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Sewall partners with clients to create practical, sustainable solutions.*

Ground Control Report

Ground Control Blind Check Points for the Coastal Northeast LiDAR project

State of Massachusetts Project

USGS Task Order G10PD02143 and G10PD01027

Prepared for:
Photo Science, Inc.

2 March 2011

Control Survey Report

Massachusetts Ground Control Blind Check Points

For the Northeast LiDAR Project

Task Order No.: G10PD02143 and G10PD01027

US Geological Survey

1400 Independence Road

Rolla, Missouri 65401

James W. Sewall Company was contracted by Photo Science, Inc. to locate a total of 20 blind control points for this project. These points were designated as BP 1 – BP 20. These points were located on relatively flat terrain on surfaces that generally consisted of grass, gravel or bare earth.

Field work was conducted by four staff surveyors during November and December of 2010 with Topcon dual-frequency survey grade GPS receivers to locate the check points. Static sessions lasting a minimum of twenty minutes were conducted. Published control points were located during the course of the day to serve as a horizontal and vertical check. GPS session log sheets were completed along with several photos and a taping sketch which accompany this report.

The GPS data was submitted to NGS using the OPUS-RS utility. A sample of the data was post processed in Trimble Geomatics Office and / or Topcon Tools and processed using the nearest Continuously Operating Reference Station (CORS) to check the OPUS-RS results. CORS stations used in processing are referenced with the processed data and included in this report.

The horizontal coordinates are Universal Transverse Mercator (UTM) coordinate system Zone 19; units are in meters, and the datum is the North American Datum of 1983 (NAD83). Vertical data is in the North American Vertical Datum of 1988 (NAVD88) Geoid09.



Ground Control Report Coastal Northeast LiDAR Project Massachusetts

GPS Control Survey Results

- 1.0 Coordinate Summary and Overview Map Location
- 2.0 Field Data Sheets & OPUR RS Solution Reports
- 3.0 Published Control Locations

1.0 Coordinate Summary
and Overview Map

Control Summary

Project Number: 75980S - Massachusetts
 Project Name: Photo Science Inc - NE Lidar Project - BP data
 Horizontal Datum: UTM NAD83 (Zone 19)
 Vertical Datum: NAVD 88 (GEOID09)
 Units: Meters
 Date: December 15, 2010

Station	Easting (X)	Northing (Y)	Elevation	Description
BP1	344015.965	4742461.659	19.859	8" spike
BP2	312913.888	4728381.986	60.008	8" spike
BP3	349219.655	4729676.683	2.885	8" spike
BP4	335654.125	4724585.161	26.827	8" spike
BP5	315929.795	4711729.774	45.839	8" spike
BP6	366422.513	4722745.615	49.979	8" spike
BP7	340541.959	4708319.058	15.032	8" spike
BP8	317270.052	4677261.584	89.186	8" spike
BP9	352840.627	4673338.998	33.574	8" spike
BP10	340265.649	4655980.842	26.856	8" spike
BP11	359917.378	4656480.540	24.069	8" spike
BP12	323092.682	4641828.035	17.712	8" spike
BP13	344214.150	4643201.346	15.948	8" spike
BP14	367891.614	4637000.197	51.545	8" spike
BP15	401539.067	4656552.832	7.409	8" spike
BP16	414954.594	4621168.614	33.789	8" spike
BP17	391832.829	4613984.063	13.005	8" spike
BP18	367506.362	4604905.452	13.662	8" spike
BP19	348737.924	4625658.077	12.290	8" spike
BP20	324545.916	4613994.167	59.494	8" spike

Published Control Summary

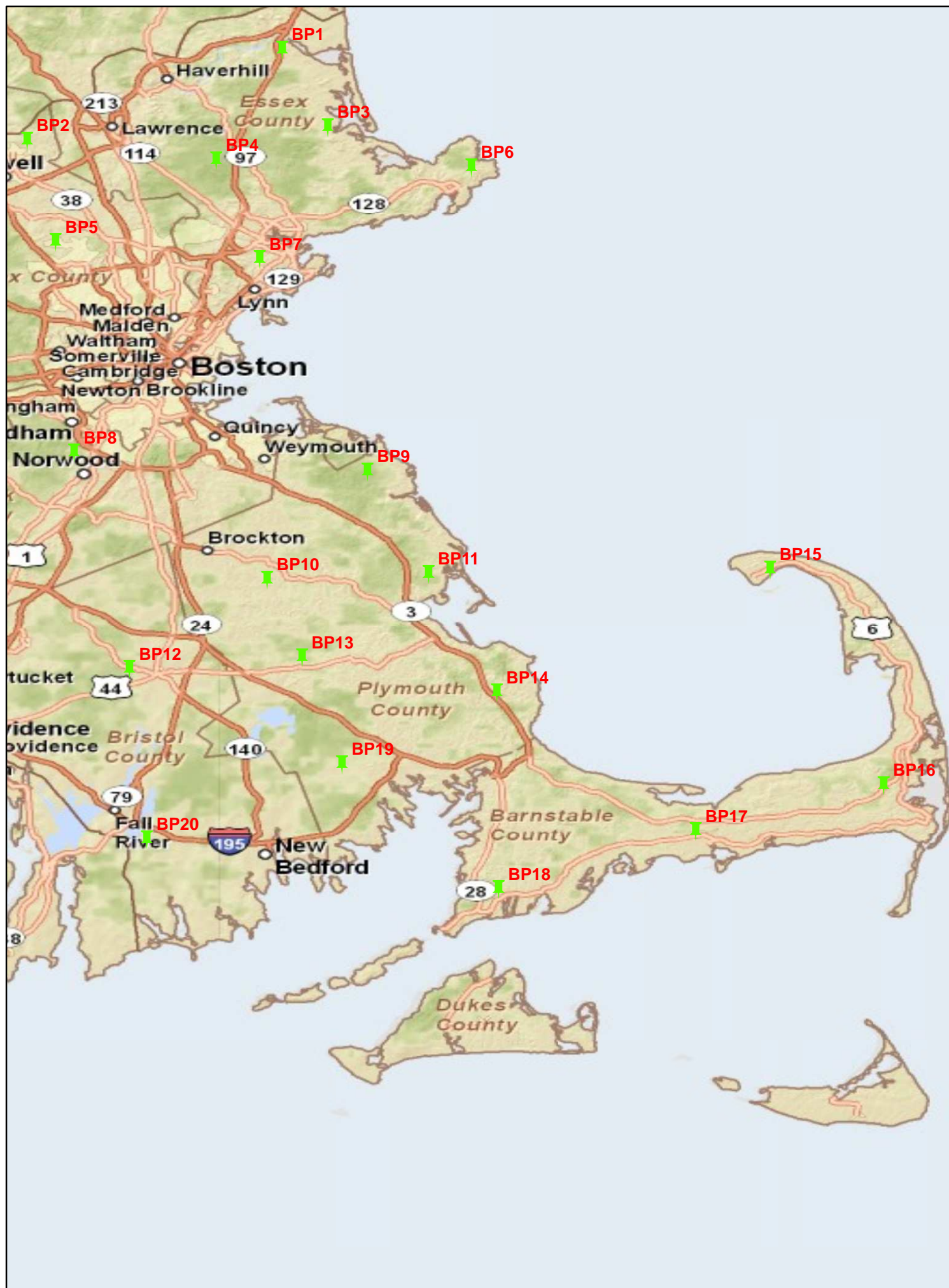
Station	Easting (X)	Northing (Y)	Elevation	Name
6121C	401971.846	4656086.481	3.502	BBBV11
BM2-56	364185.832	4620445.270	5.220	BBBL81
PC191A	320631.350	4618854.917	37.107	LW5833
DH-1	317571.969	4679949.457	74.083	BBBP74

844-1551A	367636.696	4724176.560	3.196	<i>BBBJ40</i>
AMTS	365500.816	4622381.409	11.877	<i>BOURNE</i>
OMTS	416273.160	4625421.929	16.937	<i>ORLEANS</i>

Notes:

1. Coordinates and elevations were derived from our GPS observations using OPUS RS processing and also Topcon Tools.
2. Datum and unit conversions performed using Corpscon v.6.0.1 software.







2.0 Field Data Sheets & OPUS RS Solution Reports

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800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP1

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Newportbury

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-49-07.8

HGT. MTS

LONGITUDE 70-54-29.1

19.86

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

J

DATE:

12/01/10

DAY OF YEAR

335

START TIME

13:59

END TIME

14:23

U.T.C.

X

LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" spike in Grass Area

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

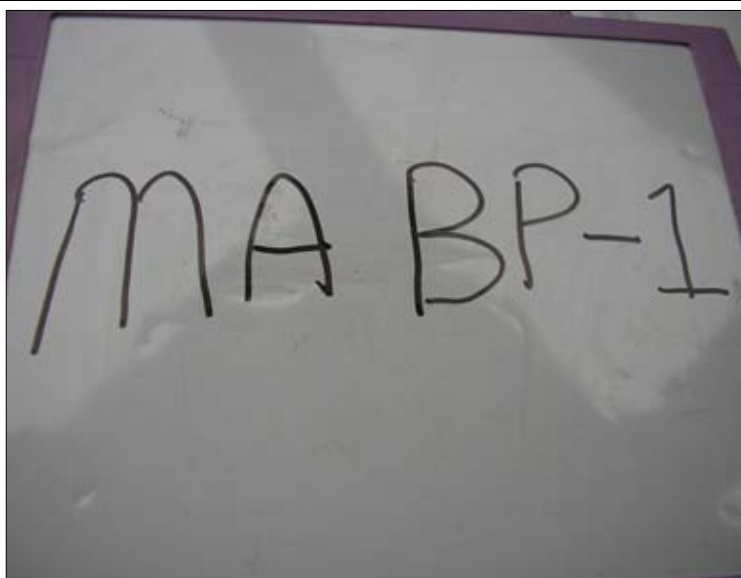
X

NEW CONTROL

PUB. CONTROL

NATURAL

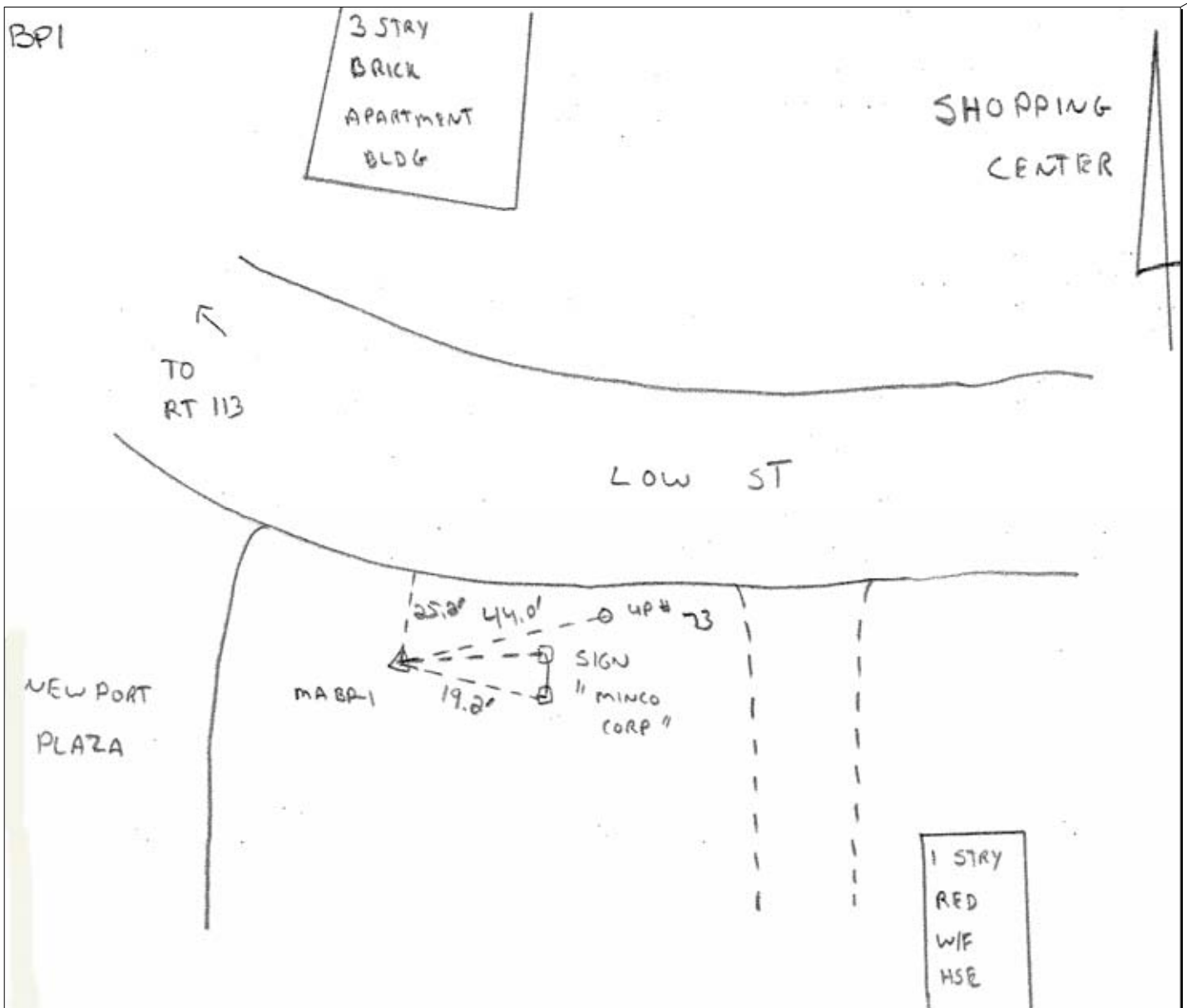
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP2

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Dracut

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42.41-06.6

HGT. MTS

LONGITUDE 71-17-01.1

60.01

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

B

DATE:

12/01/10

DAY OF YEAR

335

START TIME

07:15

END TIME

07:35

U.T.C.

X

LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Bridge Spike in Cul-de-sac

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

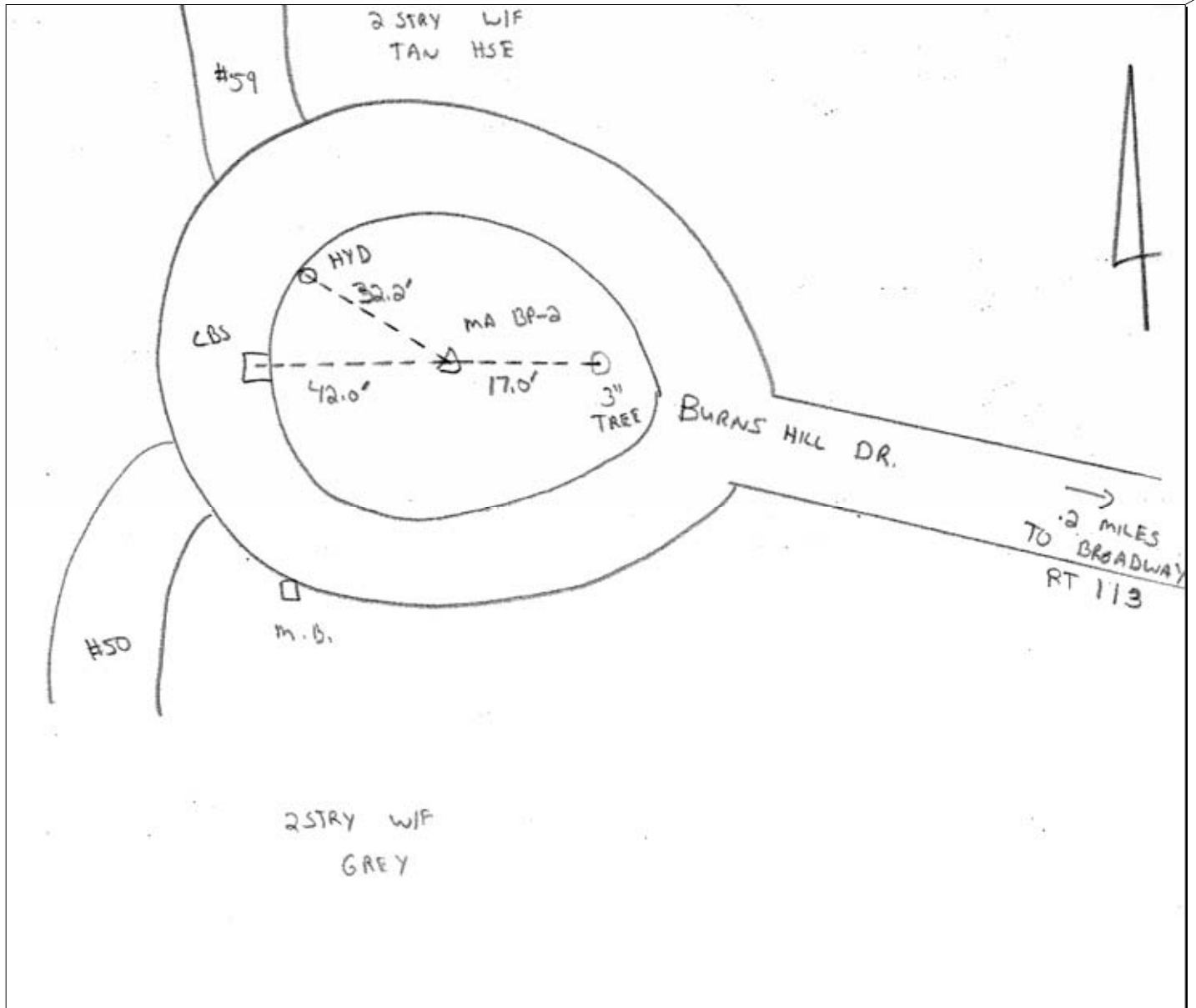
PHOTOS:



PHOTOS CONT'D:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP3

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Ipswich

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-42-17.3

HGT. MTS

LONGITUDE 70-50-27.8

2.89

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

K

DATE:

12/01/10

DAY OF YEAR

335

START TIME 15:46

U.T.C.

END TIME 16:06

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn Area

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X

NEW CONTROL

PUB. CONTROL

NATURAL

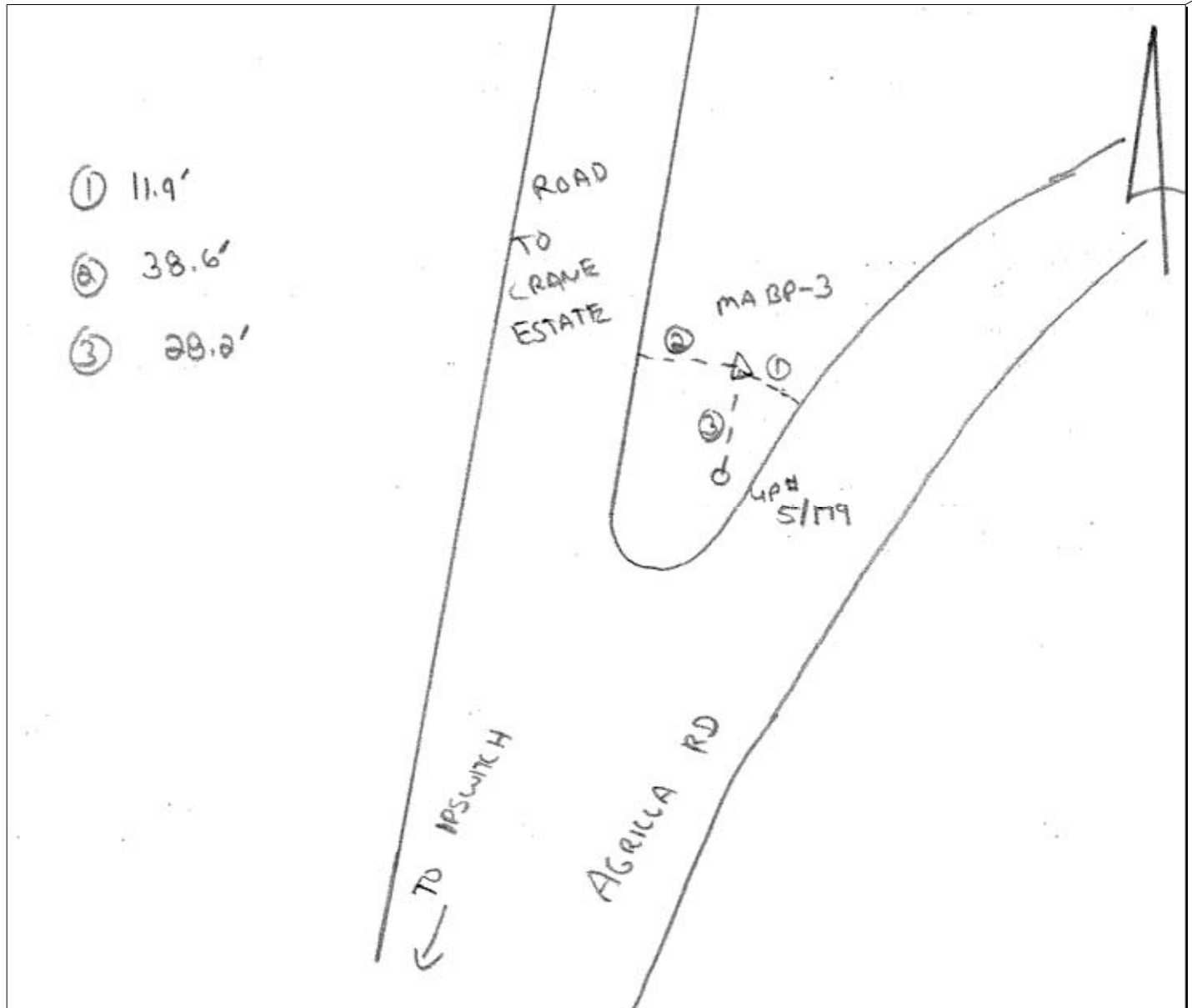
PHOTOS:



PHOTOS CONT'D:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP4

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Boxford

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE	42-39-22.3	HGT. MTS
LONGITUDE	71-00-18.5	26.83

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

SESSION

DATE: 12/02/10

RADIUS (M)

I

DAY OF YEAR 336

Antenna Serial #

START TIME 12:53

U.T.C.

Antenna Type

END TIME 13:13

X LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate

5 SECONDS

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: X FLUSH

MTRS/FT

1.8 Meters

MTRS/FEET ABOVE GROUND

MEASURED

X

FIXED HGT

MTRS/FEET BELOW GROUND

DESCRIPTION

8" Spike in Lawn Area

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

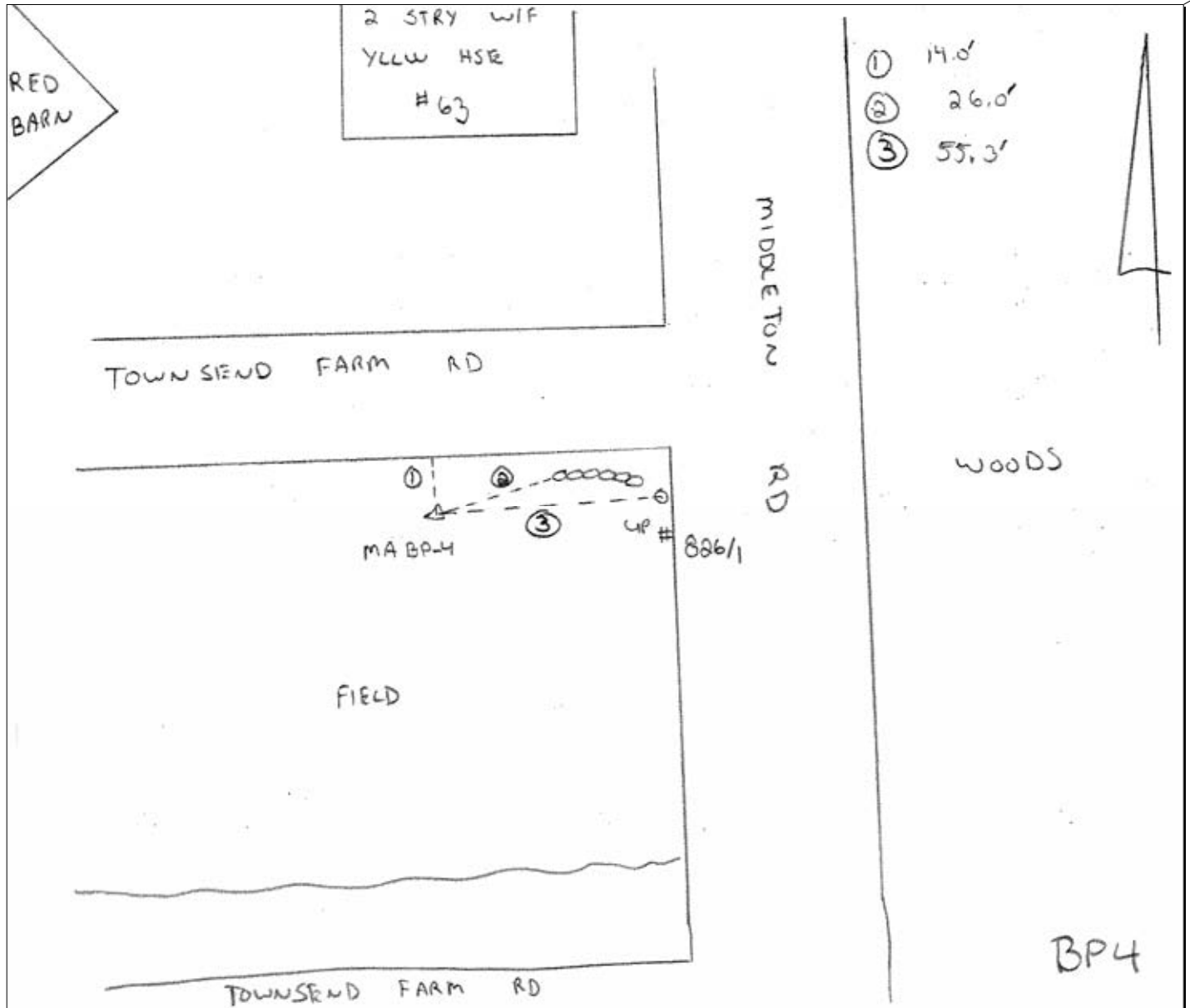
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP5

Proj. No.:

75980S

STATE Massachusetts

COUNTY Middlesex

LOCATION: Billerica

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-32-09.7

HGT. MTS

LONGITUDE 71-14-29.2

45.84

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

K

DATE:

12/02/10

DAY OF YEAR

336

START TIME 14:52

END TIME 15:17

U.T.C.

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Bridge Spike in Gravel

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

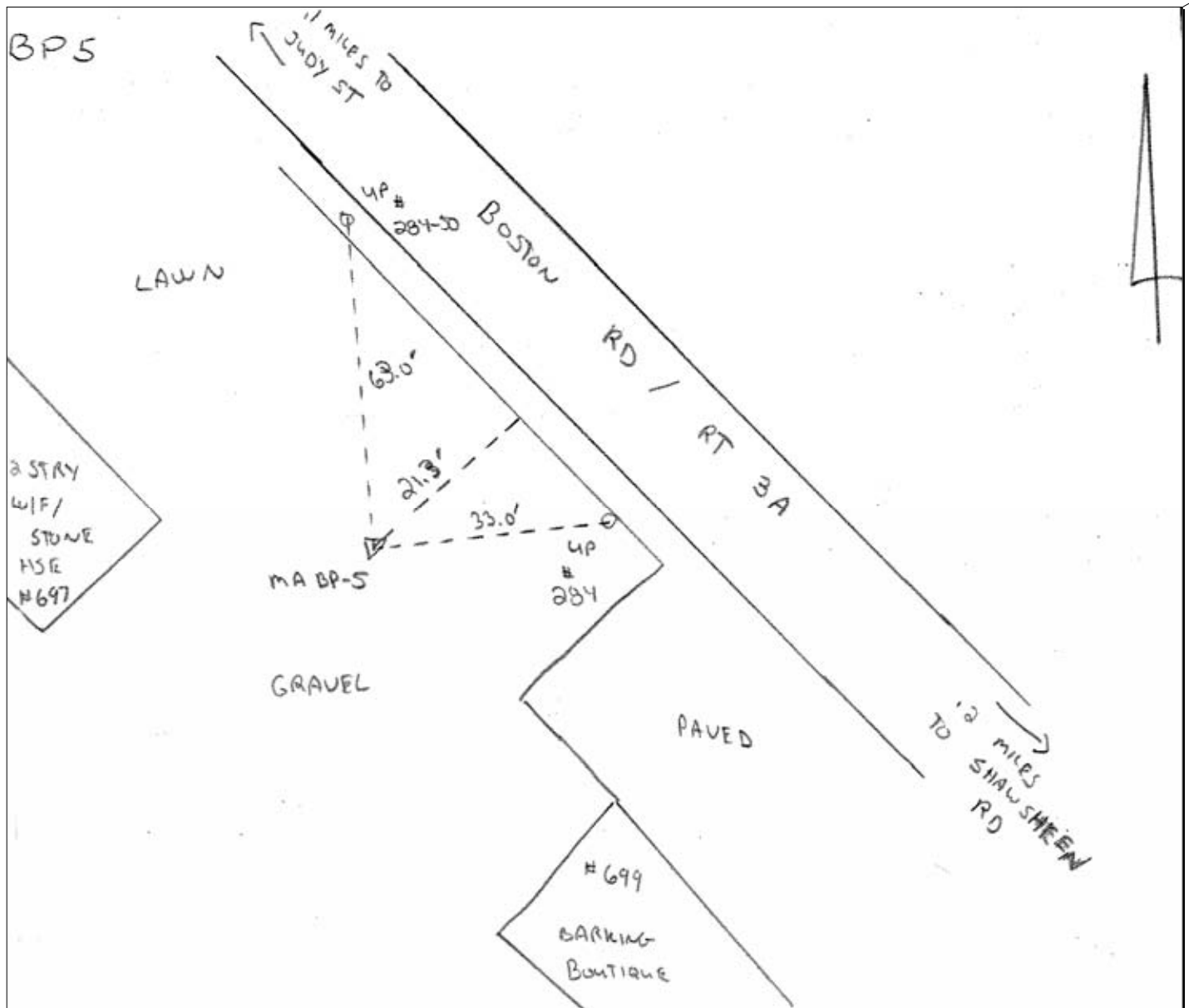
PHOTOS:



PHOTOS CONT'D:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP6

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Rockport

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-38-44.1

HGT. MTS

LONGITUDE 70-37-46.1

49.98

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

C

DATE:

12/02/10

DAY OF YEAR

336

START TIME

07:46

END TIME

08:06

X

U.T.C.

LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X

NEW CONTROL

PUB. CONTROL

NATURAL

PHOTOS:

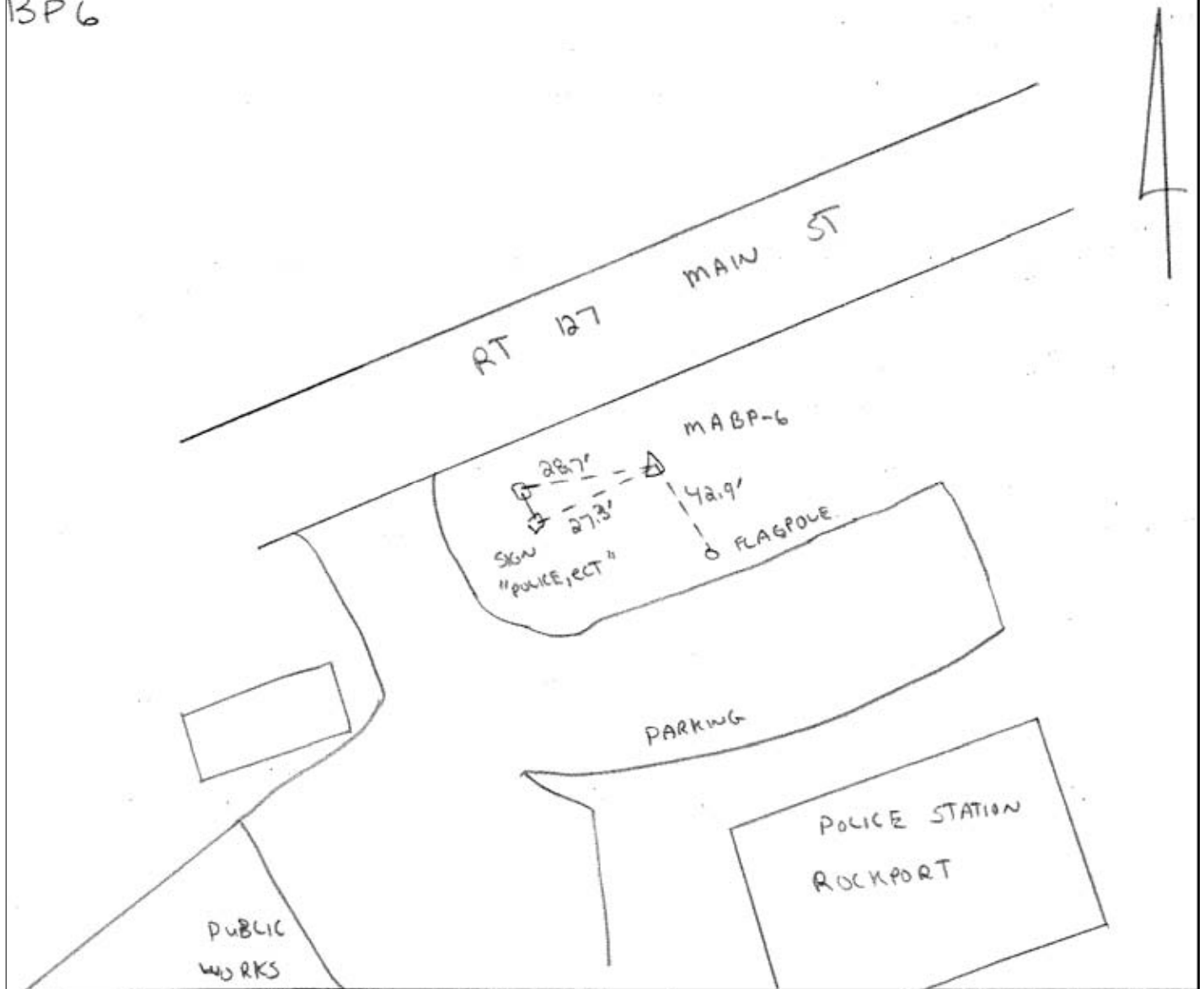


PHOTOS CONT'D:



SITE SKETCH:

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JOB REFERENCE

NE LIDAR

POINT ID:

BP7

Proj. No.:

75980S

STATE Massachusetts

COUNTY Essex

LOCATION: Peabody

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE	42-30-38.9	HGT. MTS
LONGITUDE	70-56-27.5	15.03

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

G

DATE:

12/02/10

DAY OF YEAR

336

START TIME 11:17

END TIME 11:37

U.T.C.

X LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

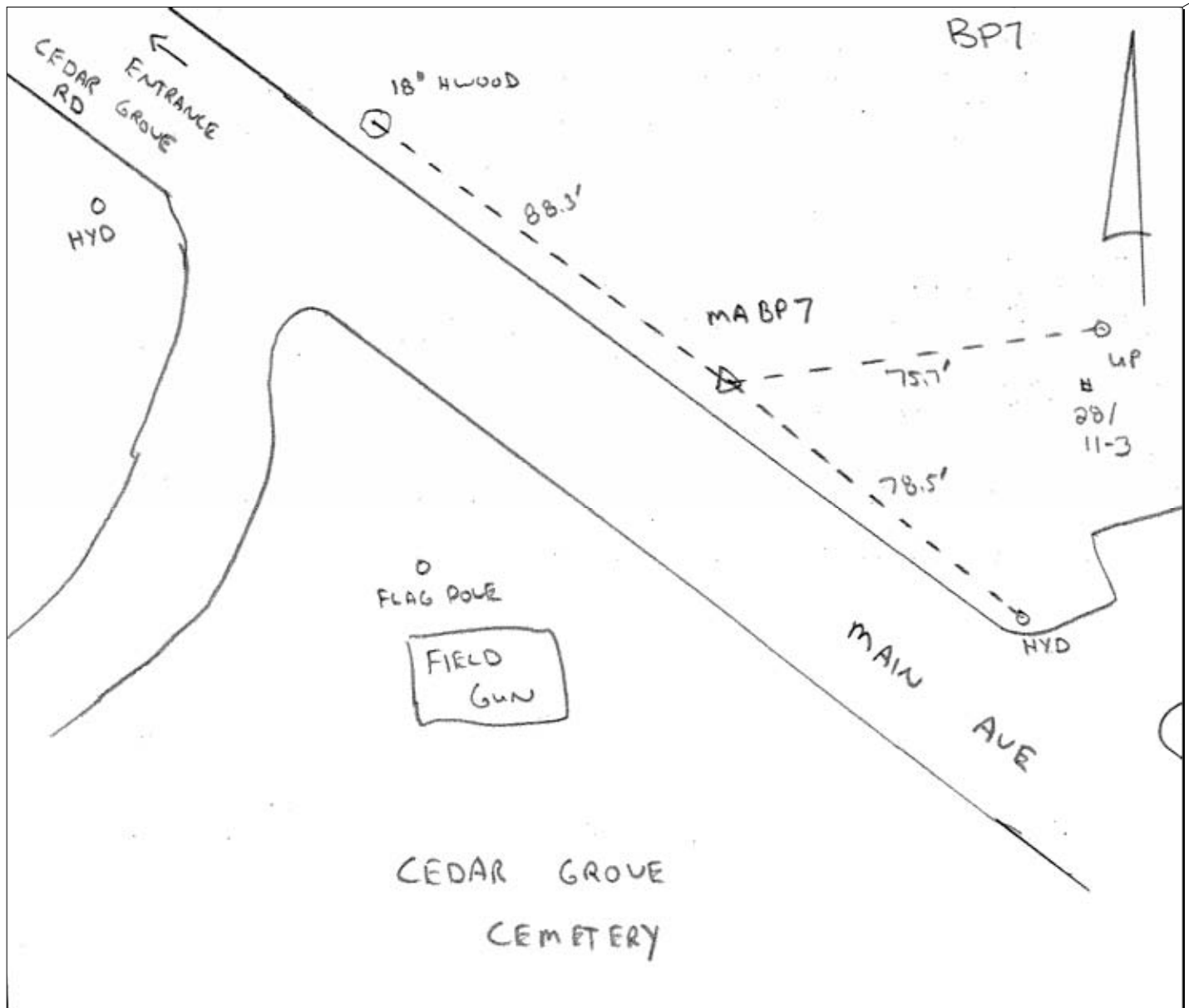
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



GPS CONTROL SURVEY
FIELD DATA SHEET

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JOB REFERENCE
NE LIDAR

POINT ID: BP8
Proj. No.: 75980S

STATE: Massachusetts COUNTY: Norfolk LOCATION: Westwood Town

OPERATOR: E Jellison

GPS OBSERVATIONS

LATITUDE	42-13-34.2	HGT. MTS
LONGITUDE	71-12-51.2	89.19

RECEIVER MODEL: TOPCON HIPER GD
RECEIVER S/N: 272-0793

ANTENNA INFO

RADIUS (M)	
Antenna Serial #	
Antenna Type	

SESSION
L

DATE: 12/02/10
DAY OF YEAR: 336

START TIME: 16:27
END TIME: 16:48

U.T.C.
X LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT	
MEASURED	FIXED HGT.

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT	1.8 Meters
MEASURED	X FIXED HGT

TOP OF MONUMENT IS: X FLUSH
MTRS/FEET ABOVE GROUND
MTRS/FEET BELOW GROUND

DESCRIPTION

8" Spike in Gravel

AERIAL TARGET	PHOTO I.D.
PUB. BENCH MARK	X NEW CONTROL
PUB. CONTROL	NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:

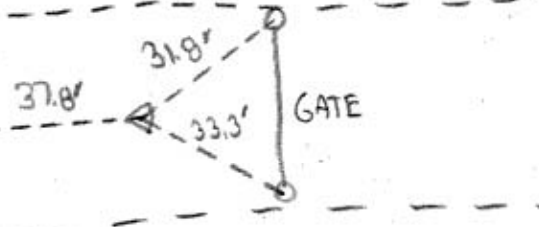
BP 8

MA BP-8

Fox Hill ST

3 STRY
W/IF HSE
#333

13
MILES
↓
TO GAY
ST



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GPS CONTROL SURVEY
FIELD DATA SHEET

PAGE:
1 of 2

JOB REFERENCE

NE LIDAR

POINT ID:

BP9

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Scituate

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-11-54.1

HGT. MTS

LONGITUDE 70-46-56.7

33.57

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0793

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

H

DATE:

12/03/10

DAY OF YEAR

337

START TIME

12:23

END TIME

12:46

U.T.C.

X LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Gravel

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

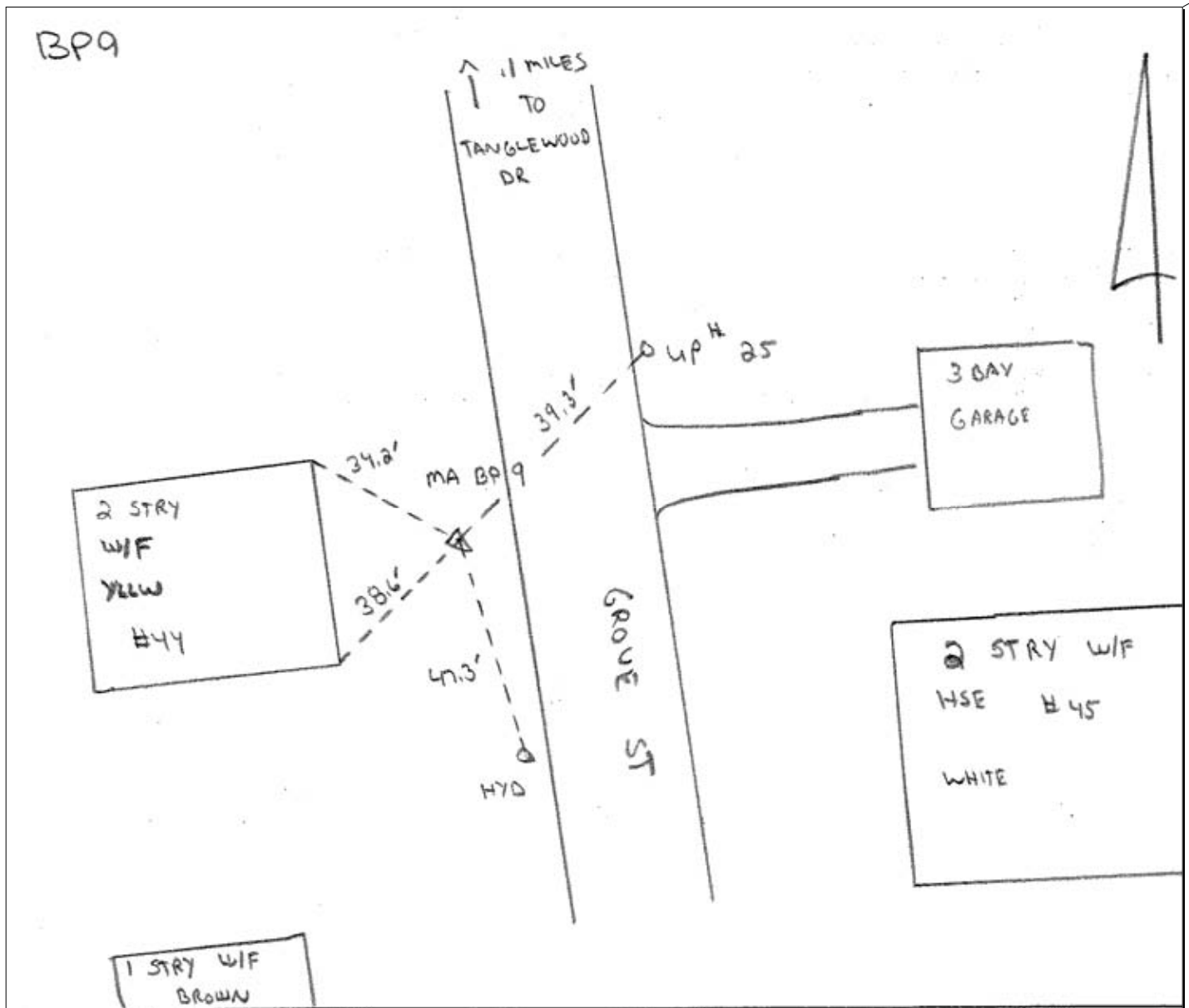
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP10

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Bridgewater

OPERATOR E Jellison

GPS OBSERVATIONS

LATITUDE 42-02-23.9

HGT. MTS

LONGITUDE 70-55-47.8

26.86

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0788

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

F

DATE:

12/07/10

DAY OF YEAR

341

START TIME 11:21

U.T.C.

END TIME 11:52

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Grass Area

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

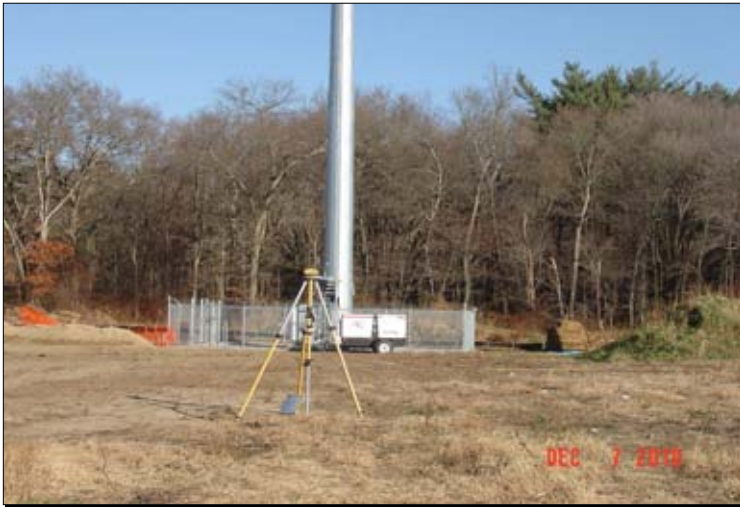
PUB. CONTROL

NATURAL

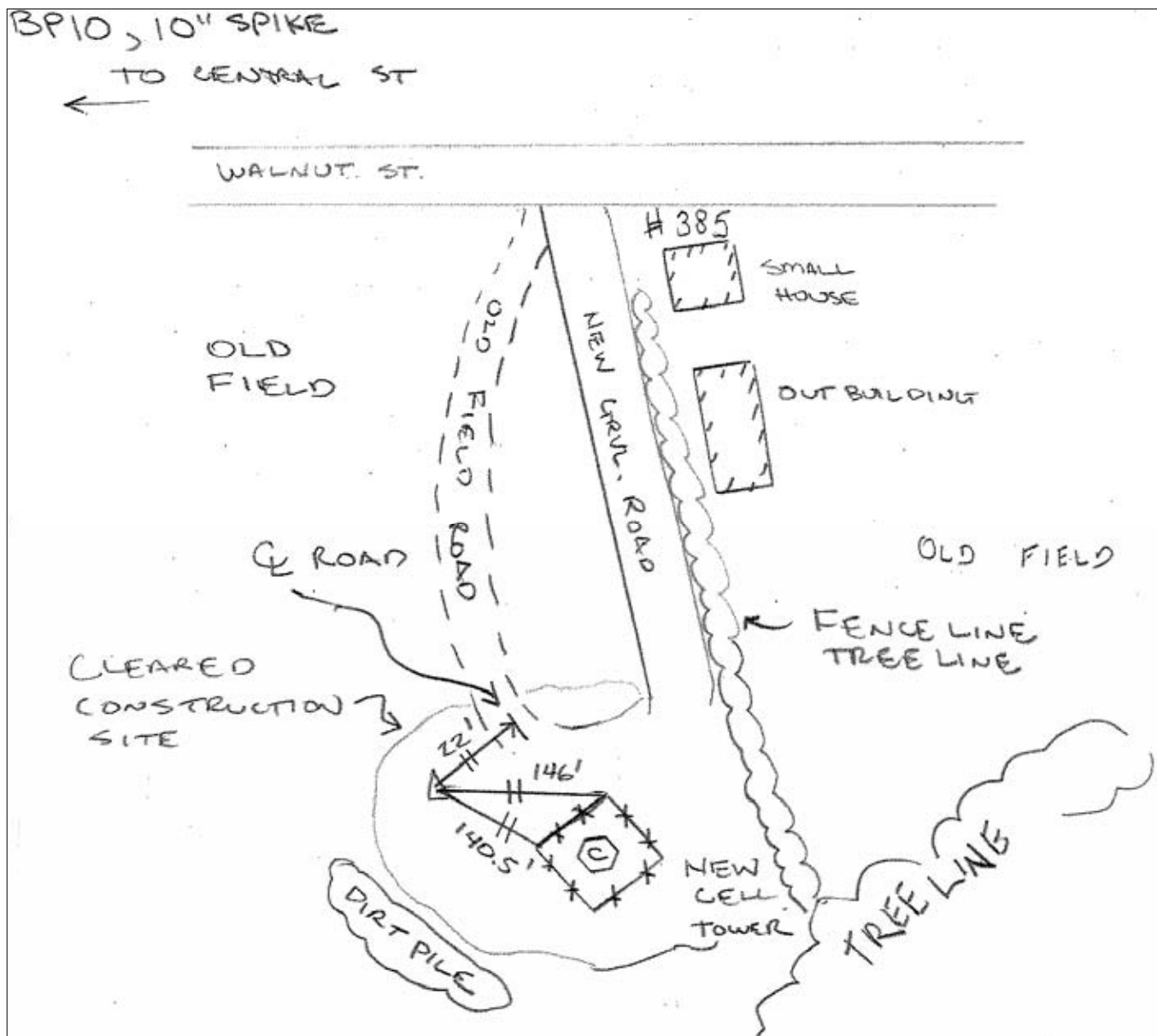
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:





GPS CONTROL SURVEY
FIELD DATA SHEET

PAGE:

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JOB REFERENCE

NE LIDAR

POINT ID:

BP11

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Duxbury

OPERATOR J Allen

GPS OBSERVATIONS

LATITUDE 42-02-53.1

HGT. MTS

LONGITUDE 70-41-32.5

24.07

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0509

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

E

DATE:

12/03/10

DAY OF YEAR

337

START TIME 08:50

END TIME 09:10

U.T.C.

X

LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

Collection Rate

5

SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

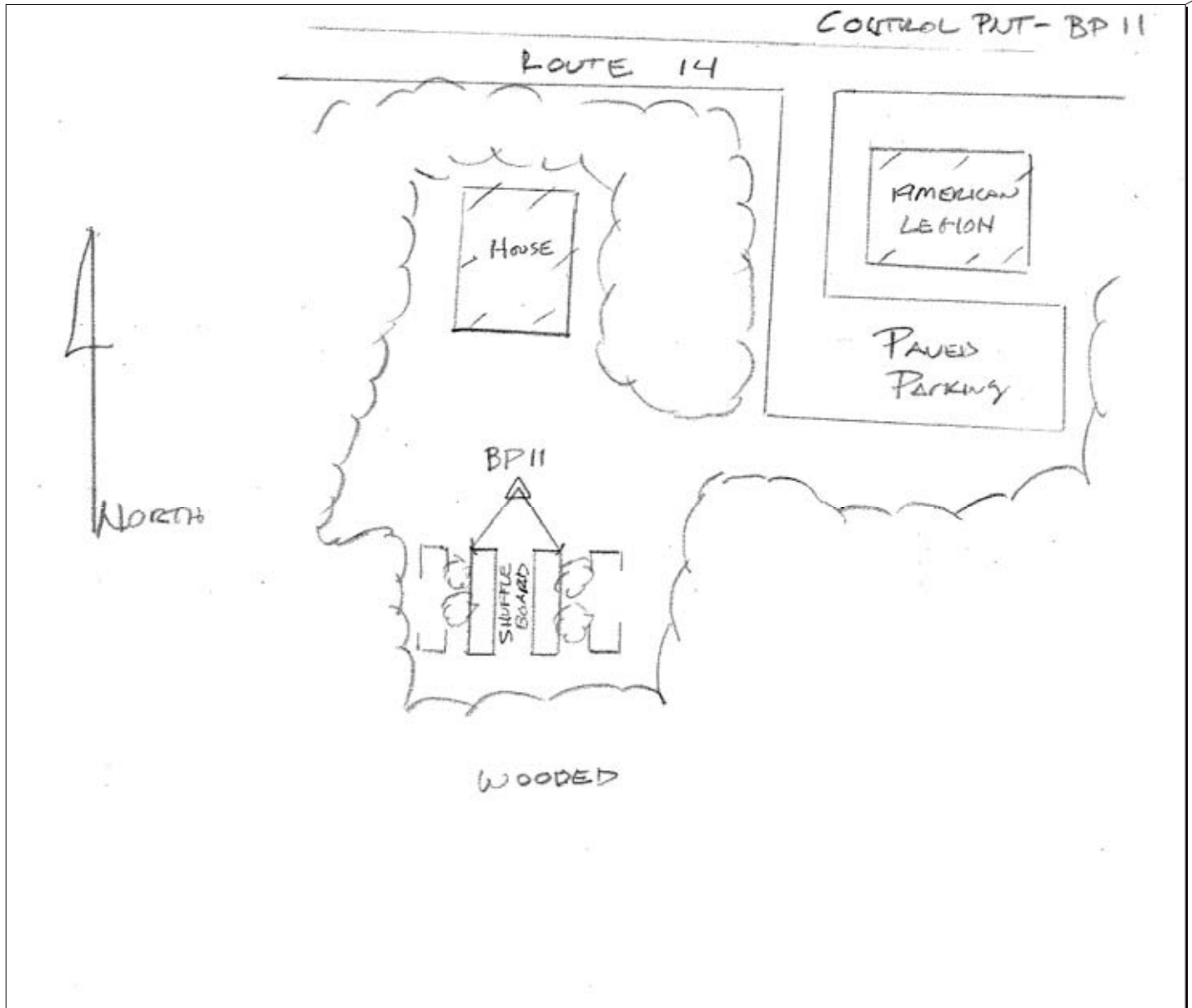
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE

NE LIDAR

POINT ID:

BP12

Proj. No.:

75980S

STATE Massachusetts

COUNTY Bristol

LOCATION: Taunton

OPERATOR D Livingstone

GPS OBSERVATIONS

LATITUDE

41-54-30.5

HGT. MTS

LONGITUDE

71-07-59.7

17.71

RECEIVER MODEL

TOPCON HIPER GD

RECEIVER S/N

272-0788

ANTENNA INFO

RADIUS (M)

SESSION

DATE:

12/08/10

Antenna Serial #

A

DAY OF YEAR

342

Antenna Type

START TIME

07:25

U.T.C.

END TIME

07:48

X

LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

Collection Rate

5

SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Cemetery Lawn

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X

NEW CONTROL

PUB. CONTROL

NATURAL

PHOTOS:



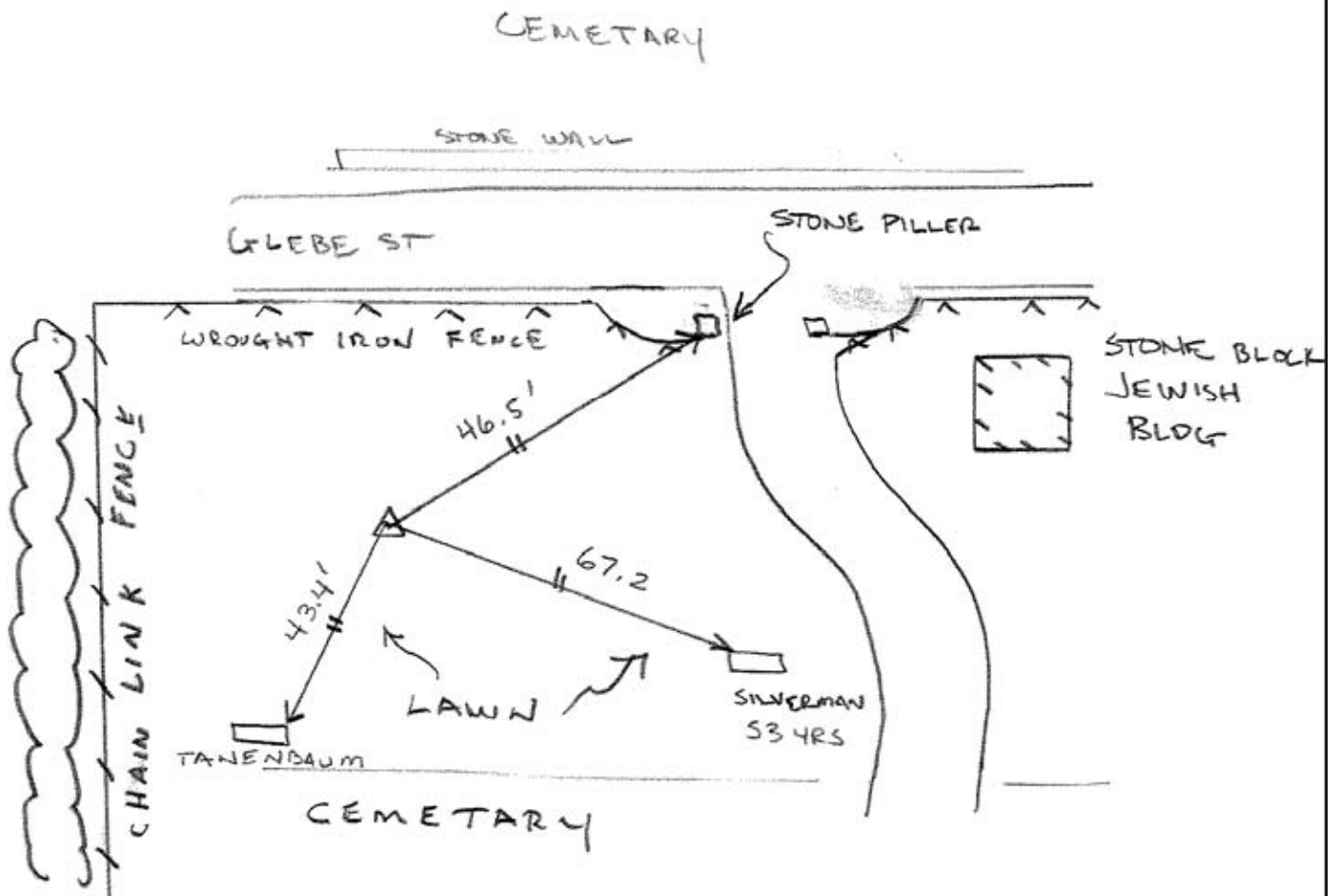
PHOTOS CONT'D:



SITE SKETCH:

BP12

10" SPIKE



Offices nationwide
sewall.com
136 Center Street
P.O. Box 433
Old Town, Maine 04468
207 827 4456
fax: 207 827 3647
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP13

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Middleborough

OPERATOR D Livingstone

GPS OBSERVATIONS

LATITUDE 41-55-30.7

HGT. MTS

LONGITUDE 70-52-44.3

15.94

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0788

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

D

DATE:

12/07/10

DAY OF YEAR

341

START TIME 09:42

END TIME 10:07

U.T.C.

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

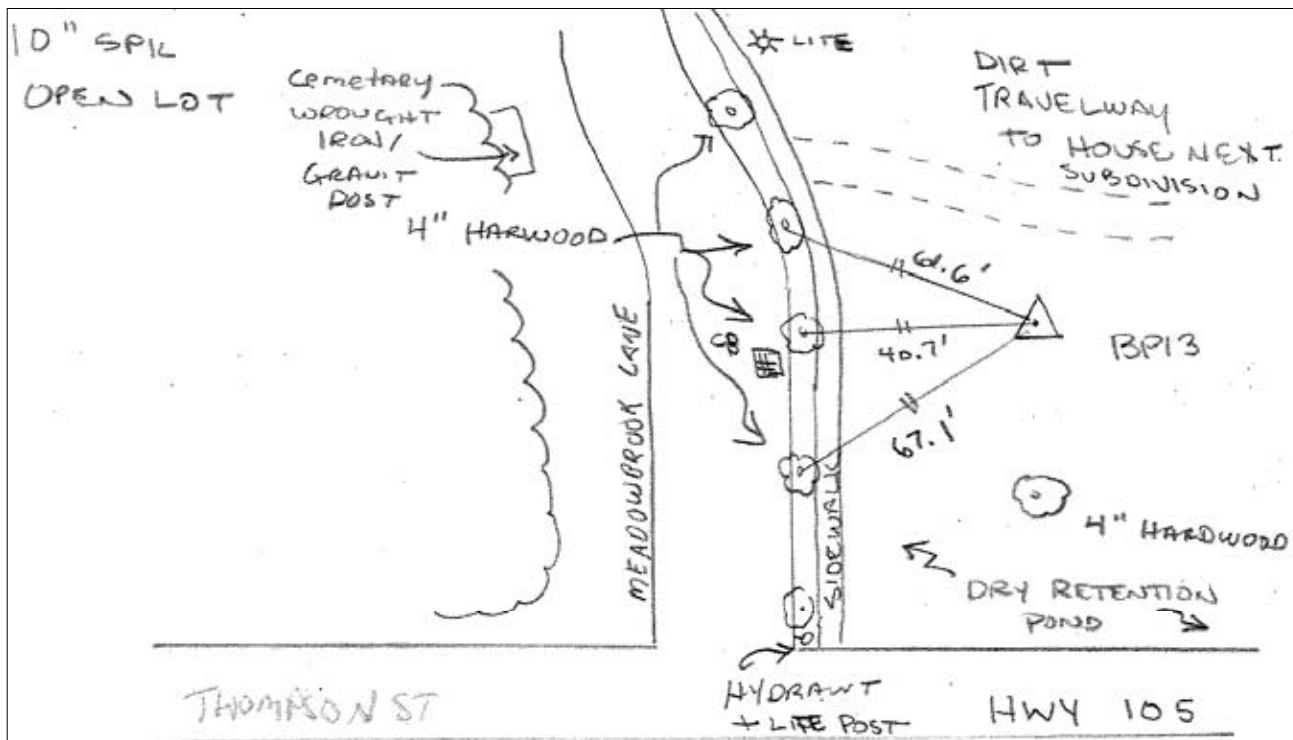
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



BPI3

Offices nationwide
sewall.com
136 Center Street
P.O. Box 433
Old Town, Maine 04468
207 827 4456
fax: 207 827 3641
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP14

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Plymouth

OPERATOR J Allen

GPS OBSERVATIONS

LATITUDE 41-52-26.1

HGT. MTS

LONGITUDE 70-35-31.5

51.55

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0509

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

C

DATE:

12/03/10

DAY OF YEAR

337

START TIME

07:25

END TIME

07:45

U.T.C.

X LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

PHOTOS:

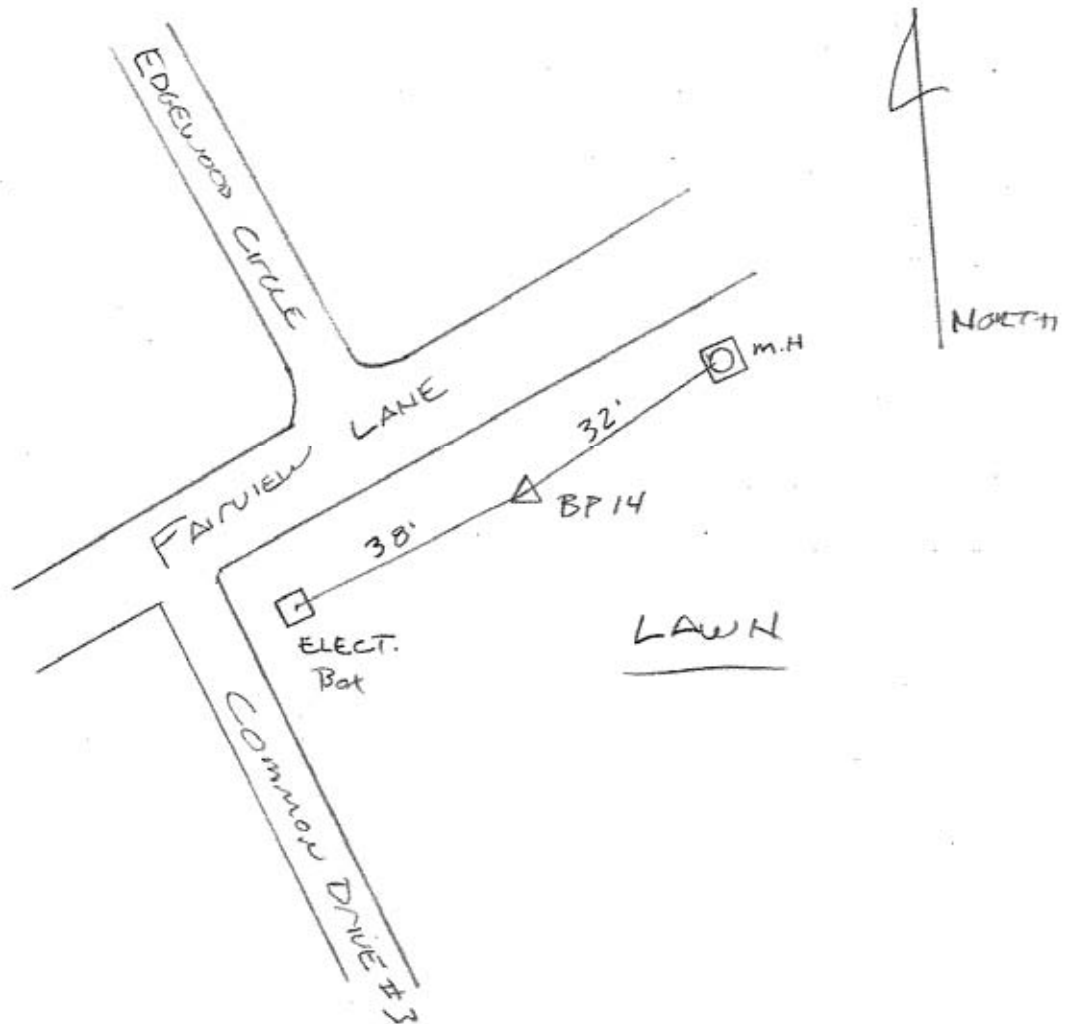


PHOTOS CONT'D:



SITE SKETCH:

CONTROL PNT - BP 14



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sewall.com

136 Center Street
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Old Town, Maine 04468

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800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP15

Proj. No.:

75980S

STATE Massachusetts

COUNTY Barnstable

LOCATION: Provincetown

OPERATOR J Allen

GPS OBSERVATIONS

RECEIVER MODEL TOPCON HIPER GD

LATITUDE 42-03-17.2

HGT. MTS

RECEIVER S/N 272-0515

LONGITUDE 70-11-22.9

7.41

ANTENNA INFO

RADIUS (M)

SESSION

DATE:

12/01/10

Antenna Serial #

B

DAY OF YEAR

335

Antenna Type

START TIME

08:14

U.T.C.

END TIME

08:45

X

LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

Collection Rate

MEASURED

FIXED HGT.

5

SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

TOP OF MONUMENT IS:

X

FLUSH

MEASURED

X

FIXED HGT

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

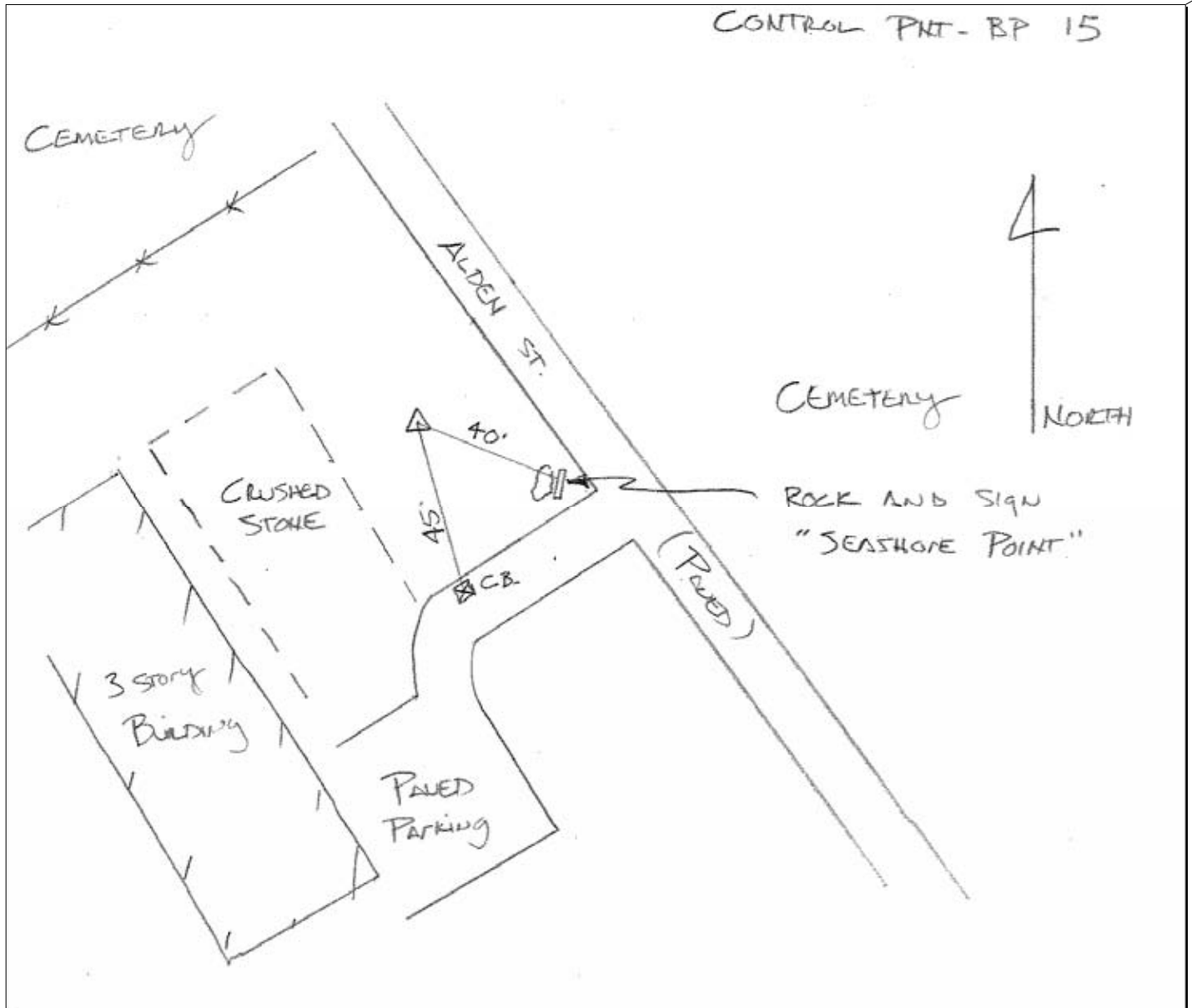
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



Offices nationwide
sewall.com

136 Center Street
P.O. Box 433
Old Town, Maine 04468

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fax: 207 827 3641
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP16

Proj. No.:

75980S

STATE Massachusetts

COUNTY Barnstable

LOCATION: Brewster

OPERATOR J Allen

GPS OBSERVATIONS

LATITUDE 41-44-16.7

HGT. MTS

LONGITUDE 70-01-22.7

33.79

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0515

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

H

DATE:

12/01/10

DAY OF YEAR

335

START TIME 13:15

END TIME 13:35

U.T.C.

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

Point in Baseball Field, No Spike

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

PHOTOS:

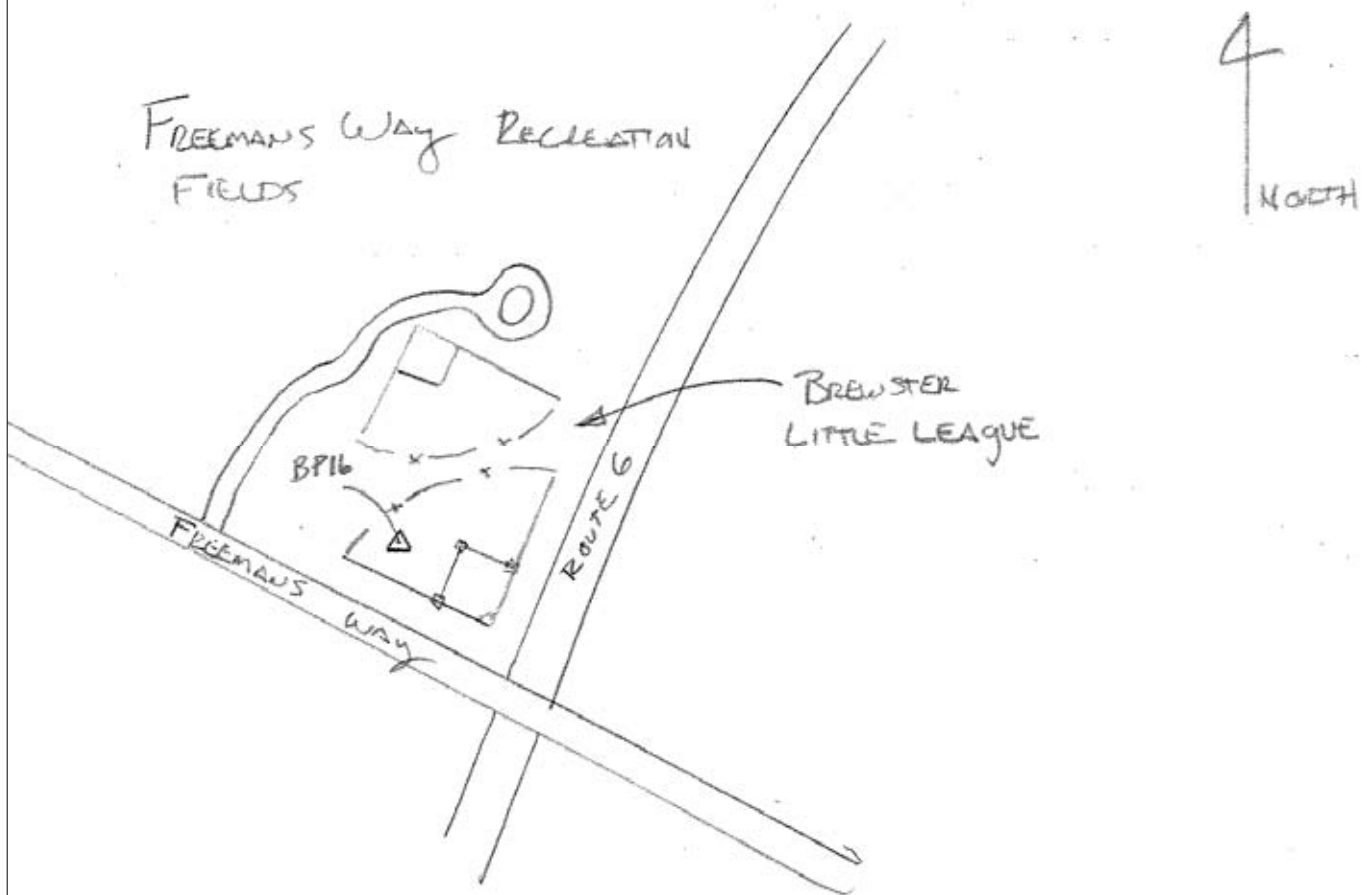


PHOTOS CONT'D:



SITE SKETCH:

CONTROL POINT - BP 16



Offices nationwide
sewall.com
136 Center Street
P.O. Box 433
Old Town, Maine 04468
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fax: 207 827 3641
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID: BP17
Proj. No.: 75980S

STATE Massachusetts

COUNTY Barnstable

LOCATION: Hyannis

OPERATOR J Allen

GPS OBSERVATIONS

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0515

LATITUDE 41-40-12.6

HGT. MTS

LONGITUDE 70-17-56.9

13.01

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

H

DATE:

11/30/10

DAY OF YEAR

334

START TIME

16:22

END TIME

16:47

U.T.C.

X

LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

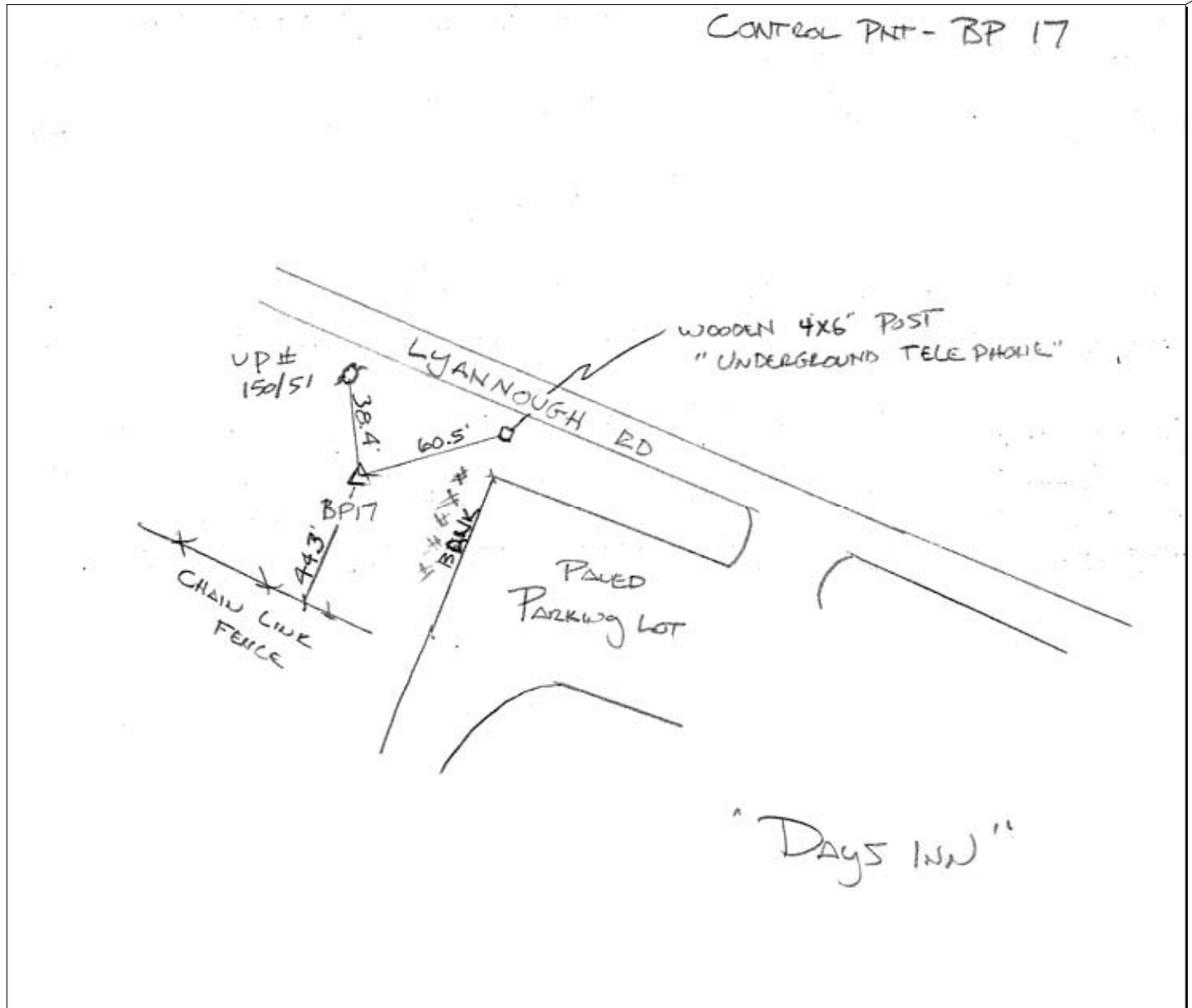
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



Offices nationwide
sewall.com

136 Center Street
P.O. Box 433
Old Town, Maine 04468

207 827 4456
fax: 207 827 3647
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP18

Proj. No.:

75980S

STATE Massachusetts

COUNTY Barnstable

LOCATION: East Falmouth

OPERATOR J Allen

GPS OBSERVATIONS

LATITUDE 41-35-05.2

HGT. MTS

LONGITUDE 70-35-22.0

13.66

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0515

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

D

DATE:

12/02/10

DAY OF YEAR

336

START TIME 08:44

END TIME 09:05

U.T.C.

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Cul-de-sac

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

PHOTOS:

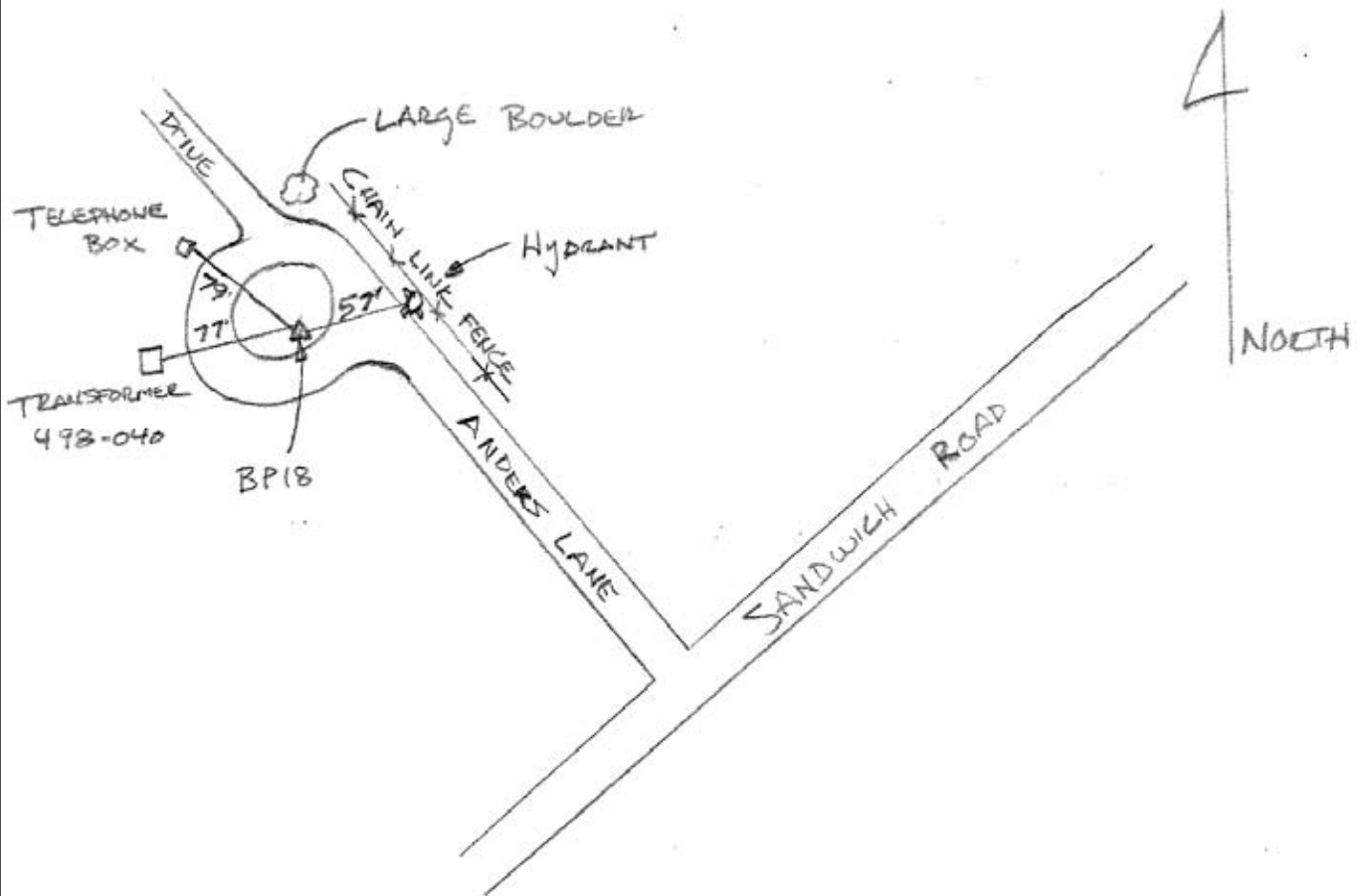


PHOTOS CONT'D:



SITE SKETCH:

CONTROL PNT - BP 18



Offices nationwide
sewall.com
136 Center Street
P.O. Box 433
Old Town, Maine 04468
207 827 4456
fax: 207 827 3647
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP19

Proj. No.:

75980S

STATE Massachusetts

COUNTY Plymouth

LOCATION: Rochester

OPERATOR D Livingstone

GPS OBSERVATIONS

LATITUDE 41-46-06.3

HGT. MTS

LONGITUDE 70-49-11.0

12.29

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0788

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

A

DATE:

12/07/10

DAY OF YEAR

341

START TIME 07:26

END TIME 07:47

U.T.C.

X

LOCAL

Collection Rate

5 SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

8" Spike in Lawn (Small Park Area)

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

X NEW CONTROL

NATURAL

PHOTOS:

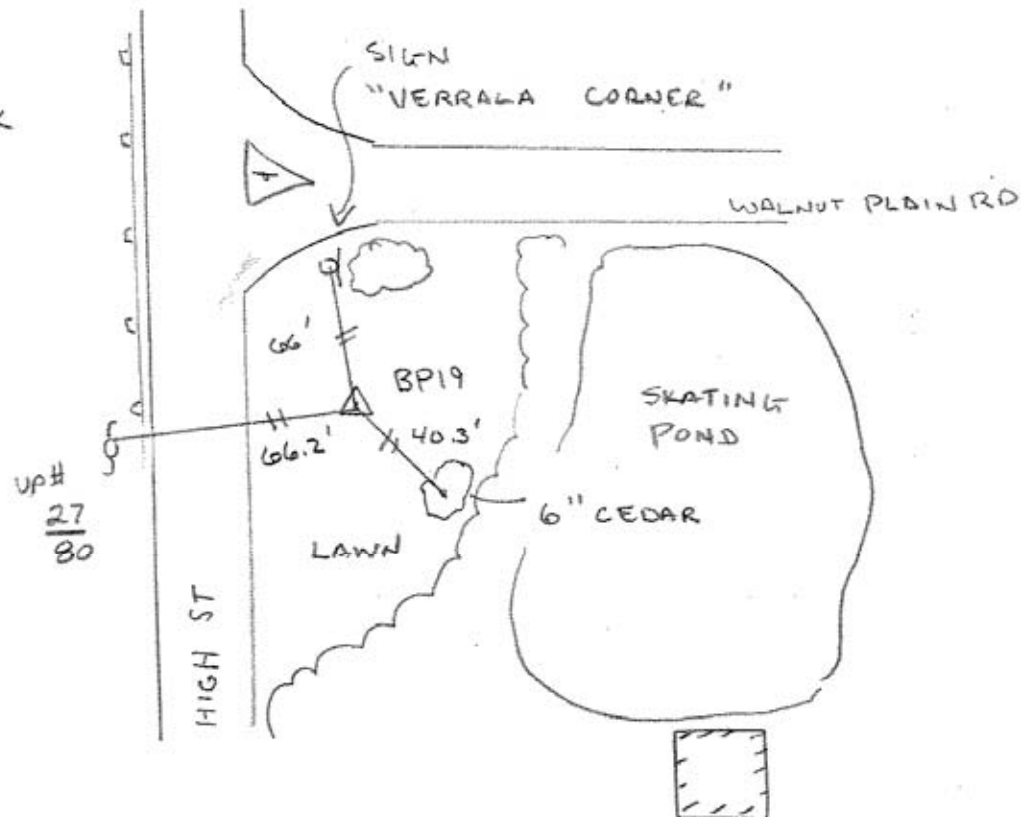


PHOTOS CONT'D:



SITE SKETCH:

BP 19

10" SPK
IN SMALL PARK

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sewall.com
136 Center Street
P.O. Box 433
Old Town, Maine 04468
207 827 4456
fax: 207 827 3641
800 648 4202

JOB REFERENCE

NE LIDAR

POINT ID:

BP20

Proj. No.:

75980S

STATE Massachusetts

COUNTY Bristol

LOCATION: Westport

OPERATOR D Livingstone

GPS OBSERVATIONS

LATITUDE	41-39-29.9	HGT. MTS
LONGITUDE	71-06-26.3	59.49

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0788

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

B

DATE:

12/09/10

DAY OF YEAR

343

START TIME

07:28

END TIME

07:52

U.T.C.

X

LOCAL

Collection Rate

5

SECONDS

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED

FIXED HGT.

ANTENNA HEIGHT (ARP)

MTRS/FT

1.8 Meters

MEASURED

X

FIXED HGT

TOP OF MONUMENT IS:

X

FLUSH

MTRS/FEET

ABOVE GROUND

MTRS/FEET

BELOW GROUND

DESCRIPTION

Point in Lawn, Private Property

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X

NEW CONTROL

PUB. CONTROL

NATURAL

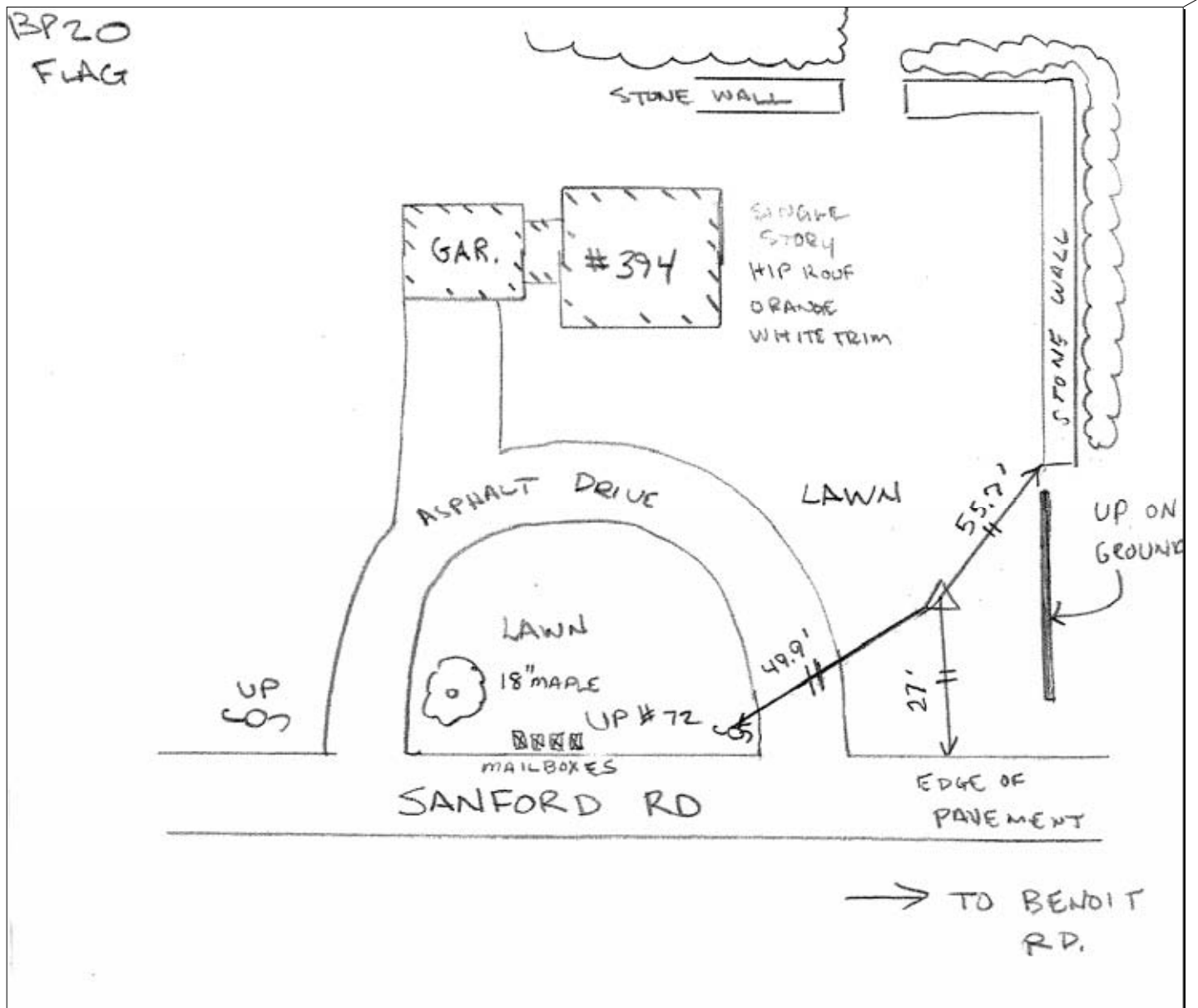
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



MA BP 1

FILE: 0793log1201j.tps 000180717

NGS OPUS-RS SOLUTION REPORT

=====

USER: JOHN.ALLEN@SEWALL.COM DATE: December 13, 2010
RINEX FILE: 0793335s.10o TIME: 19:23:19 UTC

SOFTWARE: rsgps 1.35.1 RS40.prl 1.65 START: 2010/12/01 18:59:40
EPHEMERIS: igr16123.eph [rapid] STOP: 2010/12/01 19:23:25
NAV FILE: brdc3350.10n OBS USED: 2484 / 2619 : 95%
ANT NAME: TPSHIPER_GGD QUALITY IND. 16.56/ 29.10
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.331

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91726)

X: 1532603.446(m) 0.010(m) 1532602.670(m) 0.010(m)
Y: -4427917.656(m) 0.017(m) -4427916.229(m) 0.017(m)
Z: 4312755.369(m) 0.018(m) 4312755.311(m) 0.018(m)

LAT: 42 49 7.77058 0.013(m) 42 49 7.80450 0.013(m)
E LON: 289 5 30.86048 0.010(m) 289 5 30.84874 0.010(m)
W LON: 70 54 29.13952 0.010(m) 70 54 29.15126 0.010(m)
EL HGT: -7.118(m) 0.021(m) -8.333(m) 0.021(m)
ORTHO HGT: 19.859(m) 0.024(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4742461.659	952191.509
Easting (X) [meters]	344015.965	248406.839
Convergence [degrees]	-1.29715882	0.39760002
Point Scale	0.99989934	1.00002274
Combined Factor	0.99990046	1.00002385

US NATIONAL GRID DESIGNATOR: 19TCH4401542461(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	36140.4
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	53097.3
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	72405.9
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	88463.2
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	119450.6
AJ2693	YMTS MTS YARMOUTH COOP CORS ARP	N434754.610	W0701120.298	123489.0
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	130211.3
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	133407.3
DJ8961	VTSP SPRINGFIELD VT CORS ARP	N431653.241	W0722839.238	137810.4

NEAREST NGS PUBLISHED CONTROL POINT

MY6005 11051 N424903.877 W0705453.794 572.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 2

FILE: 0793log1201b.tps 000180821

NGS OPUS-RS SOLUTION REPORT

=====

USER: john.allen@sewall.com DATE: December 13, 2010
RINEX FILE: 0793335m.10o TIME: 20:49:46 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.65 START: 2010/12/01 12:16:00
EPHEMERIS: igr16123.eph [rapid] STOP: 2010/12/01 12:36:35
NAV FILE: brdc3350.10n OBS USED: 1791 / 1872 : 96%
ANT NAME: TPSHIPER_GGD QUALITY IND. 33.44/ 24.63
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.303

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91649)

X: 1506792.735(m) 0.012(m) 1506791.960(m) 0.012(m)
Y: -4447441.522(m) 0.024(m) -4447440.095(m) 0.024(m)
Z: 4301879.162(m) 0.024(m) 4301879.101(m) 0.024(m)

LAT: 42 41 6.58512 0.003(m) 42 41 6.61882 0.003(m)
E LON: 288 42 58.95005 0.008(m) 288 42 58.93792 0.008(m)
W LON: 71 17 1.04995 0.008(m) 71 17 1.06208 0.008(m)
EL HGT: 32.515(m) 0.035(m) 31.297(m) 0.035(m)
ORTHO HGT: 60.008(m) 0.037(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4728381.986	937197.577
Easting (X) [meters]	312913.888	217733.228
Convergence [degrees]	-1.54867564	0.14534530
Point Scale	1.00003063	1.00000027
Combined Factor	1.00002554	0.99999517

US NATIONAL GRID DESIGNATOR: 19TCH1291328381(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	18957.7
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	44715.0
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	57580.2
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	69065.1
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	95646.4
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	100528.1
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	105601.4
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	109598.7
DJ8961	VTSP SPRINGFIELD VT CORS ARP	N431653.241	W0722839.238	117775.0

NEAREST NGS PUBLISHED CONTROL POINT

MY2656 DRACUT OLD YELLOW CHURCH N424010.120 W0711811.647 2371.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 3

FILE: 0793log1201k.tps 000180668

Your station is 7.4 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

=====

USER: john.allen@sewall.com
RINEX FILE: 0793335u.10o

DATE: December 13, 2010
TIME: 18:57:31 UTC

SOFTWARE: rsgps 1.35.1 RS26.prl 1.65 START: 2010/12/01 20:02:15
EPHEMERIS: igr16123.eph [rapid] STOP: 2010/12/01 20:23:15
NAV FILE: brdc3350.10n OBS USED: 1576 / 1800 : 88%
ANT NAME: TPSHIPER_GGD QUALITY IND. 11.78/ 8.95
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.371

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91738)

X:	1540601.453(m)	0.009(m)	1540600.677(m)	0.009(m)
Y:	-4434234.138(m)	0.024(m)	-4434232.709(m)	0.024(m)
Z:	4303443.583(m)	0.030(m)	4303443.524(m)	0.030(m)
LAT:	42 42 17.25482	0.008(m)	42 42 17.28868	0.008(m)
E LON:	289 9 32.18133	0.012(m)	289 9 32.16973	0.012(m)
W LON:	70 50 27.81867	0.012(m)	70 50 27.83027	0.012(m)
EL HGT:	-24.008(m)	0.037(m)	-25.227(m)	0.037(m)
ORTHO HGT:	2.885(m)	0.039(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4729676.683	939564.308
Easting (X) [meters]	349219.655	253986.692
Convergence [degrees]	-1.24888096	0.44262839
Point Scale	0.99987971	1.00000323
Combined Factor	0.99988347	1.00000699

US NATIONAL GRID DESIGNATOR: 19TCH4921929676(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	49465.6
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	54436.1
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	66786.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	78770.7
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	102910.4
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	106837.9
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	124360.4
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	146507.2

NEAREST NGS PUBLISHED CONTROL POINT

MY4969	NEWBURY SOUTH BASE	N424150.637	W0705104.798	1176.3
--------	--------------------	-------------	--------------	--------

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 4

FILE: 0793log1202i.tps 000180720

NGS OPUS-RS SOLUTION REPORT

=====

USER: JOHN.ALLEN@SEWALL.COM DATE: December 13, 2010
RINEX FILE: 0793336r.10o TIME: 19:22:16 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.65 START: 2010/12/02 17:53:10
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 18:14:30
NAV FILE: brdc3360.10n OBS USED: 1809 / 2376 : 76%
ANT NAME: TPSHIPER_GGD QUALITY IND. 38.40/ 3.67
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.332

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91987)

X:	1529094.600(m)	0.012(m)	1529093.825(m)	0.012(m)
Y:	-4442105.000(m)	0.037(m)	-4442103.571(m)	0.037(m)
Z:	4299490.310(m)	0.031(m)	4299490.250(m)	0.031(m)

LAT:	42 39 22.27504	0.005(m)	42 39 22.30882	0.005(m)
E LON:	288 59 41.53425	0.010(m)	288 59 41.52250	0.010(m)
W LON:	71 0 18.46575	0.010(m)	71 0 18.47750	0.010(m)
EL HGT:	-0.296(m)	0.049(m)	-1.516(m)	0.049(m)
ORTHO HGT:	26.827(m)	0.050(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4724585.161	934074.069
Easting (X) [meters]	335654.125	240576.101
Convergence [degrees]	-1.35897399	0.33241879
Point Scale	0.99993231	0.99999612
Combined Factor	0.99993235	0.99999617

US NATIONAL GRID DESIGNATOR: 19TCH3565424585(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	40325.2
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	53431.8
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	68826.5
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	101840.4
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	111256.9
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	128526.8
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	136672.2
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	143068.9
AJ1830	BARN BARTLETT CORS ARP	N440556.684	W0710934.400	160790.6

NEAREST NGS PUBLISHED CONTROL POINT

MY2566	HOOPER	N423818.215	W0710035.133	2016.8
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 5

FILE: 0793log1202k.tps 000180682

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0793336t.10o

DATE: December 13, 2010
TIME: 19:14:29 UTC

SOFTWARE: rsgps 1.35.1 RS53.prl 1.65 START: 2010/12/02 19:52:20
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 20:17:35
NAV FILE: brdc3360.10n OBS USED: 2556 / 3276 : 78%
ANT NAME: TPSHIPER_GGD QUALITY IND. 27.71/ 27.96
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.329

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92010)

X: 1513668.585(m) 0.014(m) 1513667.810(m) 0.014(m)
Y: -4456940.609(m) 0.012(m) -4456939.180(m) 0.012(m)
Z: 4289677.907(m) 0.013(m) 4289677.845(m) 0.013(m)

LAT: 42 32 9.74647 0.006(m) 42 32 9.78009 0.006(m)
E LON: 288 45 30.75297 0.012(m) 288 45 30.74095 0.012(m)
W LON: 71 14 29.24703 0.012(m) 71 14 29.25905 0.012(m)
EL HGT: 18.228(m) 0.018(m) 17.006(m) 0.018(m)
ORTHO HGT: 45.839(m) 0.022(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4711729.774	920642.210
Easting (X) [meters]	315929.795	221239.306
Convergence [degrees]	-1.51577039	0.17367040
Point Scale	1.00001688	0.99998165
Combined Factor	1.00001402	0.99997879

US NATIONAL GRID DESIGNATOR: 19TCH1592911729(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	22390.2
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	30974.1
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	52451.1
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	71413.9
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	88633.6
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	92775.6
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	112455.2
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	117581.1
DJ8961	VTSP SPRINGFIELD VT CORS ARP	N431653.241	W0722839.238	130560.0

NEAREST NGS PUBLISHED CONTROL POINT

MY6226 203 H N423118.494 W0711545.524 2352.2

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 6

FILE: 0793log1202c.tps 000180719

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: December 13, 2010
RINEX FILE: 0793336m.10o TIME: 19:23:40 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.65 START: 2010/12/02 12:46:25
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 13:07:15
NAV FILE: brdc3360.10n OBS USED: 1386 / 1773 : 78%
ANT NAME: TPSHIPER_GGD QUALITY IND. 28.05/ 18.05
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.246

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91929)

X: 1558456.843(m) 0.009(m) 1558456.067(m) 0.009(m)
Y: -4432753.281(m) 0.024(m) -4432751.850(m) 0.024(m)
Z: 4298639.836(m) 0.029(m) 4298639.777(m) 0.029(m)

LAT: 42 38 44.09946 0.015(m) 42 38 44.13335 0.015(m)
E LON: 289 22 13.91874 0.008(m) 289 22 13.90744 0.008(m)
W LON: 70 37 46.08126 0.008(m) 70 37 46.09256 0.008(m)
EL HGT: 23.224(m) 0.034(m) 22.001(m) 0.034(m)
ORTHO HGT: 49.979(m) 0.036(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4722745.615	933142.678
Easting (X) [meters]	366422.513	271389.100
Convergence [degrees]	-1.10406377	0.58476197
Point Scale	0.99981952	0.99999467
Combined Factor	0.99981588	0.99999102

US NATIONAL GRID DESIGNATOR: 19TCH6642222745(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	61168.5
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	70952.1
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	77050.8
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	82417.1
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	102426.0
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	116899.4
AJ2693	YMTS MTS YARMOUTH COOP CORS ARP	N434754.610	W0701120.298	132989.3
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	148428.4
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	158848.0

NEAREST NGS PUBLISHED CONTROL POINT

MY4929	ROCKPORT WATER TOWER	N423840.839	W0703745.309	102.3
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 7

FILE: 0793log1202g.tps 000180676

Your station is 14.9 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0793336q.10o

DATE: December 13, 2010
TIME: 19:03:48 UTC

SOFTWARE: rsgps 1.35.1 RS41.prl 1.65 START: 2010/12/02 16:17:20
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 16:38:30
NAV FILE: brdc3360.10n OBS USED: 1344 / 1939 : 69%
ANT NAME: TPSHIPER_GGD QUALITY IND. 17.38/ 21.85
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.317

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91969)

X:	1537632.542(m)	0.065(m)	1537631.767(m)	0.065(m)
Y:	-4450710.455(m)	0.078(m)	-4450709.024(m)	0.078(m)
Z:	4287591.956(m)	0.055(m)	4287591.895(m)	0.055(m)

LAT:	42 30 38.92182	0.083(m)	42 30 38.95553	0.083(m)
E LON:	289 3 32.47210	0.040(m)	289 3 32.46048	0.040(m)
W LON:	70 56 27.52790	0.040(m)	70 56 27.53952	0.040(m)
EL HGT:	-12.074(m)	0.069(m)	-13.299(m)	0.069(m)
ORTHO HGT:	15.050(m)	0.070(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4708319.058	917958.092
Easting (X) [meters]	340541.959	245941.691
Convergence [degrees]	-1.31185275	0.37550978
Point Scale	0.99991284	0.99997917
Combined Factor	0.99991474	0.99998107

US NATIONAL GRID DESIGNATOR: 19TCH4054108319(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	46765.2
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	55820.9
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	70184.7
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	103628.0
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	120117.6
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	123472.7
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	136090.1

NEAREST NGS PUBLISHED CONTROL POINT

MY5128 BOULDER WEST OF SALEM TURNPIKE N423021.677 W0705605.605 730.8

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 8

FILE: 0793log1202l.tps 000180683

Your station is 0.7 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0793336v.10o

DATE: December 13, 2010
TIME: 19:03:34 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.65 START: 2010/12/02 21:26:55
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 21:49:05
NAV FILE: brdc3360.10n OBS USED: 1112 / 1840 : 60%
ANT NAME: TPSHIPER_GGD QUALITY IND. 30.15/ 12.95
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.481

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92028)

X:	1523269.164(m)	0.010(m)	1523268.391(m)	0.010(m)
Y:	-4478216.067(m)	0.028(m)	-4478214.634(m)	0.028(m)
Z:	4264280.724(m)	0.020(m)	4264280.659(m)	0.020(m)

LAT:	42 13 34.20921	0.006(m)	42 13 34.24263	0.006(m)
E LON:	288 47 8.81588	0.010(m)	288 47 8.80409	0.010(m)
W LON:	71 12 51.18412	0.010(m)	71 12 51.19591	0.010(m)
EL HGT:	60.913(m)	0.034(m)	59.681(m)	0.034(m)
ORTHO HGT:	89.186(m)	0.036(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4677261.584	886229.816
Easting (X) [meters]	317270.052	223592.366
Convergence [degrees]	-1.48849553	0.19196809
Point Scale	1.00001086	0.99996465
Combined Factor	1.00000130	0.99995510

US NATIONAL GRID DESIGNATOR: 19TCG1727077261(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	18272.4
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	48757.0
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	60075.5
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	66600.5
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	85923.2
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	99207.9
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	118023.3
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	127374.8

NEAREST NGS PUBLISHED CONTROL POINT

MY3588	WEST DEDHAM CHURCH	N421251.735	W0711245.647	1319.5
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 9

FILE: 0793log1203h.tps 000180692

Your station is 10.4 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0793337r.10o

DATE: December 13, 2010
TIME: 19:06:46 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.65 START: 2010/12/03 17:23:50
EPHEMERIS: igr16125.eph [rapid] STOP: 2010/12/03 17:46:55
NAV FILE: brdc3370.10n OBS USED: 1620 / 1827 : 89%
ANT NAME: TPSHIPER_GGD QUALITY IND. 19.97/ 20.40
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.336

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92256)

X:	1557643.672(m)	0.009(m)	1557642.898(m)	0.009(m)
Y:	-4468529.985(m)	0.018(m)	-4468528.550(m)	0.018(m)
Z:	4261956.429(m)	0.018(m)	4261956.365(m)	0.018(m)

LAT:	42 11 54.12587	0.005(m)	42 11 54.15937	0.005(m)
E LON:	289 13 3.26271	0.009(m)	289 13 3.25144	0.009(m)
W LON:	70 46 56.73729	0.009(m)	70 46 56.74856	0.009(m)
EL HGT:	5.722(m)	0.024(m)	4.487(m)	0.024(m)
ORTHO HGT:	33.574(m)	0.027(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4673338.998	883351.633
Easting (X) [meters]	352840.627	259263.665
Convergence [degrees]	-1.19746968	0.48201434
Point Scale	0.99986646	0.99996455
Combined Factor	0.99986557	0.99996365

US NATIONAL GRID DESIGNATOR: 19TCG5284073338(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	41480.3
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	51254.8
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	55584.2
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	74495.1
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	97441.2
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	105800.6
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	142450.5
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	153807.7
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	157145.3

NEAREST NGS PUBLISHED CONTROL POINT

MY2155	M 3 A 17	N421207.	W0704626.	808.9
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 10

FILE: 0788log1207f.tps 000179360

Your station is 16.8 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com DATE: December 09, 2010
RINEX FILE: 0788341q.10o TIME: 23:22:45 UTC

SOFTWARE: rsgps 1.35.1 RS30.prl 1.65 START: 2010/12/07 16:22:20
EPHEMERIS: igr16132.eph [rapid] STOP: 2010/12/07 16:52:40
NAV FILE: brdc3410.10n OBS USED: 2925 / 3141 : 93%
ANT NAME: TPSHIPER_GD QUALITY IND. 22.23/ 7.64
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.330

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93340)

X:	1549997.595(m)	0.011(m)	1549996.822(m)	0.011(m)
Y:	-4483694.092(m)	0.013(m)	-4483692.656(m)	0.013(m)
Z:	4248874.988(m)	0.017(m)	4248874.923(m)	0.017(m)

LAT:	42 2 22.75550	0.007(m)	42 2 22.78887	0.007(m)
E LON:	289 4 12.32866	0.009(m)	289 4 12.31730	0.009(m)
W LON:	70 55 47.67134	0.009(m)	70 55 47.68270	0.009(m)
EL HGT:	-1.562(m)	0.021(m)	-2.801(m)	0.021(m)
ORTHO HGT:	26.856(m)	0.024(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4655980.842 865631.437
Easting (X) [meters]	340265.649 247201.323
Convergence [degrees]	-1.29262592 0.38294667
Point Scale	0.99991396 0.99996848
Combined Factor	0.99991421 0.99996872

US NATIONAL GRID DESIGNATOR: 19TCG4026555980(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	26673.1
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	33080.7
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	51248.5
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	78820.1
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	111688.9
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	121700.3
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	144581.3
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	153659.2
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	164153.7

NEAREST NGS PUBLISHED CONTROL POINT

MY4266 E BRIDGEWATER UNITARIAN CHURCH N420145.851 W0705709.539 2199.5

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 11

FILE: 0509log1203e.tps 000182042

Your station is 17.2 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0509337n.10o

DATE: December 16, 2010
TIME: 14:06:47 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.66 START: 2010/12/03 13:47:30
EPHEMERIS: igr16125.eph [rapid] STOP: 2010/12/03 14:11:25
NAV FILE: brdc3370.10n OBS USED: 2430 / 2808 : 87%
ANT NAME: TPSHIPER_GD QUALITY IND. 29.95/ 24.33
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.298

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92214)

X:	1568343.426(m)	0.011(m)	1568342.653(m)	0.011(m)
Y:	-4476658.125(m)	0.017(m)	-4476656.688(m)	0.017(m)
Z:	4249553.434(m)	0.013(m)	4249553.369(m)	0.013(m)

LAT:	42 2 52.43726	0.006(m)	42 2 52.47069	0.006(m)
E LON:	289 18 26.26782	0.009(m)	289 18 26.25676	0.009(m)
W LON:	70 41 33.73218	0.009(m)	70 41 33.74324	0.009(m)
EL HGT:	-4.035(m)	0.021(m)	-5.276(m)	0.021(m)
ORTHO HGT:	24.069(m)	0.024(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4656480.540	866705.740
Easting (X) [meters]	359917.378	266831.825
Convergence [degrees]	-1.13387480	0.54228429
Point Scale	0.99984146	0.99996809
Combined Factor	0.99984209	0.99996872

US NATIONAL GRID DESIGNATOR: 19TCG5991756480(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	37450.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	46204.7
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	67943.6
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	91098.6
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	100521.6
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	123443.9
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	130802.0
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	137931.5
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	163596.9

NEAREST NGS PUBLISHED CONTROL POINT

MY2142	T 42	N420254.	W0704130.	98.4
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 12

FILE: 0788log1208a.tps 000179368

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com DATE: December 09, 2010
RINEX FILE: 0788342m.10o TIME: 23:23:36 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.65 START: 2010/12/08 12:25:50
EPHEMERIS: igu16133.eph [ultra-rapid] STOP: 2010/12/08 12:47:50
NAV FILE: brdc3420.10n OBS USED: 1764 / 1971 : 89%
ANT NAME: TPSHIPER_GD QUALITY IND. 30.74/ 16.74
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.313

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93569)

X:	1537240.545(m)	0.009(m)	1537239.772(m)	0.009(m)
Y:	-4498365.795(m)	0.010(m)	-4498364.358(m)	0.010(m)
Z:	4238046.289(m)	0.013(m)	4238046.222(m)	0.013(m)

LAT:	41 54 30.95102	0.006(m)	41 54 30.98425	0.006(m)
E LON:	288 52 1.18774	0.009(m)	288 52 1.17617	0.009(m)
W LON:	71 7 58.81226	0.009(m)	71 7 58.82383	0.009(m)
EL HGT:	-11.239(m)	0.016(m)	-12.481(m)	0.016(m)
ORTHO HGT:	17.712(m)	0.020(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4641828.035	850982.758
Easting (X) [meters]	323092.682	230448.641
Convergence [degrees]	-1.42509602	0.24652214
Point Scale	0.99998512	0.99997747
Combined Factor	0.99998688	0.99997923

US NATIONAL GRID DESIGNATOR: 19TCG2309241828(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	19806.4
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	27456.6
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	50432.2
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	62747.7
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	83735.5
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	91684.5
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	99452.2
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	129909.2
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	134020.5

NEAREST NGS PUBLISHED CONTROL POINT

LW1485	V 45	N415439.	W0710730.	708.2
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 13

FILE: 0788log1207d.tps 000179358

Your station is 1.4 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com DATE: December 09, 2010
RINEX FILE: 07883410.10o TIME: 23:27:41 UTC

SOFTWARE: rsgps 1.35.1 RS40.prl 1.65 START: 2010/12/07 14:41:30
EPHEMERIS: igr16132.eph [rapid] STOP: 2010/12/07 15:05:40
NAV FILE: brdc3410.10n OBS USED: 3222 / 3276 : 98%
ANT NAME: TPSHIPER_GD QUALITY IND. 18.40/ 0.71
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.302

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93321)

X:	1556770.991(m)	0.008(m)	1556770.218(m)	0.008(m)
Y:	-4490322.963(m)	0.016(m)	-4490321.525(m)	0.016(m)
Z:	4239434.725(m)	0.019(m)	4239434.659(m)	0.019(m)

LAT:	41 55 31.46699	0.007(m)	41 55 31.50030	0.007(m)
E LON:	289 7 16.16924	0.008(m)	289 7 16.15798	0.008(m)
W LON:	70 52 43.83076	0.008(m)	70 52 43.84202	0.008(m)
EL HGT:	-12.595(m)	0.024(m)	-13.838(m)	0.024(m)
ORTHO HGT:	16.026(m)	0.027(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4643201.346 852971.926
Easting (X) [meters]	344214.150 251521.792
Convergence [degrees]	-1.25562370 0.41724972
Point Scale	0.99989864 0.99997603
Combined Factor	0.99990062 0.99997800

US NATIONAL GRID DESIGNATOR: 19TCG4421443201(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	20209.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	34420.2
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	62451.6
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	72571.6
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	83866.0
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	112726.8
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	117534.0
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	135335.2
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	150961.9

NEAREST NGS PUBLISHED CONTROL POINT

LW5827	401 H	N415439.724	W0705257.076	1628.8
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 14

FILE: 0509log1203c.tps 000176515

Your station is 24.9 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0509337m.10o

DATE: December 04, 2010
TIME: 21:13:20 UTC

SOFTWARE: rsgps 1.35.1 RS40.prl 1.65 START: 2010/12/03 12:23:20
EPHEMERIS: igu16125.eph [ultra-rapid] STOP: 2010/12/03 12:40:40
NAV FILE: brdc3370.10n OBS USED: 1800 / 1818 : 99%
ANT NAME: TPSHIPER_GD QUALITY IND. 23.17/ 2.41
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.250

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92198)

X:	1580509.260(m)	0.008(m)	1580508.487(m)	0.008(m)
Y:	-4486102.467(m)	0.020(m)	-4486101.027(m)	0.020(m)
Z:	4235199.922(m)	0.017(m)	4235199.856(m)	0.017(m)

LAT:	41 52 26.01711	0.004(m)	41 52 26.05046	0.004(m)
E LON:	289 24 28.76342	0.007(m)	289 24 28.75255	0.007(m)
W LON:	70 35 31.23658	0.007(m)	70 35 31.24745	0.007(m)
EL HGT:	23.284(m)	0.026(m)	22.037(m)	0.026(m)
ORTHO HGT:	51.546(m)	0.029(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4637000.199	847463.919
Easting (X) [meters]	367891.622	275373.120
Convergence [degrees]	-1.06280954	0.60992281
Point Scale	0.99981476	0.99998072
Combined Factor	0.99981111	0.99997707

US NATIONAL GRID DESIGNATOR: 19TCG6789137000(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0884	ACU6 ACUSHNET 6 CORS ARP	N414435.676	W0705311.720	28457.1
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	58517.9
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	84765.4
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	88869.7
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	107694.7
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	135437.8
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	143994.0
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	174907.9
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	184871.2

NEAREST NGS PUBLISHED CONTROL POINT

LW5793	5109 Z	N415225.968	W0703604.503	766.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 17

FILE: 0515log1130h.tps 000176491

Your station is 49.5 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0515334v.10o

DATE: December 04, 2010
TIME: 21:05:25 UTC

SOFTWARE: rsgps 1.35.1 RS50.prl 1.65 START: 2010/11/30 21:20:45
EPHEMERIS: igr16122.eph [rapid] STOP: 2010/11/30 21:49:05
NAV FILE: brdc3340.10n OBS USED: 2565 / 2691 : 95%
ANT NAME: TPSHIPER_GD QUALITY IND. 17.96/ 37.91
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.332

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91479)

X:	1608469.021(m)	0.007(m)	1608468.249(m)	0.007(m)
Y:	-4492128.905(m)	0.026(m)	-4492127.461(m)	0.026(m)
Z:	4218307.684(m)	0.020(m)	4218307.618(m)	0.020(m)

LAT:	41 40 12.99763	0.008(m)	41 40 13.03093	0.008(m)
E LON:	289 42 2.19827	0.008(m)	289 42 2.18789	0.008(m)
W LON:	70 17 57.80173	0.008(m)	70 17 57.81211	0.008(m)
EL HGT:	-15.168(m)	0.032(m)	-16.422(m)	0.032(m)
ORTHO HGT:	12.956(m)	0.034(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4613984.057	825151.109
Easting (X) [meters]	391832.827	299980.766
Convergence [degrees]	-0.86397343	0.80648459
Point Scale	0.99974398	1.00000711
Combined Factor	0.99974636	1.00000949

US NATIONAL GRID DESIGNATOR: 19TCG9183213984(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0884	ACU6 ACUSHNET 6 CORS ARP	N414435.676	W0705311.720	49539.8
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	117714.5
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	134584.1
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	150793.8
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	159239.1
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	172130.6
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	202279.7
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	206792.1
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	218572.9

NEAREST NGS PUBLISHED CONTROL POINT

AI5585	HYA A	N414011.432	W0701719.907	876.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 19

FILE: 0788log1207a.tps 000179355

Your station is 5.6 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com DATE: December 09, 2010
RINEX FILE: 0788341m.10o TIME: 23:19:12 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.65 START: 2010/12/07 12:26:20
EPHEMERIS: igr16132.eph [rapid] STOP: 2010/12/07 12:49:40
NAV FILE: brdc3410.10n OBS USED: 1692 / 1980 : 85%
ANT NAME: TPSHIPER_GD QUALITY IND. 31.70/ 54.34
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.247

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93295)

X:	1565217.557(m)	0.014(m)	1565216.785(m)	0.014(m)
Y:	-4499705.780(m)	0.021(m)	-4499704.340(m)	0.021(m)
Z:	4226437.819(m)	0.023(m)	4226437.751(m)	0.023(m)

LAT:	41 46 6.08366	0.008(m)	41 46 6.11686	0.008(m)
E LON:	289 10 48.62045	0.011(m)	289 10 48.60937	0.011(m)
W LON:	70 49 11.37955	0.011(m)	70 49 11.39063	0.011(m)
EL HGT:	-16.494(m)	0.031(m)	-17.743(m)	0.031(m)
ORTHO HGT:	12.290(m)	0.034(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4625658.077	835566.408
Easting (X) [meters]	348737.924	256555.708
Convergence [degrees]	-1.21245414	0.45689127
Point Scale	0.99988156	0.99999284
Combined Factor	0.99988415	0.99999543

US NATIONAL GRID DESIGNATOR: 19TCG4873725658(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0884	ACU6 ACUSHNET 6 CORS ARP	N414435.676	W0705311.720	6213.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	48516.4
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	78365.3
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	90011.7
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	113319.5
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	153030.6
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	156994.6
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	162544.5
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	184215.1

NEAREST NGS PUBLISHED CONTROL POINT

LW4864	HUBBARDS BARN	N414452.962	W0705104.035	3444.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

MA BP 20

FILE: 0788log1209b.tps 000181220

NGS OPUS-RS SOLUTION REPORT

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USER: livda@sewall.com
RINEX FILE: 0788343m.10o

DATE: December 14, 2010
TIME: 18:45:31 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.65 START: 2010/12/09 12:27:45
EPHEMERIS: igr16134.eph [rapid] STOP: 2010/12/09 12:52:55
NAV FILE: brdc3430.10n OBS USED: 1944 / 2250 : 86%
ANT NAME: TPSHIPER_GD QUALITY IND. 26.99/ 11.60
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.300

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93843)

X:	1545266.450(m)	0.010(m)	1545265.678(m)	0.010(m)
Y:	-4515223.482(m)	0.017(m)	-4515222.042(m)	0.017(m)
Z:	4217351.601(m)	0.020(m)	4217351.531(m)	0.020(m)

LAT:	41 39 30.21208	0.009(m)	41 39 30.24512	0.009(m)
E LON:	288 53 33.82668	0.011(m)	288 53 33.81527	0.011(m)
W LON:	71 6 26.17332	0.011(m)	71 6 26.18473	0.011(m)
EL HGT:	30.018(m)	0.024(m)	28.767(m)	0.024(m)
ORTHO HGT:	59.494(m)	0.027(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4613994.167	823202.724
Easting (X) [meters]	324545.916	232711.575
Convergence [degrees]	-1.40103386	0.26380776
Point Scale	0.99997884	1.00000904
Combined Factor	0.99997413	1.00000433

US NATIONAL GRID DESIGNATOR: 19TCG2454513994(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	20634.5
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	39797.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	46582.5
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	76476.3
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	86488.8
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	92219.7
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	110767.3
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	133862.5
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	146575.5

NEAREST NGS PUBLISHED CONTROL POINT

LW2126	HIGHWAY	N414024.938	W0710633.669	1701.1
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.



Project Summary

Project name: 75980S - Cape Cod data.ttp

Surveyor:

Comment:

Linear unit: Meters

Projection: UTMNorth-Zone_19 : 72W to 66W

Geoid: g2009u04

Adjustment Summary

Adjustment type: Plane + Height, Constraint

Confidence level: 95 %

Number of adjusted points: 37

Number of plane control points: 2

Number of used GPS vectors: 42

A posteriori plane UWE: 0.6930414 , Bounds: (0.6341473 , 1.365912)

Number of height control points: 1

A posteriori height UWE: 0.6894426 , Bounds: (0.4546061 , 1.551881)

Used GPS Observations

Name	dN (m)	dE (m)	dHt (m)	Horizontal	Vertical
6121C CONTROL-PVC34	2922.077	-2683.34	-1.431	0.002	0.003
BM2-56 CONTROL-MTS	1936.138	1314.984	6.701	0.002	0.002
CQX39-MTS ORLEANS MA	-4759.66	-3234.341	13.391	0.004	0.007
CQX40-MTS ORLEANS MA	8441.617	-3515.795	3.553	0.008	0.009
CQX41-MTS ORLEANS MA	5127.238	3065.997	-13.841	0.01	0.015
CQX42-MTS BOURNE MA	481.461	-38596.93	0.693	0.022	0.032
CQX42-MTS ORLEANS MA	3521.994	12175.399	6.309	0.008	0.012
CQX43-MTS ORLEANS MA	12121.353	10796.122	13.982	0.01	0.018
CQX44-MTS ORLEANS MA	10486.969	21149.878	5.655	0.014	0.023
CQX45-MTS ORLEANS MA	13214.319	-3924.844	2.787	0.01	0.015
HYA46-MTS BOURNE MA	5156.683	-24142.738	-6.338	0.018	0.024
HYA46-MTS ORLEANS MA	8197.214	26629.595	-0.68	0.019	0.027
HYA47-MTS BOURNE MA	96.025	-13961.708	6.493	0.007	0.014
HYA48-MTS BOURNE MA	-6376.239	-6858.905	-21.075	0.007	0.013
HYA49-MTS BOURNE MA	3139.334	-99.55	10.346	0.002	0.002
HYA50-MTS BOURNE MA	9899.288	-9988.42	-21.083	0.009	0.017
HYA51-MTS BOURNE MA	13231.238	-19202.037	1.44	0.067	0.037
HYA51-MTS ORLEANS MA	16271.805	31570.352	7.007	0.061	0.033
HYA52-MTS ORLEANS MA	9963.464	32919.162	-12.338	0.019	0.029
HYA53-MTS BOURNE MA	3837.362	-10280.56	-38.94	0.007	0.011

MA BP14-MTS BOURNE	-14618.788	-2390.798	-39.895	0.009	0.023
MA BP15-MTS ORLEANS	-31130.903	14734.092	9.203	0.013	0.022
MA BP15-PVC34	2455.727	-2250.561	-5.344	0.001	0.003
MA BP16-MTS ORLEANS	4253.315	1318.565	-16.802	0.002	0.004
MA BP17-MTS BOURNE	8397.346	-26332.014	-1.486	0.012	0.024
MA BP18-MTS BOURNE	17475.957	-2005.546	-1.718	0.011	0.02
MTS BOURNE MA-MTS	3040.528	50772.334	5.618	0.018	0.029
MTS BOURNE MA-MVY54	-16499.848	11548.152	-3.695	0.011	0.025
MTS BOURNE MA-MVY55	-13169.86	5304.196	11.562	0.008	0.014
MTS BOURNE MA-MVY56	-10426.736	225.198	-1.848	0.006	0.011
MTS BOURNE MA-MVY57	-24395.79	-4205.748	4.353	0.018	0.023
MTS BOURNE MA-MVY58	-17051.739	2284.742	3.725	0.009	0.017
MTS BOURNE MA-MVY59	-15645.265	-1729.678	3.113	0.01	0.016
MTS BOURNE MA-MVY60	-21729.883	2964.486	-10.516	0.014	0.024
MTS BOURNE MA-PYM12	11384.621	6585.69	-2.746	0.007	0.014
MTS ORLEANS MA-PVC34	33586.632	-16984.651	-14.56	0.013	0.022
MTS ORLEANS MA-PVC35	29175.224	-15347.67	-13.645	0.009	0.022
MTS ORLEANS MA-PVC36	29932.883	-7015.803	-1.923	0.013	0.024
MTS ORLEANS MA-PVC37	24218.109	-3100.474	-10.484	0.012	0.019
MTS ORLEANS MA-PVC38	12589.567	1771.097	-10.429	0.006	0.012
PVC34-PVC35	-4411.402	1636.989	0.897	0.002	0.004
PVC34-PVC36	-3653.752	9968.847	12.64	0.005	0.009

GPS Observation Residuals

Name	dN (m)	dE (m)	dHt (m)	Horizontal	Vertical
6121C CONTROL-PVC34	2922.077	-2683.34	-1.431	0.002	0.003
BM2-56 CONTROL-MTS	1936.138	1314.984	6.701	0.002	0.002
CQX39-MTS ORLEANS MA	-4759.66	-3234.341	13.391	0.004	0.007
CQX40-MTS ORLEANS MA	8441.617	-3515.795	3.553	0.008	0.009
CQX41-MTS ORLEANS MA	5127.238	3065.997	-13.841	0.01	0.015
CQX42-MTS BOURNE MA	481.461	-38596.93	0.693	0.022	0.032
CQX42-MTS ORLEANS MA	3521.994	12175.399	6.309	0.008	0.012
CQX43-MTS ORLEANS MA	12121.353	10796.122	13.982	0.01	0.018
CQX44-MTS ORLEANS MA	10486.969	21149.878	5.655	0.014	0.023
CQX45-MTS ORLEANS MA	13214.319	-3924.844	2.787	0.01	0.015
HYA46-MTS BOURNE MA	5156.683	-24142.738	-6.338	0.018	0.024
HYA46-MTS ORLEANS MA	8197.214	26629.595	-0.68	0.019	0.027
HYA47-MTS BOURNE MA	96.025	-13961.708	6.493	0.007	0.014
HYA48-MTS BOURNE MA	-6376.239	-6858.905	-21.075	0.007	0.013
HYA49-MTS BOURNE MA	3139.334	-99.55	10.346	0.002	0.002
HYA50-MTS BOURNE MA	9899.288	-9988.42	-21.083	0.009	0.017
HYA51-MTS BOURNE MA	13231.238	-19202.037	1.44	0.067	0.037
HYA51-MTS ORLEANS MA	16271.805	31570.352	7.007	0.061	0.033
HYA52-MTS BOURNE MA	6922.941	-17853.18	-17.958	0.076	0.056

HYA52-MTS ORLEANS MA	9963.464	32919.162	-12.338	0.019	0.029
HYA53-MTS BOURNE MA	3837.362	-10280.56	-38.94	0.007	0.011
MA BP14-MTS BOURNE	-14618.788	-2390.798	-39.895	0.009	0.023
MA BP15-MTS ORLEANS	-31130.903	14734.092	9.203	0.013	0.022
MA BP15-PVC34	2455.727	-2250.561	-5.344	0.001	0.003
MA BP16-MTS ORLEANS	4253.315	1318.565	-16.802	0.002	0.004
MA BP17-MTS BOURNE	8397.346	-26332.014	-1.486	0.012	0.024
MA BP18-MTS BOURNE	17475.957	-2005.546	-1.718	0.011	0.02
MTS BOURNE MA-MTS	3040.528	50772.334	5.618	0.018	0.029
MTS BOURNE MA-MVY54	-16499.848	11548.152	-3.695	0.011	0.025
MTS BOURNE MA-MVY55	-13169.86	5304.196	11.562	0.008	0.014
MTS BOURNE MA-MVY56	-10426.736	225.198	-1.848	0.006	0.011
MTS BOURNE MA-MVY57	-24395.79	-4205.748	4.353	0.018	0.023
MTS BOURNE MA-MVY58	-17051.739	2284.742	3.725	0.009	0.017
MTS BOURNE MA-MVY59	-15645.265	-1729.678	3.113	0.01	0.016
MTS BOURNE MA-MVY60	-21729.883	2964.486	-10.516	0.014	0.024
MTS BOURNE MA-PYM12	11384.621	6585.69	-2.746	0.007	0.014
MTS ORLEANS MA-PVC34	33586.632	-16984.651	-14.56	0.013	0.022
MTS ORLEANS MA-PVC35	29175.224	-15347.67	-13.645	0.009	0.022
MTS ORLEANS MA-PVC36	29932.883	-7015.803	-1.923	0.013	0.024
MTS ORLEANS MA-PVC37	24218.109	-3100.474	-10.484	0.012	0.019
MTS ORLEANS MA-PVC38	12589.567	1771.097	-10.429	0.006	0.012
PVC34-PVC35	-4411.402	1636.989	0.897	0.002	0.004
PVC34-PVC36	-3653.752	9968.847	12.64	0.005	0.009

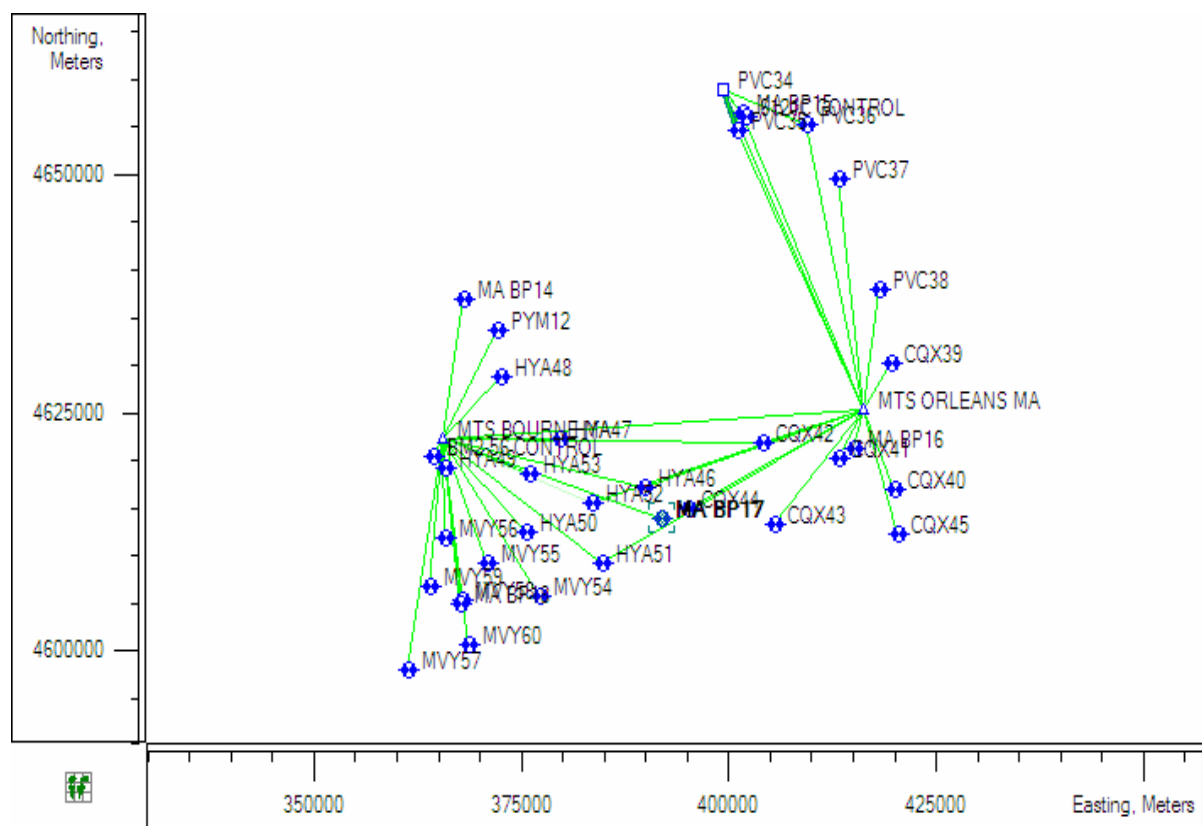
Control Points

Name	Grid Northing (m)	Grid Easting	Elevation	Code
MTS BOURNE MA	4622381.409	365500.816	11.867	
MTS ORLEANS MA	4625421.929	416273.16	16.927	
PVC34	4659008.559	399288.506	2.018	

Adjusted Points

Name	Grid Northing (m)	Grid Easting	Elevation	Code
6121C CONTROL	4656086.481	401971.846	3.492	
BM2-56 CONTROL	4620445.27	364185.832	5.21	
CQX39	4630181.588	419507.501	3.485	
CQX40	4616980.312	419788.954	13.483	
CQX41	4620294.691	413207.162	30.829	
CQX42	4621899.937	404097.758	10.664	
CQX43	4613300.576	405477.038	3.121	
CQX44	4614934.96	395123.282	11.456	
CQX45	4612207.611	420198.003	14.305	
HYA46	4617224.72	389643.558	17.783	
HYA47	4622285.384	379462.524	4.987	

HYA48	4628757.648	372359.721	32.72
HYA49	4619242.074	365600.366	1.536
HYA50	4612482.121	375489.235	32.706
HYA51	4609150.144	384702.826	10.149
HYA52	4615458.465	383353.998	29.439
HYA53	4618544.046	375781.376	50.521
MA BP14	4637000.197	367891.614	51.535
MA BP15	4656552.832	401539.067	7.399
MA BP16	4621168.614	414954.594	33.779
MA BP17	4613984.063	391832.829	12.995
MA BP18	4604905.452	367506.362	13.652
MTS BOURNE MA	4622381.409	365500.816	11.867
MTS ORLEANS MA	4625421.929	416273.16	16.927
MVY54	4605881.56	377048.968	7.968
MVY55	4609211.549	370805.012	23.347
MVY56	4611954.673	365726.014	10.073
MVY57	4597985.619	361295.068	16.561
MVY58	4605329.67	367785.558	15.646
MVY59	4606736.144	363771.138	15.141
MVY60	4600651.526	368465.302	1.433
PVC34	4659008.559	399288.506	2.018
PVC35	4654597.157	400925.495	2.987
PVC36	4655354.807	409257.354	14.681
PVC37	4649640.038	413172.686	6.193
PVC38	4638011.496	418044.257	6.361
PYM12	4633766.029	372086.506	8.852





Project Summary

Project name: 75980S OWD-GHG-PYM-BP checks.ttp

Surveyor:

Comment:

Linear unit: Meters

Projection: UTMNorth-Zone_19 : 72W to 66W

Geoid: g2009u04

Adjustment Summary

Adjustment type: Plane + Height, Minimal constraint

Confidence level: 95 %

Number of adjusted points: 19

Number of plane control points: 1

Number of used GPS vectors: 20

A posteriori plane UWE: 1.114996 , Bounds: (0.3478505 , 1.668832)

Number of height control points: 1

A posteriori height UWE: 0.4079529 , Bounds: (0.1590597 , 1.920937)

Used GPS Observations

Name	dN (m)	dE (m)	dHt (m)	Horizontal	Vertical
BP9-hmts	-9948.45	-2551.299	-15.554	0.011	0.021
BP10-hmts	7409.696	10023.663	-8.257	0.006	0.01
BP11-hmts	6909.997	-9628.05	-5.821	0.018	0.028
BP11-hmts	6909.996	-9628.065	-5.803	0.014	0.024
BP13-hmts	20189.18	6075.159	2.791	0.016	0.028
BP14-hmts	26390.335	-17602.306	-33.104	0.018	0.044
BP19-hmts	37732.446	1551.386	6.679	0.015	0.038
GHG16-hmts	-12338.593	-3694.566	2.554	0.026	0.047
GHG16-hmts	-12338.622	-3694.548	2.538	0.013	0.023
GHG17-hmts	1497.173	-8933.55	13.504	0.021	0.04
GHG18-hmts	-5942.34	-695.607	-9.461	0.005	0.008
GHG19-hmts	2368.833	-1584.225	7.815	0.002	0.003
GHG20-hmts	8356.916	-616.115	-15.983	0.01	0.011
OWD21-hmts	-21977.923	8160.605	16.014	0.016	0.028
OWD22-hmts	-16102.159	7557.38	14.267	0.015	0.025
OWD23-hmts	-9858.102	5687.587	-18.607	0.007	0.014
OWD24-hmts	-5748.547	18176.824	-23.048	0.013	0.019
PYM11-hmts	9599.487	-10641.485	7.225	0.009	0.016
PYM13-hmts	4628.641	5393.809	-11.57	0.003	0.005
PYM14-hmts	18461.655	6754.492	4.289	0.012	0.02

GPS Observation Residuals

Name	dN (m)	dE (m)	dHt (m)	Horizontal	Vertical
BP9-hmts	-9948.45	-2551.299	-15.554	0.011	0.021
BP10-hmts	7409.696	10023.663	-8.257	0.006	0.01
BP11-hmts	6909.997	-9628.05	-5.821	0.018	0.028
BP11-hmts	6909.996	-9628.065	-5.803	0.014	0.024
BP13-hmts	20189.18	6075.159	2.791	0.016	0.028
BP14-hmts	26390.335	-17602.306	-33.104	0.018	0.044
BP19-hmts	37732.446	1551.386	6.679	0.015	0.038
GHG16-hmts	-12338.593	-3694.566	2.554	0.026	0.047
GHG16-hmts	-12338.622	-3694.548	2.538	0.013	0.023
GHG17-hmts	1497.173	-8933.55	13.504	0.021	0.04
GHG18-hmts	-5942.34	-695.607	-9.461	0.005	0.008
GHG19-hmts	2368.833	-1584.225	7.815	0.002	0.003
GHG20-hmts	8356.916	-616.115	-15.983	0.01	0.011
OWD21-hmts	-21977.923	8160.605	16.014	0.016	0.028
OWD22-hmts	-16102.159	7557.38	14.267	0.015	0.025
OWD23-hmts	-9858.102	5687.587	-18.607	0.007	0.014
OWD24-hmts	-5748.547	18176.824	-23.048	0.013	0.019
PYM11-hmts	9599.487	-10641.485	7.225	0.009	0.016
PYM13-hmts	4628.641	5393.809	-11.57	0.003	0.005
PYM14-hmts	18461.655	6754.492	4.289	0.012	0.02

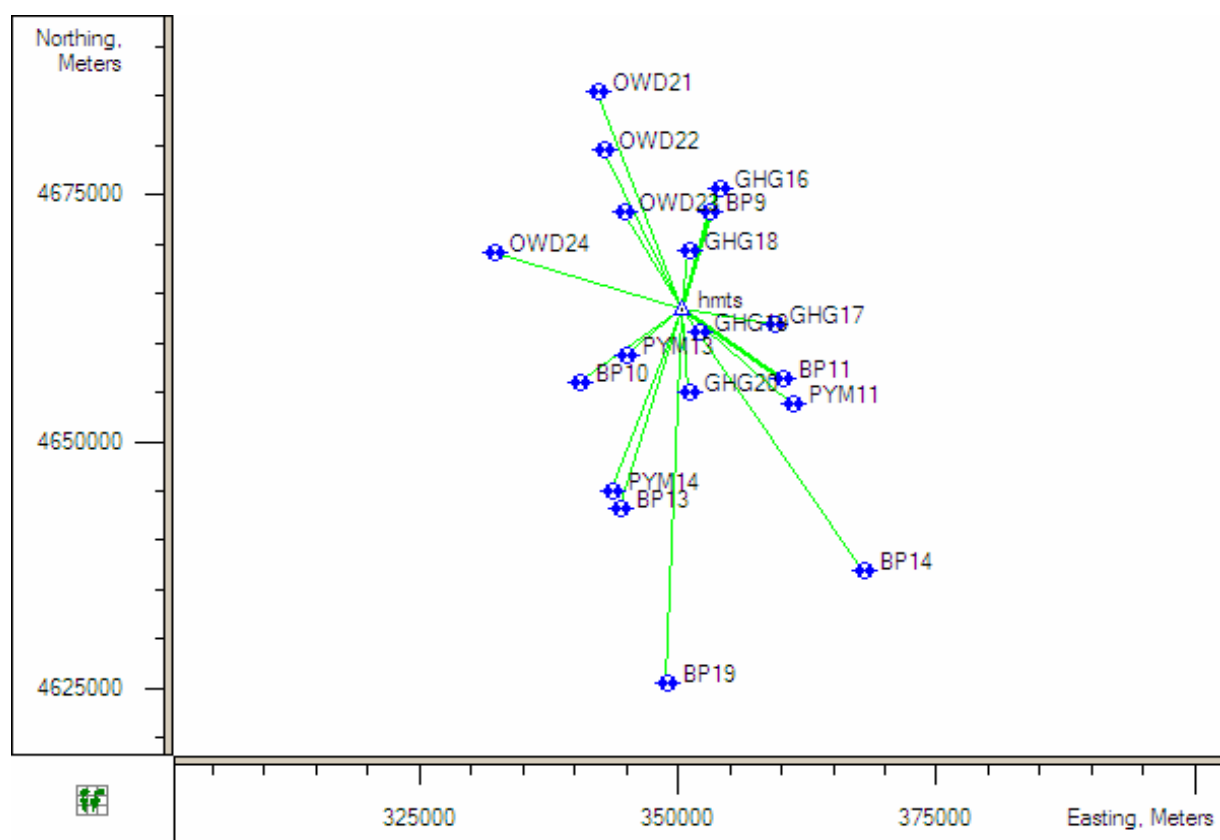
Control Points

Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Code
hmts	4663390.533	350289.329	18.325	

Adjusted Points

Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Code
BP9	4673338.983	352840.628	33.612	
BP10	4655980.837	340265.666	26.881	
BP11	4656480.536	359917.388	24.121	
BP13	4643201.353	344214.17	16.036	
BP14	4637000.198	367891.635	51.572	
BP19	4625658.087	348737.942	12.312	
GHG16	4675729.149	353983.881	15.443	
GHG17	4661893.36	359222.879	4.707	
GHG18	4669332.873	350984.936	27.642	
GHG19	4661021.699	351873.554	10.534	
GHG20	4655033.617	350905.443	34.467	
OWD21	4685368.456	342128.724	1.875	
OWD22	4679492.692	342731.949	3.765	
OWD23	4673248.635	344601.742	36.772	
OWD24	4669139.08	332112.505	41.459	

PYM11	4653791.045	360930.814	11.121
PYM13	4658761.892	344895.52	30.072
PYM14	4644928.878	343534.837	14.513



3.0 Published Control Locations

SURVEY DATASHEET (Version 1.0)

PID: BBBJ40

Designation: 844 1551 A

Stamping: 1551 A 1992

Stability: Monument will probably hold position well

Setting: Retaining wall or concrete ledge

Mark Condition: G

Description: Recovered as described.

Observed: 2011-02-03T14:05:00Z See Also [2009-06-05](#)

Source: OPUS - page5 1009.28



Close-up View

REF_FRAME: NAD_83 (CORS96)	EPOCH: 2002.0000	SOURCE: NAVD88 (Computed using GEOID09)	UNITS: m	SET PROFILE	DETAILS
LAT: 42° 39' 31.22762" ± 0.024 m LON: -70° 36' 53.98045" ± 0.020 m ELL HT: -23.566 ± 0.046 m X: 1559238.008 ± 0.016 m Y: -4431397.566 ± 0.034 m Z: 4299677.702 ± 0.043 m ORTHO HT: 3.173 ± 0.079 m			UTM 19 SPC 2001(MA M) NORTHING: 4724176.562m 934609.050m EASTING: 367636.706m 272560.800m CONVERGENCE: -1.09452631° 0.59448352° POINT SCALE: 0.99981555 0.99999647 COMBINED FACTOR: 0.99981925 1.00000016		

CONTRIBUTED BY

[stephen.randall](#)

 [National Geodetic Survey](#)



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

SURVEY DATASHEET (Version 1.0)

PID: BBBL81

Designation: MASNEE BM 2

Stamping: BM 2 56

Stability: May hold, commonly subject to ground movement

Setting: Set in top of concrete monument

Description: STATION IS LOCATED ON THE WESTERN SIDE OF MASNEE RD ON APPROACH TO MASNEE ISLAND, ON THE EASTERN SHORE OF THE HEAD OF BUZZARDS BAY AND THE APPROACH TO THE CAPE COD CANAL. SURFACE MARK IS A STANDARD DISK SET IN THE TOP OF A CONC MON AND PROTRUDES 0.5 FT ABOVE GROUND. DISK IS WITNESSED BY A USACE PROPERTY BOUNDARY WITNESS POST. STATION IS LOCATED 0.5 MI SW ON MASHNEE RD FROM SOUTH END OF GRAY GABLES AREA, 100 FT NE OF LOCKED GATE AT ACCESS RD TO HIGH BLUFF (HOG ISLE) AND 70 FT WEST OF EOP.

Observed: 2009-09-24T14:52:00Z

Source: OPUS - page5 0909.08



Close-up View

REF_FRAME: NAD_83
(CORS96)

EPOCH:
2002.0000

SOURCE: NAVD88 (Computed using
GEOID03)

UNITS:
m

SET
PROFILE

DETAILS

LAT: 41° 43' 27.18065" ± 0.019 m

LON: -70° 37' 58.30064" ± 0.021 m

ELL HT: -23.276 ± 0.063 m

X: 1580973.356 ± 0.035 m

Y: -4497649.015 ± 0.052 m

Z: 4222775.537 ± 0.027 m

ORTHO HT: 5.271 ± 0.068 m

UTM 19 SPC 2001(MA M)

NORTHING: 4620445.272m 830805.161m

EASTING: 364185.852m 272151.152m

CONVERGENCE: -1.08690985° 0.58248194°

POINT SCALE: 0.99982699 0.99999890

COMBINED FACTOR: 0.99983064 1.00000255

CONTRIBUTED BY

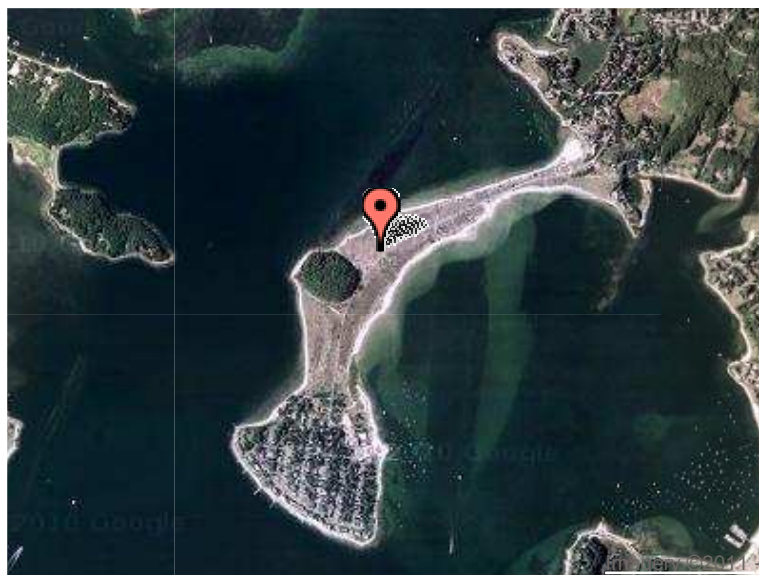
[jah](#)



[Halnon Land Surveying, Inc.](#)



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

SURVEY DATASHEET (Version 1.0)

PID: BBBP74

Designation: DH 1

Stamping: DH-1

Stability: Most reliable; expected to hold position well

Setting: In rock outcrop or ledge

Description: In Dedham, set in ledge on the north side of Country Club Road just east of the driveway to house number 85. The mark is 70 feet east from a utility pole located at the intersection of Country Club Road and the driveway to house number 85, 16.6 feet north from a signpost, and approximately 3 feet above the level of the road.

Observed: 2009-10-07T12:58:00Z

Source: OPUS - page5 0909.08



Close-up View

REF_FRAME: NAD_83 (CORS96)	EPOCH: 2002.0000	SOURCE: NAVD88 (Computed using GEOID09)	UNITS: m	SET PROFILE	DETAILS
--------------------------------------	----------------------------	---	--------------------	------------------------	----------------

LAT: 42° 15' 1.54665" ± 0.036 m
LON: -71° 12' 41.06483" ± 0.023 m
ELL HT: 45.871 ± 0.063 m
X: 1522901.833 ± 0.014 m
Y: -4476415.818 ± 0.072 m
Z: 4266265.735 ± 0.016 m
ORTHO HT: 74.079 ± 0.075 m

UTM 19 SPC 2001(MA M)
NORTHING: 4679949.473m 888925.281m
EASTING: 317571.964m 223815.299m
CONVERGENCE: -1.48729798° 0.19385626°
POINT SCALE: 1.00000950 0.99996493
COMBINED FACTOR: 1.00000230 0.99995773

CONTRIBUTED BY

[john.barnes](mailto:john.barnes@mass.gov)

☐ [MassDOT Geodetic Survey](#)



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

SURVEY DATASHEET (Version 1.0)

PID: BBBS84

Designation: 489-0440

Stamping: 489 0440

Stability: Most reliable; expected to hold position well

Setting: In rock outcrop or ledge

Description: In Windham, From the Junction of NH Route 111 and North Lowell Road, go northeast for 0.55 mi on route 111 to the Park and Ride & the station on the left. 28.5 ft North from the white fogline, 74.2 ft East from Pole # PSNH / 11 1/2A, 31.2 ft South from light pole L2 with mast arm at chainlink fence.

Observed: 2010-03-01T13:37:00Z

Source: OPUS - page5 0909.08



Close-up View

REF_FRAME: NAD_83
(CORS96)

EPOCH:
2002.0000

SOURCE: NAVD88 (Computed using
GEOID09)

UNITS:
m

SET
PROFILE

DETAILS

LAT: 42° 48' 23.75743" ± 0.031 m

LON: -71° 17' 18.19141" ± 0.003 m

ELL HT: 54.182 ± 0.018 m

X: 1503490.794 ± 0.008 m

Y: -4438909.295 ± 0.022 m

Z: 4311800.706 ± 0.027 m

ORTHO HT: 81.552 ± 0.026 m

UTM 19 SPC 2800(NH)

NORTHING: 4741878.151m 34127.155m

EASTING: 312889.562m 330940.883m

CONVERGENCE: -1.55546768° 0.25705317°

POINT SCALE: 1.00003073 0.99997844

COMBINED FACTOR: 1.00002224 0.99996994

CONTRIBUTED BY

[rcrevier](#)

New Hampshire DOT



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

489-0440

FILE: 0793log1201d.tps 000180661

NGS OPUS-RS SOLUTION REPORT

=====

USER: john.allen@sewall.com
RINEX FILE: 0793335n.10o

DATE: December 13, 2010
TIME: 18:50:08 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.65 START: 2010/12/01 13:45:30
EPHEMERIS: igr16123.eph [rapid] STOP: 2010/12/01 14:07:00
NAV FILE: brdc3350.10n OBS USED: 1899 / 1989 : 95%
ANT NAME: TPSHIPER_GGD QUALITY IND. 17.77/ 17.63
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.298

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91666)

X:	1503490.800(m)	0.014(m)	1503490.024(m)	0.014(m)
Y:	-4438909.289(m)	0.026(m)	-4438907.863(m)	0.026(m)
Z:	4311800.704(m)	0.024(m)	4311800.644(m)	0.024(m)

LAT:	42 48 23.75746	0.005(m)	42 48 23.79126	0.005(m)
E LON:	288 42 41.80893	0.009(m)	288 42 41.79671	0.009(m)
W LON:	71 17 18.19107	0.009(m)	71 17 18.20329	0.009(m)
EL HGT:	54.178(m)	0.037(m)	52.964(m)	0.037(m)
ORTHO HGT:	81.548(m)	0.038(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2800 NH)
Northing (Y) [meters]	4741878.152	34127.156
Easting (X) [meters]	312889.570	330940.890
Convergence [degrees]	-1.55546762	0.25705323
Point Scale	1.00003073	0.99997844
Combined Factor	1.00002224	0.99996994

US NATIONAL GRID DESIGNATOR: 19TCH1288941878(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	27255.5
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	46328.2
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	57665.3
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	82171.4
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	102639.4
DJ8961	VTSP SPRINGFIELD VT CORS ARP	N431653.241	W0722839.238	110326.1
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	122635.4
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	141615.2
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	147689.9

NEAREST NGS PUBLISHED CONTROL POINT

MY5426	489 0270	N424843.889	W0711634.545	1169.5
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

844-1551A Rockport

FILE: 0793log1202a.tps 000180671

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 07933361.10o

DATE: December 13, 2010
TIME: 18:57:31 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.65 START: 2010/12/02 11:28:35
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 11:49:55
NAV FILE: brdc3360.10n OBS USED: 2268 / 2520 : 90%
ANT NAME: TPSHIPER_GGD QUALITY IND. 24.43/ 30.06
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.294

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.91914)

X:	1559238.005(m)	0.008(m)	1559237.229(m)	0.008(m)
Y:	-4431397.587(m)	0.012(m)	-4431396.156(m)	0.012(m)
Z:	4299677.716(m)	0.024(m)	4299677.657(m)	0.024(m)

LAT:	42 39 31.22754	0.015(m)	42 39 31.26143	0.015(m)
E LON:	289 23 6.01912	0.008(m)	289 23 6.00784	0.008(m)
W LON:	70 36 53.98088	0.008(m)	70 36 53.99216	0.008(m)
EL HGT:	-23.543(m)	0.022(m)	-24.765(m)	0.022(m)
ORTHO HGT:	3.196(m)	0.025(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4724176.560	934609.048
Easting (X) [meters]	367636.696	272560.790
Convergence [degrees]	-1.09452639	0.59448344
Point Scale	0.99981555	0.99999647
Combined Factor	0.99981924	1.00000016

US NATIONAL GRID DESIGNATOR: 19TCH6763624176(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	60387.1
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	72216.8
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	78803.6
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	84293.7
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	104099.4
DL7764	P776 GUNSTOCKMRNH2008 CORS ARP	N433235.721	W0712242.789	116283.1
AJ2693	YMTS MTS YARMOUTH COOP CORS ARP	N434754.610	W0701120.298	131273.1
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	134731.2
DJ7833	BRU6 BRUNSWICK 6 CORS ARP	N435322.916	W0695647.885	147128.4

NEAREST NGS PUBLISHED CONTROL POINT

MY0231	TIDAL 10 STA 8	N423928.	W0703658.	135.3
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

BM2 56 Masnee

FILE: 0515log1202m.tps 000178052

Your station is 21.2 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 0515336t.10o

DATE: December 07, 2010
TIME: 21:49:18 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.65 START: 2010/12/02 19:55:30
EPHEMERIS: igr16124.eph [rapid] STOP: 2010/12/02 20:11:00
NAV FILE: brdc3360.10n OBS USED: 1998 / 2097 : 95%
ANT NAME: TPSHIPER_GD QUALITY IND. 23.61/ 25.05
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.267

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92010)

X:	1580973.334(m)	0.017(m)	1580972.562(m)	0.017(m)
Y:	-4497648.984(m)	0.032(m)	-4497647.543(m)	0.032(m)
Z:	4222775.512(m)	0.017(m)	4222775.445(m)	0.017(m)

LAT:	41 43 27.18083	0.022(m)	41 43 27.21406	0.022(m)
E LON:	289 22 1.69891	0.012(m)	289 22 1.68807	0.012(m)
W LON:	70 37 58.30109	0.012(m)	70 37 58.31193	0.012(m)
EL HGT:	-23.320(m)	0.031(m)	-24.570(m)	0.031(m)
ORTHO HGT:	5.208(m)	0.033(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4620445.278	830805.166
Easting (X) [meters]	364185.841	272151.141
Convergence [degrees]	-1.08690993	0.58248185
Point Scale	0.99982699	0.99999890
Combined Factor	0.99983064	1.00000256

US NATIONAL GRID DESIGNATOR: 19TCG6418520445(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0884	ACU6 ACUSHNET 6 CORS ARP	N414435.676	W0705311.720	21214.4
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	79038.4
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	92638.4
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	106191.1
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	131287.7
DI1075	NHUN U NEW HAMPSHIRE CORS ARP	N430833.179	W0705706.863	159718.4
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	173051.3
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	176619.8
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	195613.4

NEAREST NGS PUBLISHED CONTROL POINT

LW4813	HOG	N414322.296	W0703800.571	159.9
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DH1 A

FILE: 0788log1207j.tps 000179364

Your station is 12.0 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com
RINEX FILE: 0788341u.10o

DATE: December 09, 2010
TIME: 23:21:10 UTC

SOFTWARE: rsgps 1.35.1 RS26.prl 1.65 START: 2010/12/07 20:17:45
EPHEMERIS: igr16132.eph [rapid] STOP: 2010/12/07 20:37:55
NAV FILE: brdc3410.10n OBS USED: 1710 / 1791 : 95%
ANT NAME: TPSHIPER_GD QUALITY IND. 25.36/ 17.35
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.344

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93384)

X: 1522901.829(m) 0.011(m) 1522901.055(m) 0.011(m)
Y: -4476415.791(m) 0.017(m) -4476414.358(m) 0.017(m)
Z: 4266265.706(m) 0.012(m) 4266265.641(m) 0.012(m)

LAT: 42 15 1.54654 0.006(m) 42 15 1.57998 0.006(m)
E LON: 288 47 18.93538 0.010(m) 288 47 18.92355 0.010(m)
W LON: 71 12 41.06462 0.010(m) 71 12 41.07645 0.010(m)
EL HGT: 45.832(m) 0.021(m) 44.600(m) 0.021(m)
ORTHO HGT: 74.040(m) 0.024(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4679949.469	888925.278
Easting (X) [meters]	317571.969	223815.304
Convergence [degrees]	-1.48729794	0.19385630
Point Scale	1.00000950	0.99996493
Combined Factor	1.00000231	0.99995774

US NATIONAL GRID DESIGNATOR: 19TCG1757179949(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	19797.4
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	62388.9
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	68287.4
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	88562.5
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	100903.7
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	118030.4
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	123231.2
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	128312.9
DJ8953	VTD2 DUMMERSTON CORS ARP	N425506.108	W0723206.441	131573.8

NEAREST NGS PUBLISHED CONTROL POINT

MY5400 10925 N421457.363 W0711226.384 360.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DH 1 - WESTWOOD

FILE: 0793log1203a.tps 000180684

Your station is 2.1 KM outside the polygon enclosing the reference stations.

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com
RINEX FILE: 07933371.10o

DATE: December 13, 2010
TIME: 19:06:10 UTC

SOFTWARE: rsgps 1.35.1 RS30.prl 1.65 START: 2010/12/03 11:39:55
EPHEMERIS: igr16125.eph [rapid] STOP: 2010/12/03 12:01:35
NAV FILE: brdc3370.10n OBS USED: 2376 / 2583 : 92%
ANT NAME: TPSHIPER_GGD QUALITY IND. 39.89/ 25.69
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.319

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.92190)

X:	1522901.842(m)	0.010(m)	1522901.068(m)	0.010(m)
Y:	-4476415.829(m)	0.016(m)	-4476414.396(m)	0.016(m)
Z:	4266265.726(m)	0.011(m)	4266265.661(m)	0.011(m)

LAT:	42 15 1.54614	0.007(m)	42 15 1.57958	0.007(m)
E LON:	288 47 18.93539	0.007(m)	288 47 18.92356	0.007(m)
W LON:	71 12 41.06461	0.007(m)	71 12 41.07644	0.007(m)
EL HGT:	45.875(m)	0.020(m)	44.643(m)	0.020(m)
ORTHO HGT:	74.083(m)	0.023(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4679949.457	888925.266
Easting (X) [meters]	317571.969	223815.304
Convergence [degrees]	-1.48729794	0.19385630
Point Scale	1.00000950	0.99996493
Combined Factor	1.00000230	0.99995773

US NATIONAL GRID DESIGNATOR: 19TCG1757179949(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	19797.4
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	46510.2
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	62388.9
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	68287.4
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	88562.5
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	100903.7
DE8093	HAMP NORTHAMPTON CORS ARP	N421903.873	W0723822.404	118030.4
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	123231.2
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	128312.9

NEAREST NGS PUBLISHED CONTROL POINT

MY5400	10925	N421457.363	W0711226.384	360.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

PC 191A

FILE: 0788log1208j.tps 000179377

NGS OPUS-RS SOLUTION REPORT

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USER: dan.landsurveyor@gmail.com
RINEX FILE: 0788342w.10o

DATE: December 09, 2010
TIME: 23:27:20 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.65 START: 2010/12/08 22:23:00
EPHEMERIS: igu16133.eph [ultra-rapid] STOP: 2010/12/08 22:46:45
NAV FILE: brdc3420.10n OBS USED: 2358 / 2835 : 83%
ANT NAME: TSPHIPER_GD QUALITY IND. 27.98/ 40.15
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.296

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93682)

X:	1540419.943(m)	0.004(m)	1540419.171(m)	0.004(m)
Y:	-4513515.438(m)	0.015(m)	-4513513.998(m)	0.015(m)
Z:	4220893.689(m)	0.012(m)	4220893.620(m)	0.012(m)

LAT:	41 42 4.57725	0.004(m)	41 42 4.61034	0.004(m)
E LON:	288 50 39.42809	0.005(m)	288 50 39.41661	0.005(m)
W LON:	71 9 20.57191	0.005(m)	71 9 20.58339	0.005(m)
EL HGT:	7.643(m)	0.018(m)	6.394(m)	0.018(m)
ORTHO HGT:	37.107(m)	0.021(m)	[NAVD88 (Computed using GEOID09)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 19)	SPC (2001 MA M)
Northing (Y) [meters]	4618854.917	827947.748
Easting (X) [meters]	320631.350	228657.332
Convergence [degrees]	-1.43446394	0.23126650
Point Scale	0.99999593	1.00000229
Combined Factor	0.99999473	1.00000109

US NATIONAL GRID DESIGNATOR: 19TCG2063118854(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	22851.5
DE6262	URIL U OF RI COOP CORS ARP	N412920.158	W0713139.778	38963.2
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	64815.6
DI0964	FMTS MTS FRAM COOP CORS ARP	N421800.171	W0712630.865	70608.1
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	84975.4
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	87864.6
AF9520	WES2 WESTFORD CORS ARP	N423647.975	W0712935.968	105079.3
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	129811.0
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	134297.4

NEAREST NGS PUBLISHED CONTROL POINT

LW5399	191 A	N414204.577	W0710920.572	0.0
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.