DECISION DOCUMENT

53 Putnam Street
Brownfield Cleanup Program
Saratoga Springs, Saratoga County
Site No. C546057
April 2021

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - DECISION DOCUMENT

53 Putnam Street
Brownfield Cleanup Program
Saratoga Springs, Saratoga County
Site No. C546057
April 2021

Statement of Purpose and Basis

This document presents the remedy for the 53 Putnam Street site, a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the 53 Putnam Street site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Green Remediation
Green remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation
All soils in the upper two feet which exceed the restricted residential soil cleanup objectives (SCOs) will be excavated and transported off-site for disposal. Approximately 340 cubic yards of contaminated soil will be removed from the site as depicted on Figure 2.

3. Backfill
Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site.

4. Cover System
A site cover will be required to allow for restricted residential use of the site. Where a soil cover is to be used it will be a minimum of two feet of soil meeting the restricted residential SCOs placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. In-Situ Geochemical Stabilization (ISGS)
In-situ geochemical stabilization (ISGS) will be implemented in an approximately 1,600 square foot area located in the western portion of the site, as depicted on Figure 3 – Area A, to treat the petroleum contaminants in soils which exceed the protection of groundwater SCOs as well as to treat the groundwater in that area. The ISGS process to be implemented uses a modified permanganate solution to stabilize the contaminated soil. As the solution migrates through the treatment area, manganese oxide will precipitate from the permanganate solution and encapsulate the contaminated soil. This causes a "hardening" of the contaminated soil, stabilizing it. The stabilized soil will then be covered with a cover system as described in element 4 to prevent direct exposure. This treatment changes the contamination from a soluble form to a stable, insoluble compound that reduces or eliminates the matrix as a source of groundwater contamination. Confirmation sampling will occur within the treatment area to ensure cleanup objectives are met.

6. In-Situ Chemical Reduction
In-situ chemical reduction (ISCR) will be implemented to treat chlorinated contaminants in soil and groundwater. A chemical reducing agent will be injected in the subsurface to destroy the contaminants in an approximately 1,400 square foot area located in the eastern portion of the site, as depicted on Figure 3 – Area B, where chlorinated contaminants were elevated in the groundwater and soil *via* injection wells screened from 12 to 29 feet. Confirmation sampling will occur within the treatment area to ensure soil and groundwater cleanup objectives are met.

7. Vapor Mitigation
Any future on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from remaining site impacts in soil, groundwater and soil vapor.

8. Engineering and Institutional Controls
Imposition of an institutional control in the form of an environmental easement and Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum.

Institutional Control - Imposition of an institutional control in the form of an environmental easement for a controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

9. Site Management Plan

A Site Management Plan is required, which includes the following:

a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

-- Institutional Controls: The Environmental Easement discussed in Paragraph 8 above.
-- Engineering Controls: The soil cover discussed in Paragraph 4, the ISGS treatment area discussed in Paragraph 5 and sub-slab depressurization system discussed in Paragraph 7 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater and soil to assess the performance and effectiveness of the remedy; and
- a schedule of monitoring and frequency of submittals to the Department.

c) an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system. The plan includes, but is not limited to:

- procedures for operating and maintaining the system; and
- compliance inspection of the system to ensure proper O&M as well as providing the data for any necessary reporting.

The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

April 12, 2021
Date

Richard A. Mustico, Director
Remedial Bureau A

DECISION DOCUMENT

53 Putnam Street
Saratoga Springs, Saratoga County
Site No. C546057
April 2021

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repository:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C546057

Saratoga Springs Public Library
49 Henry Street
Saratoga Springs, NY 12866
Phone: (518) 584-7860

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location:
The 53 Putnam Street site is located in an urban area along the west side of Putnam Street within the Business District of the City of Saratoga Springs. The site is north of the intersection of Putnam and Phila Streets and south of the intersection of Putnam and Gardner Streets.

Site Features:
The approximately 0.3-acre property is fenced and consists of a combination of gravel, crushed concrete and part of a crumbling concrete pad. The one-story on-site building was demolished and removed in March 2019.

Current Zoning and Land Use:
The site is zoned for commercial use and residential accessory use (with City approval) and is currently inactive and vacant. The surrounding parcels are currently used for commercial use and may potentially provide residential accessory use according to zoning. The nearest residential neighborhood is approximately 400 feet to the east of the site.

Past Use of the Site:
A former one-story, concrete block, slab-on-grade building was constructed in 1905. The property was initially used as an ice-skating rink during the winter months and a garage during the summer. The site was used as a laundromat from approximately 1925 to approximately 1965. The site remained vacant from the late 1960s to 1986. From 1986 to the early 2000s, the site was used as a parking garage for waste hauling vehicles and has been vacant since truck storage operations ceased.

According to the Sanborn Maps for the location, several underground petroleum storage tanks were shown to be present on the property. In 2002, a 10,000-gallon No. 6 fuel oil underground storage tank was removed from the area immediately west of the building. Approximately 173 tons of petroleum impacted soil was removed from the vicinity of the former fuel oil tank in March 2002. NYSDEC spill #0109572 was issued in association with the tank removal and documented soil impacts. The spill currently remains open.

Site Geology and Hydrogeology:
The site is covered by a layer of fill material ranging from approximately eight to 12 feet thick. The fill generally consists of coarse-medium-fine sand with varying amounts of silt and gravel.

The fill also contains brick, cinders and slag. Beneath the fill is soil consisting primarily of coarse-medium-fine sand with varying amounts of gravel, silt and clay. Layers of organic peat ranging in thickness from less than one inch to as much as two feet are present in the sand.

The depth to groundwater ranges from approximately six to ten feet below grade. Site groundwater flow is to the south, east and southeast.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The Applicant under the Brownfield Cleanup Agreement is a Volunteer. The Volunteer does not have an obligation to address off-site contamination. The Department has determined that this site poses a significant threat to human health and the environment and there are potential off-site impacts that require remedial activities; accordingly, enforcement actions are necessary. The potential off-site impacts are being addressed by NYSDEC separately under the remedial program for 53 Putnam Street – Off-Site (C546057A).

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be

sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

mercury	trichloroethene (TCE)
benzene	vinyl chloride
ethylbenzene	polycyclic aromatic hydrocarbons (PAHs)
toluene	perfluorooctane sulfonic acid (PFOS)
cis-1,2-dichloroethene (cis-1,2-DCE)	perfluorooctanoic acid (PFOA)
tetrachloroethane (PCE)	xylene (mixed)

The contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Decision Document.

There were no IRMs performed at this site during the RI.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water. The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and per- and polyfluoroalkyl substances (PFAS). Based upon investigations conducted to date, the primary contaminants of concern (COCs) include petroleum-related VOCs: benzene, ethylbenzene, toluene and xylenes; chlorinated VOCs: cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), trichloroethylene (TCE), and vinyl chloride; polycyclic aromatic hydrocarbons (PAHs), which are a subset of SVOCs (*e.g.*, benzo(a)anthracene); mercury; and the PFAS compounds perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA).

Soil: Mercury is found in the shallow soils (0-24 inches below ground surface (bgs)) within the urban fill throughout the site. Petroleum-related VOCs are found at 10 to 25 feet bgs in the west end of the site. Chlorinated VOCs are found at 10 to 15 feet bgs in the northeast end of the site.

Concentrations of mercury found on-site ranged from 0.18 parts per million (ppm) to 3.22 ppm, with concentrations exceeding the restricted residential soil cleanup objective (RRSCO) of 0.81 ppm. Petroleum-related VOC concentrations exceeding protection of groundwater soil cleanup objectives (PGSCOs) include: benzene detected at 0.7 ppm, as compared to the PGSCO of 0.06 ppm; ethylbenzene detected at 5.7 ppm, as compared to the PGSCO of 1 ppm; toluene detected at 3.6 ppm, as compared to the PGSCO of 0.7 ppm; and xylene detected at 21 ppm, as compared to the PGSCO of 1.6 ppm. Chlorinated VOCs detected at concentrations exceeding the PGSCOs include: TCE detected at 0.55 ppm, as compared to the PGSCO of 0.47 ppm; cis-1,2-DCE detected at 22 ppm, as compared to the PGSCO of 0.25 ppm; and vinyl chloride detected at 0.12 ppm, as compared to the PGSCO of 0.02 ppm. PAH exceedances of RRSCOs are as follows: benzo(a)anthracene at 16 ppm, benzo(a)pyrene at 12 ppm and benzo(b)fluoranthene at 13 ppm, as compared to their RRSCOs of 1 ppm each; chrysene at 14 ppm, as compared to the RRSCOs of 3.9 ppm; dibenz(a,h)anthracene at 1.9 ppm, as compared to its RRSCO of 0.33 ppm; and indeno(1,2,3-cd)pyrene at 5.7 ppm, as compared to its RRSCO of 0.5 ppm.

Off-site soil (MW-3, MW-13, MW-14, and MW-17) was analyzed for VOCs and SVOCs. Neither petroleum-related VOCs or chlorinated VOCs were detected above soil cleanup objectives for unrestricted use. SVOCs were detected above soil cleanup objectives for unrestricted use and

restricted residential use; however, at low levels indicative of developed areas. Data do not indicate any off-site impacts in soil related to this site.

Groundwater: Petroleum-related VOCs are present in groundwater at the west end of the site at concentrations greater than groundwater standards (typically 5 parts per billion (ppb)), with a maximum concentration of 21 ppb (benzene). In addition, free product, indicative of #6 fuel oil, was observed in monitoring wells on top of the groundwater table at the west end of the site. Chlorinated VOCs are present in groundwater at the east end of the site at concentrations greater than groundwater standards, with a maximum concentration of 1,000 ppb (cis-1,2-DCE).

Chlorinated VOCs (PCE, vinyl chloride and cis-1,2-DCE) were detected in off-site monitoring wells that are located north and east of the site at concentrations slightly greater than groundwater standards, with maximum concentrations of PCE at 5.1 ppb, vinyl chloride at 6.0 ppb and cis-1,2-DCE at 13 ppb.

For PFAS, the maximum concentrations of PFOA and PFOS were detected in MW-11A at concentrations of 82.7 and 127 parts per trillion (ppt), respectively exceeding the Maximum Contaminant Level (drinking water standard) of 10 ppt in groundwater. MW-14 is considered side gradient to the site where concentrations of PFOA and PFOS were detected at 32.7 ppt and 70.8 ppt, respectively. MW-3 and MW-13 are currently the most upgradient sampling locations but neither have been analyzed for PFAS.

Soil Vapor- The following contaminants were detected in soil vapor: benzene at concentrations ranging from 0.847 to 4.15 micrograms per cubic meter ($\mu g/m^3$); toluene from 0.874 to 2.43 $\mu g/m^3$; PCE from 4.87 to 2,530 $\mu g/m^3$; TCE from 1.42 to 206 $\mu g/m^3$; cis-1,2-DCE from 6.07 to 42.8 $\mu g/m^3$; and 1,1,1-trichloroethane from 2.72 to 84.6 $\mu g/m^3$.

There are currently no data for off-site soil vapor.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

The site is completely fenced, which restricts public access. However, persons who enter the site could contact contaminants in the soil by walking on the site, digging or otherwise disturbing the soil. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds may move into the soil vapor (air spaces within the soil), which in turn may move into nearby buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because there is no onsite building, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future onsite development.

Additional investigation is necessary to determine if the potential exists for the indoor air impacts due to soil vapor intrusion in off-site structures.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation exposure to contaminants volatilizing from soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Track 4: Restricted use with generic soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation, In-situ Stabilization, In-situ Chemical Reduction, Site Cover and Soil Vapor Mitigation remedy.

The elements of the selected remedy, as shown in Figure 2 and Figure 3, are as follows:

1. Green Remediation
Green remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation
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Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site.

4. Cover System
A site cover will be required to allow for restricted residential use of the site. Where a soil cover is to be used it will be a minimum of two feet of soil meeting the restricted residential SCOs placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. In-Situ Geochemical Stabilization (ISGS)
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permanganate solution to stabilize the contaminated soil. As the solution migrates through the treatment area, manganese oxide will precipitate from the permanganate solution and encapsulate the contaminated soil. This causes a "hardening" of the contaminated soil, stabilizing it. The stabilized soil will then be covered with a cover system as described in element 4 to prevent direct exposure. This treatment changes the contamination from a soluble form to a stable, insoluble compound that reduces or eliminates the matrix as a source of groundwater contamination. Confirmation sampling will occur within the treatment area to ensure cleanup objectives are met.

6. In-Situ Chemical Reduction

In-situ chemical reduction (ISCR) will be implemented to treat chlorinated contaminants in soil and groundwater. A chemical reducing agent will be injected in the subsurface to destroy the contaminants in an approximately 1,400 square foot area located in the eastern portion of the site, as depicted on Figure 3 – Area B, where chlorinated contaminants were elevated in the groundwater and soil *via* injection wells screened from 12 to 29 feet. Confirmation sampling will occur within the treatment area to ensure soil and groundwater cleanup objectives are met.

7. Vapor Mitigation

Any future on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from remaining site impacts in soil, groundwater and soil vapor.

8. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum.

Institutional Control - Imposition of an institutional control in the form of an environmental easement for a controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

9. Site Management Plan

A Site Management Plan is required, which includes the following:

a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

-- Institutional Controls: The Environmental Easement discussed in Paragraph 8

above.

-- Engineering Controls: The soil cover discussed in Paragraph 4, the ISGS treatment area discussed in Paragraph 5 and sub-slab depressurization system discussed in Paragraph 7 above.

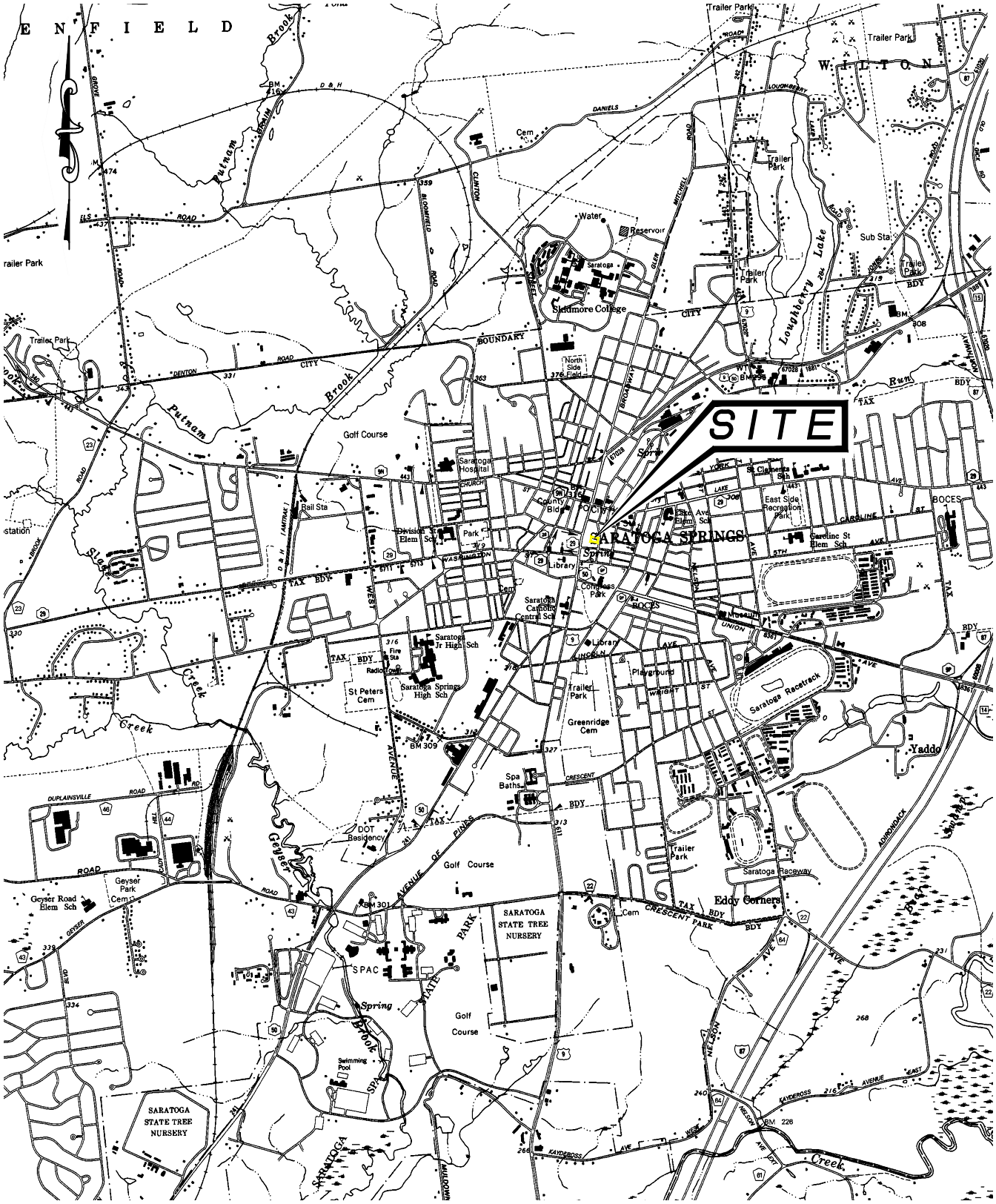
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
   - monitoring of groundwater and soil to assess the performance and effectiveness of the remedy; and
   - a schedule of monitoring and frequency of submittals to the Department.

c) an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system. The plan includes, but is not limited to:
   - procedures for operating and maintaining the system; and
   - compliance inspection of the system to ensure proper O&M as well as providing the data for any necessary reporting.

The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.



MAP REFERENCE: NYSDOT SARATOGA SPRINGS QUADRANGLE

S:\Sterling\Projects\2015 Projects\Putnam Resources – 2015-30\ACAD\2015-30042_F-1 – Site Location Map 2019.dwg CAD 2/13/2019 3:32 PM

STERLING

Sterling Environmental Engineering, P.C.

24 Wade Road ♦ Latham, New York 12110

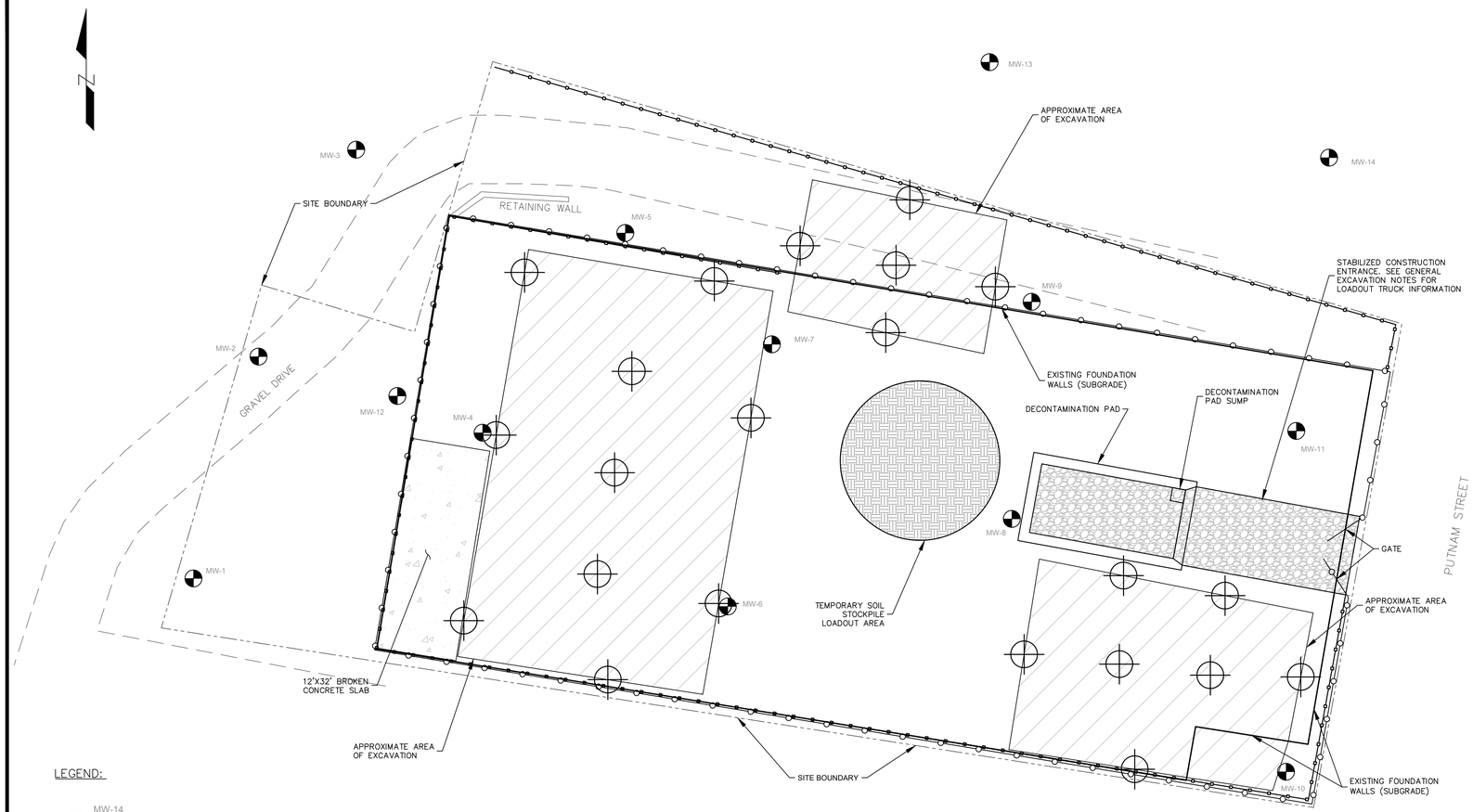
SITE LOCATION MAP

PUTNAM RESOURCES, LLC

53 PUTNAM STREET

CITY OF SARATOGA SPRINGS SARATOGA COUNTY, N.Y.

PROJ. No.: 2015-30	DATE: 2/13/2019	SCALE: 1" = 1000'	DWG. NO. 2015-30016	FIGURE 1



LEGEND:

- MW-14 — EXISTING MONITORING WELL
- SILT FENCE
- PROPERTY LINE
- SECURITY FENCE
- DOCUMENTATION SOIL SAMPLE

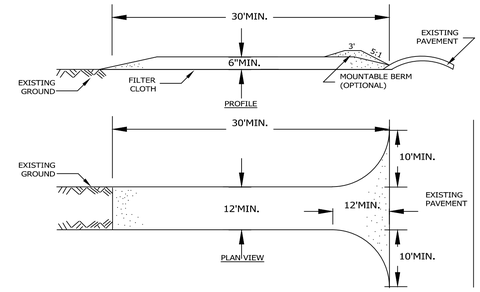
PERSPECTIVE VIEW

SECTION VIEW

SILT FENCE DETAIL
NOT TO SCALE

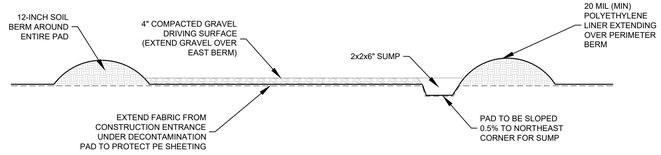
SILT FENCE NOTES:

1. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE STAKES WITH WIRE TIES OR STAPLES.
3. FILTER FABRIC SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
4. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.



1. A STABILIZED CONSTRUCTION ENTRANCE IS TO BE INSTALLED IN ACCORDANCE WITH THE NEW YOUR STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
2. STONE SIZE – USE 1–4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
3. LENGTH – NOT LESS THAN 30 FEET.
4. THICKNESS – NOT LESS THAN SIX (6) INCHES.
5. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
6. GEOTEXTILE – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
7. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
8. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
9. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
10. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ACCESS
(NOT TO SCALE)



DECONTAMINATION PAD CROSS SECTION
SCALE: N.T.S.

GENERAL NOTES

1. ALL TO BE PERFORMED AT THE DIRECTION OF, AND UNDER FULL TIME SUPERVISION BY THE PROJECT ENGINEER.
2. INSTALL EROSION AND SEDIMENT CONTROL MEASURES AND STABILIZED CONSTRUCTION ENTRANCE PRIOR TO ANY SITE DISTURBANCES.
3. EROSION AND SEDIMENT CONTROL MEASURES INSPECTIONS, MAINTENANCE AND REPAIR OR REPLACEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. PRIOR TO REMOVAL OF EROSION AND SEDIMENT CONTROL MEASURES VEGETATION OR ALTERNATIVE STABILIZATION MUST BE ESTABLISHED AND THE PROPERTY OWNER AND PROJECT ENGINEER MUST BE NOTIFIED FOR INSPECTION AND FINAL APPROVAL OF THE WORK.
5. NO WORKER VEHICLES WILL BE ALLOWED ON THE SITE. ONLY REQUIRED EXCAVATION, GRADING, OR OTHER HEAVY EQUIPMENT WILL BE PERMITTED.
6. ALL EQUIPMENT DRIVEN ON SITE THAT DOES NOT REMAIN ON THE STABILIZED CONSTRUCTION ENTRANCE WILL REQUIRE DECONTAMINATION PRIOR TO LEAVING THE SITE.

FIGURE 2

STATE OF NEW YORK — ANDREW M. MILLSPAUGH — LICENSED PROFESSIONAL ENGINEER — 094708

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NO.	DATE	RECORD OF WORK	DRN	CKD	APPR
1	02/10/21	LABEL SITE BOUNDARY	TMJ	TMJ	AMM

PROJECT	
PROJ. ENGR.:	AMM
PROJ. NO.:	2015–30
PREPARED BY:	TAS
DRAFTED BY:	TAS
CHECKED BY:	TMJ
APPROVED BY:	AMM
DATUM:	N/A
CONTOUR INTERVAL =	N/A FEET

0 5' 10' 20'
1" = 10'

REMEDIAL DESIGN DRAWING
SOIL EXCAVATION AND REMOVAL REMEDY
53 PUTNAM STREET
PUTNAM RESOURCES, LLC
CITY OF SARATOGA SPRINGS SARATOGA CO., NEW YORK

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

DATE: 10/05/2020 | SCALE: 1" = 10' | DWG. NO. 2015–30071 | SHEET 2 OF 3

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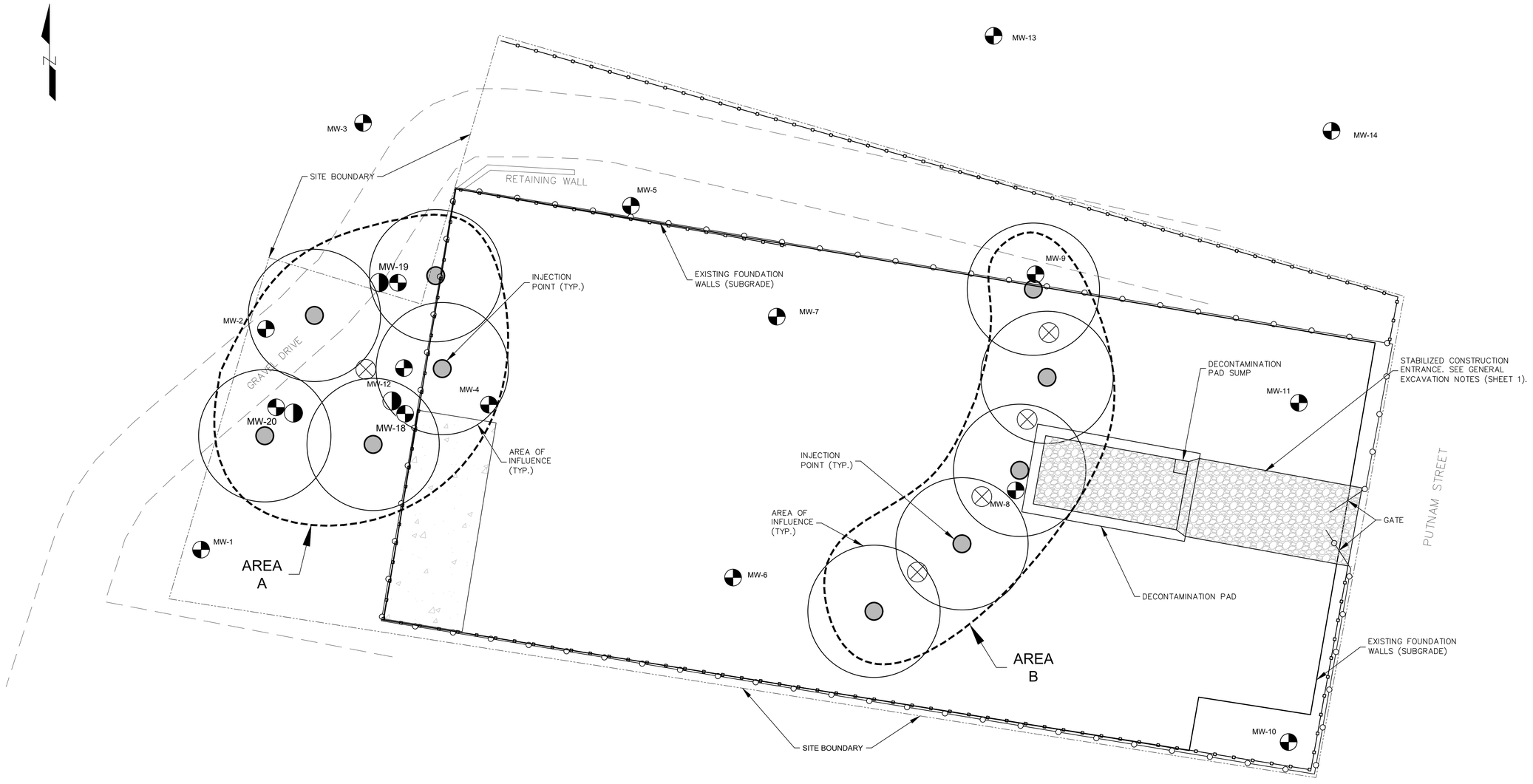

IN-SITU INJECTION QUANTITIES

AREA A	
ISGS MIXTURE	3,510 GALLONS
AREA B	
VITAMIN B-2	4,766 GRAMS
VITAMIN B-12	686 GRAMS
RED YEAST RICE EXTRACT	116 GRAMS
PROVECT IR	2,500 POUNDS
ZERO VALENT IRON	810 POUNDS
SODIUM SULFITE	100 POUNDS
NUTRIENT	100 POUNDS
CALCIUM PROPIONATE	1,000 POUNDS
WATER	2,000 GALLONS

IN-SITU INJECTION NOTES

1. INJECTION LOCATIONS TO BE DETERMINED BY CONTRACTOR AND CONFIRMED BY PROJECT ENGINEER.
2. ISGS SOLUTION WILL BE THE APPROXIMATE QUANTITY LISTED ABOVE AND WILL TREAT BETWEEN 12 AND 29 FEET BELOW GROUND SURFACE (BGS) WITH FOUR EVENLY SPACED INJECTION INTERVALS.
3. A 10% ISGS SOLUTION WILL BE USED IN AREA A (3,600 GALLONS OF ISGS INJECTED AT RATES FROM 1-20 GPM AND PRESSURES RANGING FROM 10 TO 100 PSI).
4. THE REDUCTIVE DECHLORINATION SLURRY FOR AREA B WILL TREAT BETWEEN 12 AND 29 FEET BELOW GROUND SURFACE (BGS) WITH FOUR EVENLY SPACED INJECTION INTERVALS.
5. A SLURRY FOR AREA B WILL BE THE APPROXIMATE QUANTITIES LISTED ABOVE EVENLY DISTRIBUTED THROUGH INJECTION LOCATIONS AT RATES OF 1-20 GPM AND PRESSURES RANGING FROM 10 TO 100PSI.
6. THE ABOVE VOLUMES, FLOWRATES AND CONCENTRATIONS ARE ESTIMATES BASED ON CALCULATIONS AND KNOWN SITE CONDITIONS. ACTUAL QUANTITIES WILL BE DETERMINED BY CONTRACTOR, ADJUSTED AS NECESSARY BASED ON FIELD CONDITIONS, AND MONITORED DURING THE INJECTION PROCESS.

FIGURE 3

STATE OF NEW YORK · ANDREW M. MILLSPAUGH · 094708 · LICENSED PROFESSIONAL ENGINEER

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NO.	DATE	RECORD OF WORK	DRN	CKD	APPR
1	12/03/20	ADDED EFFECTIVENESS SOIL BORING LOCATIONS	TAS	TMJ	AMM
2	04/01/21	MOVE EFFECTIVENESS SOIL BORING LOCATIONS	TAS	TMJ	AMM

PROJECT	
PROJ. ENGR.:	AMM
PROJ. NO.:	2015-30
PREPARED BY:	TAS
DRAFTED BY:	TAS
CHECKED BY:	TMJ
APPROVED BY:	AMM
DATUM:	N/A
CONTOUR INTERVAL =	N/A FEET

0 2' 4' 8' 16'
1" = 8'

REMEDIAL DESIGN DRAWING
IN-SITU INJECTION REMEDY
53 PUTNAM STREET
PUTNAM RESOURCES, LLC
CITY OF SARATOGA SPRINGS SARATOGA CO., NEW YORK

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road ● Latham, New York 12110

DATE: 10/13/2020 | SCALE: 1" = 8' | DWG. NO. 2015-30072 | SHEET 3 OF 3

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