GEOPHYSICAL ENGINEERING SURVEY REPORT

White Plains Mall

200 Hamilton Avenue
White Plains, New York 10601

NOVA PROJECT NUMBER
18-0644

DATED
February 12, 2018

PREPARED FOR:

AKRF, INC.
Environmental, Planning, and Engineering Consultants
34 South Broadway, Suite 401
White Plains, NY 10601

PREPARED BY:

NOVA
GEOPHYSICAL
ENGINEERING
Subsurface Mapping Solutions

56-01 Marathon Parkway # 765
Douglaston, New York 11362
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NOVA GEOPHYSICAL SERVICES

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February 12, 2018

Timothy McClintock
Environmental Scientist
AKRF, INC.
34 South Broadway, Suite 401
White Plains, NY 10601
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Re: Geophysical Engineering Survey (GES) Report
White Plains Mall
200 Hamilton Avenue
White Plains, New York 10601

Dear Mr. McClintock:

Nova Geophysical Services (NOVA) is pleased to provide findings of the geophysical engineering survey (GES) at the above referenced project site: 200 Hamilton Avenue, White Plains, New York 10601 (the "Site"). Please see attached Site Location and Survey Plan maps for more details.

INTRODUCTION TO GEOPHYSICAL ENGINEERING SURVEY (GES)

NOVA performed a Geophysical engineering surveys (GES) consisting of a Ground Penetrating Radar (GPR) survey at the site. The purpose of this survey is to locate and identify utilities and other substructures as well as clear boring locations on February 6, 2018.

The equipment selected for this investigation was a Sensors and Software Noggin 250 MHz ground penetrating radar (GPR) shielded antenna and a Radio Detection RD7100 utility locator.

A GPR system consists of a radar control unit, control cable and a transducer (antenna). The control unit transmits a trigger pulse at a normal repetition rate of 250 MHz. The trigger pulse is sent to the transmitter electronics in the transducer via the control cable. The transmitter electronics amplify the trigger pulses into bipolar pulses that are radiated to the surface. The transformed pulses vary in shape and frequency according to the transducer used. In the subsurface, variations of the signal occur at boundaries where there is a dielectric contrast (void, steel, soil type, etc.). Signal reflections travel back to the control unit and are represented as color graphic images for interpolation.

GEOPHYSICAL METHODS

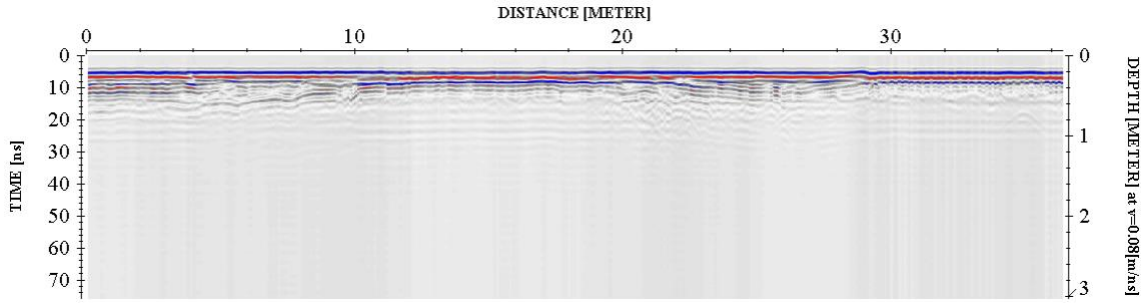
The project site was screened using the GPR to search the specified area and inspected for reflections, which could be indicative of substructures and utilities within the subsurface.

GPR data profiles were collected for the areas of the Site specified by the client. The surveyed areas consisted of asphalt, concrete, soil.

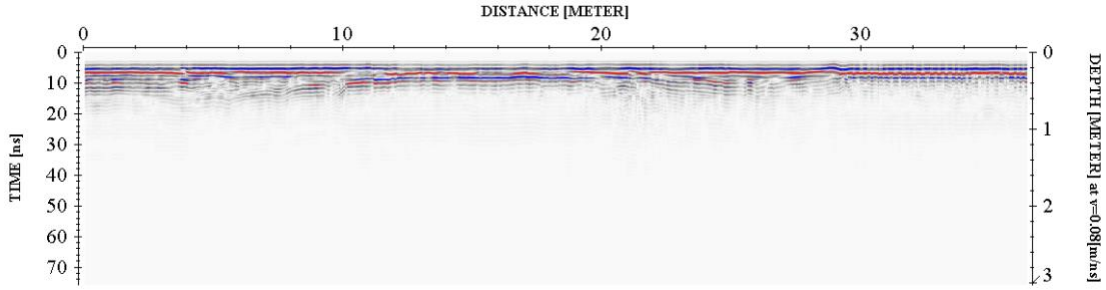
DATA PROCESSING

In order to improve the quality of the results and to better identify subsurface anomalies NOVA processed the collected data. The processes flow is briefly described in this section.

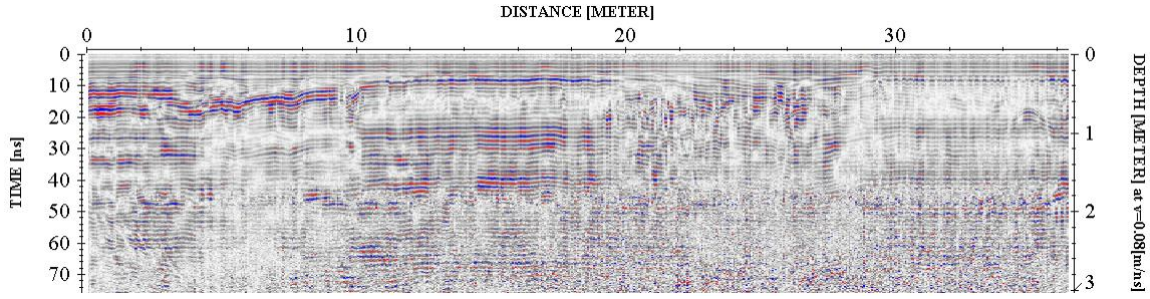
Step 1. Import raw RAMAC data to standard processing format



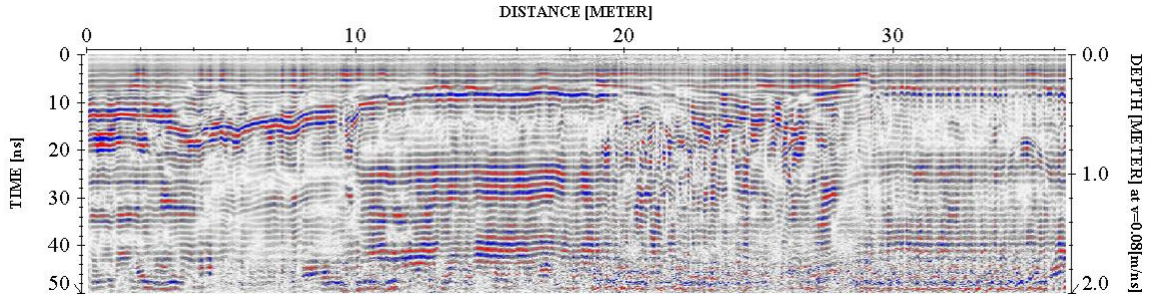
Step 2. Remove instrument noise *(dewow)*



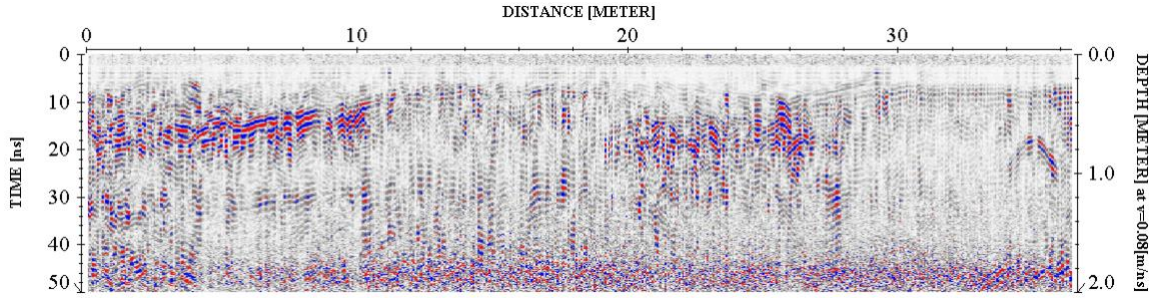
Step 3. Correct for attenuation losses *(energy decay function)*



Step 4. Remove static from bottom of profile *(time cut)*



Step 5. Mute horizontal ringing/noise *(subtracting average)*



The above example shows the significance of data processing. The last image (step 5) has higher resolution than the starting image (raw data – step 1) and describes the subsurface anomalies more accurately.

PHYSICAL SETTINGS

NOVA observed following physical conditions at the time of the survey:

Weather: Cloudy

Temperature: 30 Degrees (F)

Surface: Concrete, asphalt, soil

Geophysical Noise Level (GNL): Geophysical Noise Level (GNL) was high at the site. The noise was the result of being in an urban environment.

RESULTS

The results of the geophysical engineering survey (GES) identified following at the project Site:

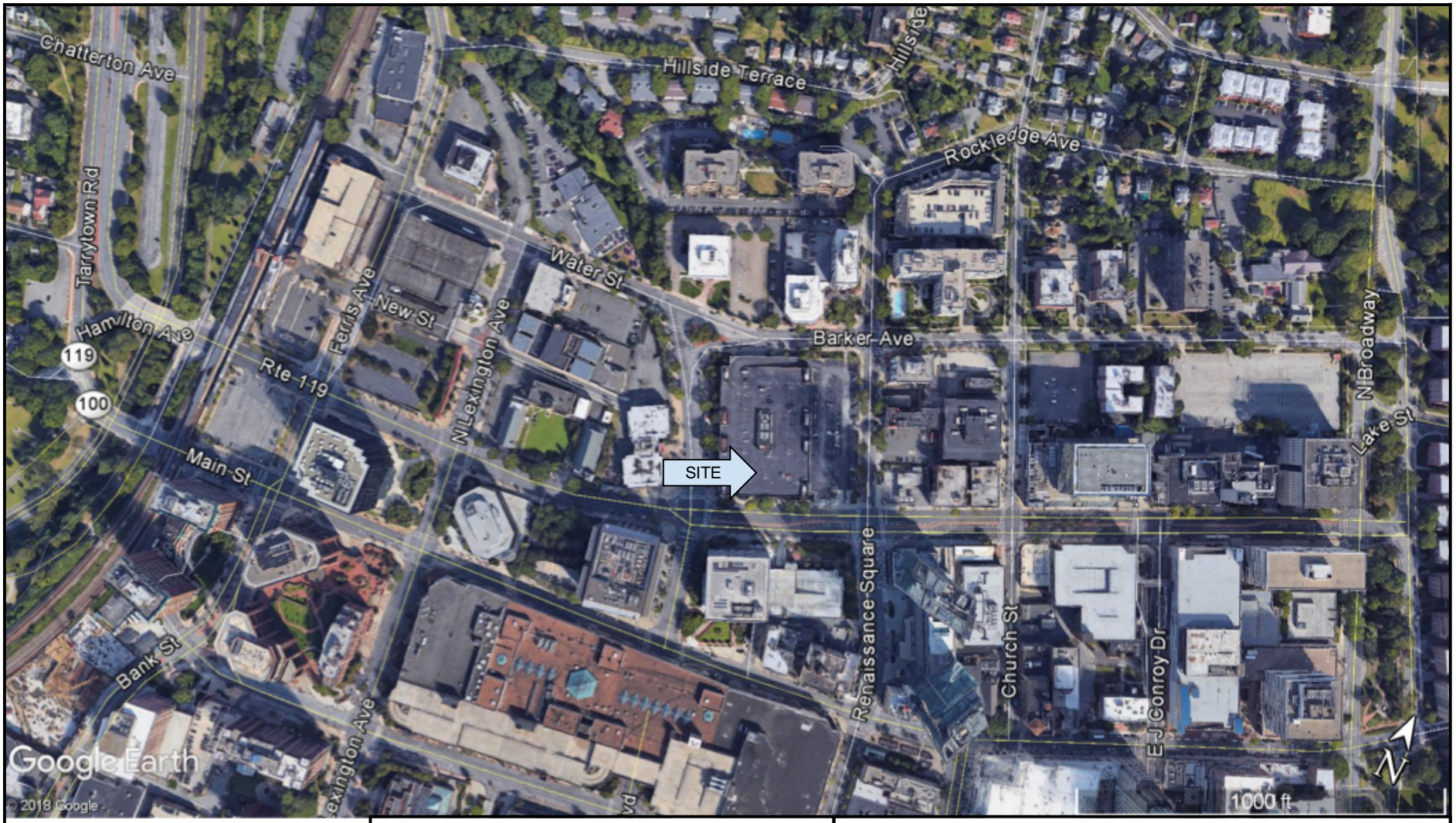
- NOVA identified multiple gas, electric, water, sewer and telecom lines within the survey area as shown in the site survey plan.
- NOVA did not identify any anomalies resembling an underground storage tank on the site.
- All detected subsurface anomalies were marked in the onsite mark out.
- All cleared boring locations were shown in the onsite mark out.
- The Survey Plan portrays the subsurface areas investigated during the GES.

If you have any questions, please do not hesitate to contact the undersigned. Sincerely,

NOVA Geophysical Services

Levent Eskicakit, P.G., E.P.
Project Engineer

Attachments:
Site Location Map
Survey Plan
Geophysical Images



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SITE LOCATION MAP

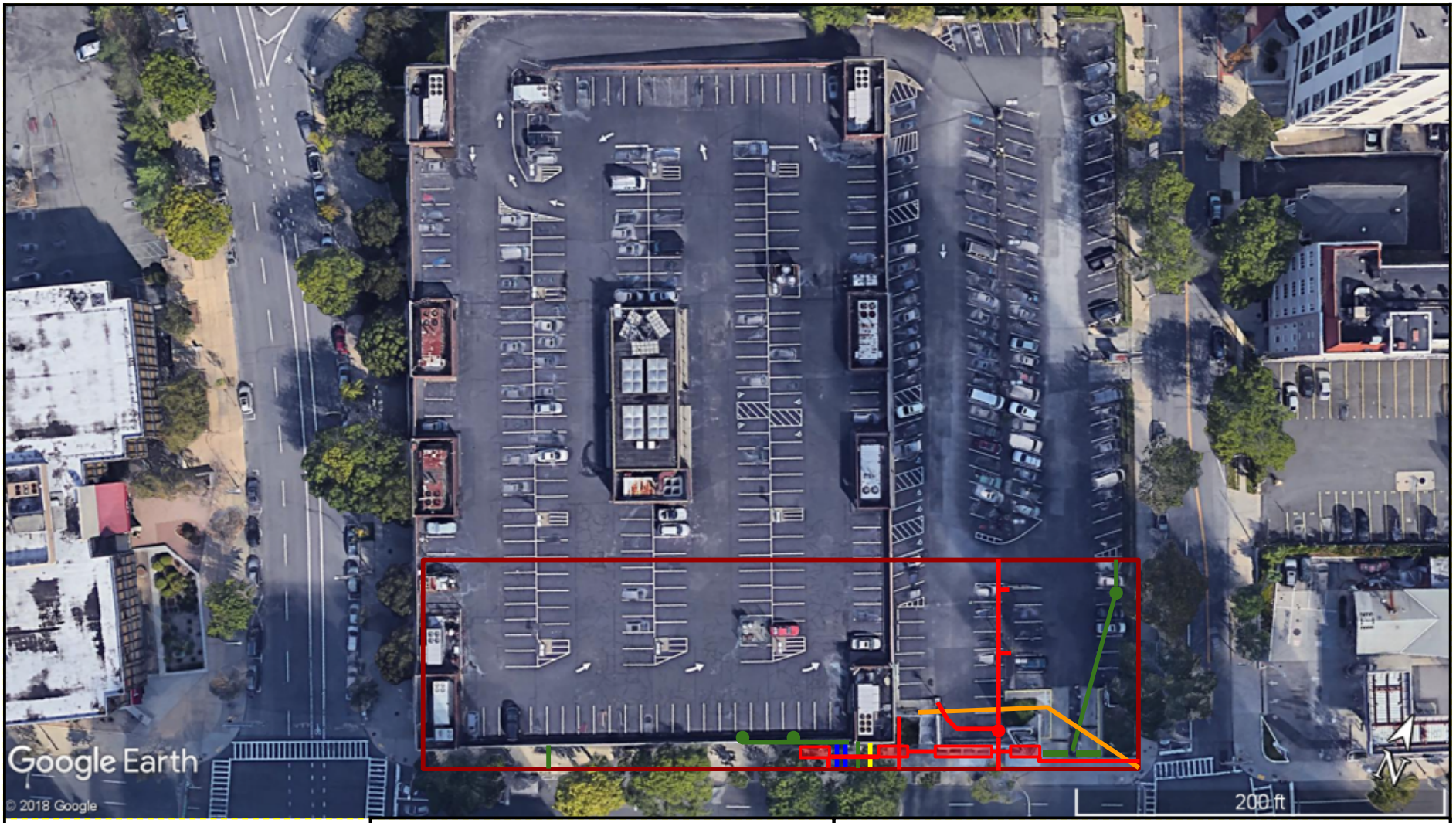
SITE: **White Plains Mall**
200 Hamilton Avenue,
White Plains, New York 10601

CLIENT: AKRF

DATE: February 6, 2018

AUTH: Chris Steinley

LEGEND



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SURVEY PLAN

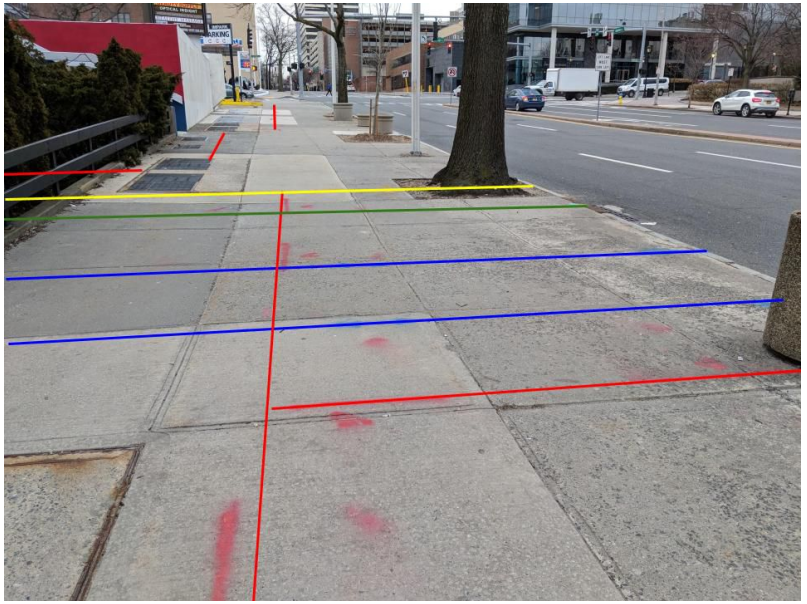
SITE:	**White Plains Mall** 200 Hamilton Avenue, White Plains, New York 10601
CLIENT:	AKRF
DATE:	February 6, 2018
AUTH:	Chris Steinley

LEGEND

- Survey Area
- Sewer
- Electric
- Water
- Gas
- Telecom
- Electric Manhole
- Floor Drain
- Electric Vault
- Trench Drain

GEOPHYSICAL IMAGES

White Plains Mall
200 Hamilton Avenue
White Plains, New York 10601
February 6, 2018



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