MILONE & MACBROOM

July 31, 2019

Mr. Daniel M. Watson, Director of School Facilities
Greenwich Public Schools
290 Greenwich Avenue
Greenwich, CT 06830

RE: Preliminary Environmental Investigation at Central Middle School
Greenwich, Connecticut
MMI #5062-10-02

Dear Mr. Watson:

Milone & MacBroom, Inc. (MMI) conducted a limited investigation of information and files pertaining to past construction activities associated with the playing field at Central Middle School located at 9 Indian Rock Lane in Greenwich, Connecticut. This work was performed in an effort to determine if, and potentially when, additional fill material was imported and/or placed at the field. Concurrently with this investigation, MMI also collected soil samples from 12 test pits located throughout the field area. This work was completed in an effort to inform the design process for the proposed field improvements.

Background Investigation Summary

The background research on the history of field construction included a review of historical aerial photography, a request to review pertinent town documentation, and in-person interviews of staff at the Town Hall of Greenwich. The following departments were contacted and interviewed: Department of Public Works (Building Inspection), the Board of Education Department, Planning & Zoning Department (includes Land Use and Environmental Affairs), Engineering Department, Assessor and Clerk Offices, and Parks & Recreation.

None of the town departments had any documentation pertaining to the construction of the playing field.

The in-person and phone interviews conducted with Town Hall staff resulted in no new or additional information.

Historical aerials from Connecticut Environmental Conditions Online (CT ECO) covering the following years were reviewed: 1934, 1951, 1970, 1985, 1990, 1996, 2004, 2008, 2012, and 2016. The aerial photography review indicated that the field may have been used for residential purposes with a few cleared areas in 1934. By 1951, the site appeared almost completely covered in woods and unused. In the 1970 aerial photo, the school building and playing field with one ballfield in the northern corner are apparent. The 1985, 1990, and 1996 aerial photographs show three ballfields on the athletic field, one each on the northern, western, and southeastern corners. By the 2004 aerial photo, only two ballfields remain, the ones in the northern and southeastern corners. In addition, the 2004 aerial photo also shows a structural addition to the northwestern side of the school building. The 2004 and forward photographs showed the field and the school building as it appears in the present.

The August 31, 2018, Topographic Survey completed by MMI indicated similar topographic conditions on the field as existing conditions.

Soil Sampling Activities

MMI observed and logged 12 test pits (TP-1 through TP-12) that were excavated by A. Vitti Excavators, LLC on July 15, 2019. The test pits were made to explore the subsurface conditions in the project area using a Caterpillar 420D backhoe to depths ranging between 4 and 6 feet below existing grades. Explorations were observed and logged by an MMI Environmental Scientist and an MMI Geotechnical Engineer. Refer to the attached exploration location plan for approximate locations of the test pits and attached logs of the test pits for the subsurface conditions encountered.

The generalized subsurface profile generally consists of fill or topsoil over fill over silt. Bedrock was not encountered in any of the test pits.

At Test Pits TP-5 and TP-11, fill was encountered at existing grade and extended to the depths explored. The fill consisted of reddish-brown, fine to medium sand, some silt, trace fine gravel over brown, fine to medium sand, some fine to coarse gravel, little to some silt, with cobbles and boulders.

Topsoil was encountered at each test pit location (excluding TP-5 and TP-11) and consisted of approximately 6 to 12 inches of dark brown, fine to medium sand, some silt, trace fine gravel, with trace roots. Fill was encountered below the topsoil that consisted of between 1.0 and at least 4.7 feet of brown/gray/gray-brown, fine to coarse sand, little to some fine to coarse gravel, little to some silt, with trace debris (e.g., rebar, asphalt, plastic), cobbles, and boulders. Where the fill is completely penetrated, silt was encountered below that consisted of gray, clayey silt, little fine to coarse gravel, trace to and fine to coarse sand, and trace roots to the depths explored.

Other than the trace presence of construction-related materials, the fill material consisted entirely of earthen materials with no apparent environmental impact such as staining, discoloration, or odor.

The current plans for the field reconstruction call for the installation of a synthetic turf playing surface. Construction of these types of surfaces typically involves the removal of existing soils to a depth of at least 2 feet so that drainage piping and base material can be installed. As such, soil samples were collected from the upper 2 feet and analyzed for selected parameters to help determine if special disposal measures will be necessary for the excess soil.

The samples were submitted to Complete Environmental Testing, Inc. (CET), a State of Connecticut certified laboratory for analysis of the following parameters:

- Resource Conservation and Recovery Act (RCRA) List of 8 Metals by the Environmental Protection Agency (EPA) 6010C Method (including total mercury by the EPA 7471B Method)
- Polychlorinated biphenyls (PCBs) by the EPA 8082A Method
- Polynuclear aromatic hydrocarbons (PAHs) by the EPA 8270D Method

Soil Sampling Results

The laboratory results indicated the following:

- No PCBs were detected in any of the samples.
- No PAH compounds were detected in any of the samples.
- Several metals were detected in all the soil samples at trace concentrations, which is likely indicative of naturally occurring levels.

Based upon the laboratory results and the observations made during the test pit advancements, the soil at the Central Middle School playing field does not contain contaminants and would be considered "clean fill" if excavated and removed from the site.

Very truly yours,

MILONE & MACBROOM, INC.

Scott G. Bristol, LEP, PG
Associate, Manager of Environmental Services

Enclosures

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FIGURE

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TEST PIT LOCATION MAP

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
GREENWICH PUBLIC SCHOOLS
9 INDIAN ROCK LANE
GREENWICH, CONNECTICUT

SCALE	1 " = 200 '
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FIGURE

TABLE

Summary Table of Results
Central Middle School
Greenwich, Connecticut

Soil Samples Collected July 15, 2019

				Sample ID	TP-1	TP-2	TP-3	TP-4	TP-5	TP-6	TP-7	TP-8	TP-9	TP-10	TP-11	TP-12
Parameter	GA PMC	GB PMC	I/C DEC	RES DEC	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft	0-2ft
RCRA 8 Metals, Total by EPA 6010C (mg/kg)																
Arsenic	NA	NA	10	10	2.7	2.6	3.2	4.5	3.4	2.5	3.5	4.2	2.4	4.8	5	2.9
Barium	NA	NA	140,000	4,700	150	86	140	120	72	110	110	120	110	250	75	85
Cadmium	NA	NA	1,000	34	ND<0.57	ND<0.53	ND<0.57	ND<0.56	ND<0.55	ND<0.58	ND<0.60	ND<0.56	ND<0.59	ND<0.58	ND<0.54	ND<0.54
Chromium	NA	NA	NE	NE	39	23	36	31	21	25	37	33	29	77	22	25
Lead	NA	NA	1,000	400	16	17	21	23	15	14	18	21	20	28	12	12
Selenium	NA	NA	10,000	340	1.7	1.3	1.7	2.3	1.1	1.5	1.9	1.5	1.5	1.7	ND<1.1	ND<1.1
Silver	NA	NA	10,000	340	ND<2.3	ND<2.1	ND<2.3	ND<2.2	ND<2.2	ND<2.3	ND<2.4	ND<2.2	ND<2.4	ND<2.3	ND<2.2	ND<2.2
Mercury, Total by EPA 7471B (mg/kg)																
Mercury	NA	NA	610	20	ND<0.15	ND<0.15	ND<0.15	ND<0.14	ND<0.13	ND<0.15	ND<0.16	ND<0.14	ND<0.14	ND<0.14	ND<0.13	ND<0.14
PCBs by EPA 8082A (mg/kg)																
PCB-1016	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1221	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1232	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1242	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1248	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1254	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1260	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1262	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PCB-1268	NA	NA	10	1	ND<0.12	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.11	ND<0.11
PAHs by EPA 8270D (ug/Kg)																
Acenaphthene	8,400	84,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Acenaphthylene	8,400	84,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Anthracene	40,000	400,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Benzo[a]anthracene	1,000	1,000	7,800	1,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Benzo[a]pyrene	1,000	1,000	1,000	1,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Benzo[b]fluoranthene	1,000	1,000	7,800	1,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Benzo[g,h,i]perylene	1,000	1,000	78,000	8,400	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Benzo[k]fluoranthene	1,000	1,000	78,000	8,400	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Chrysene	1,000	1,000	780,000	84,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Dibenz[a,h]anthracene	1,000	1,000	1,000	1,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Fluoranthene	5,600	56,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Fluorene	5,600	56,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Indeno[1,2,3-cd]pyrene	1,000	1,000	7,800	1,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
2-Methyl Naphthalene	560	5,600	1,000,000	270,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Phenanthrene	4,000	40,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Pyrene	4,000	40,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Naphthalene	5,600	56,000	2,500,000	1,000,000	ND<360	ND<330	ND<350	ND<340	ND<330	ND<350	ND<360	ND<350	ND<360	ND<350	ND<330	ND<330
Percent Solids by SM 2540 G (%)																
Percent Solids	NA	NA	NA	NA	84	90	86	87	89	85	84	85	84	84	90	90

EPA	Environmental Protection Agency	GA PMC	GA Pollutant Mobility Criteria	NA	Not applicable
RCRA	Resource Conservation & Recovery Act	GB PMC	GB Pollutant Mobility Criteria	NE	Not established
PCBs	Polychlorinated biphenyls (PCBs)	I/C DEC	Industrial/Commercial DEC		
PAHs	Polynuclear Aromatic Hydrocarbons	RES DEC	Residential Direct Exposure Criteria		
ug/kg	Micrograms per kilogram	ND<5.5	Not detected above indicated laboratory reporting limit		
mg/kg	Milligrams per kilogram				

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1934 AERIAL

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
GREENWICH PUBLIC SCHOOLS

9 INDIAN ROCK LANE
GREENWICH, CONNECTICUT

SCALE	1 " = 175 '
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FIG. 1

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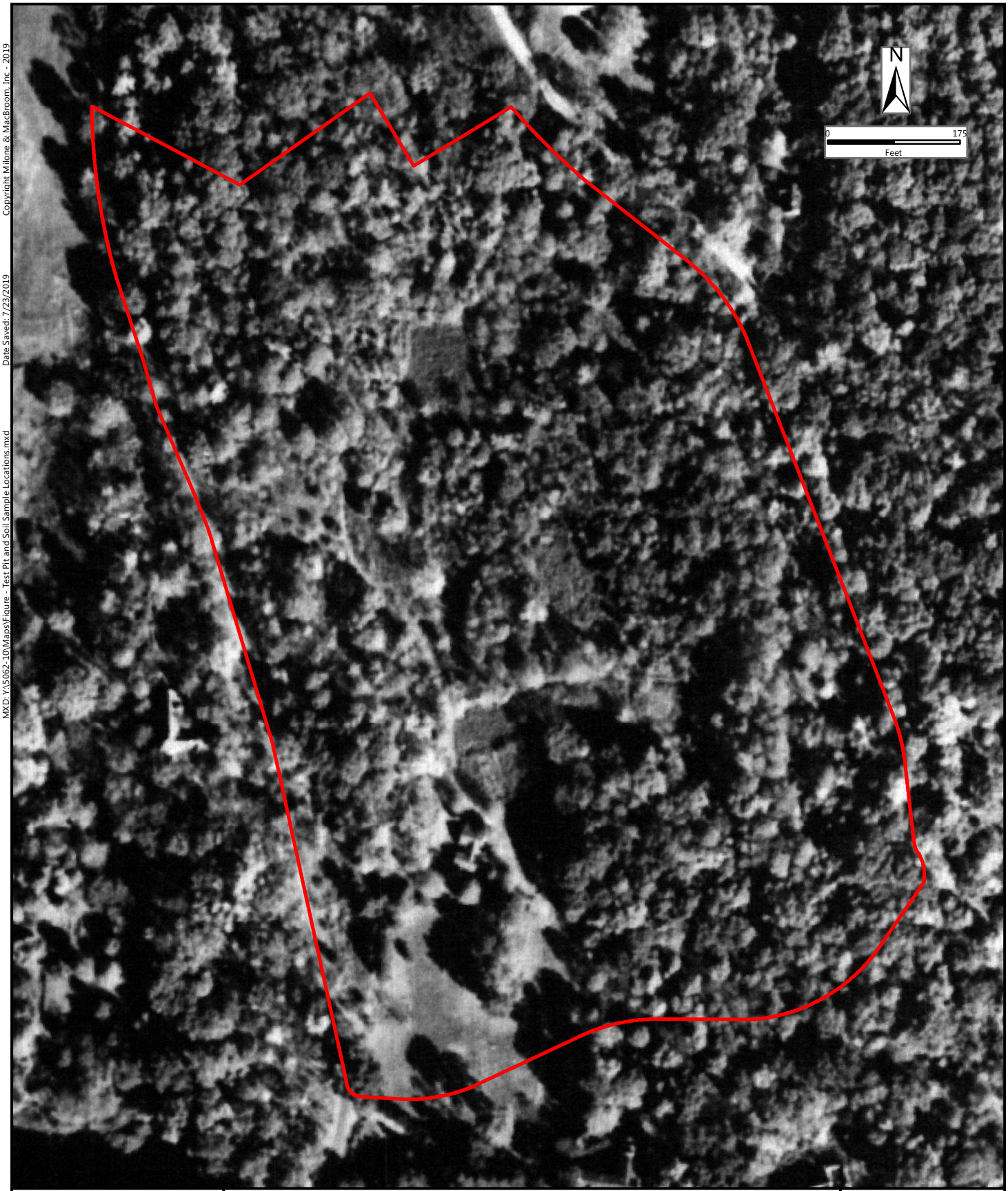

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1951 AERIAL

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
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9 INDIAN ROCK LANE
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FIG. 2

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1970 AERIAL

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GREENWICH PUBLIC SCHOOLS

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PROJ. NO.	5062-10-02

FIG. 3

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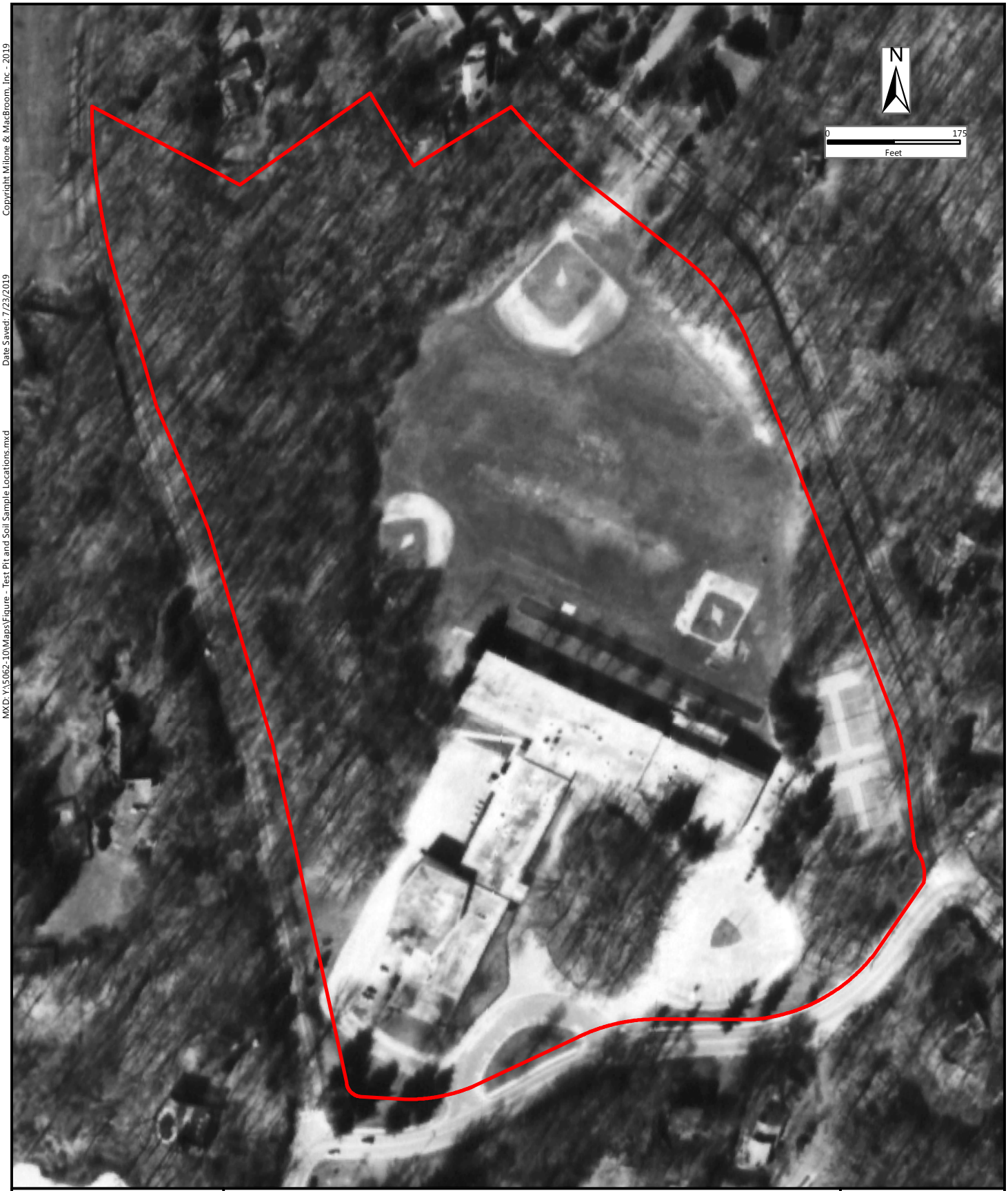

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1985 AERIAL

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DATE	7/23/2019
PROJ. NO.	5062-10-02

FIG. 4

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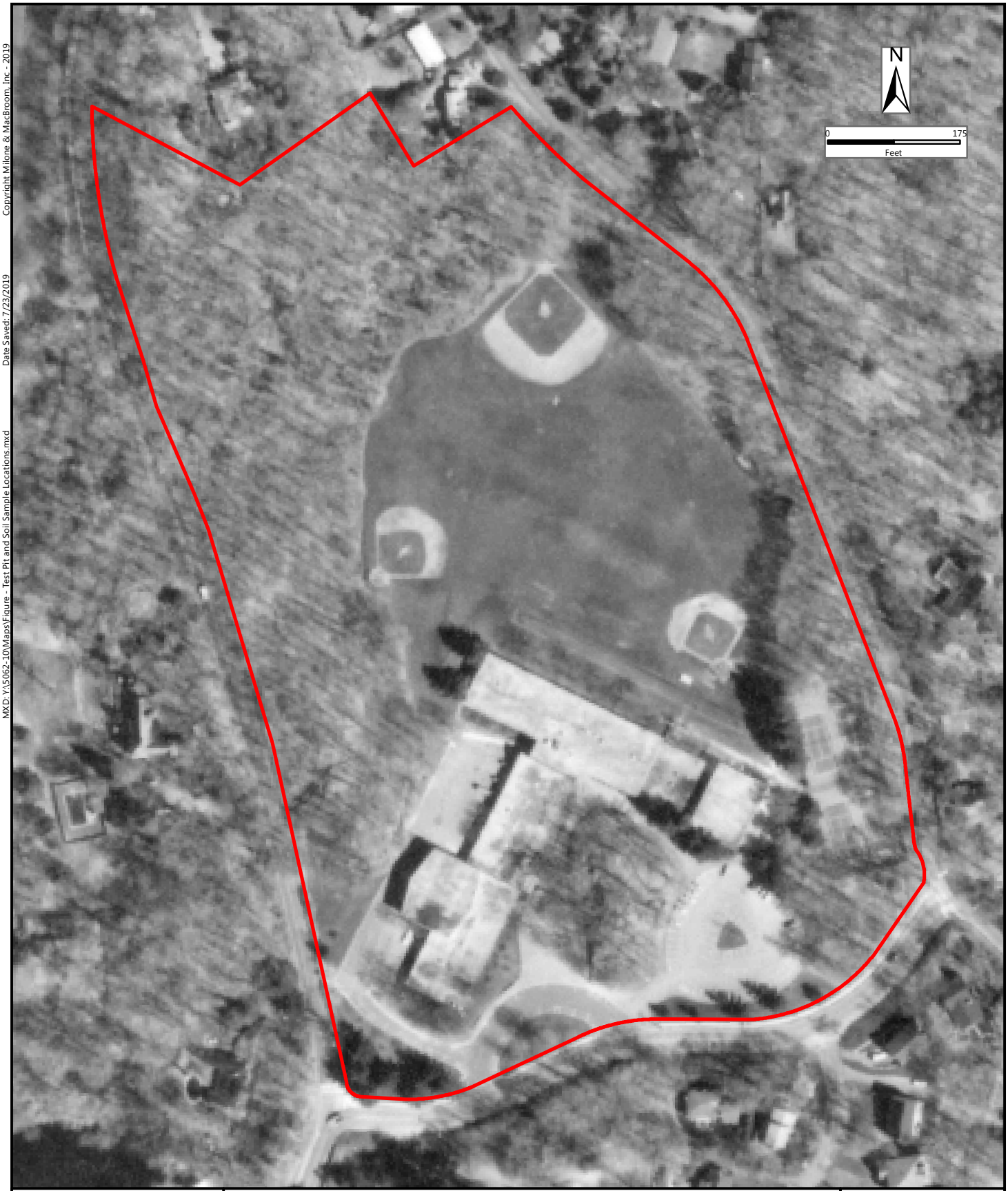

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1990 AERIAL

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
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PROJ. NO.	5062-10-02

FIG. 5

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1996 AERIAL

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DATE	7/23/2019
PROJ. NO.	5062-10-02

FIG. 6

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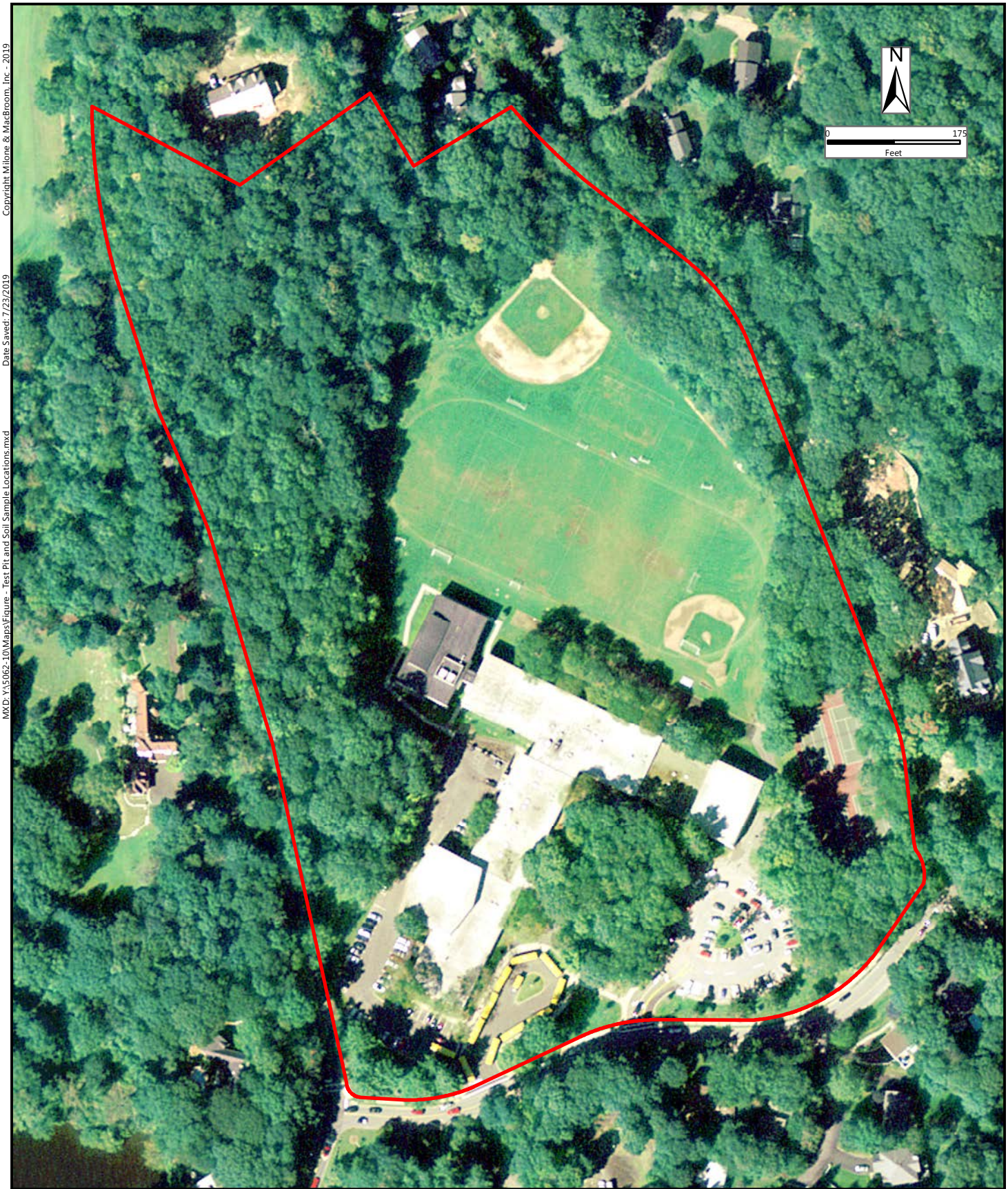

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2004 AERIAL

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9 INDIAN ROCK LANE
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PROJ. NO.	5062-10-02

FIG. 7

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2008 AERIAL

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
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FIG. 8

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2012 AERIAL

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GREENWICH PUBLIC SCHOOLS

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GREENWICH, CONNECTICUT

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PROJ. NO.	5062-10-02

FIG. 9

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2016 AERIAL

CENTRAL MIDDLE SCHOOL ENVIRONMENTAL SOIL INVESTIGATION
GREENWICH PUBLIC SCHOOLS

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GREENWICH, CONNECTICUT

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FIG. 10