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REPORT ON NON-INVASIVE  
ARCHAEOLOGICAL TESTING  
AT THE MARTINS FIELD PLAYGROUND  
FLUSHING, QUEENS, NEW YORK

Contract No. Q017-299 OMBP



Non-Invasive Testing at Martins Field

Prepared for: New York City Department of Parks and  
Recreation  
Olmsted Center  
Flushing Meadows-Corona Park  
Flushing, New York 11368

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## EXECUTIVE SUMMARY

This report on the non-invasive archaeological testing of the Martins Field Playground in Flushing, Queens, New York City has been conducted to comply with environment review regulations and was done in advance of the New York City Department of Parks and Recreation making any decision on the future of the park. The testing was successful in identifying anomalous areas and targets within the grassy section of the park. Inferences were made based on the fact that these results were related to the former cemetery which was located there. Two levels of possible burials were identified, confirming historic documentation of stacked burials. Several large deep pits were identified. It was speculated these could be from mass burials, possibly from internments of those dying during epidemics. One large metallic object was identified. This could be a possible individual grave. Remnants of the stone wall which used to border the eastern side of the original 1840 cemetery were also identified. The majority of the anomalous areas were located to the west of this, indicating a larger number of burials took place before the cemetery was augmented in 1873. Although the concentration of anomalous areas and targets was within the central part of the grassy area of the park and within the original 1840 cemetery boundaries, it was speculated that burials could have extended beyond these bounds. Targets were also identified to the north, east and west of the primary search area. Testing was not successful in the playground equipment area or in the handball court area. However, because targets were identified up to the boundaries of these two parts of the park and because there was historic documentation of burials within the wading pool area, it was presumed burials do extend into both of these zones. Recommendations were made to perform test excavations in four area to confirm the hypotheses and assertions made in this report.

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## INTRODUCTION

The New York City Department of Parks and Recreation recognizes the property now known as Martins Field Playground in Queens was formerly a cemetery and that there is a strong likelihood that human remains still exist buried beneath the surface. The New York State Office of Parks, Recreation and Historical Preservation (SHPO) has declared the property meets the eligibility criteria for the State and National Registers of Historic Places. Therefore the potential significance of the site as a former burial place has been acknowledged.

Before the New York City Department of Parks and Recreation (DPR) makes its decision regarding the future treatment of the park, they have requested non-invasive archaeological testing of Martins Field to determine the extent and density of graves throughout the property. This is the report on that testing. This report was prepared by Linda Stone, MA, RPA with geotechnical subconsulting services and associated report provided by Geo-Graf, Inc. The field work was conducted on October 6 and 13, 1999.

The contract for this work required two items. The first was preparation of a scope of work. The second was the actual testing and report preparation. The scope was to include the standard information required for an archaeological testing scope of work as well as a "written protocol for consultation with members of the descendent community". The author thought it best to separate these two components since they involve very different kinds of issues. Both scopes of work are attached to this report as Appendix A. As prescribed in the contract, the technical scope of work includes plans for non-invasive testing only, although "ground truthing" by excavating test areas which display targets or anomalies is a normal part of non-invasive testing. It should be noted that in the absence of conducting any test excavations to prove the hypothesis that the targets and anomalies found during non-invasive testing are related to burials, testing is incomplete. The fact that no breaking of the ground was to take place was echoed in the Landmarks Preservation Commission's Environmental Review Sign-off form for this scope. This sign-off form is also included in Appendix A. The Landmarks Commission declined to provide written comments or sign-off on the scope regarding consultation.

## SITE HISTORY AND ARCHAEOLOGICAL POTENTIAL

The report on the archaeological potential of the property now known as Martins Field Playground was completed in 1996. It presents the prehistory and history of the project area both prior to its use as a cemetery and up until the present. Part of the property, comprising a triangular shaped section extending north from a base along 46<sup>th</sup> Avenue, was purchased in 1840 by the Town of Flushing expressly to be used as a public cemetery. The eastern boundary can be seen on Figure 19 in the Archaeological Documentary Study and is reproduced here as Figure 1. It is labeled "stone wall" on Figure 1. The current park boundaries are superimposed as bold lines on this figure. The property was augmented to the east and north in 1873. Upon consolidation in 1898 the property became vested in New York City. It became a park in 1914 and portions of the western edge of the current park along 164<sup>th</sup> Street began to be purchased that year with the current boundaries established by 1957. The park became a playground in 1936 (Stone 1996: 19-21).

The archaeological documentary study report concluded that the "data presented demonstrated the likelihood of encountering intact and partially intact burials within sections of the Martins Field Playground" just beneath the ground surface or buried under a small amount of fill (Stone 1996:29). Burials and burial related features were considered significant and were the only types of archaeological resources felt to potentially be preserved within the park.

This use as a burial ground is Martins Field's most significant potential archaeological resource. It is possible that the cemetery was the final resting place of 500 to over 1000 individuals beginning in 1840. However only four marked headstones remained in 1919 when the Queens Topographical Bureau mapped local cemeteries. Three of these were members of the Bunn family, who are of Native American ancestry (Stone 1996:E.S.).

The report looked at a sample of the available death records from the Town and Village of Flushing from 1881 when records were first kept until 1898 when interments stopped. The cemetery was referred to by a number of similar names during that period but was most commonly called Town Ground in the death records. Seven percent of the death records reviewed were of individuals who were buried at the cemetery which is now part of Martins Field (Stone 1996:22-23). The archaeological documentary study provides an appendix with the results of the death record search including the names of the individuals buried, their "race/color", date of death, and age at death.

Age and ethnicity of those buried was tabulated. Not surprisingly among a population of those requiring public burial in the nineteenth century, infant mortality was high. Over 50% of the death records sampled were individuals who died under the age of five years. Only about one quarter of the sampled population lived to over the age of 30 (Stone 1996: 24).

Sixty-two percent of the individuals were listed as "black" or "colored" in the sampled death records. Four percent of the individuals were identified as white and no "race/color" was recorded for 34% of those buried in what is now part of Martins Field. Furthermore, since there was no way to distinguish possible Native American burials and this was considered advantageous because of the potential applicability of the Native American Graves Protection and Repatriation Act, surname identifications were used. Mr. Ralph Bunn, great-grandson of James Bunn whose headstone was recorded at the location of what is now the wading pool on the 1919 survey of the property, was interviewed for the 1996 study in his capacity as the chairman of the Native American Validation Alliance, Inc.. This is a genealogical and cultural organization.

He was asked, based on his knowledge of Native American genealogy, if he could determine likely ancestry based on surname of individuals listed in Appendix A. Including Bunn, he identified 27 common Native American surnames on Long Island among those listed in the appendix (Stone 1996:24).

This comprises 42% of the individuals listed in the appendix of the 1996 report and because the percentage is so large, it does seem likely that a large percentage of those buried at what is now Martins Field were of Native American ancestry.

Although the cemetery was used primarily to bury the poor, there were reports that wealthier people who died of disease during the epidemic years were also buried in what is now called Martins Field.

Only one news account from the period the property was actively used as a cemetery was found during the 1996 research. This article indicated that some graves were shallow and that burials were stacked at least one on top of the other in places. Grave markers were mentioned in two newspaper articles published around the time the property became a playground. One article indicates the property contained wooden grave markers and the other says some individuals were buried without any markers at all (Stone 1996:26). Although the wooden grave markers were observed in the 1930s, they were not mapped by the Queens Topographic Bureau in 1919. Only four marble headstones were mapped at that time, as mentioned above.

The report concluded that since no records of disinterments of graves were identified and "historic grade alterations were not substantial enough to have destroyed burials", there is a high likelihood of Martins Field still containing a substantial number of intact or partially intact burials (Stone 1996: 30). It was decided the best way to proceed with the archaeological evaluation of Martins Field Playground would be to conduct a program of remote sensing primarily relying on ground penetrating radar.

## METHODOLOGY

The archaeological testing took place over two days, as mentioned above. The field team was to consist of an engineer and technician from Geo-Graf, Inc. and the archaeologist. Work was to have taken place over four days. However, in order to expedite the project, Geo-Graf, Inc. doubled their efforts so that testing could be completed in two field days by using four people.

Figure 2 is a reduced version of the most current topographic survey of Martins Field Playground. It clearly shows the three zones within the park; the playground equipment area in the south, the grassy central section, and the handball courts at the northern end of the park. As stated in the scope of work, the testing began with establishing a ten foot grid. Work began in the grassy, central part of the park. The grid was established with the baseline against the eastern fence heading south from a point just inside the handball court area at the top of the ramp. The grid extended to 380 feet south and 120-190 feet west. The same reference points were used within the handball court area. All measurements were taken in reference to this grid.

The first equipment used was the ground penetrating radar (GPR). Two different GPR antenna systems were available for use (Plates 1 and 2). The one with the higher frequency antenna was used most extensively (Plate 1). This provides higher resolution, but does not penetrate as deep. It was felt this unit may be effective in the grassy area where very little fill had been added on top of the cemetery since it became a park. The GPR antenna was attached to recording equipment in the back of the van (Plate 3). In addition to recording the data, this equipment enabled real time observations. Interpretation of GPR data requires comparison of anomalies to undisturbed areas. This is done through collecting data at regularly spaced intervals which include undisturbed sections.

First a small section of each of the zones was covered with the GPR to establish settings on the equipment and to confirm that it was penetrating below the surface. Once this was done, actual systematic testing began. The pilot testing was successful only within the grassy area of the park. The extensive historic disturbances to the playground equipment area from the installation of the equipment, utilities and plantings precluded the identification of undisturbed sections along transects. Some testing within a circular pattern around the wading pool, roughly between the drains at the north and northeast, and

radiating out from this pattern, as well as within the wading pool itself, was attempted using both GPR antenna systems. This was the area where headstones were mapped in 1919. Unfortunately, this pilot program was not successful in establishing a pattern. The pilot testing within the handball court area presented a different problem. The concrete reinforcing was too deep and pervasive for the radar to penetrate it.

Within the grassy area, the units were dragged both manually as well as at the back of the Geo-Graf, Inc. vehicle (see report cover) along the ten foot grid. A smaller scale grid measuring forty feet square was tested by hand using both antenna systems. It was located between 130 - 170 feet south and 40 - 80 feet west. GPR transects were at two and a half foot intervals throughout this grid. In addition to covering the entire grassy area at ten foot intervals along the established grid, the lower frequency antenna was used at a 45 degree angle to the grid in a northeast to southwest direction making these transects at about 7.1 feet apart.

The magnetometer, for the identification of ferrous targets, was used extensively in two areas (Plate 4). The first was in the 40 foot grid established for the tight GPR transects. The second was in a swath running the length of the grassy area from 65 - 75 feet west. This swath was also the focus of testing with the GPR using the lower frequency antenna system. The magnetometer was also used in a limited way in the playground equipment area in conjunction with the pilot GPR testing.

For the identification of other metal targets, the radio frequency equipment (RF) was used (Plate 5). This was used where utilities were believed to be concentrated. The two main areas were along the eastern fence line and just north of the playground equipment area. The electromagnetic survey equipment was also used within the forty foot grid as well as in areas where larger targets were observed with the GPR equipment (Plate 6).

Size of targets can be estimated by the measurements along the grid. However depths of targets can only be established relative to one another. Actual depths may be obtainable during a ground truthing phase. However Geo-Graf, Inc. has provided some broad estimates of target depths based on the known depth of historic fill deposits of up to four feet and of the identified utility lines. These depths are discussed below as well as in the Geo-Graf, Inc. report (see Appendix B).

## RESULTS

Results of the geophysical testing are presented in Appendix B, the Geo-Graf, Inc. report. This report identifies targets and anomalous areas within the park and provides graphic depictions of their locations. Targets were identified at multiple depths below the ground surface. Both shallower and deeper targets are mapped on the large scale site plan (subsurface anomaly map) found at the end of Appendix B. Areas of their overlap are the areas where there is the highest likelihood of identifying burials associated with the former cemetery. These overlapping areas are depicted as cross-hatch marks on the subsurface anomaly map.

As stated above, the major testing effort was concentrated on the central grassy portion of the park. Furthermore, within this area, the focus was on the widest part. This is because of the decreased level of confidence of comparative targets due to the presence of trees as well as a general decrease in the number of targets at the northern end of the grassy area. This widest area is the area where statements can now be made regarding the potential for this part of the property to contain remains of the former cemetery. In addition to showing the locations of remote sensing targets and anomalies, the subsurface anomaly map (SAM) depicts the location of the original boundaries of the 1840 cemetery. This is of interest because what appear to be remnants of the stone wall which is depicted on the 1919 cemetery survey (see Figure 1) were identified by the GPR survey.

Targets and anomalies presumed to be burials were identified throughout the grassy section of the park. However the major concentration of targets was within the original 1840 cemetery boundaries. Interpretations of the geophysical data indicates what may be expected. The burials were not in orderly rows. They were somewhat haphazard in their layout making the data look somewhat random. This is not surprising since there is documentation of wooden grave markers and possibly no grave markers which would have made identification of available burial plots difficult to discern over the years of internments during the nineteenth century. Individual grave sites were difficult to identify through the geophysical testing because of the irregularity of spacing between probable graves, as well as from the fact that a large percentage of children were buried at what is now part of Martins Field. This added the element of irregularity of size.



The results of the non-invasive testing also indicate two distinct burial levels. This too was expected based on the historic report from 1896 describing a maintenance worker falling through two graves (Stone 1996: 25). Although precise depths of these levels cannot be established without ground truthing excavation, Geo-Graf, Inc. estimates the upper level extends to anywhere up to six feet below the current ground surface. They predict the lower level will be from 6 to 15 feet down. The shallow layer appears to extend up to the limit of the primary search area indicating that it probably extends beyond to both the north and south. Targets in the deeper layer duplicated much of those from the shallower layer with the deeper layer extending further in the southwest. In addition to the anomalous layers, several deep pit features were identified. One of these large pits is shown on the SAM. It was speculated this could have been a burial pit of mass graves of individuals who died from epidemics.

In addition to the possible grave sites identified by the ground penetrating radar, the magnetometer and electromagnetics identified a substantially sized feature. This target was a grave shaped metallic object located within the 1840 cemetery plot. Geo-Graf, Inc. speculates this may have been from a burial marker or from a non-pauper's grave based on their experience with other cemetery sites. There were also a large number of smaller magnetometer and EM hits within the area of presumed concentration of graves. Because of the level of sensitivity of this equipment it is not clear if these hits were from legitimate burial related metal objects or from modern debris. Surface objects such as nails were observed to cause the equipment to register in a similar way.

## DISCUSSION

During the preparation of the technical scope of work, a series of research question was formulated around the results of the documentary study.

- 1) Do burials remain in all parts of the park?
- 2) Do burial markers still exist beneath the ground surface in any part of the park?
- 3) Do other archaeological remains exist throughout the park?

An attempt to answer these questions was made through the non-invasive testing. The testing was successful in identifying anomalous areas and targets in the central grassy section of the park, falling mainly within the boundaries of the original 1840 cemetery. However similar areas were also identified to the east and west, both to a lesser extent. Several small metal targets were also identified. These could not definitively be associated with possible burial locations. One large metal target was identified. This has a higher probability of being related to cemetery usage.

The fact that most of the targets and anomalies presumed to be burials are within the boundaries of the original 1840 cemetery may indicate that after additional land was purchased in 1873 fewer interments took place. This implication of this is that a greater number of individuals than previously thought may have been buried in the cemetery that is now part of Martins Field Playground. Estimates made in the archaeological documentary study of the number of individuals which may have been buried there were based on death records kept after 1881 which was after the cemetery property had been augmented. If internments did in fact decrease after that time, a proportionally larger number of burials would have taken place during the earlier years of the cemetery thereby increasing the overall estimate of number of individuals buried at what is now Martins Field Playground by an unknown amount.

Although the major concentration of targets was within the 1840 cemetery boundaries, there is every reason to believe that burials extended both to the north and south of the grassy area. To the south is the play equipment and wading pool area where four headstones were documented in 1919. Therefore it is known internments were made in this part of the park. It is also known that the cemetery extended to the north prior to 1873.

The large pit which has tentatively been interpreted as a mass grave is shown on the SAM bordered by the stone wall on the east. This may be an indication that, should this actually be a mass grave, it was made prior to 1873 when the cemetery was augmented beyond that border.

## CONCLUSIONS AND RECOMMENDATIONS

The non-invasive archaeological testing at Martins Field Playground was successful in identifying locations of possible grave sites and of the stone wall boundary of the original 1840 cemetery. The areas of the project where both shallow and deeper targets were identified are those which would have the highest probability of containing the original cemetery. However, all of the hypotheses and assertions made in this report require further archaeological testing to determine their validity. Anomalous areas may have been the result of something other than burials. Therefore excavations need to be done to prove or disprove the hypothesis that anomalies identified during this non-invasive testing are the result of burials or burial related features. Without excavation of test areas to "ground truth" the results and prove that anomalous areas and targets are actual burials or burial related features it is not possible to make definitive conclusions.

Geo-Graf, Inc. recommends four locations for test excavations. These are discussed in their report and mapped on the SAM labeled as "TP-#". Two of these are recommended in areas of what are suspected to be individual graves, one of them is over the deep pit which could be a mass grave and the final test is in the area of the former stone wall which bounded the eastern side of the original cemetery. TP-1 is recommended for the area where the forty foot square close interval testing was completed. It appears that individual graves may be stacked in this area. TP-2 could encounter the large possible metallic object which could be an individual grave located near the center of the grassy area. TP-3 is recommended in the area mapped on the SAM which contains the possible deep, large burial pit. TP-4 is recommended in one of two areas, both over the locations suspected to be the remains of the former stone wall which ran along the eastern side of the original cemetery.

After the completion of below ground testing, the non-invasive testing data should be reanalyzed. All the recommended tests are proposed for the area of the original cemetery. This is the area where the highest degree of confidence exists for the identification of burials and burial related features. However anomalous areas and targets were also identified outside the boundaries of the original cemetery. Should the four proposed tests prove positive for burials or cemetery features, further consideration should be given to where additional tests could best be placed. These additional tests should be planned in other areas to prove or disprove that these other areas contain similar findings. In addition to the subsequent testing, should below ground disturbances be planned by the Parks Department, additional documentary

research, particularly research of death records, may be warranted.

Should test excavations prove burials to be as pervasive as the non-invasive testing indicates they may be, there would be a high likelihood that graves would be disturbed by any proposed below ground actions which the Parks Department may plan. Even the removal of existing facilities and plantings could disturb graves. Presuming there is no intent to relocate individuals who were buried at what is now part of Martins Field, every precaution should be taken to avoid unintentional disturbance of graves. This includes not only proposed actions to either restore the park or to create a memorial but also the recommended archaeological test excavations. Consultation with the descendent community will be important to determine the best approach, as specified in the attached scope of work (Appendix A). To prove that the anomalous areas and targets identified during the non-invasive testing are actual grave sites, buried individuals will necessarily have to be exposed. If the assumption that there is no intent to disturb these individuals is correct, plans will be required to protect any exposed graves throughout this process until they can be covered up again. This, of course, only relates to graves which would be exposed at the top of any archaeological test excavation. Since the non-invasive testing supports the documentary evidence that burials are stacked and there is a possible mass grave or graves at the Martins Field site, due consideration should be given to how testing for these types of burial situations may best be done without the removal of individuals from what was intended to be their final resting place.



Plate 1      Photograph of the high-frequency ground penetrating radar antenna.

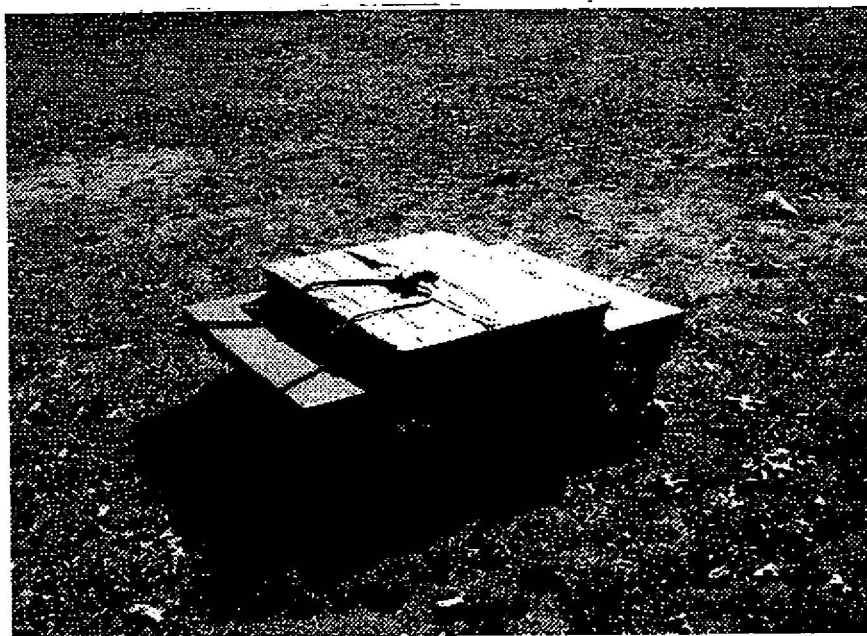


Plate 2      Photograph of the low-frequency ground penetrating radar antenna.



Plate 3      Photograph of the back of the Geo-Graf, Inc. van.

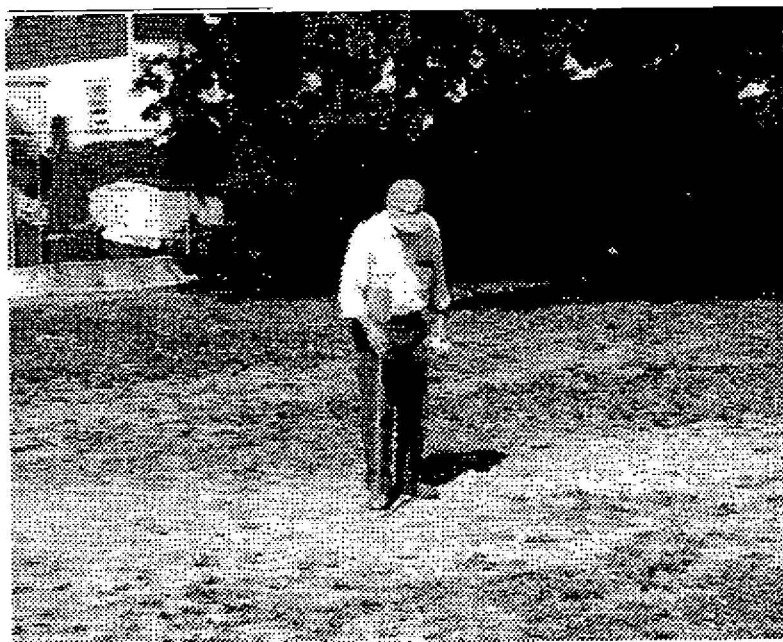


Plate 4      Photograph showing the use of the magnetometer.



Plate 5

Photograph showing the use of the radio frequency equipment.



Plate 6

Photograph showing the use of the electromagnetic equipment.



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(FRANCONIA)

AVE.

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No 13

# COLORED CEMETERY

FLUSHING

Surveyed Oct. 10, 1919

164<sup>TH</sup>

716.70

112.90

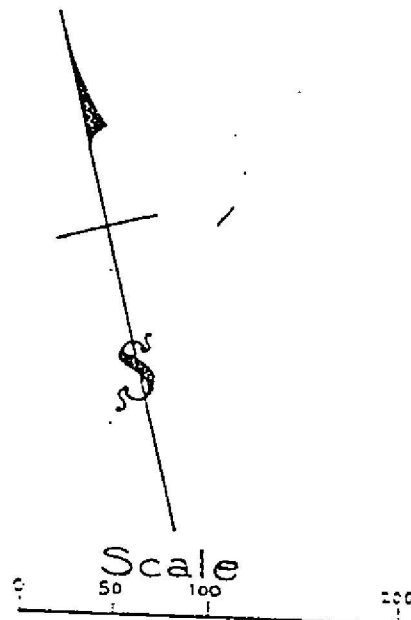
STONE WALL

705.00

165<sup>TH</sup>

314.82

4  
2  
2  
0  
0  
0



46<sup>TH</sup>

(QUEENS)

AVE.

FLUSHING CEMETERY

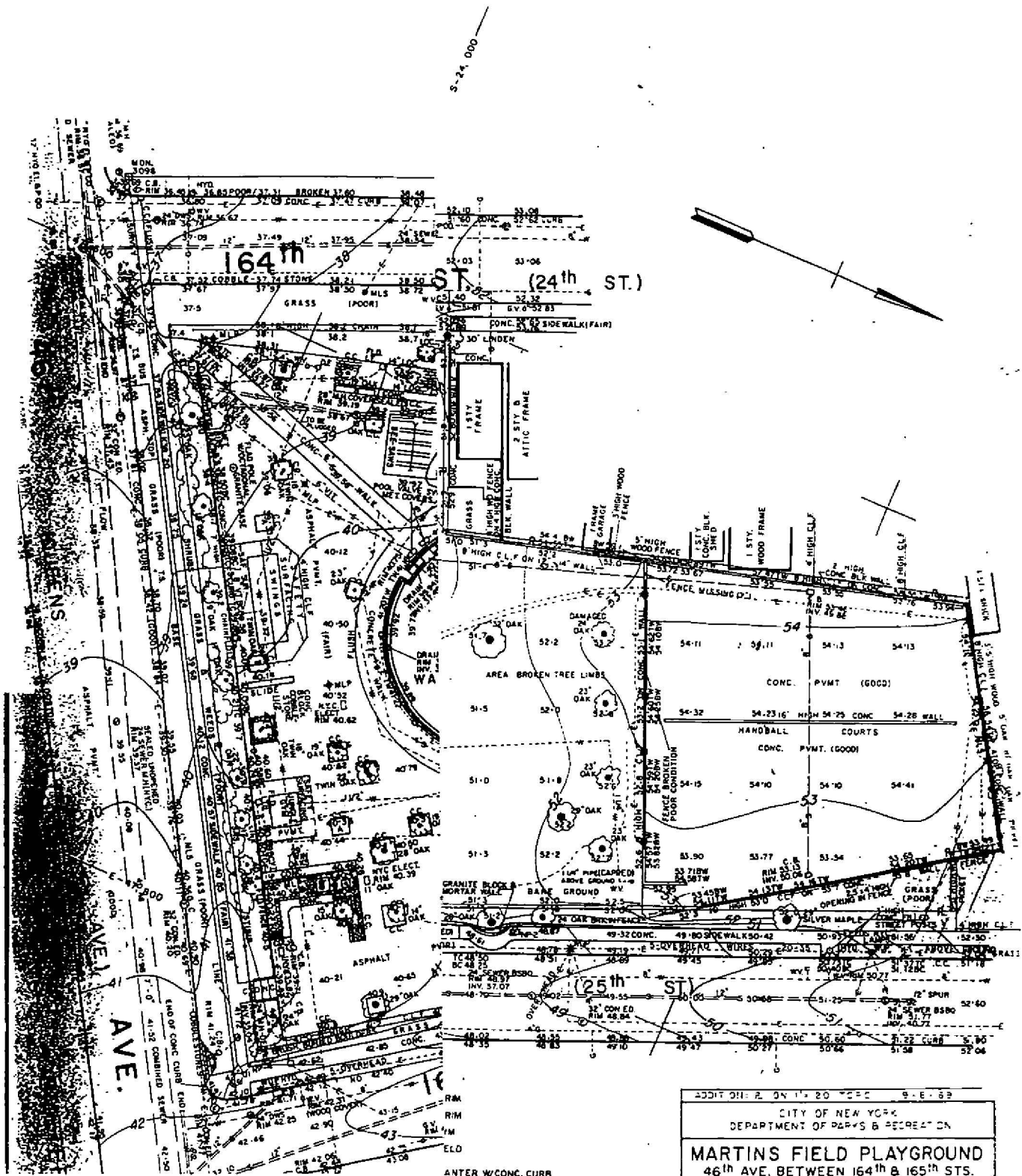


Figure 2 The 1986 topographic survey of

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Appendix A

SCOPES OF WORK  
FOR NON-INVASIVE ARCHAEOLOGICAL TESTING  
(WITH THE NYC LANDMARKS PRESERVATION COMMISSION SIGN-OFF)  
AND  
FOR DEVELOPING A WRITTEN PROTOCOL FOR CONSULTATION  
AT MARTINS FIELD PLAYGROUND  
Contract # Q017-299 OMBP

SCOPE OF WORK FOR  
NON-INVASIVE ARCHAEOLOGICAL TESTING  
AT MARTINS FIELD PLAYGROUND  
QUEENS, NEW YORK  
Contract Q017-299

September 1, 1999

The New York City Department of Parks and Recreation recognizes the property now known as Martins Field Playground in Queens was formerly a cemetery and that there is a strong likelihood that human remains still exist buried beneath the surface. Therefore the Parks Department is deferring any decisions regarding the future of the property until they know the extent of the buried remains still located there. The impact to human remains and other potential archaeological resources may exist in all areas of the park. Therefore the Parks Department has issued a contract to conduct non-invasive testing and archaeological interpretation of this geotechnical data. Per their specifications, this testing is to be done without any excavation of any kind, including "ground-truthing" to test the results of the geophysical survey. The contract was awarded to Linda Stone, RPA who will direct and coordinate the field testing and final report preparation with Geo-Graf, Inc. providing the geotechnical engineering services.

This scope of work has been prepared to comply with environmental review regulations. All activities indicated below shall be conducted in a manner consistent with the LPC *Guidelines for Archaeology* (1987), the *City Environmental Quality Review Technical Manual* (1993) and the New York Archaeological Council's *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York State* (1993). At the time the documentary study on Martins Field Playground was completed in 1996 the New York City Landmarks Preservation Commission expressed interest in applying federal standards as well. These include Section 106 of the National Historic Preservation Act, as amended and the Secretary of Interior's Standards and Guidelines for Archaeology (48CFR Part 4). In addition to the technical expertise and due to the active community interest in this project, the Parks Department has acknowledged the need for consultation with the descendant community, as was prescribed in the Documentary Study. They have requested this scope contain both a technical component and address these issues as they relate to community interests. This document contains the technical specifications and the accompanying document discusses the protocol for consultation with the descendant community.

A series of research question can be formulated around the results of the documentary study. The answers to these important questions cannot be found in the documentary record. They can only be found through the continuation of the phased archaeological approach.

- 1) Do burials remain in all parts of the park?
- 2) Do burial markers still exist beneath the ground surface in any part of the park?
- 3) Do other archaeological remains exist throughout the park?

Very little information on the cemetery exists in the documentary record, as detailed in the "Report on Phase 1A Archeological Documentary Research in Advance of Reconstruction of the Martins Field Playground, Flushing, Queens, New York" (Stone 1996). It is not known precisely how many individuals were buried at what is now called Martins Field or if the entire property which is now the playground had been used for burial purposes. Furthermore it is not known whether individuals were disinterred prior to the cemetery becoming a playground, however the negative evidence suggests no disinterments took

place. Although only four marble headstones were recorded in 1919, it is possible there were formerly more which had been buried during the process of converting the cemetery to a playground. Therefore the entire park will be tested.

Non-invasive testing does not have the capacity to determine exactly how many burials still remain within the park. Nor is there any guarantee the equipment will work effectively on the site. The equipment is sensitive to soil conditions which can negatively affect signal penetration. However should the testing be successful, it may be able to determine the extent and density of burials throughout the park. This will help the Parks Department in preparing their plans for the future of the park as well as the Landmarks Preservation Commission make decisions regarding potential landmark status of the property. The project has the potential to yield archaeological data which could provide information important to the site's history as well as to the history in a broader context. It is for these reasons the best professional effort of the testing team will be made to induce a successful outcome.

The primary geophysical method to be employed at Martins Field Playground is ground penetrating radar (GPR). This is the most successful non-invasive testing method used to evaluate for possible graves. However other methods will also be used because certain inclusions in the soil may limit the penetration of the radar signal. The other methods will help evaluate the nature of the soils in order to determine the best way to set the GPR equipment. These other methods include electromagnetic and magnetometer survey and radio frequency induction.

Fieldwork will begin with establishing a ten foot grid throughout the park. This will be done using a tape measure and spray paint. The grid will be tied into the most current site survey provided by the Parks Department, for reporting purposes. This can be most easily done should the survey be available in CADD format. For purposes of this study, the park will be divided into three zones based on the current conditions. These areas are 1) the handball court area, 2) the grassy central section of the park and 3) the playground equipment area. The geophysical testing equipment will have to be set to penetrate each of these three different ground conditions separately.

Once a grid is established in each zone, soil conditions will be evaluated using electromagnetic survey equipment. This involves the use of a handheld instrument which induces an electric current to look of variations in conductivity. This part of the survey can be performed rapidly while the operator merely walks along the grid. The field results of this survey will permit the geophysical subconsultant to evaluate the ability of the soil to be penetrated by electrical energy. This will provide a preliminary assessment of the potential for success of the GPR portion of the survey.

A magnetometer will also be used. It will identify buried ferrous materials. Radio frequency equipment will be used to identify locations of other metal objects. These are also handheld devices which can quickly be used. In addition to identifying locations of buried archaeological resources these methods will also pinpoint locations of utility lines throughout the park. For this reason, in addition to aiding in the archaeological evaluation of the park, this part of the survey can provide useful data for the Parks Department regarding exact locations of utility lines, many of which have not been mapped since 1940.

The GPR survey is where the majority of the field effort will be directed. This method involves the use of an antenna which transmits a relatively low power electromagnetic impulse. The antenna is mounted on a wooden cart. The cart is then dragged over the site while continuously collecting data. Two different GPR antennas may be used during the Martins Field Playground project. One has a lower

frequency which is able to penetrate deeper, but the resolution is less. The higher frequency device will enable detection of smaller, shallower targets. Data will be collected along the grid and then at shorter intervals dependent on field readings and time. The data will identify anomalies within the ground. Presumably, the major type of anomaly expected will be grave locations. All field testing is scheduled to take four days.

Upon completion of the fieldwork, data will be analyzed and interpreted to present in the report. This is a key phase of the project. As stated in the proposal for this work, interpretations of the data are inferred opinions. Since signal penetration is key to a successful outcome and no data on this currently exists for the park, it is not at all clear geophysical testing will work. However, should the testing produce seemingly desired results they must be interpreted and presented in terms of expected results. It should be understood field results are preliminary and any definitive answers will be reserved for the report. It should also be understood geophysical testing is generally accompanied by "ground-truthing". This would allow removal of earth in one or two test areas which display GPR anomalies in order to test the hypothesis that the anomalies actually represent either graves or buried grave markers. However this component of work has specifically been prohibited by the Parks Department during this phase of testing at Martins Field Playground. Therefore, archaeological testing will not be complete at the conclusion of this contract.

The report on the non-invasive testing will include a description of the actual field testing and an interpretation of the results. It will include a drawing of the accessible areas surveyed at a scale of at least one inch equals twenty feet on the Parks Department provided site survey. It will also be accompanied by samples of GPR profiles that include representative anomalies or targets. This report will be incorporated into the archaeological testing report. The archaeological testing report will include a summary of the previously completed documentary research, and indicate how the research questions and fieldwork activities described above have been addressed. Since no below ground work is planned for the park and will not be planned until the completion of this contract the report will not contain any specific recommendations regarding either archaeological evaluation or mitigation phases, as would be done should actions be planned. However, should the non-invasive testing be successful in penetrating the soils and identifying possible grave locations the report will contain recommendations for the completion of the identification phase of the archaeology. Those recommendations would be appropriate to the testing results and the desire to not disturb any potential buried human remains. Should the non-invasive testing not prove successful, the report recommendations would include developing alternatives to testing. These would also consider the preference to leave all potential burials in place and not disturb the graves.



THE CITY OF NEW YORK LANDMARKS PRESERVATION COMMISSION  
100 Old Slip, New York, NY 10005 (212) 487-6800

## ENVIRONMENTAL REVIEW

NYC PARKS/CEQR-Q

09/02/99

PROJECT NUMBER

DATE RECEIVED

### PROJECT

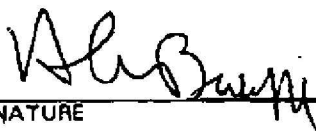
46 AVE: FLSHNG PAUPER BRL GD/MARTINS FIE

- ☒ No architectural significance
- ☐ No archaeological significance
- ☐ Designated New York City Landmark or Within Designated Historic District
- ☐ Listed on National Register of Historic Places
- ☒ Appears to be eligible for National Register Listing and/or New York City Landmark Designation
- ☒ May be archaeologically significant; requesting additional materials

### COMMENTS

The Scope of Work for Non-Invasive Archaeological Field Testing at Martins Field Playground Queens, New York, dated September 1, 1999 and written by Linda Stone is accepted. The Commission notes that no sub-surface work will be done as part of this work.

SIGNATURE



09/08/99

DATE

SCOPE OF WORK FOR DEVELOPING A  
WRITTEN PROTOCOL FOR CONSULTATION  
AT MARTINS FIELD PLAYGROUND  
QUEENS, NEW YORK  
Contract Q017-299

September 1, 1999

The New York City Department of Parks and Recreation recognizes the property now known as Martins Field Playground in Queens was formerly a cemetery and that there is a strong likelihood that human remains still exist buried beneath the surface. The Parks Department has completed an archaeological documentary study, "Report on Phase 1A Archeological Documentary Research in Advance of Reconstruction of the Martins Field Playground, Flushing, Queens, New York" (Stone 1996), which recommended non-invasive testing and participation of the descendant community on any future actions planned for the park. The Landmarks Preservation Commission (LPC) concurred with the findings of the report by accepting it. This scope of work addresses issues related to consultation.

Unfortunately, community participation is not specified in the LPC Guidelines, the Cultural Resources Section of the CEQR Technical Manual, nor the NYAC Standards used by the State Historic Preservation Office (SHPO). However the federal laws, regulations and guidelines do provide some direction, albeit quite general, when it comes to consultation on the archaeological and historic preservation process. The attached list of suggested readings contains some of this direction. Like the archaeological process, the consultation process contains sequential steps. They are identification, notification, consultation and compliance. Participating parties specified in regulations include by federal, state and local agencies, interested members of the public, those, including Indian Tribes, who attach cultural significance to the property, and those with direct legal or financial interests.

The Maryland Historical Trust's *Standards and Guidelines for Archeological Investigations in Maryland* provide a succinct summary of the considerations specific to burial sites.

The archeological investigation or treatment of any human remains and burial sites must be undertaken with sensitivity for the wishes of descendants and groups culturally affiliated with the deceased, and must be conducted in full compliance with applicable federal and state law. Any excavation of burials should be preceded by careful consideration, thorough planning, and extensive consultation. ... The consultation process is likely to include the participation of the Maryland Commission on Indian Affairs for prehistoric burial sites, descendants, culturally affiliated groups, and other interested parties as pertinent to the human remains concerned.

The Federal Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) establishes protection and procedures for the treatment of Native American human burials located on federally-owned property or Indian lands. NAGPRA gives certain rights regarding the treatment and disposition of human remains, funerary objects, sacred objects, and objects of cultural patrimony to lineal descendants and to federally recognized Indian tribes when these groups demonstrate cultural affiliation. The law encourages the avoidance and preservation of archeological sites which contain Native American burials on federal land. NAGPRA requires federal agencies to consult with qualified culturally affiliated Indian Tribes or lineal descendants prior to undertaking any

archeological investigations which may encounter human remains or upon the unanticipated discovery of human remains on federal land. The consulting parties decide the appropriate treatment and disposition of human remains and other cultural items recovered. This consultation may be a lengthy process and should occur early in project planning. (MHT 1994: 63-64).

Within the federal regulations, the Advisory Council on Historic Preservation along with the Agencies conducting undertakings and the State Historic Preservation Officer (SHPO) are assigned certain responsibilities regarding the consultation component of historic preservation. This protocol relates these procedures substituting the LPC for the Advisory Council and the Parks Department for the Agency. In New York City, the SHPO generally defers to the Landmarks Commission. However, SHPO should be asked whether or not their office would like to participate in these consultations or would like to defer, as they generally do in archaeological matters.

Federal regulations covering the protection of historic and cultural properties are presented in the Code of Federal Regulations 36 CFR Part 800 which relates to implementation of Section 106 of the National Historic Preservation Act. "The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation between the Agency Official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to avoid or minimize adverse effects on historic properties" (800.1). Since no actions which would have adverse affects on the historic cemetery now called Martins Field Playground have been planned, it is of interest to the Parks Department as well as to those in the descendant community to begin their consultation process now. This will enable all of those with a vested interest in the future of the property to provide input prior to making decisions. Newly adopted changes to the federal regulations have further defined provisions for consultation with the public, interested parties and Native American groups as they relate to actions proposed on federal properties. Although no ground disturbing actions are currently planned for Martins Field Playground, the Parks Department should consider initiating consultation on the current work, including this scope and the accompanying technical scope of work, with the two members of the descendant community identified in the Documentary Research report; Mr. Ralph Bunn and Mr. Mandingo Tshaka. "Consultation may be initiated with a letter, but should be followed up by telephone or face-to-face dialogue..." (Department of Interior 1995: 62164).

The obligation is on the Parks Department "to take steps to identify the interested public and involve them at specific points in the section 106 process" (36 CFR Part 800.2.d.4) and to "provide an adequate opportunity for members of the public to receive information and express their views". The participation of ethnographers in this process is central in the National Park Service's *Cultural Resources Management Guidelines* which provides a framework for creating and implementing consultations through the Section 106 process. The New York City Department of Parks and Recreation might consider contacting the NPS to obtain further information on the appropriate use of an ethnographic specialist in the consultation process at Martins Field Playground. "Ethnographic studies make it possible to ensure that culturally affiliated groups are consulted about archaeological research..." (NPS 1997: 81). With this goal of facilitating collaborative relationships, "developing programs, policies, guidelines, and data to help management identify and protect culturally significant resources falls to the applied ethnography program" (NPS 1997: 157).

One of six areas where the National Park Service requires ethnographic assistance is in "consulting

about and determining lineal descent or cultural affiliations between past and contemporary Native Americans and their associations to park resources" (NPS 1997: 158). Ethnographic research principles include guidance for consultation. "Concurrence in study goals and permission to proceed will be obtained before conducting a study; written permission will be sought from tribal councils...Draft reports will be circulated so that affected groups can suggest mid-course corrections" (NPS 1997: 163-164). One form of ethnographic study is used to determine cultural affiliation and lineal descendants of park resources.

The affiliation study establishes relationships between park resources and associated past and present peoples. Lineal descent studies trace relationships between objects in park collections, or other resources, and descendants of individuals whose remains or objects are in park collections. They are required to address the cultural affiliation and consultation requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) and other legislation, policy, and regulations that address peoples traditionally associated with park resources. Parks with Native American materials will program affiliations studies as soon as possible. Researchers will consult with NPS archeologists, curators, ethnographers, and other professionals concerned with repatriation, as well as with community members (NPS 1997: 167).

Quoting the Advisory Council with regard to notification and consultation, The Park Service states "agencies should involve the public 'in a flexible manner that reflects the type of undertaking under consideration, the agency's administrative process and the nature of known or expected public interests'" (NPS 1997:61). They go on to say

Notification and consultation will conform to NPS ethnographic program policies and meet the requirements of ARPA; 43 CFR Part 7, *Protection of Archaeological Resources*; the Native American Graves Protection and Repatriation Act (NAGPRA); and 43 CFR Part 10, *NAGPRA Regulations*. NPS archeologists, in coordination with NPS ethnographers, curators, and park superintendents, are responsible for ensuring that archeological research on park lands is in compliance with these policies and requirements (NPS 1997: 72).

Once a determination of who to consult is made the next step is to notify the parties. The National Park Service recommends such avenues as letters, advertisements, flyers, radio announcements, and follow-up phone calls (NPS 1997:171). They feel consultation meetings can be most effective when the group size is small. However this is not to imply a limit is placed on the number of people or groups to be consulted, rather several small meetings may be more effective than one larger meeting (NPS 1997: 172). With specific regard to the possibility of encountering human remains in archaeological contexts, the Park Service stresses the importance of documenting, in writing, any agreements reached during consultations.

As stated in the federal regulations regarding consultations, these are to be initiated when actions are planned. However the New York City Parks Department will not be planning any actions to below ground resources in Martins Field Playground until after the completion of this contract. Therefore a specific discussion of items of potential concern, such as excavation of human remains, lab work, treatment of human burials, treatment of human remains from disturbed contexts, reburial of human remains and conservation, curation and disposition of archaeological collections, should be deferred until the consultation process is initiated and all appropriate parties can participate in decision making. In addition to archaeological and historic preservation laws, regulations and guidelines, the Parks Department should keep in mind that there are state laws governing removal of bodies from cemeteries, should they determine

burials will be moved. The Parks Department should also familiarize itself with the appropriate laws, regulations and guidelines regarding consultations as part of the Section 106 process, some of which are included in the attached list of references and suggested reading. They may also wish to contact agencies which can direct them to specific procedures which they have used in the past. This could include the NYC Landmarks Preservation Commission, the New York State Historic Preservation Office, the President's Advisory Council on Historic Preservation as well as other localities which have conducted similar types of consultations.

The need for commencing the consultation as early as possible in the planning process should be further emphasized, particularly because buried human remains are expected to be identified. The National Park Service's review of the laws protecting archaeological sites identifies specific and often varied opinions exist regarding human remains. "Douglas H. Ubelaker and Lauryn Guttenplan Grant explain that Native Americans, African Americans, and other groups are quite concerned about the excavation, analysis, and museum display of their ancestors' bones, some even viewing such activities as outright desecration" (Henry 1993: 56). Similar views have been expressed regarding the property now known as Martins Field Playground, as described in the archaeological documentary study. Therefore the Parks Department should expect similar views to arise during their consultation on matters relating to the site. Sufficient time should be allowed to accommodate consultation and review in future Parks Department contracts relating to Martins Field Playground. Time frames for notification and comment are discussed in 36 CFR Part 800.

## REFERENCES AND SUGGESTED READING

### Advisory Council for Historic Preservation

1993 Protection of Historic and Cultural Properties. 36 CFR Part 800. Effective June 17, 1999.

### City of New York

1993 City Environmental Review Technical Manual. Mayor's Office of Environmental Coordination.

### Department of Interior

1995 Native American Graves Protection and Repatriation Act Regulations. 43 CFR Part 10. Federal Register: December 4, 1995. Pages 62133-62169.

### Henry, Susan L.

1993 *Protecting Archeological Sites on Private Lands*. Washington, D.C.: U.S. Department of the Interior, National Park Service, Preservation Planning Branch, Cultural Resources Interagency Resources Division.

### Maryland Historical Trust

1994 Standards and Guidelines for Archeological Investigations in Maryland. Maryland Historical Trust Technical Report Number 2.

### National Park Service

1997 Cultural Resource Management Guideline. NPS-28. Release No. 5. Washington, D.C.: U.S. Department of the Interior, National Park Service.

### New York Archaeological Council

1993 Standards for Cultural Resources Investigations and Curation of Archaeological Collections.

### Stone, Linda

1996 Report on Phase 1A Archeological Documentary Research in Advance of Reconstruction of the Martins Field Playground, Flushing, Queens, New York. Prepared for the New York City Department of Parks and Recreation.

### U.S. Code

1990 Native American Graves Protection and Repatriation Act. Public Law 101-601 - November 16, 1990. HR 5237. 104 STAT. 3049.

Appendix B

Geo-Graf, Inc. Report





GEOTECHNICAL ENGINEERING

**GEOTECHNICAL ENGINEERING REPORT  
GPR SEARCH FOR FORMER CEMETERY  
MARTINS FIELD PLAYGROUND  
46<sup>th</sup> AVE BETWEEN 164<sup>th</sup> & 165<sup>th</sup> STS  
BOROUGH OF QUEENS, NEW YORK CITY  
1 NOVEMBER 1999**

**Prepared for:**

Linda Stone, MA, SOPA  
249 East 48th St., #2B  
New York, NY 10017

**Project Manager:**

Linda Stone, MA

**Prepared by:**

Geo-Graf, Inc.  
511 Beechwood Drive  
Kennett Square, PA 19348

**Project Manager:**

Fred L. Graf, P.E.  
Project Number: 100699

**Geo-Graf, Inc. Disclaimer**

Services and resulting interpretations provided by Geo-Graf, Inc., shall be performed with our best professional efforts. Depth of GPR, EM, RF and magnetic signal penetration is dependent upon the electrical properties of the material(s) probed and interpretations are opinions based on inference from acquired GPR, EM, RF, magnetic and/or other data. Thus, Geo-Graf, Inc., does not guarantee the desired penetration depth, accuracy or correctness of interpretations. Geo-Graf, Inc., will not accept liability or responsibility for any losses, damages or expenses which may be incurred or sustained by any services or interpretations performed by Geo-Graf, Inc., or others.

**Summary:**

This report contains the findings of a nonintrusive geotechnical engineering investigation performed by Geo-Graf, Inc. (GGI) on October 6 and 13, 1999, at Martins Field Playground, 46<sup>th</sup> Avenue Between 164<sup>th</sup> and 165<sup>th</sup> Streets, Borough of Queens in the City of New York, in accordance with the GGI Geotechnical Engineering Proposal No. 918 dated 6-9-99.

Prior to planned reconstruction of the playground and park areas within the Martin's Field Site, an archaeological research project indicated that a former Pauper's Cemetery could have existed within the current boundaries of the Park. In lieu of an archaeological excavation, GGI was retained to perform a nonintrusive geophysical investigation in an attempt to provide additional subsurface information on the possible existence of human burials within the playground and field areas.

GGI executed the nonintrusive investigation primarily utilizing Ground Penetrating Radar (GPR) technologies. Although sample GPR profiles were collected in all areas of the park, the data was superior within the more undisturbed grass and field sections, thus the GPR efforts were concentrated there.

Through extensive GPR data analysis and post-processing, subsurface anomalies which GGI interprets could represent both individual and multiple human burials were detected throughout the search area.

According to information provided to GGI by Ms. Linda Stone, the Park had reportedly been a farm prior to the purchase of the initial cemetery plot in 1840. The majority of the GPR-detected subsurface anomalies indicative of possible burials were located within this original 1840 plot. GGI could delineate no regular spacing or other apparent pattern of the detected anomalies, as has been the experience with other cemeteries or memorial parks. However, this random or haphazard burial pattern would be expected within a Pauper's Cemetery with an undocumented internment policy, as was reportedly the case at this site.

Two possible burial levels were delineated within the search area suggesting the possibility that graves were buried on top of other graves. The deeper possible burial level was delineated at a depth approximately 6' to 15' below current grade, and the shallower possible burial level was found to be located from 0' to 6' under the existing surface.

Within the majority of the search area a small zone of fill (0' to 4') was detected via GPR between the current surface level and the former farm field/original cemetery surface. In addition, possible remnants of a stone wall bordering the eastern boundary of the original cemetery parcel were also delineated by GPR.

The GPR-detected subsurface anomalies indicative of possible graves are plotted on the accompanying Subsurface Anomaly Map (*SAM*) separated into the aforementioned shallow and deeper burial levels. Based on the apparent lack of burial symmetry or pattern, and information that the majority of the burials were for children less than five years of age, individual grave sites could be difficult to delineate. The overall anomalous areas were plotted and shown on the *SAM*.

Two additional subsurface features were detected by GGI within the area containing both shallow and deep anomalous layers. An isolated grave shaped metallic target was detected by EM and magnetic techniques. This target, if associated with the former cemetery, could be a non-pauper's burial site. The second subsurface feature detected within this area was a "strong" GPR target, standing out among the shallow-deep anomalous layers. This feature could be a large possible burial pit containing mass graves as was reported during the disease epidemics that occurred during the era of this cemetery (the original plot).

As with any geophysical investigation, interpretations of the data collected at this site are based on GGI's experience from similar projects. However, the possibility exists that GPR-detected anomalous areas may be unrelated to human graves and could be the result of unknown subsurface features. As a result, GGI strongly recommends that a small number of test pits be undertaken to either verify or discount these findings as being related to the human burials associated with the former cemetery. Several areas representing the strongest possibility for graves are recommended for test pits which are included in the findings.

**Scope of Work:**

Perform a nonintrusive geophysical subsurface investigation within the accessible specified search areas in an attempt to delineate subsurface anomalies that could be related to a former cemetery. Nonintrusive delineation techniques will include the collection and interpretation of data from ground penetrating radar (GPR), electromagnetics (EM), radio frequency (RF) and magnetic geophysical instruments. Collected site data will be reviewed, correlated and findings presented on a color GGI Subsurface Anomaly Map (*SAM*) of the site.

**Specified Search Area:**

A 1986 topographic survey of the search area known as Martins Field Playground was provided to GGI by Linda Stone, MA (LSA). This City of New York, Department of Parks and Recreation File Map No. Q-T-17-2 included a fenced area approximately 200' x 700'. The northern end consisted of concrete surfaced handball courts; the southern end consisted of a paved playground with a former wading pool; and the largest area in the center consisted of a grass-surfaced play area. The area is relatively level with a slope from north to south.

**Site Background:**

A 1996 Report by LSA on Archaeological Documentary Research at the Martins Field Playground site utilized death and property records to substantiate the conclusion that a Pauper's Cemetery had existed from 1840 to about 1898. Records suggest that from 500 to 1,000 burials may have existed in this area. Smallpox, cholera, and yellow fever epidemics were reported during this era in the City and could have resulted in mass burials within a Pauper's Cemeteries to avoid perceived contamination of existing cemeteries.

The initial purchase of land for a Pauper's Cemetery in 1840 included an elongated triangular-shaped parcel of approximately 1.7 acres; additional land was purchased but not until 1873. Lacking any interment records it would be expected that graves, both individual and mass, for both paupers and people of means exist within this site possibly concentrated within the original parcel.

The site fell into disuse and became a playground in 1936. It is currently scheduled to undergo renovation efforts.

**Field Investigation:**

On October 6 and 13, 1999, GGI performed a nonintrusive geophysical investigation as directed by Ms. Linda Stone, Archaeological Consultant - LSA. Two GGI field crews were utilized for each field day.

GPR profiles were completed at varying intervals (2.5', 5', and 10') in three orientations: north-south, east-west, and northeast to southwest grid directions in an attempt to delineate and identify subsurface anomalies. GPR data was collected utilizing two different frequency antenna systems; a 550 MHz and a 120 MHz system. Two GPR systems were also utilized for data collection.

To facilitate documentation of site findings and GPR data collection, GGI created a reference grid with 10' spacings over the specified, accessible search area. The GGI zero/zero reference datum point was located at a northeast location on the eastern fence (refer to the *SAM*). Pink water-based spray paint was used to field mark the reference grid.

Within an approximate 10' x 360' section which includes some of the detected GPR anomalous areas, EM and magnetic geophysical detection techniques were utilized in an attempt to delineate subsurface metallic and/or iron-containing objects. Detected targets were documented and marked in the field with green paints. Where applicable, RF pipe tracing techniques were utilized in induction modes in an attempt to locate and field-mark metallic piping.

*Geophysical Instrumentation:*

The following is a list and brief description of the geophysical equipment utilized for this investigation.

- GPR - Ground Penetrating Radars - A Geophysical Survey Systems, Inc. Subsurface Interface Radar (SIR) System 2000 and SIR System 3 ground penetrating radar units were utilized for this investigation. Profiles collected on site are recorded for subsequent data analyzation and post-processing at the GGI office. GPR is capable of delineating metallic and nonmetallic: USTs, drums, utilities, pipeline leaks, voids, bed rock layers, product plumes, rebar and rebar spacings, concrete floor thicknesses, grave sites and other subsurface anomalies.

In addition, various computer processing techniques are used at the GGI office in order to improve the image resolution for GPR interpretation and for the generation of a representative color GPR data printout.

Two GPR antenna systems were utilized for the investigation: a 550 MHz and a 120 MHz antenna system. The use of the different antennae are based on the following: the higher the antenna frequency the greater the GPR image resolution (ability to detect smaller targets), but at the "cost" of signal penetration depth. The lower the antenna frequency, the deeper the signal penetration, but at the "cost" of GPR image resolution. A total of 168 GPR profiles were recorded at the site.

- RF - Radio Frequency - A Metrotech Pipe/Cable Locator, model 810. Capable of "tracing" electrically continuous pipes/cables. Operates in either conductive (direct pipe contact) or inductive (inducing current onto pipe when a direct pipe contact is inaccessible) modes. Utilized to locate and trace utilities.
- EM - Electromagnetics - An Aqua-Tronics Tracer, model A-6. Capable of locating and delineating metallic masses. Operates by inducing and measuring the returning electric field on subsurface metallic targets. Utilized to delineate USTs, drum piles, subsurface concrete pads, utilities and metallic debris.
- Magnetics - A Schonstedt Locator (Vertical Field Gradiometer), model MAC-51. Capable of detecting small and large ferrous (iron) containing targets. Operates by measuring the remnant vertical magnetic fields from ferrous containing compounds. Utilized to detect buried drums, fill lids, manhole lids, valves, utilities, rebar and iron containing debris.

#### **Findings:**

Sample GPR profiles were collected in all areas of the park including; the handball courts at the northern end which were found to contain metallic reinforcing within the concrete, as well as, the asphalt surfaced playground and metallic reinforced wading pool. The reinforcing and the man-made influences in these areas limited the GPR signal penetration and conclusiveness of the results. However, GPR data collected within the relatively undisturbed grass field composing the majority of the site yielded excellent GPR signal penetration. As a result a field decision was made to concentrate the investigation within this grass-covered center section of the site.

After extensive review and processing of GPR data, the findings are discussed below and plotted on the *SAM*.

#### **GPR-Detected Anomalies:**

Two subsoil levels or layers of GPR anomalies were detected with Primary GPR Search Area as indicated on the *SAM*. The outline of these distinct anomalous layers form the extent of what GGI suspects to contain multiple individual and mass grave burials. These anomalous layers were detected independent of one another, except within an approximately 90' x 260' area oriented north-south where the levels overlapped. Individual targets within these anomalous layers were, for the most part, camouflaged and could not be individually plotted.

### **Shallow Layer:**

A shallow GPR anomalous subsoil layer was detected throughout the majority of the field areas of the site, as shown on the *SAM*. This layer appears to be buried beneath approximately 0' to 3' of fill below the current grade. GGI suspects this layer interface is the original farm/cemetery surface and generally follows the reported former surface elevations that were provided to GGI. Also delineated within this layer were the remains of a possible stone retaining wall that extends throughout the grassy area in a general north/south direction. This possible wall remnant is positioned at the same location as the original eastern boundary of the cemetery parcel shown on archival mapping.

Many possible burial targets indicative of graves were detected within or just beneath this layer. The majority of these targets are located in a north-south band approximately 40' wide that extends through the search area at 100' south to 370' south (based on the GGI reference grid). Note that the limits at 100' south and 370' south were based on data collection accessibility. It is probable that this band of shallow targets extends both further north and south. The eastern boundary/retaining wall associated with the initial property purchase in 1940 appears to be associated with the eastern side of this shallow target band.

Figure 1 is a GPR data profile from the 40' x 40' test plot area which covers both the shallow and deeper GPR subsurface anomalous layers.

### **Deeper Layer:**

In addition to the aforementioned shallow layer, a deeper GPR anomalous layer was delineated within the investigated area ranging in depths from approximately 6' to 15' below current grade. This layer and the shallow layer were delineated overlapping within the 40' x 270' area discussed above. Targets indicative of possible grave burials were also delineated within this level. The concentrations of targets within this deeper level nearly duplicates that of the shallower layer. Although, the boundaries of this level extend further west within the southern half of the site.

In areas within the southern half of the original parcel, several deep pit-shaped areas were detected that could be indicative of possible mass grave burial pits. One of these areas is shown on the *SAM* and Figure 2 which is a GPR data profile at 70' west extending from 40' south to 360' south. This particular possible mass grave pit is located along the eastern border of the original cemetery next to the possible stone wall remnant also detected by GPR. Although only one pit is shown on the *SAM* at least three pits are partially seen grouped together in the southern end of Figure 2.

### **Additional Findings - EM, Magnetics, RF**

EM and magnetic techniques were only utilized within the area approximately from 65' W to 75' W and from 40' S to 370' S. Multiple small magnetic "peaks" were detected within this area indicative of buried iron-containing objects. Based on the GPR findings GGI suspects



these magnetic targets could be associated with possible burials, however, the possibility exists that these signals could also be associated to unrelated 20th century trash or other debris.

Only one EM target, approximately 4' x 8' in size was delineated within the EM and magnetic search area. This target was oriented north-south and is indicative of a large buried metal-containing object or conductive subsoils. Based on the location of this target within the overlapping GPR anomalous layers and the fact that it is located within the original cemetery plot, GGI suspects this target could be a single possible coffin burial or memorial marker remnant.

Although several subsurface utilities were shown on mapping provided to GGI only a single possible water line was detected via RF pipe tracing techniques extending through the primary search area. This utility is included on the *SAM*. Note, that the purpose of this subsurface investigation was not for utility detection or mapping.

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Figures 3 and 4 are site photographs taken at the time of the investigation depicting site conditions.



**Recommendations:**

As with any geophysical investigation, interpretations of the data collected at this site are based on GGI's experience from similar projects. However, the possibility exists that GPR-detected targets and anomalous areas may be unrelated to human graves and could be the result of unknown natural or manmade subsurface features. As a result, GGI strongly recommends that a small number of test pits be undertaken to either verify or discount these findings as being related to the human burials associated with the former cemetery. Four areas representing the strongest possibility for graves are recommended for test pits. These are denoted TP-1 through TP-4 on the SAM and described below.

**Recommended Test Pit Locations:**

Dimensioned to GGI reference grid.

**TP-1 - 68' W/154' S**

This location is within the 40' x 40' test plot area. GGI anticipates a possible shallower grave (approximately 2' to 6' below current grade) over a possible deeper grave (6' to 15' below current grade).

**TP-2 - 60' W/240' S**

This location is found over a strong EM and magnetic target indicating a possible metallic and/or iron-contain object. GGI suspects this location could be a possible coffin burial or marker.

**TP-3 - 300' S/70' W**

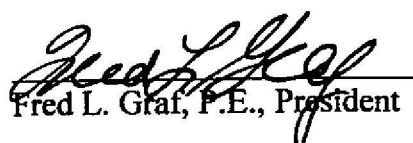
This recommended test pit is located over the a deeper possible mass burial pit.

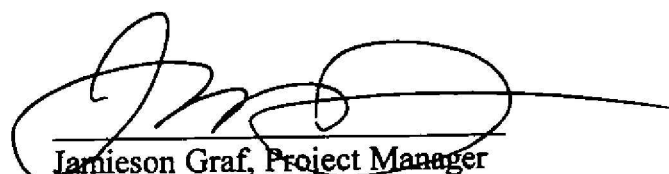
**TP-4a & TP-4b -54' W/155' S & 60' W/110' S**

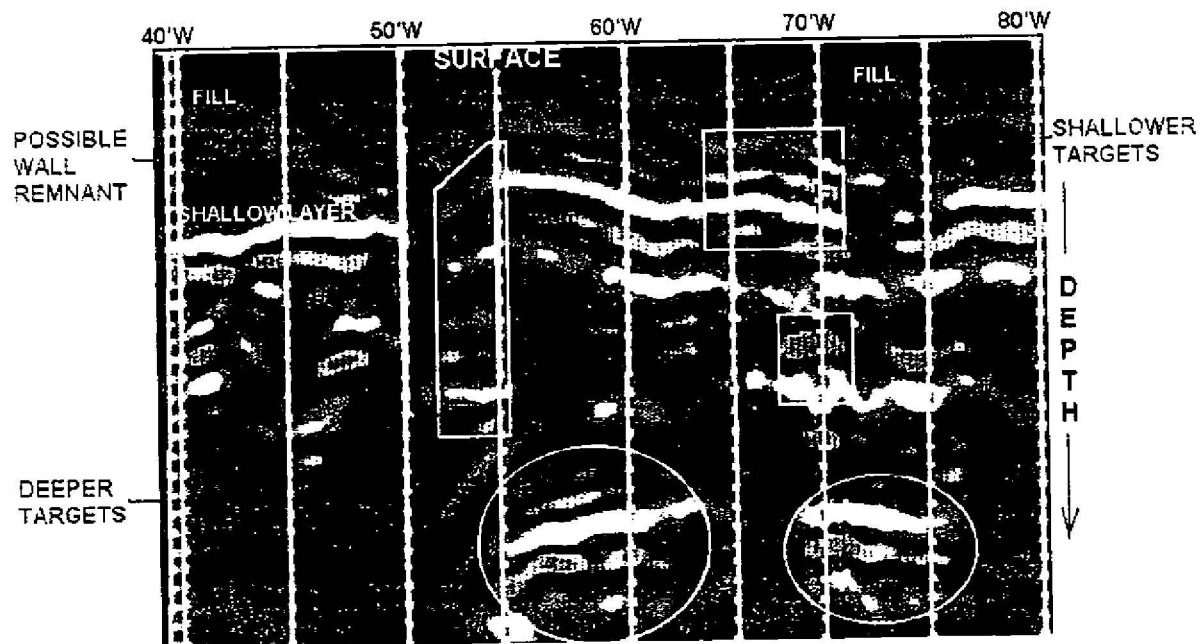
At either of these locations, GGI would expect to encounter possible remnants of the stone retaining wall which extended along the eastern original border.

With any geophysical investigation, it must be stressed that careful ground truthing precede any excavation or intrusive testing in proximity to any anomalies/targets indicated in this report. GGI always recommends careful ground-truthing to verify all investigative findings. Also note, the absence of detected geophysical data signals does not preclude the possibility that targets exist.

Respectfully submitted,

  
Fred L. Graf, P.E., President

  
Jamieson Graf, Project Manager



**Figure 1**

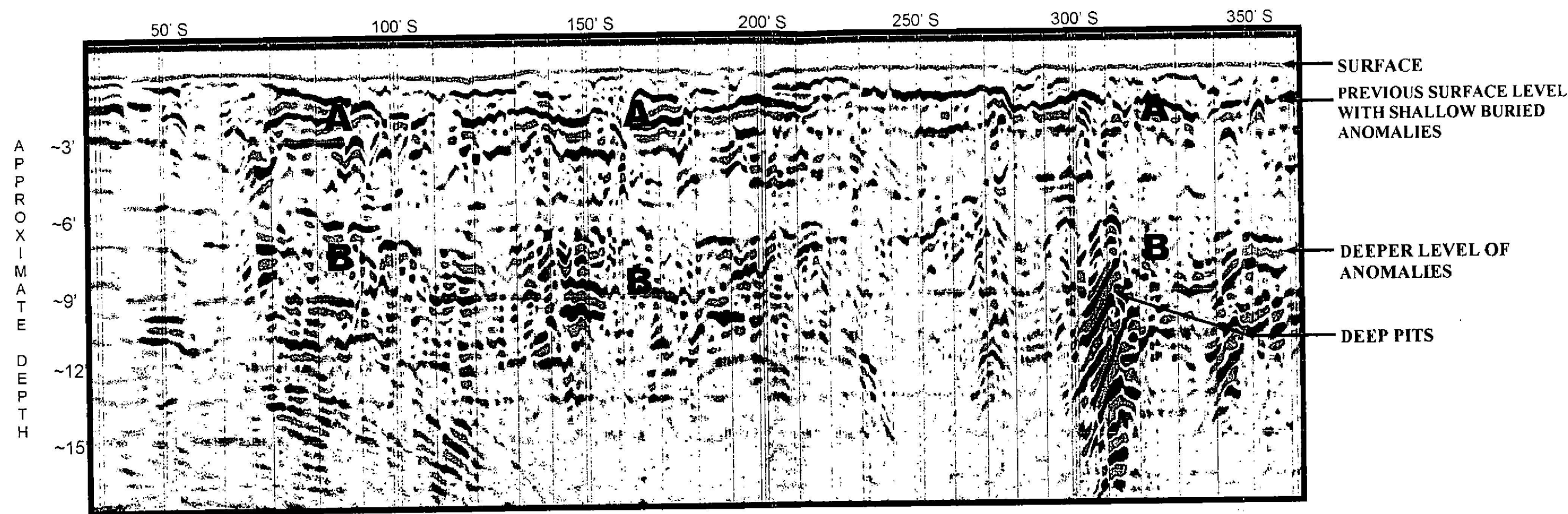
A GPR data profile at 155' S extending from 40' W to 80' W. Shown in this profile are several of the subsurface features detected by GPR within the primary search area. The anomalous shallow layer is shown throughout this profile, interrupted by what GGI suspects is a remnant of the stone wall which originally consisted of the eastern boundary marker of the 1840 cemetery plot as shown on archival mapping. Also shown in this profile are shallow targets within the anomalous layer which could be possible grave burials, denoted with the "box". Several of the stronger, deeper targets indicative of possible burials are shown here represented by the "ovals". 120 MHz GPR antenna system, edited from 80 ns.



Figure 3 - Site Photo



Figure 4 - Site Photo



**Figure 2**  
GPR- Data Profile at 70'W extending from 40' S to 360' S. Shown in this profile is what GGI suspects to be the original surface layer *A* prior to the use of fill incorporated during park construction to obtain the current surface level. Multiple targets were also detected in this subsoil layer, some of which could be burials. *B* is a deeper layer containing a second set of targets also likely to contain mass and individual burial pits.

120 MHz GPR antenna system. 120 ns. GGI sys2000 File No. 86.



164th STREET

165th STREET

HANDBALL COURTS

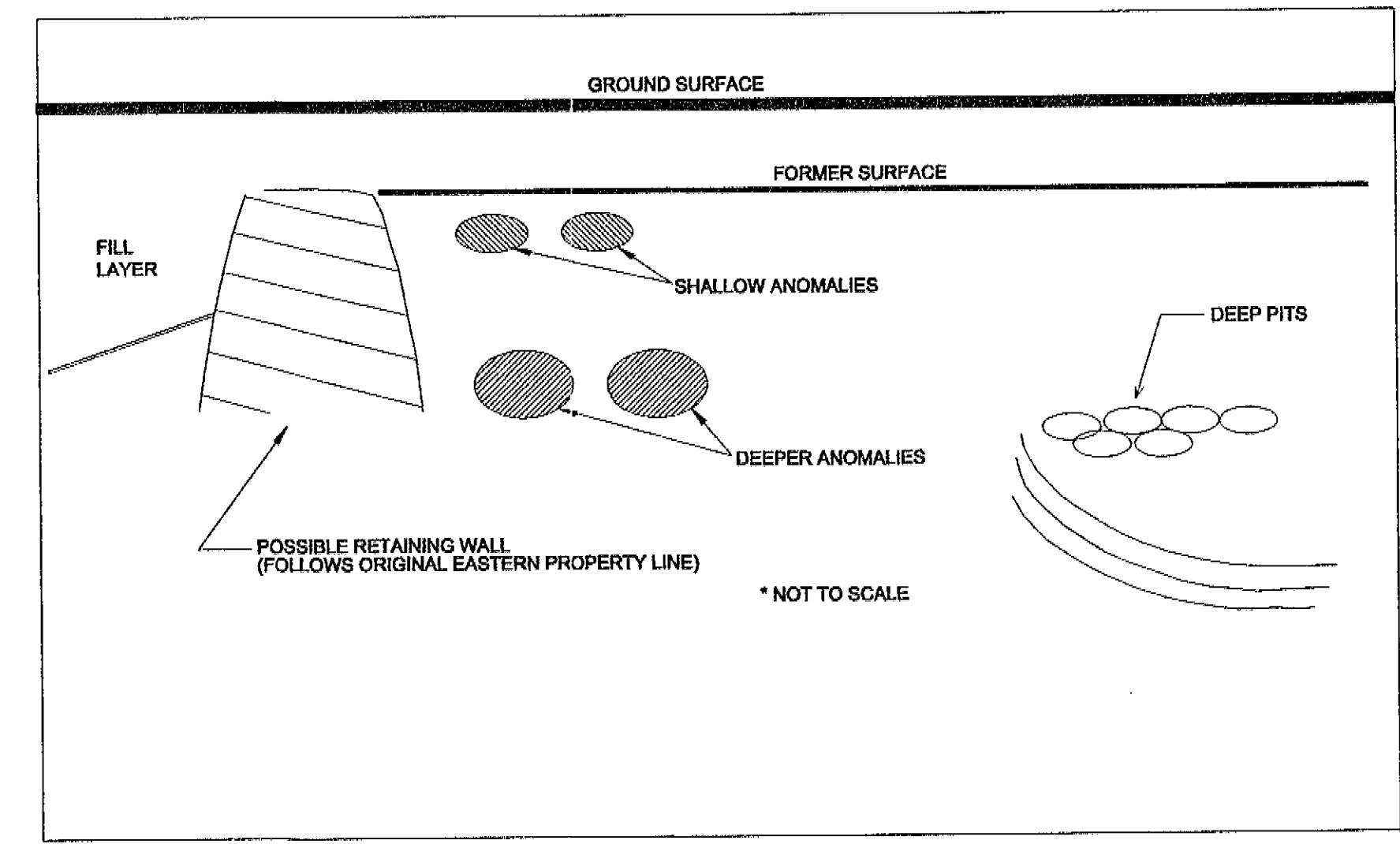
PRIVATE PROPERTY

SHUFFLEBOARD COURT

WADING POOL

46th AVENUE

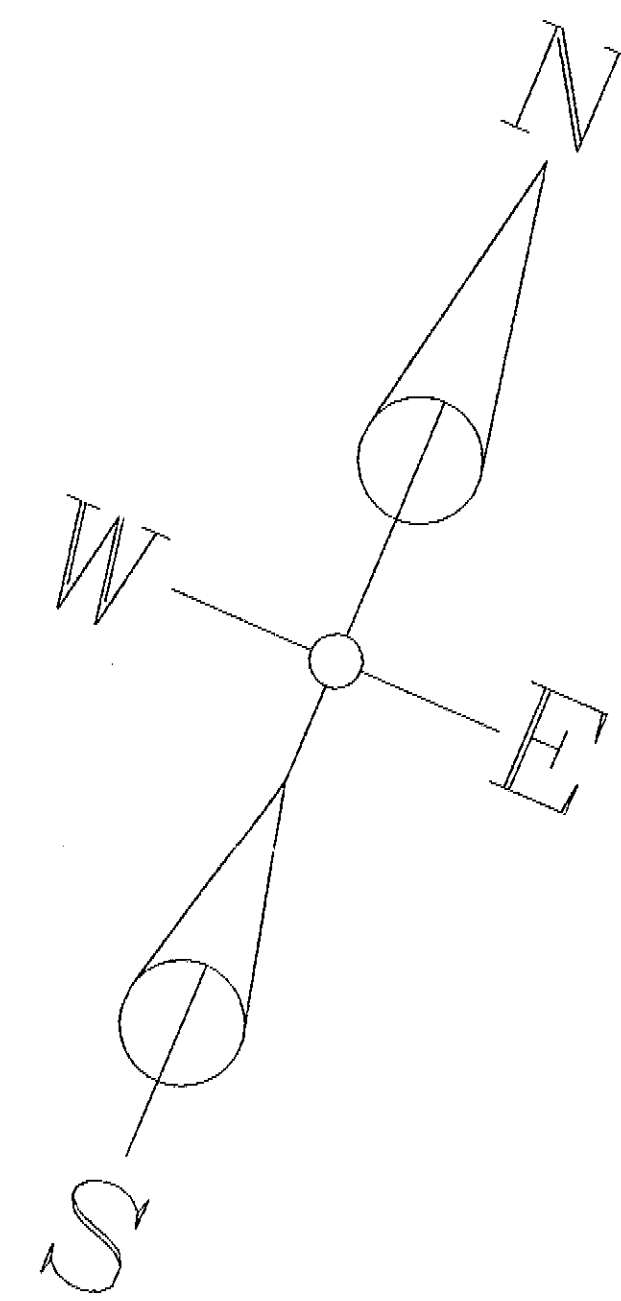
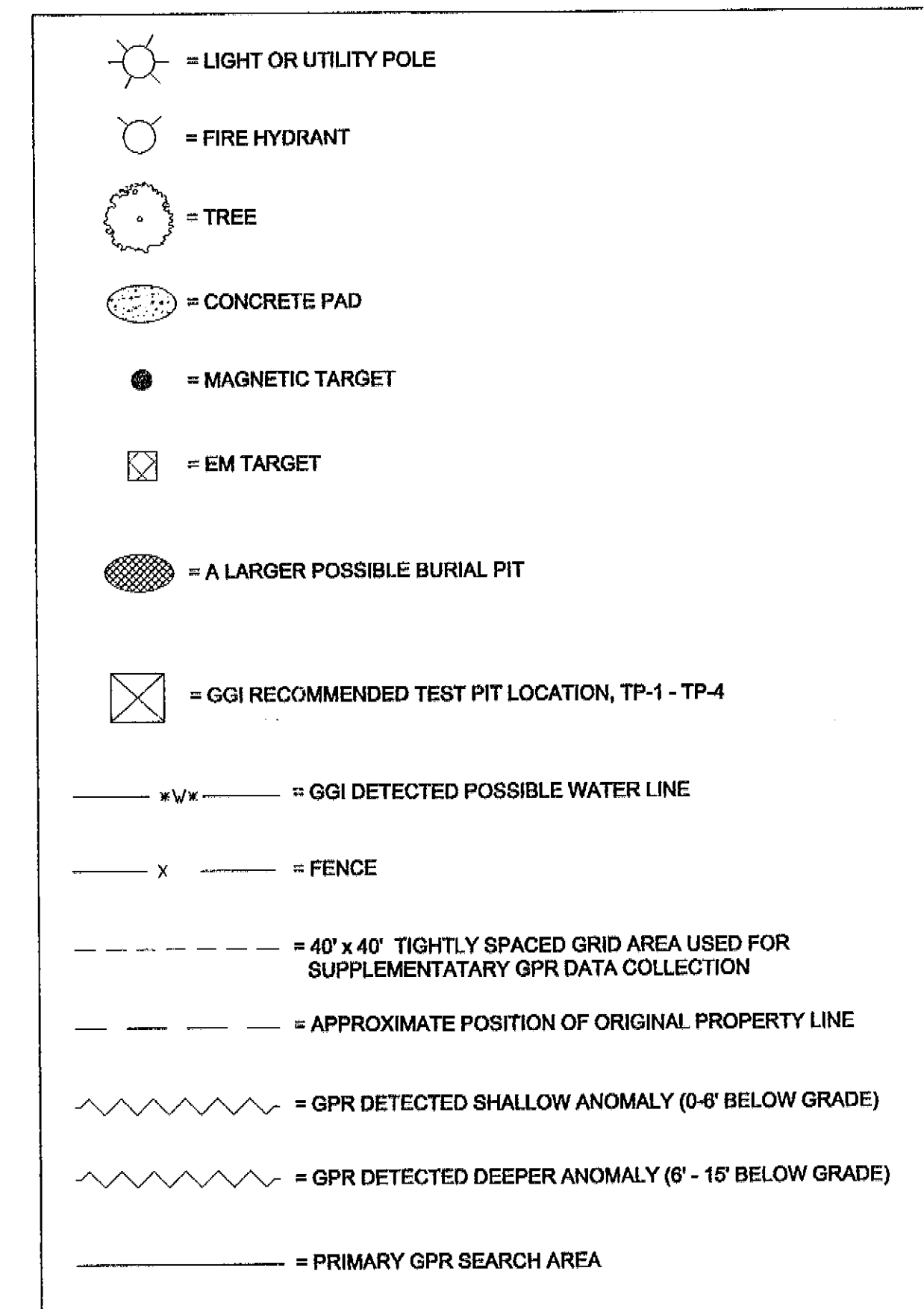
SUBSURFACE CROSS-SECTION SCHEMATIC OF TYPICAL  
GPR-DETECTED ANOMALOUS AREA



THE SEARCH AREA AS SHOWN WAS INVESTIGATED WITH:  
GROUND PENETRATING RADAR (GPR), ELECTROMAGNETICS (EM),  
RADIO FREQUENCY (RF), AND MAGNETIC NONINTRUSIVE  
GEOPHYSICAL DELINEATION TECHNIQUES.

PLOTTED FINDINGS ARE THE RESULT OF REVIEW, ANALYZATION  
AND CORRELATION OF THE COLLECTION GEOPHYSICAL DATA AND  
THE RESULTS SHOULD BE GROUND-TRUTHED. GEO-GRAF, INC.  
RECOMMENDS A SMALL EXCAVATION OR TEST PIT AT THE SEVERAL  
AREAS SHOWN TO CORRELATE AND VERIFY THIS NONINTRUSIVE  
INVESTIGATION'S FINDINGS.

LEGEND



0' 20' 60' 120' 180'  
SCALE 1" = 20'

<b>Gco-Graf, Inc.</b> <small>A Geotechnical Engineering Company</small> 511 Beechwood Drive Kensett Square, PA 19348 800-690-3745 www.gco-graf.com		<b>SUBSURFACE ANOMALY MAP</b> MARTINS FIELD PLAYGROUND 46th AVE. BETWEEN 164th & 165 STS BOROUGH OF QUEENS CITY OF NEW YORK	
Prepared For: LINDA STONE, MA, SOPA	DATE: E	Project No. 100699	REV
NOVEMBER 1, 1999	SCALE: 1" = 20'	100699-MARTINS.DWG	SHEET 1/1