



**LONG-TERM MONITORING PLAN
MINE REMEDIATION
STREETS WEST OF PRYOR
LEE'S SUMMIT, MISSOURI**

Prepared for:
STREETS OF WEST PRYOR, LLC

Prepared by:
**GEOTECHNOLOGY, INC.
OVERLAND PARK, KANSAS**

Date:
APRIL 5, 2021

Geotechnology Project No.:
J035637.02

**SAFETY
QUALITY
INTEGRITY
PARTNERSHIP
OPPORTUNITY
RESPONSIVENESS**



April 5, 2021

Mr. David Olson
Streets of West Pryor, LLC
7200 W 132nd Street, #150
Overland Park, Kansas 66213

Re: Long-Term Monitoring Plan
Mine Remediation Streets West of Pryor
Lee's Summit, Missouri
Geotechnology Project No. J035637.02

Dear Mr. Olson:

This letter transmits the requested Long-Term Monitoring Plan (LTMP) for the referenced project. This LTMP provides a discussion of the project, proposed survey monuments, and a plan showing the location of the proposed monuments. In addition, this plan includes a discussion on the frequency of surveys of the monuments and when in the construction process of the surface and subsurface improvements the monuments should be established.

Our services were performed in general accordance with Geotechnology's Proposal P035637.02 dated December 19, 2020. We appreciate the opportunity to provide underground services for this project. If you have questions regarding this report, or if we may be of additional service to you, please contact the undersigned.

Respectfully submitted,

GEOTECHNOLOGY, INC.

Andrea Prince, P.G.
Senior Project Manager

Amy Yang
Engineer

ALP/MHM:alp/ljd

**LONG-TERM MONITORING PLAN
MINE REMEDIATION STREETS WEST OF PRYOR
LEE'S SUMMIT, MISSOURI
April 5, 2021 | Geotechnology Project No. J035637.02**

1.0 PROJECT DESCRIPTION

Streets of West Pryor, LLC (SWP, LLC) is currently developing a parcel in Lee's Summit, Missouri. The triangular parcel is bounded by NW Lowenstein Drive, NW Pryor Road, and Interstate 470 (I-470). Portions of the property are underlain by mine space. Presently, the Streets of West Pryor development has been limited to the east side of the property in an area not underlain by mine space. It is our understanding SWP, LLC would like to further develop the parcel by constructing the Pryor Crossing subdivision (which consists of single and multifamily residential homes), a hotel, and an apartment complex over the undermined property.

Several reports have been prepared by others over the past 20 years in the vicinity for surface development. A selection of reports written for the subject area and adjacent parcels have been written to address soil material types and the depths to bedrock. This data was utilized in the preparation of this report and is summarized in Geotechnology's report *Revised Mine Mitigation Study, Mine Filling at Pryor Crossing* dated February 25, 2021.

2.0 SETTLEMENT MONITORING

Settlement monitoring will be performed on the portions of the Streets West of Pryor development that are underlain by a limestone mine. Monitoring of potential ground movements will be accomplished using a combination of surface monitoring points (SMPs) and survey points established on sanitary and storm sewer inlets and/or manholes. These points will comprise a survey monitoring network. The network data will be utilized in evaluation of potential vertical and differential settlement of infrastructure as related to the mine space.

2.1 Scope of Surface Instrumentation/Monitoring Plan

The following sections cover:

- Locations of survey network points
- Descriptions of the survey network points
- A description of monitoring frequencies
- A description of survey network measurement procedures
- Maintenance of the survey network



- Collection and reporting of the survey data, and
- A description of settlement that would initiate the proposed Action Plan (published under separate cover)

Survey Network Location. A concept for the layout of this monitoring network is depicted on Figure 1. Monitoring points will consist of either chiseled marks or metal markers embedded into sewer inlets or manholes. In addition to the chiseled marks or metal markers, sleeved rods driven into the ground and protected with traffic-rated boxes will also be installed. Refinements to this SMP layout and construction details could be required to accommodate site features (e.g., paved versus unpaved areas) and subsurface utilities.

Construction Details of Network Markers. Chiseled marks will consist of “squares” in the concrete. Metal markers will be such that the intended use is for concrete. The sleeved rods will be driven to bedrock and free from influence of frost heave and lateral deformation as shown on Figure 2. Construction details are to be provided by the engineer at a later date. Geotechnology will provide oversight and support during the layout and installation of the survey network. At this time, it is estimated that 11 rods will be installed and seven (7) chiseled marks or metal markers will be placed.

Monitoring Frequencies. It will be a priority to install the SMP instruments early in the project (where feasible) to establish a baseline and begin to assess movement via readings at two-month intervals for the duration of surface construction. Once construction is complete, readings should be taken on network points every three months for the first year. Evaluation of readings will determine if monitoring can be performed on a bi-annual basis thereafter.

Settlement Monitoring Procedure. Figure 3 provides the procedure for settlement monitoring.

Maintenance of Network. Components of the network should be checked prior to initiation of the survey. If chiseled marks are becoming obscured then the marks are to be re-chiseled. Changes to a marker are to be noted at the time of the survey and necessary repairs are to be made as soon as feasible, but no less than prior to the next scheduled survey.

A visual inspection of the survey monitoring locations is undertaken during routine monitoring of the survey network. If this inspection indicates that a survey mark is unreliable, damaged or malfunctioning, then steps are taken to repair, relocate, renew or decommission the monitoring site. Ongoing monitoring could be required to determine the ultimate fate of the monitoring location. Alternatively, analysis of the monitoring data could identify a monitoring location that is unreliable or dubious. Re-measurement and a thorough inspection of the monitoring location is undertaken to ascertain the reliability of the data and the monitoring location. If it is identified that a monitoring location requires remediation such as repairs or relocation, then these are implemented as soon as practicable, but before the next scheduled survey.



Settlement Data Collection and Reporting. Once a complete set of data has been collected in the field, it is transferred to a master database for storage and the production of data plots. Checks involve updating of the time-history graphs (cumulative change in ground surface over time) for each mark. Where a settlement trend is different from those of adjacent marks, the mark is revisited and examined. If no damage to the mark is apparent, the mark and adjacent marks are check-levelled to confirm the measurement made before accepting the value and confirming on the database. A report will be issued following each 6-month survey. This report will include:

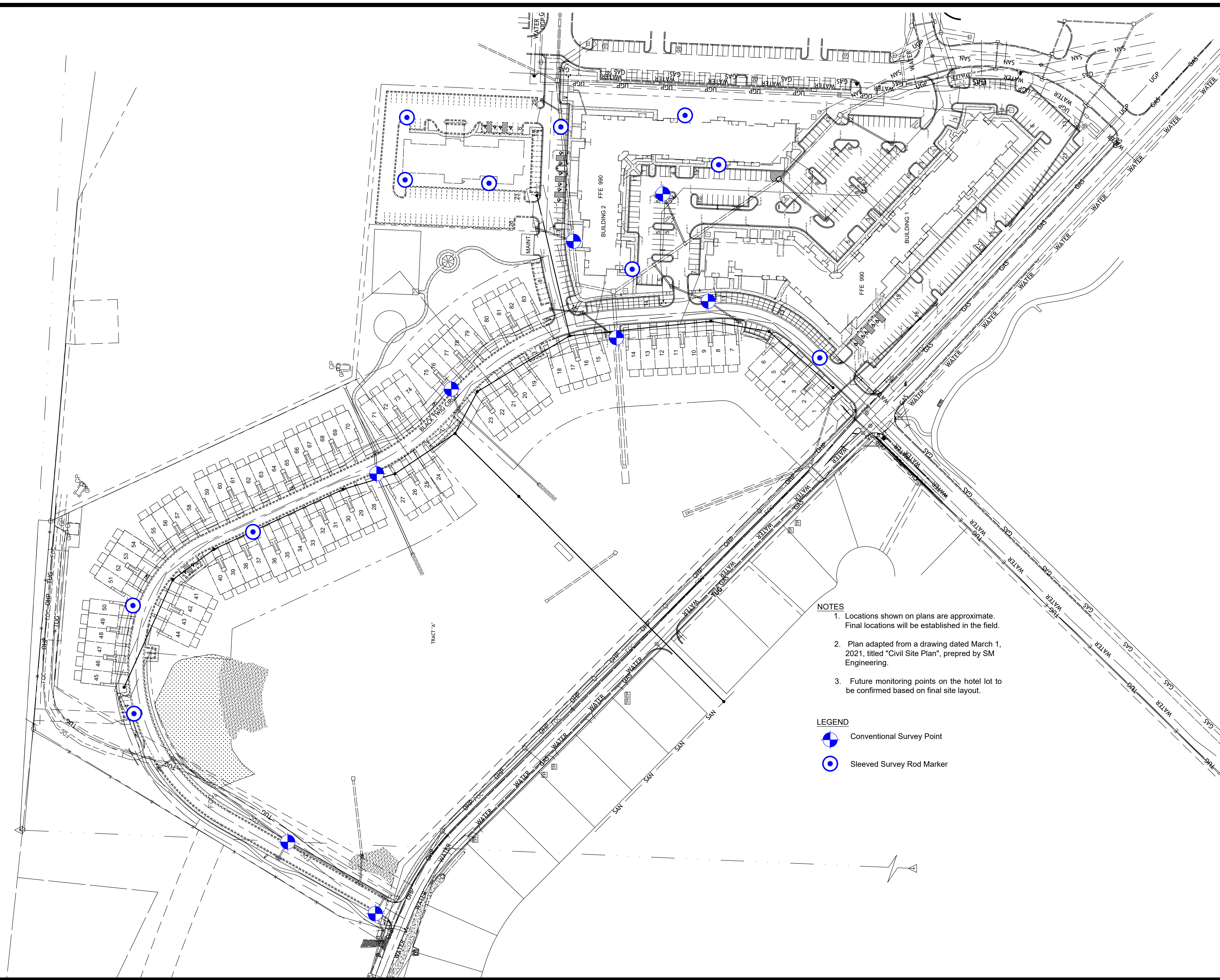
- Survey data
- A plan of the total settlement values
- Comments on survey marks which are showing unusual behavior, if any
- Changes made to the survey network, specifically marks that have been removed and replacement marks added to the network

Initiation of Action Plan. Where agreed, remediation and mitigation plans are to be developed by Geotechnology and forwarded to the City of Lee's Summit for approval prior to their implementation. Such plans should also be agreed to by affected landowners. The final composition of the remediation and mitigation plan, if required, will depend upon:

- The magnitude of ground movement
- The size of the affected area
- The soil conditions under the affected area
- The type of structure affected, if any
- Environmental and social issues
- The wishes of the affected parties and land owners
- A cost-benefit analysis of the various mitigation options.

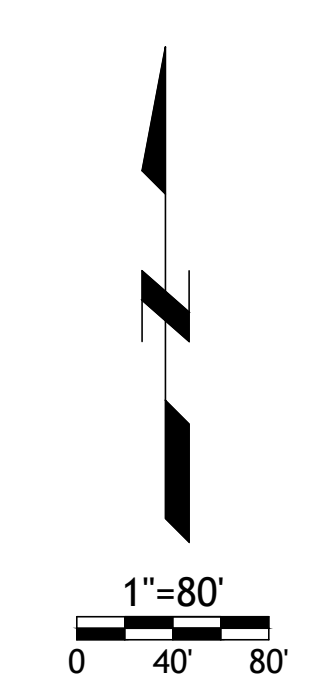
Figure 4 shows that these mitigation plans are to be monitored in terms of success and if necessary, revised.

* * * * *



- NOTES**
1. Locations shown on plans are approximate. Final locations will be established in the field.
 2. Plan adapted from a drawing dated March 1, 2021, titled "Civil Site Plan", preped by SM Engineering.
 3. Future monitoring points on the hotel lot to be confirmed based on final site layout.

- LEGEND**
- Conventional Survey Point
 - Sleeved Survey Rod Marker



Drawn By: WAH	Ch'd By:	App'd By:
Date: 4-1-21	Date:	Date:

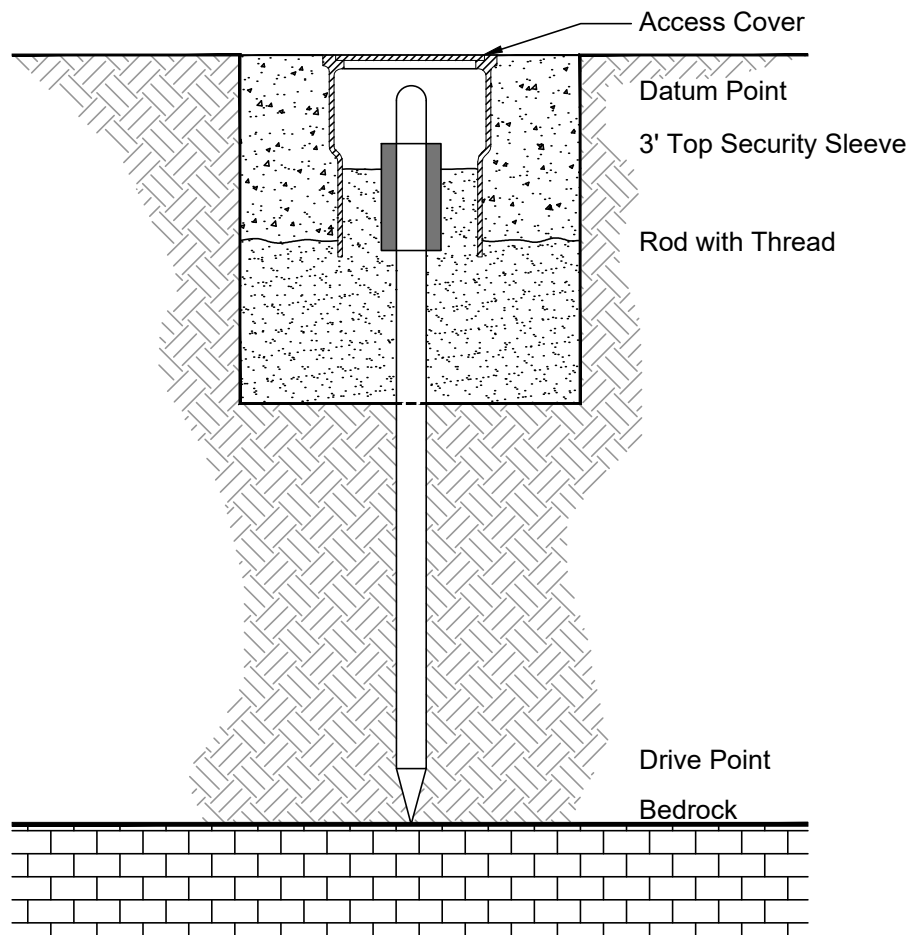
GEOTECHNOLOGY
UNDERGROUND AND CONSTRUCTION MONITORING

Underground and Construction Monitoring
Streets West of Pryor
Lee's Summit, Missouri

PLAN OF SITE AND PROPOSED SURVEY MARKERS

Project Number: J035537.02

FIGURE 1



Drawn By: WAH	Ck'd By:	App'vd By:
Date: 4-2-21	Date:	Date:
 GEOTECHNOLOGY FROM THE GROUND UP		
Underground and Construction Monitoring Streets West of Pryor Lee's Summit, Missouri		
SURFACE MONITORING POINT		
Project Number J035637.02	FIGURE 2	

Streets West of Pryor Settlement Monitoring Procedures

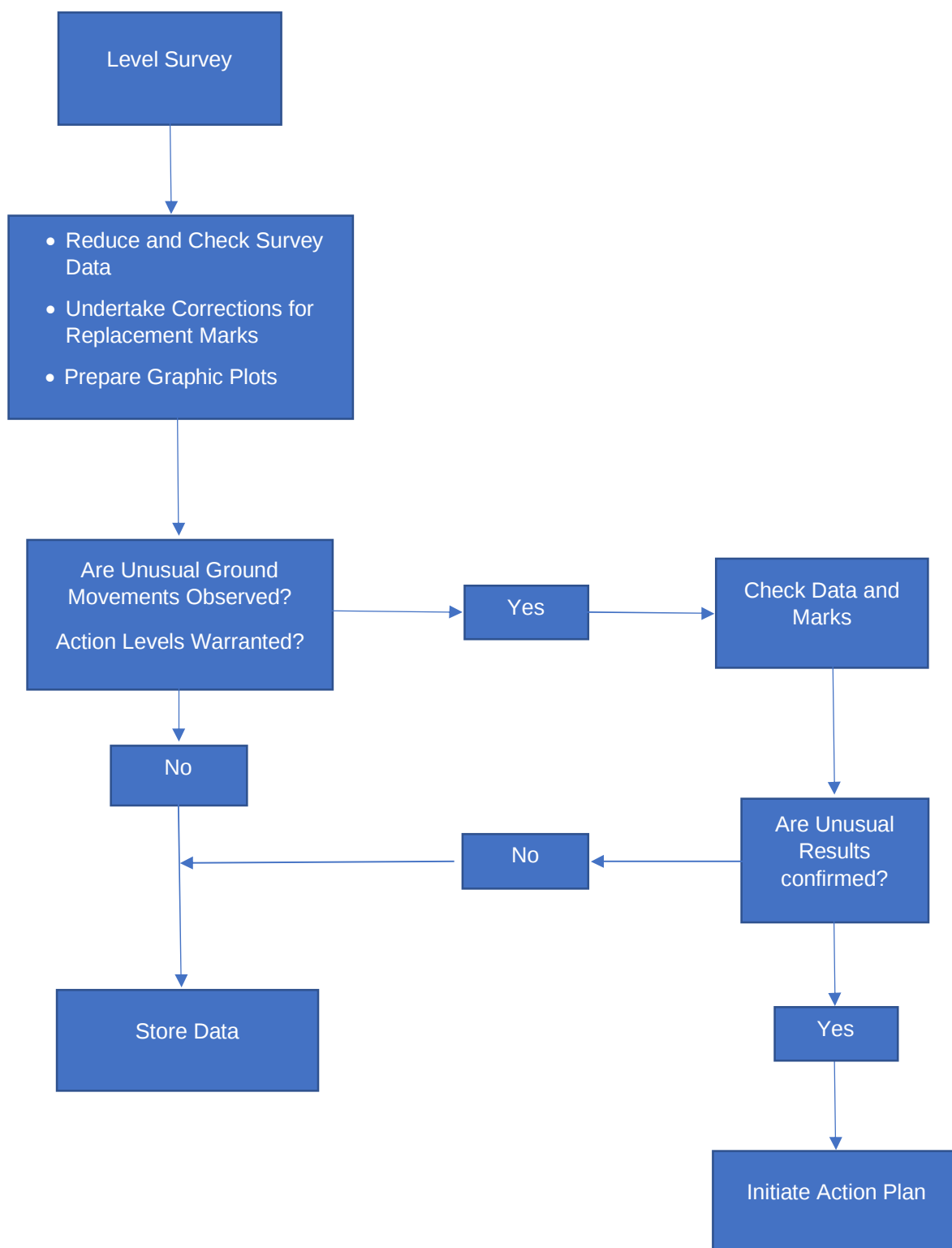


Figure 3

Streets West of Pryor Mitigation Plan

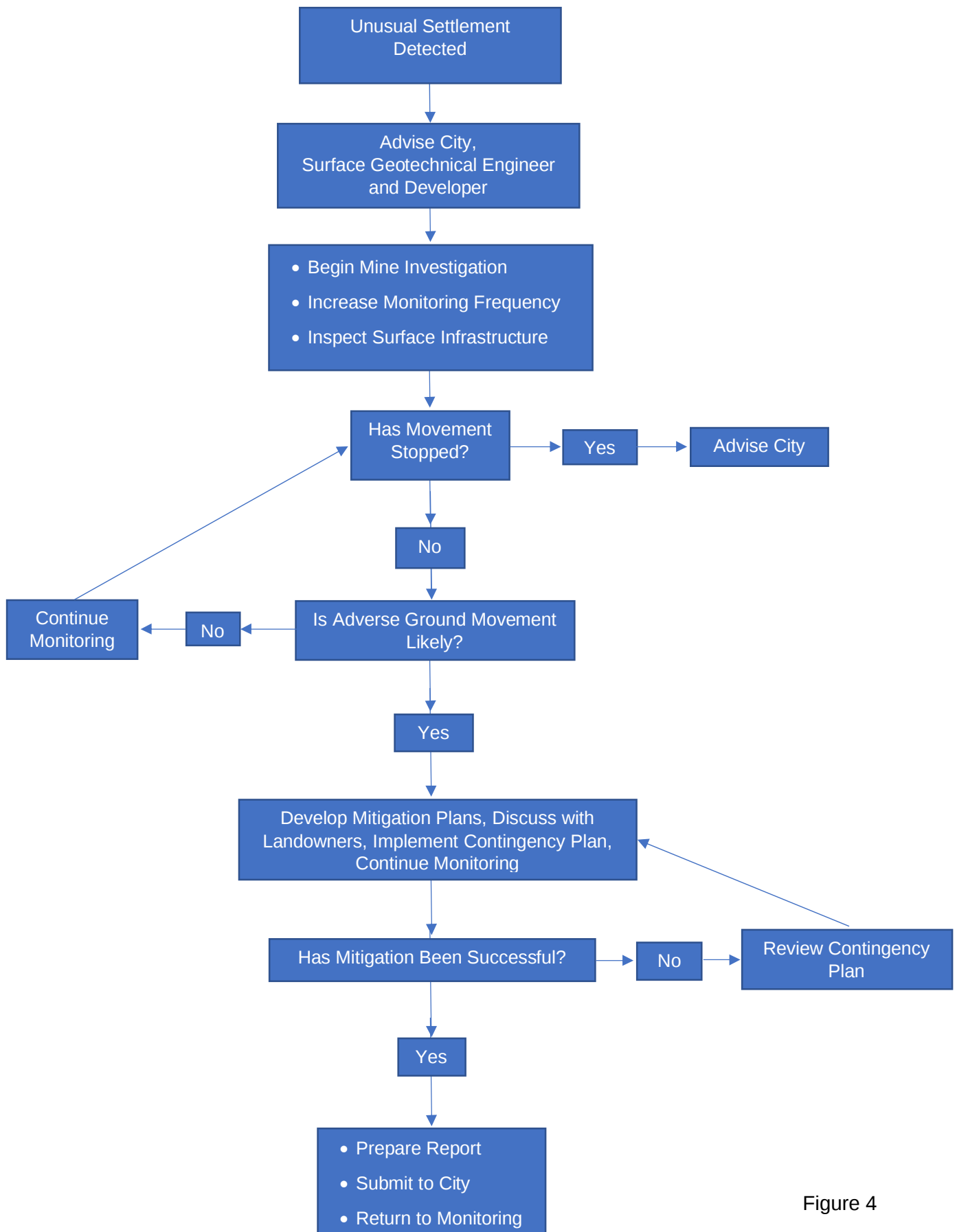


Figure 4