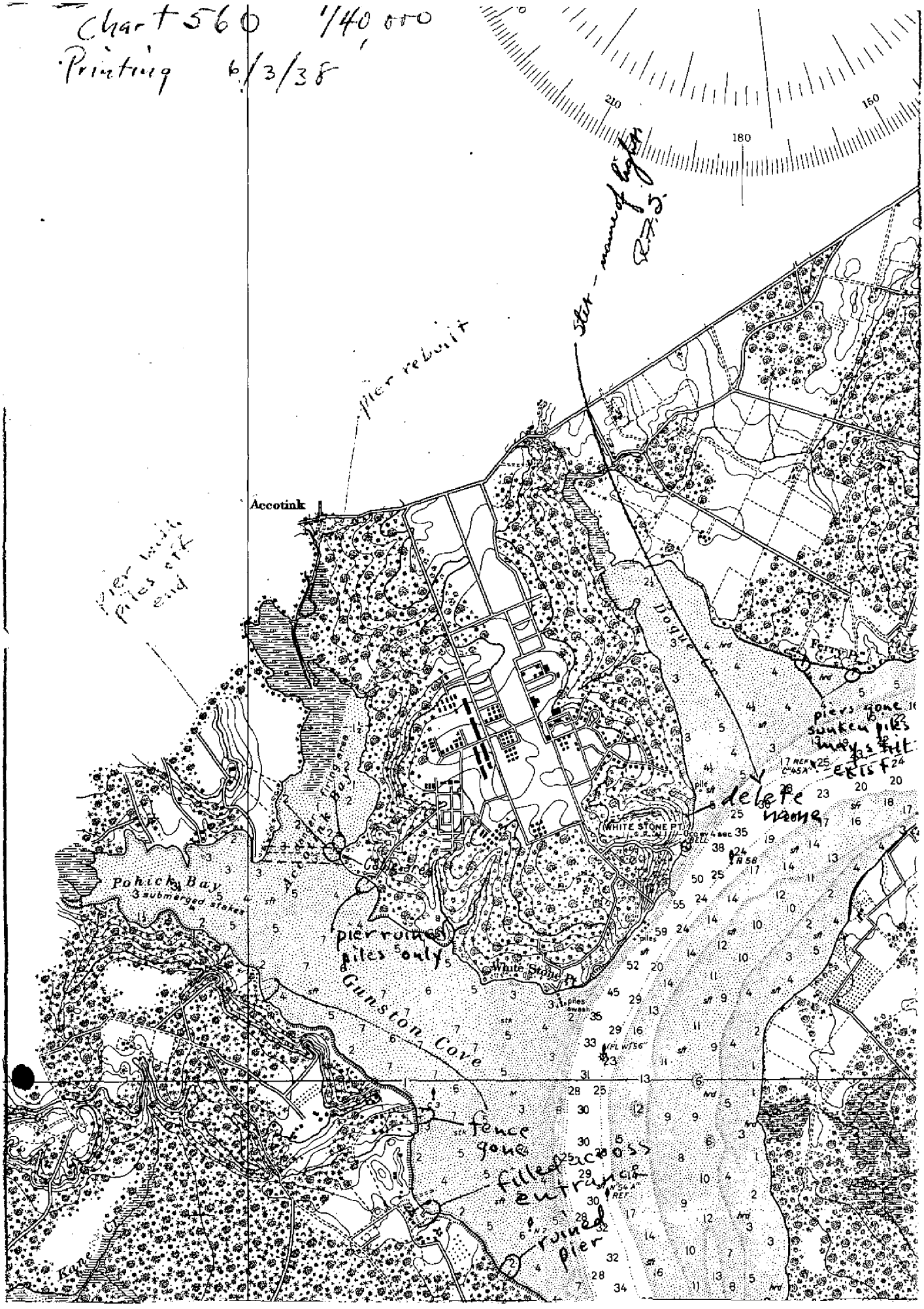
Chart 560 1/40,000
Printing 6/3/38
pier rebuilt
Accotink
pier inside piles still end
Pohick Bay
3 submerged stakes
pier ruins piles only
Gunston Cove
White Stone Pt
WHITE STONE PT
fence gone
filled entrance
ruined pier
Rape
delete name
piers gone sunken piles may still exist

GEOGRAPHIC NAMES

Survey No.

T 5759

Name on Survey	On Chart No. 560 A	On previous survey No. B	On U. S. quadrangle Maps C	From local information D	On local Maps E	P. O. Guide ~~or Map~~ F	Rand McNally Atlas G	U. S. Light List H	USC. Map of Ft. Belvoir & Vicinity K	
✓ Mason Neck		see T-5761								1
✓ Gunston Hall			Gunston Hall School	✓						2
✓ Gunston Cove	✓		✓	✓					✓	3
✓ Pohick Bay	✓		✓						✓	4
✓ Pohick Creek			✓	✓					✓	5
✓ Accotink Bay	✓		✓						✓	6
✓ Accotink Cr			✓						✓	7
✓ Accotink	✓		✓	✓					✓	8
✓ Fort Belvoir			Ft. Humphreys	✓	✓	✓			✓	9
✓ Whitestone Pt.	Whitestone Pt		✓		✓				✓	10
✓ Bureau of Fisheries Station				✓						11
✓ Dogue Cr	✓		✓						✓	12
✓ Ferry Pt.	✓		✓						✓	13
✓ Wood Haven			✓	✓					✓	14
✓ ~~Avon~~ Marshall Hall	✓		✓	✓		✓			✓	15
✓ Greenway Flats	##			✓						16
										17
										18
The above is list as prepared by field inspection party J. M. Pierce Jr.										19
										20
										21
										22
										23
										24
										25
										26
										27

M 234

T-5759

	Remarks	Field Decisions
1		USE
2	On name standard This is well known & very old estate	USE
3	Well recognized name	USE
4	no local check made	USE
5	on name standard on highway sign at bridge on U.S. No. 1	Use
6	no local check made	USE
7	On name standard checks highway sign at bridge	USE
8	checks highway signs The R.F. & P. R.R. Sta. is about 2 mi. N.W.	USE
9	Name changed from Fort Humphreys to Fort Belvoir.	USE
10	One word. On name standard Delete from chart the name by the light	USE
11	for air photo survey only. ~~House~~ and pier near the light	USE
12	~~no~~ no local check made	USE
13	Letter	USE
14	Large estate of historic interest. Woodlawn church nearby	USE
15	Large Amusement Park. Post office is about ½ mi. inshore	USE
16	Large flats named thus by fishermen. Derived from the very old name of Greenway fishing shore	USE
17	Authorities: Judge Wright, Fenwick, Md. W.D. Simmons, Bryans Rd., Md	USE
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		

M 234

GEOGRAPHIC NAMES

Survey No. T5759

Name on Survey	On Chart No. A	On previous survey No. B	On U. S. quadrangle Maps C	From local information D	On local Maps E	P. O. Guide or Map F	Rand McNally Atlas G	U. S. Light List H	K	
Marshall Hall										1
Gunston Cove										2
Mason Neck										3
Gunston Hall										4
Pohick Bay										5
Pohick Creek										6
Accotink Bay										7
Accotink Creek										8
Accotink										9
Fort Belvoir										10
Whitestone Point										11
Dogue Creek										12
Ferry Point										13
Woodlawn										14
Greenway Flats										15
Bureau of Fisheries Station										16 17
Kane Creek	see	T 5761								18
					approved					19
			L. Heck		on 4/21/39					20
										21
										22
										23
										24
										25
										26
										27

M 234

T5759

	Remarks	Decisions
1		386770
2		386771
3		386771
4		386771
5		386771 U S G B.
6		386771 U S G B
7		386771
8		386771
9		387771
10		386771 U S G B
11		386771
12		386771 Greek U S G B
13		386771
14		387771
15		386771
16		386771
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		

M 234

M-350

T-5759

PLANE COORDINATE GRID SYSTEM

Va. North

Positions of grid intersections used for fitting the grid to this compilation were computed by Division of Geodesy and the computation forms are included in this report.

Positions plotted by E. W. Frederick

Positions checked by E. W. Frederick

Grid inked on machine by E. W. Frederick

Intersections inked by E. W. Frederick

Points used for plotting grid:

x = 2,380,000 y = 365,000	x = 2,400,000 y = 395,000
x = 2,400,000 y = 365,000	x y
x = 2,385,000 y = 380,000	x y
x = 2,380,000 y = 395,000	x y

Triangulation stations used for checking grid:

1. Duck, 1928 {X = 2,396,069.6 Y = 361,210.9}
2. Ft. Humphreys large Squat Tank, 1934 {X = 2,387,665.2 Y = 376,625.0}
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

T5759

Plane coordinates on Lambert projection

80
2,375,000
365,000

State Va. Nort. Station

ϕ = 38° 39 41.07 λ = 77° 10 09.06

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,214,198.8	y'			362,245.6
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+	2,754.4
		° ′ ″	y			365,000.0
θ (for min. of λ)						
Cor. for sec. of λ		−				
θ		+ 0 49 50.1112	$\frac{\theta}{2}$			° 24′ 55.0556
θ''	For machine computation	″		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	1.01449596 04	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.0072481706
log R				R sin $\frac{\theta}{2}$		190,004.98
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$		1,377.19
x'	R sin θ	380	log R			
		2,000,000.00	log 2			0.30103000
x		2,380,0000	log y''			

x = 2,000,000.00 + R sin θ

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Va. North Station 2,400,000 / 365,000

$\phi = 38^\circ 39' 38.13$ $\lambda = 77^\circ 05' 56.94$

Tabular difference of R for 1″ of ϕ =

R (for min. of ϕ)			y′ (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,214,496.3	y′		361,948.2
			y″ (=2R $\sin^2 \frac{\theta}{2}$)		+ 3,051.9
		° ′ ″			365,000.1
θ (for min. of λ)			y		
Cor. for sec. of λ		−			
θ		+ 0 52 27.4638	$\frac{\theta}{2}$		° 26′ 13.7319
θ''	For machine computation	″		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.0152587429	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.0076295935
log R				R sin $\frac{\theta}{2}$	200,005.95
log x′			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$	1,525.964
x′	R sin θ	400,000.3	log R		
		2,000,000.00	log 2		0.30103000
x		2,400,000.3	log y″		

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

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

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

T 5759

Plane coordinates on Lambert projection

State Va. North Station 2,385,000 / 380,000

$\phi = 38°42'08.61$ $\lambda = 77°09'03.25$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,199,273.6	y'		377,170.8
			y'' (=2R sin² $\frac{\theta}{2}$)		+ 2,829.0
		° ' "	y		379,999.8
θ (for min. of λ)					
Cor. for sec. of λ		−			
θ		+ 0 50 31.1844	$\frac{\theta}{2}$		°25 15.5922
θ''	For machine computation	"		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.01469506 77	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.007347732
log R				R sin $\frac{\theta}{2}$	192,505 24
log x'			log sin² $\frac{\theta}{2}$	R sin² $\frac{\theta}{2}$	1,414.48
x'	R sin θ	+ 385,000.1	log R		
		2,000,000.00	log 2		0.30103000
x		2,385,000.1	log y''		

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection 80

2,375,000

State Va. North Station 395,000

$\phi = 38^\circ 44' 37.60''$ $\lambda = 77^\circ 10' 03.57''$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,184,200.6	y'			392,242.8
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+	2,757.5
		° ' "	y			395,000.3
θ (for min. of λ)						
Cor. for sec. of λ		−				
θ		+ 0 49 53.5376	$\frac{\theta}{2}$			° 24 56.7688
θ''	For machine computation	"		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	.014512570 4	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.007256476 2
log R				R sin $\frac{\theta}{2}$		190,005.03
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$		1,378.76
x'	R sin θ	380,000.0	log R			
		2,000,000.00	log 2			0.30103000
x		2,380,000.0	log y''			

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Va. North Station 2,400,000 / 395,000

$\phi = 38°\ 44'\ 34.65$ $\lambda = 77°\ 05'\ 51.17$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,184,500.0	y'			391,944.4
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+	3,055.4
		° ' "	y			394,999.8
θ (for min. of λ)						
Cor. for sec. of λ		−				
θ		+ 0 52 31.0650	$\frac{\theta}{2}$			°26' 15.5325
θ''	For machine computation	"		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	.0152762000	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.0076 38323
log R				R sin $\frac{\theta}{2}$		200,005.66
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$		1,527.71
x'	R sin θ	+ 399,999.6	log R			
		2,000,000.00	log 2			0.30103000
x		2,399,999.6	log y''			

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Va. North, Station Duck 1928

$\phi = 38^\circ\ 39'\ 01''.267$ $\lambda = 77^\circ\ 06'\ 47''.210$ ✓

Tabular difference of R for 1″ of ϕ =

R (for min. of ϕ)			y′ (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,218,225.3	y′		358,219.1
			y″ (=2R $\sin^2 \frac{\theta}{2}$)		+ 2,991.8
		° ′ ″			
θ (for min. of λ)			y		361,210.9
Cor. for sec. of λ		−			
θ		+ 0 51 56.0894	$\frac{\theta}{2}$		°25′ 58.0447
θ''	For machine computation	″		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.0151066531	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.007553542
log R				R sin $\frac{\theta}{2}$	198,040.46
log x′			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$	1,495.90
x′	R sin θ	+ 396,069.6	log R		
		2,000,000.00	log 2		0.30103000
x		2,396,069.6	log y″		

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Va. North Station Ft. Humphreys large squat tank, 1934

$\phi = 38^\circ\ 41'\ 34.865$ $\lambda = 77^\circ\ 08'\ 30.265$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,202,687.3	y'		373,757.1
			y'' (=2R sin² $\frac{\theta}{2}$)		+ 2,867.9
		° ′ ″			376,625.0
θ (for min. of λ)			y		
Cor. for sec. of λ		−			
θ		+ 0 50 51.7710	$\frac{\theta}{2}$		°25′ 25.8855
θ''	For machine computation	″		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.0147948635	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.0073976342
log R				R sin $\frac{\theta}{2}$	193,837.89
log x'			log sin² $\frac{\theta}{2}$	R sin² $\frac{\theta}{2}$	1,433.94
x'	R sin θ	+ 387,665.2	log R		
		2,000,000.00	log 2		0.30103000
x		2,387,665.2	log y''		

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

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

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

(R 340)

M-350

T-5759

PLANE COORDINATE GRID SYSTEM

Md.

Positions of grid intersections used for fitting the grid to this compilation were computed by Division of Geodesy and the computation forms are included in this report.

Positions plotted by E. W. Frederick.

Positions checked by E. W. Frederick

Grid inked on machine by E. W. Frederick

Intersections inked by E. W. Frederick.

Points used for plotting grid:

x = 750,000 y = 300,000	x = 770,000 y = 330,000
x = 750,000 y = 330,000	x y
x = 755,000 y = 315,000	x y
x = 770,000 y = 300,000	x y

Triangulation stations used for checking grid:

1. Duck, 1928 {X: 767,695.2 Y: 297,557.9}
2. Ft. Humphreys large squat Tank, 1934 {X: 759,543.8 Y: 313,107.5}
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

T 5759

Plane coordinates on Lambert projection

State Md. Station 300,000

ϕ = 38° 39 25.13 λ = 77° 10 30.32

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,069,160.8	y'		299,951.9
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+ 47.9
		° ′ ″	y		299,999.8
θ (for min. of λ)					
Cor. for sec. of λ		−			
θ		− 0 06 35.6104	$\frac{\theta}{2}$		° 3′ 17.8052
θ''	For machine computation	″		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.00191797 22	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.000958986 5
log R				R sin $\frac{\theta}{2}$	24,999.97
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$	23.97
x'	R sin θ	− 49,999.9 8	log R		
		2,000,000.00	log 2		0.30103000
x		750,000.1	log y''		

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Md. Station 330.000 745,000

$\phi = 38^\circ 44' 21.69$ $\lambda = 77^\circ 10' 31.05$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,039,160.4	y'		329,952.3
			y'' (=2R sin^2 $\frac{\theta}{2}$)		+ 48.0
θ (for min. of λ)		° ' "	y		330,000.3
Cor. for sec. of λ		−			
θ		− 0 06 36.0685	$\frac{\theta}{2}$		° 3' 18".03425
θ''	For machine computation	"		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.001920193 1	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.000960097 0
log R				R sin $\frac{\theta}{2}$	25,000.12
log x'			log sin^2 $\frac{\theta}{2}$	R sin^2 $\frac{\theta}{2}$	24.00
x'	R sin θ	− 50,000.2	log R		
		2,000,000.00	log 2		0.30103000
x		749,999.8	log y''		

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

State Md. Station 755,000 315,000

ϕ = 38° 41′ 53.50 λ = 77° 09′ 27.62

Tabular difference of R for 1″ of ϕ =

R (for min. of ϕ)			y′ (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,054,151.6	y′			314,961.2
			y″ (=2R $\sin^2 \frac{\theta}{2}$)		+	38.9
θ (for min. of λ)		° ′ ″	y			315,000.1
Cor. for sec. of λ		−				
θ		− 0 05 56.2577	$\frac{\theta}{2}$			° 2′ 58.12885
θ''	For machine computation	″		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	.0017271852	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.0008635929
log R				R sin $\frac{\theta}{2}$		22,500.18
log x′			log sin^2 $\frac{\theta}{2}$	R sin^2 $\frac{\theta}{2}$		19.43
x′	R sin θ	45,000.3	log R			
		2,000,000.00	log 2			0.30103000
x		754,999.7	log y″			

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

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

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

(R 340)

T 5759

Plane coordinates on Lambert projection

770,000

State Md Station 300,000

$\phi = 38^\circ\ 39'\ 25.43$ $\lambda = 77^\circ\ 06'\ 18.19$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,069,130.5	y'			299,982.3
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+	17.3
θ (for min. of λ)		° ' "	y			299,999.6
Cor. for sec. of λ		−				
θ		− 0 03 57.3650	$\frac{\theta}{2}$			° 1 ' 58.6825
θ''	For machine computation	"		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	.0011507778	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.000 5753890
log R				R sin $\frac{\theta}{2}$		14,999.89
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$		8.63
x'	R sin θ	− 29,999.8	log R			
		2,000,000.00	log 2			0.30103000
x		770,000.2	log y''			

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

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

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

T 5759

Plane coordinates on Lambert projection

State Md. Station 770,000 330,000

ϕ = 38° 44′ 21.99 λ = 77° 06′ 18.63

Tabular difference of R for 1″ of ϕ =

R (for min. of ϕ)			y′ (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,039,130.1	y′		329,982.7
			y″ (=2R sin² $\frac{\theta}{2}$)		+ 17.3
θ (for min. of λ)		° ′ ″	y		330,000.0
Cor. for sec. of λ		−			
θ		− 0 03 57.641	$\frac{\theta}{2}$		° 1′ 58.82055
θ''	For machine computation	″		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.0011521163	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.0005760583
log R				R sin $\frac{\theta}{2}$	15,000.06
log x′			log sin² $\frac{\theta}{2}$	R sin² $\frac{\theta}{2}$	8.64
x′	R sin θ	− 30,000.1	log R		
		2,000,000.00	log 2		0.30103000
x		769,999.9	log y″		

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

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

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

T 5759

Plane coordinates on Lambert projection

State Md. Station Touch 1928

$\phi = 38^\circ 39' 01''.267$ $\lambda = 77^\circ 06' 47''.210$

Tabular difference of R for 1" of ϕ =

R (for min. of ϕ)			y' (for min. of ϕ)		
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+
R		26,071,574.9	y'		297,537.9
			y'' (=2R $\sin^2 \frac{\theta}{2}$)		+ 20.0
		° ' "	y		297,557.9
θ (for min. of λ)					
Cor. for sec. of λ		−			
θ		−0 04 15.5789	$\frac{\theta}{2}$		° 2' 07".78945
θ''	For machine computation	"		For machine computation	
			log θ''		
log θ''			colog 2		9.69897000
S for θ			S for $\frac{\theta}{2}$		
log sin θ	sin θ	.0012390812	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$	.0006195407
log R				R sin $\frac{\theta}{2}$	16,152.402
log x'			log $\sin^2 \frac{\theta}{2}$	R $\sin^2 \frac{\theta}{2}$	10.01
x'	R sin θ	− 32,304.8	log R		
		2,000,000.00	log 2		0.30103000
x		767,695.2	log y''		

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

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

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

T5759

Plane coordinates on Lambert projection

State Md Station Ft. Humphreys large 1934 "quatrefoil"

ϕ = 38° 41′ 34.865 λ = 77° 08′ 30.265

Tabular difference of R for 1″ of ϕ =

R (for min. of ϕ)			y′ (for min. of ϕ)			
Cor. for sec. of ϕ		−	Cor. for sec. of ϕ		+	
R		26,056,036.7	y′			313,076.1
			y″ (=2R sin² $\frac{\theta}{2}$)		+	31.4
		° ′ ″	y			313,107.5
θ (for min. of λ)						
Cor. for sec. of λ		−				
θ		− 0 05 20.2597	$\frac{\theta}{2}$			° 2′ 40.12985
θ''	For machine computation	″		For machine computation		
			log θ''			
log θ''			colog 2			9.69897000
S for θ			S for $\frac{\theta}{2}$			
log sin θ	sin θ	.00155 26622	log sin $\frac{\theta}{2}$	sin $\frac{\theta}{2}$		.00077 63313
log R				R sin $\frac{\theta}{2}$		20,228.117
log x′			log sin² $\frac{\theta}{2}$	R sin² $\frac{\theta}{2}$		15.70
x′	R sin θ	40,456.2	log R			
		2,000,000.00	log 2			0.30103000
x		759,543.8	log y″			

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

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

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

(R 340)