PROPOSED REMEDIAL ACTION PLAN

NYSEG - Court St. - Ithaca MGP
Operable Unit Number: 02
Ithaca, Tompkins County
Site No. 755008
February 2011

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

PROPOSED REMEDIAL ACTION PLAN

NYSEG - Court St. - Ithaca MGP
Ithaca, Tompkins County
Site No. 755008
February 2011

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of 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 document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

Tompkins County Public Library
101 East Green Street
Ithaca, NY 14850
Phone: (607) 272-4557

City of Ithaca
Attn: Office of the Mayor
108 Green Street
Ithaca, NY 14850
Phone: (607) 274-6501

Coal Tar Advisory Committee
Attn: Jutta Dotterweich
106 Washington Street
Ithaca, NY 14850
Phone: (607) 272-1239

A public comment period has been set from: March 1, 2011

To: March 31, 2011

A public meeting is scheduled for the following date: Friday, March 11, 2011 at 7:00

Public meeting location:

Greater Ithaca Activity Center (GIAC) Gymnasium.

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through to:

William Ottaway
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
wsottawa@gw.dec.state.ny.us

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

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, Voluntary 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 Ithaca Court Street Manufactured Gas Plant (MGP) is located in a residential area of Ithaca, Tompkins County, NY. The site is bounded by North Plain Street, West Court Street and Esty Street. The site is currently owned by the Ithaca City School District. The surrounding area consists primarily of single family homes, but also includes private and public schools, a city pool, and an activity center.

Site Features: The original gas house is still in place at the southwest corner of the site. This building was christened the Markles Flats building by students when the building was briefly used as a school. While this is the only remaining evidence of the former MGP aboveground, subsurface tanks and foundations were the key site features during the investigation of this site. These included tar tanks, the foundations of gas holders, and a series of conduits within West Court Street that ran from the east side of the Markles Flats building to Cayuga Inlet.

Current Zoning: The site property is zoned P-1 (Community Services), which could include schools or public recreation. The surrounding area is zoned residential, and is occupied primarily by single family and multi-family housing.

Historic Uses: The MGP operated at this site between 1853 and 1927. The site-related contamination is coal tar, which was a condensate from the gas manufacturing process. A number of conduits located beneath West Court Street conveyed coal tar from the plant site to a barge loading facility located on Cayuga Inlet (site #7-55-007). Tar escaped from several subsurface structures on the plant site and also from the conduits, creating an extensive area of subsurface tar contamination.

The former gas plant site was initially investigated by NYSEG in 1986.

Operable Units: An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination

A full remedial investigation was initiated in October 2001. During the investigation, coal tar and associated contamination were identified beyond the boundaries of the site and tar conduits in West Court Street. The site was then organized into two Operable Units, OU1 is the plant site and the conduits, and OU2 is the off-site areas where contamination had migrated through the subsurface, away from the OU1 area and into the surrounding residential community.

The remediation of the conduits in West Court Street started in the fall of 2002 and was

completed in the fall of 2005. Remediation of the gas plant site began in the fall of 2008 and was completed in January 2010, with the exception of the Markles Flats building. The construction completion report for that work was approved in December 2010.

The Remedial Investigation Report for OU2 was finalized in 2011 and is currently available for public review in the document repositories established for this site, as is the Feasibility Study.

Site Geology and Hydrogeology: The soils in the area of the site are composed of a layer of fill material that is generally 1-2 feet thick, but was observed to be a thick as 11 feet in areas where underground utilities have been installed. Underlying the fill, the soil is generally a silty sand. A thin seam of gravel is present below the silty sand in some portions of OU2. This gravel is highly permeable to the flow of liquids and appears to be the primary conduit for off-site migration of MGP tar. Below the sand and below the gravel seam is a clay layer that appears to prevent any further downward migration of contamination.

Operable Unit (OU) Number 02 is the subject of this document.

A Record of Decision was issued previously for OU 01.

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) is/are being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

New York State Electric and Gas (NYSEG)

The Department and NYSEG entered into a multi-site Consent Order (index number DO-0002-9309) on March 30, 1994, which obligates NYSEG to implement a full remedial program for 33 former MGP sites across the State, including the Ithaca, Court Street site.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

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. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- indoor air

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste 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 in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified for this Operable Unit at this site is/are:

coal tar	benzene, toluene, ethylbenzene and xylenes (BTEX)
polycyclic aromatic hydrocarbons (tPAHs), total	

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable standards, criteria and guidance 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 Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

IRM Duct Removal - West Court Street: Meadow to Fulton

This IRM was conducted from October through December 2010, and included the removal of wooden ducts and a clay tile pipe located below the pavement of West Court Street. This project extended from Meadow Street (aka Route 13N) to Fulton Street (aka Route 13S) approximately 500 feet. Within that area, the clay tile pipe was replaced by a metal pipe, consistent with reports from the earlier removals completed to the west.

Washington Street IRM

Coal tar and coal tar contaminated soil were excavated and disposed off-site between July and August 2005. Excavation started at the intersection of Washington Street and Esty Street, where the contamination was heaviest. The distribution of tar is consistent with a historic release at this location. An area of approximately 6,000 square feet was excavated, extending 100 feet north and south of the intersection. All significant visible contamination was removed, but some residual contamination remained in place: fine rootlets of tar were observed in the excavation on the western edge of the intersection; a thin seam of MGP tar was left in place at the southern extent of the excavation at a depth of greater than 10 feet, and; PAHs above 500 ppm were reported in documentation samples east of the intersection.

6.3: 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.*

Direct contact with contaminants in the soil is unlikely because the majority of the contamination has either been removed during previous remedial actions or exists beneath the ground surface. Persons who dig below the ground surface may come into contact with contaminants in subsurface soil. Soil vapor intrusion sampling has not identified impacts to indoor air quality at structures surrounding the site. People are not drinking contaminated groundwater associated with the site because the area is served by a public water supply that obtains its water from a different source.

6.4: 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.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU(s) 02.

The primary contaminant of concern at this site is coal tar (a condensate from the gas manufacturing process). Coal tar contains benzene toluene ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs).

The coal tar present on the site has been removed and treated or disposed off-site as part of OU1. A significant amount of coal tar migrated off-site and remains in OU2, north and west of the site, under the city streets and a residential property. This contamination is primarily within a layer of gravel at a depth ranging from 10 to 13 feet below the ground surface.

The site presents a significant environmental threat due to the ongoing presence of coal tar in the subsurface as described above and the release of tar-related contamination into the groundwater.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Exhibit B. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit C. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit D.

7.1: Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative

feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

7.2: Elements of the Proposed Remedy

The basis for the Department's proposed remedy is set forth at Exhibit E.

The estimated present worth cost to implement the remedy is $12,811,000. The cost to construct the remedy is estimated to be $9,744,000 and the estimated average annual cost is $230,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:
a. Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
b. Reducing direct and indirect greenhouse gas and other emissions;
c. Increasing energy efficiency and minimizing use of non-renewable energy;
d. Conserving and efficiently managing resources and materials;
e. Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
f. Maximizing habitat value and creating habitat when possible;

g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. Soil containing visible MGP impacts in areas designated as 1A and 1B will be excavated for off-site treatment and disposal at a permitted facility. Area 1A is located within Esty Street, north the plant site, approximately 40 to 200 feet east of North Plain Street. Area 1B is located west the plant site, beginning within the intersection of North Plain Street and Esty, and extending approximately 150 feet to the south. Area 1B includes some property outside the right-of-way. Excavation on that property will remove all soil impacted with site-related contamination above applicable SCGs based on the zoning of that property at the time of excavation. The Department encourages that soil that is not visibly impacted be stockpiled and used as backfill in the right-of–way portion of OU-2, following the completion of the excavation. Backfill on the residential property must meet residential SCGs.

3. If backfill material is used in the right-of–way portion of areas 1A and 1B which does not meet residential soil cleanup objectives, a soil cover will be provided over all vegetated areas to prevent exposure to underlying soils. The two foot thick cover will consist of clean soil underlain by a demarcation layer to delineate the cover soil from the subsurface soil. The top six inches of soil must be of sufficient quality to support vegetation. Clean soil is soil that is tested and meets the Division of Environmental Remediation's criteria for backfill. Non-vegetated areas (buildings, roadways, parking lots, etc.) are covered by either a paving system or concrete at least 6 inches thick.

4. The gravel seam in area 1C, which is beneath North Plain Street, north of Esty Street, which contains MGP tar will be treated using in-situ chemical oxidation (ISCO). Any tar which is recoverable will first be removed using extraction wells. A treatability study will be performed to identify the oxidizing chemical which will most effectively treat the contamination.

5. Following remediation of source areas, groundwater quality will be monitored for site-related contamination. This applies to the areas described in paragraph 3 and 4 above, the areas addressed in OU1, and the IRMs on Washington Street and West Court Street. Any groundwater contamination identified will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for MGP-related contamination and also for MNA indicators which will provide an understanding of the biological and abiotic activity breaking down the contamination. It is anticipated that BTEX contamination will decrease by an order of magnitude (i.e. 90 percent) in a reasonable period of time (5 to 10 years). Reports of the attenuation will be provided at 5 and 10 years, and active remediation will be proposed if it appears that natural processes alone will not address the contamination. The contingency remedial action will depend on the information collected, but it is currently anticipated that oxygen injection would be the expected contingency remedial action.

6. The remedy selected for OU1 included the imposition of an institutional control. The following updates the requirements for that institutional control to be consistent with current

regulations and guidance and address the necessary site management activities in OU2. An institutional control, in the form of an environmental easement will:

a) 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).

b) allow the use and development of the controlled property for restricted residential, commercial and industrial uses as defined by Part 375-1.8(g), though land use is subject to local zoning laws;

c) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;

d) prohibit agriculture or vegetable gardens on the controlled property;

e) require compliance with the Department approved Site Management Plan;

7. The remedy selected for Operable Unit 1 required a Site Management Plan (SMP). The following updates the requirements for that plan to be consistent with current regulations and guidance and address the necessary site management activities in OU2. To the extent that these provisions are in conflict with the OU1 ROD, then the provisions in this paragraph shall control. The SMP shall include 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 Environmental Easement discussed in Paragraph 5 above remain in place and effective. This plan includes, but may not be limited to: (i)an excavation plan which details the provisions for management of future excavations in areas of remaining contamination; (ii) descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions; (iii) a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. (iv) maintaining site access controls and Department notification; and (v) 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 to assess the performance and effectiveness of the remedy; a schedule of monitoring and frequency of submittals to the Department; monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required pursuant to item 6.a.iii. above.

Exhibit A

Nature and Extent of Contamination

The principal waste product produced at the former MGP site was coal tar, which is an oily, dark colored liquid with a strong, objectionable odor. Unlike most materials labeled as "tar", this is not a semi-solid, viscous material. Rather, it has a physical consistency similar to motor oil, which enables it to move through the subsurface. Coal tar is referred to as a dense non-aqueous phase liquid or DNAPL since it is slightly heavier than water and will not readily dissolve in water. When released into the subsurface, it will sink through the groundwater until it reaches some less permeable material which it cannot penetrate. It can, under certain conditions, move laterally away from the point where it was initially released.

The tar contains high levels of volatile and semi-volatile organic compounds (VOCs and SVOCs). The principal VOCs are benzene, toluene, ethylbenzene, and xylenes. These compounds, collectively known as BTEX, are slightly soluble in water. Groundwater which comes into contact with tar or tar-contaminated soils will become contaminated with BTEX compounds. This contaminated groundwater can then move through the subsurface along with the ordinary groundwater flow.

The principal SVOCs in the tar are a group of compounds known as polycyclic aromatic hydrocarbons, commonly abbreviated as PAHs. PAH compounds are generally less soluble than BTEX, and are consequently less likely to dissolve in groundwater. This makes PAH compounds less mobile in the subsurface, so the highest levels of PAHs are normally found in close proximity to the tar from which they are derived. The specific semivolatile organic compounds of concern in soil and groundwater are the following polycyclic aromatic hydrocarbons (PAHs):

acenaphthene	acenaphthylene	anthracene	benzo(a)anthracene
benzo(a)pyrene	benzo(b)fluoranthene	benzo(g,h,i)perylene	benzo(k)fluoranthene
dibenzo(a,h)anthracene	chrysene	fluoranthene	fluorene
indeno(1,2,3-cd) pyrene	2-methylnaphthalene	naphthalene	phenanthrene
pyrene			

In this document, PAH concentrations are referred to as total PAHs (TPAHs). The TPAH concentration is the sum of the concentrations of each PAH listed above.

All of the BTEX and PAH contaminants which dissolve in groundwater are subject to degradation by natural processes. Common soil bacteria are capable of using these chemical compounds as a food source, converting them to carbon dioxide and water. This degradation process takes place more rapidly when abundant oxygen is present in the groundwater, and can in many cases be expedited by the introduction of additional oxygen. However, contaminants which still remain in the tar itself, undissolved in water, remain beyond the reach of bacteria and can remain in their undegraded state indefinitely.

Figures 2 through 5 summarize the degree of contamination for the contaminants of concern in soil, groundwater and soil vapor, and compare the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste/Source Areas

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site include locations where coal tar NAPL is present in subsurface soils.

The majority of the coal tar originally present at this site was removed as part of the OU1 remedy. Significant amounts of coal tar remain in three distinct areas to the north and west of the site which are shown in Figure 2: Area 1A to the north of the plant site, Area 1B to the west of the plant site, and Area 1C within North Plain Street north of Esty Street. In each of these areas, the heaviest contamination is found within a layer of gravel at a depth typically ranging from 10 to 13 feet below the ground surface. These source areas will be addressed by the remedy selection process.

Groundwater

The primary groundwater contaminants are benzene, toluene, ethylbenzene and xylene (BTEX) associated with the former MGP. The extent of groundwater contamination is shown on Figure 4. The most significant groundwater contamination has been observed along Washington Street (Remedial Area 1), at the limits of the excavation previously completed on that street by the IRM. In Remedial Area 1, groundwater in close proximity to the coal tar present north and west of the plant site would be expected to contain site related contamination at levels above SCGs, sampling to date has not demonstrated this.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Benzene	ND – 1,300	1	6 of 38
Toluene	ND - 74	5	4 of 38
Ethylbenzene	ND – 1,100	5	2 of 38
Xylene	ND – 630	5	2 of 38
Acenaphthene	ND – 82	20	6 of 38
Phenol	ND – 2.3	1	1 of 38
Naphthalene	ND – 1,500	10	6 of 38
Cyanide	ND – 384	200	1 of 38

ND – Not detected above the detection limit.

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.

b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: benzene, toluene, ethylbenzene and xylene (BTEX).

Surface Soil

Subsurface soil samples were collected at the site during the RI. Several surface soil samples, including background samples, found PAHs present at levels exceeding unrestricted SCGs for individual PAH compounds. Based on the forensic analysis, the PAHs appear to share a common source with those identified in the background samples and do not appear to be MGP-related. Although the wooden duct removal project did not specifically target surface soil, all surface soil along the north side of West Court Street between the sidewalk and the street was excavated and replaced with clean fill as a result of the wooden duct removal.

Table 2 - Surface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Residential SCG[c] (ppm)	Frequency Exceeding Restricted SCG
SVOCs: PAHs					
Benzo(a)anthracene	ND-12	1	18/53	1	18/53
Benzo(a)pyrene	ND-20	1	27/53	1	27/53
Benzo(b)fluoranthene	ND-21	1	19/53	1	19/53
Benzo(k)fluoranthene	ND-12	0.8	19/53	3.9	14/53
Chrysene	ND-13	1	19/53	3.9	10/53
Dibenzo(a,h)anthracene	ND-4.6	0.33	19/53	0.33	19/53
Indeno(1,2,3-cd)pyrene	ND-9.7	0.5	28/53	0.5	28/53

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Residential Soil Cleanup Objectives.
ND – Not detected above the detection limit.

Any incomplete combustion process generates PAHs. Some levels of PAHs are expected in any urban area, and levels above the SCGs are not uncommon. Sources of PAHs can include exhaust from furnaces and automobiles, ash or exhaust from fireplaces, and structural fires. While some surface soil samples exhibit levels of PAHs higher than typical background levels, there does not appear to be a reasonable connection between these chemicals and the MGP related contamination. Therefore, surface soil PAHs are not considered site-specific contaminants of concern.

Soil

Subsurface soil samples were collected at the site during the RI. The results indicate that soils that are visibly impacted by coal tar exceed the unrestricted SCG for volatile and semi-volatile organics. The principal volatile organic chemicals of concern are the BTEX compounds, and the principal semi-volatile organic chemicals of concern are the PAH compounds. The BTEX compounds are generally co-located with the PAHs. At this site, elevated PAHs are collocated with visible evidence of MGP tar.

Table 3 - Soil					
Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Residential SCG[c] (ppm)	Frequency Exceeding Restricted SCG
VOCs:					
Benzene	ND-7.5	0.06	16/55	.006	16/55
Acetone	ND-1.7	0.05	54/55	.005	54/55
Toluene	ND-1.3	0.7	1/55	0.7	1/55
Ethylbenzene	ND-220	1	14/55	1	14/55
Xylene	0.02-38	0.26	15/55	1.6	0/55
SVOCs: Total PAHs					
Acenaphthene	ND-1400	20	17/55	98	3/55
Acenaphthylene	ND-170	100	1/55	100	1/55
Anthracene	ND-760	100	2/55	100	2/55
Benzo(a)anthracene	ND-430	1	27/55	1	27/55
Benzo(a)pyrene	ND-360	1	26/55	1	26/55
Benzo(b)fluoranthene	ND-290	1	26/55	1	26/55
Benzo(k)fluoranthene	ND-84	0.8	23/55	1.7	15/55
Chrysene	ND-400	1	27/55	1	27/55
Dibenzo(a,h)anthracene	ND-39	0.33	23/55	0.33	23/55
Fluoranthene	ND-770	100	3/55	100	3/55
Fluorene	ND-680	30	6/55	100	2/55
Indeno(1,2,3-cd)pyrene	ND-130	0.5	26/55	0.5	26/55
Naphthalene	ND-4200	12	15/55	12	15/55
Phenanthrene	ND-2600	100	11/55	100	11/55
Pyrene	ND-1300	100	6/55	100	6/55
Benzo(ghi)perylene	ND-190	100	2/55	100	2/55
Inorganics					
Arsenic	ND-22.4	13	1/55	16	1/55
Cadmium	ND-11.5	2.5	2/55	4.3	1/55
Lead	4.08-520	63	24/55	400	4/55

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), The lower of: Residential Soil Cleanup Objectives and Protection of Groundwater soil cleanup objective.
ND – Not detected above the detection limit.

The primary soil contaminants are polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylene (BTEX) associated with residues from the operation of the former MGP. As noted on Figure 5, the primary soil contamination is co-located with soils which are visually impacted by coal tar NAPL.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are PAHs and BTEX.

Soil Vapor Intrusion

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures.

Soil vapor samples were collected from the sub-slab of structures located near the plant site, along West Court Street, and along Washington Street. Indoor air and outdoor air samples were also collected. The samples were collected to assess the potential for soil vapor intrusion. The sampling point locations are shown on Figure 5.

Based on the information collected, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance, no site-related soil vapor contamination of concern was identified in OU-2 during the RI. Therefore, no remedial alternatives need to be evaluated for soil vapor. It is noted that soil vapor-related remediation of one on-site building (the Markles Flats building) was required as part of OU1.

Exhibit B

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 objectives for this site are:

Public Health Protection

Groundwater

- Prevent people from drinking groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Environmental Protection

Groundwater

- Remove the source of ground water contamination.
- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.

Soil

- Prevent migration of contaminants that would result in groundwater contamination.

Exhibit C

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Exhibit B) to address the contaminated media identified at the site as describe in Section 5:

Alternative 1: No Further Action

The No Further Action Alternative (FS Alternative 1) recognizes the remediation of the site completed by the IRM described in Section 5.2, as well as OU1. This alternative leaves OU2 in its present condition and does not provide any additional protection of the environment.

Alternative 2: Restoration to Unrestricted Conditions

This alternative (FS Alternative 2) achieves all of the SCGs discussed in Section 5.1.1 and soil meets the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative would include: excavation of approximately 22,000 CY of soil to a depth of up to 17 feet below ground surface. Excavations would likely be supported by sheetpiling, and odors and vapors would be controlled by the use of spray foam or other vapor control measures. Areas where excavation is not practical (e.g. under occupied homes) will be addressed using in-situ chemical oxidation (ISCO). This remedy does not rely on any new institutional or engineering controls to prevent future exposure, and no new site management or periodic review is proposed. This remedy will have no annual cost, only the capital cost.

Present Worth: *$17,807,000*
Capital Cost: *$17,807,000*
Annual Costs: *$0*

Alternative 3**: In-Situ Solidification and Monitored Natural Attenuation**

This alternative (FS Alternative 3B/4A) would include in-situ solidification (ISS) of the tar impacted soil in sub-areas 1A and 1B (north and west of the plant site, as shown in PRAP Figure 2). ISS is a process whereby contaminated soils are converted in-place into a stable cement-type matrix in which contaminants are bound or trapped and become immobile. The groundwater contamination on Washington Street, in sub-area 1C (North Plain Street, north of Esty Street, as shown on PRAP Figure 2) and in the remainder of Area 1 would be addressed using Monitored Natural Attenuation (MNA).

Present Worth: *$8,673,000*
Capital Cost: *$6,249,000*
Annual Costs: *$160,000*

Alternative 4**: In-Situ Solidification and Monitored Natural Attenuation with In-Situ Chemical Oxidation**

This alternative (FS Alternative 3B/4C) would be similar to Alternative 3 except that sub-area 1C would be treated using In-Situ Chemical Oxidation (ISCO) instead of MNA. ISCO is a process where a chemical oxidant is injected into the contaminated soil. The oxidant reacts with the contamination, breaking down the chemicals

to decrease the contaminant concentration and decrease the likelihood that chemicals would dissolve or volatilize from the area of contamination. Prior to implementing ISCO, NAPL extraction wells will be used to remove any flowable coal tar. The groundwater contamination on Washington Street would be addressed using Monitored Natural Attenuation (MNA).

Present Worth: *$10,181,000*
Capital Cost: *$7,114,000*
Annual Costs: *$220,000*

Alternative 5: Excavation, In-Situ Chemical Oxidation and Monitored Natural Attenuation

This alternative (FS Alternative 3C/4C) would be similar to Alternative 4 except that sub-areas 1A and 1B would be excavated rather than solidified. Area 1C would be treated using ISCO, and the groundwater contamination on Washington Street would be addressed using Monitored Natural Attenuation (MNA).

Present Worth: *$12,811,000*
Capital Cost: *$9,744,000*
Annual Costs: *$230,000*

Alternative 6**: Containment, NAPL recovery, and Monitored Natural Attenuation**

This alternative (FS Alternative 3A/4C) would be similar to Alternative 5 except that it would prevent further migration of MGP tar in sub-areas 1A and 1B by constructing a low permeability subsurface barrier wall around those areas of potentially mobile MGP tar. For purposes of this document, this barrier is represented as a slurry wall, which would have a permeability of less than 1x 10-6 cm/sec. However, the actual material used for the barrier and construction techniques would be addressed as part of the remedial design. Potentially mobile coal tar inside the barrier wall would be extracted to the extent possible using NAPL collection wells. The groundwater contamination on Washington Street would be addressed using Monitored Natural Attenuation (MNA).

Present Worth: *$10,038,000*
Capital Cost: *$6,525,000*
Annual Costs: *$250,000*

Exhibit D

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Action	0	0	0
2. Restoration to Unrestricted Conditions	$17,807,000	0	$17,807,000
3. In-Situ Solidification and Monitored Natural Attenuation	$6,249,000	$160,000	$8,673,000
4. In-Situ Solidification and Monitored Natural Attenuation with In-Situ Chemical Oxidation	$7,114,000	$220,000	$10,181,000
5. Excavation, In-Situ Chemical Oxidation and Monitored Natural Attenuation	$9,744,000	$230,000	$12,811,000
6. Containment, NAPL recovery, and Monitored Natural Attenuation	$6,525,000	$250,000	$10,038,000

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 5, Excavation, In-Situ Chemical Oxidation and Monitored Natural Attenuation as the remedy for this site. The elements of this remedy are described in Section 7.2 and shown on Figure 6.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives.

Justification Area 1A and 1B:

MGP tar is present in the subsurface at this site in a number of different configurations. In some areas closest to the plant site, MGP tar has saturated the spaces between soil particles for a significant thickness. This condition exists in areas 1A and 1B at this site. The remedial technologies evaluated at this site which are capable of addressing these tar saturated areas are excavation, in-situ solidification (ISS), and containment with NAPL recovery. We would not expect the other available technologies to be effective.

Creating a containment barrier alone would leave the MGP tar in place as a mobile fluid which could move horizontally or vertically over time, potentially creating new exposures. That is the reason for combining containment with NAPL recovery. If sufficient NAPL can be removed, this combination of technologies should be as reliable as ISS. In practice, however, the effectiveness of NAPL recovery is not sufficiently consistent and predictable to be able to make that case convincingly, and ISS is generally viewed as more reliable at the present time. At this site, since ISS can be implemented at a lower cost with greater long-term effectiveness, ISS would be preferred over containment.

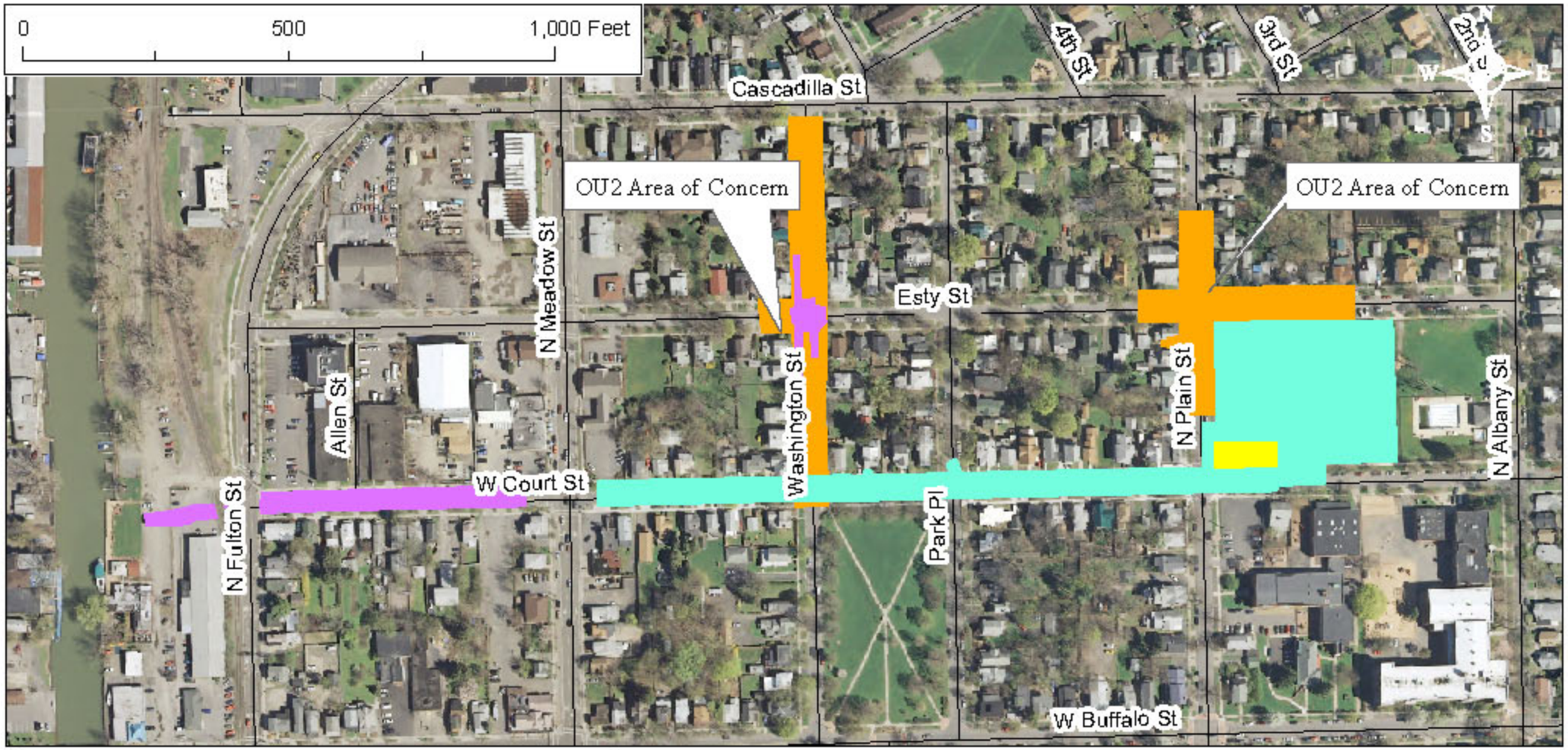
The Department generally has a preference for excavation over ISS, since excavation permanently removes the contamination. In contrast, ISS leaves the contamination in place, and the remedy would rely of institutional controls to prevent exposure. ISS is often selected at sites where excavation is difficult to implement (e.g., very deep contamination) or where it can be implemented in a way that is less disruptive. Since the contamination at this site is relatively shallow, and ISS would be nearly as disruptive to the community, these advantages are not as pronounced at this site. In comparing the cost of excavation to the cost for ISS, the costs for site preparation, treatment and restoration are quite similar. The cost for the two alternatives differs primarily by the cost of sheeting proposed for excavation support (approximately $1.5 million). While this is not an insignificant cost, it is not sufficient, in itself to offset the advantages of excavation over ISS, to wit: a) excavation is more effective in the long term; b) excavation is more effective in reducing toxicity, mobility and volume; c) excavation is more effective at eliminating potential human health exposure; and d) by viewing the sidewall of the excavation, we would have less likelihood of missing an area of contamination, and a greater understanding of subsurface conditions following remediation.

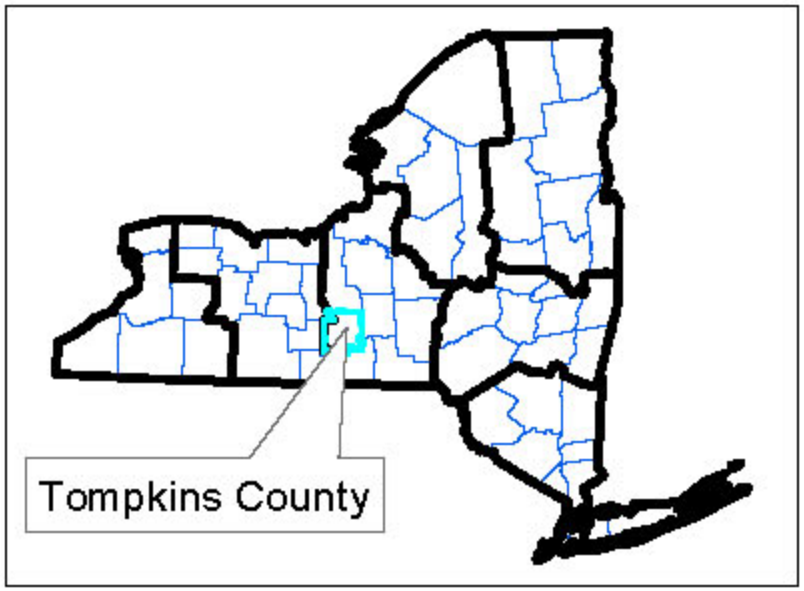
It is possible that the remedial contractor would be able to use alternate techniques to support the excavation (benching, trench boxes, etc.) which could significantly reduce the cost of excavation support. However, the selection of this remedy is based on the excavation alternatives as presented in the FS and does not rely on that savings.

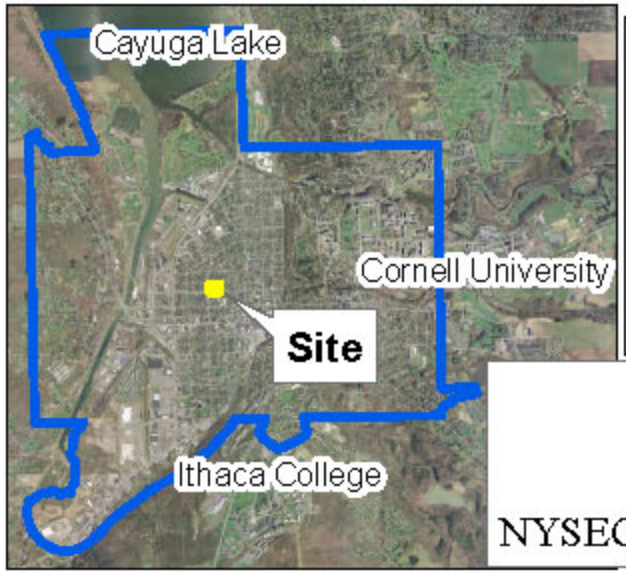
Justification Area 1C:

As MGP tar moves away from the tar-saturated areas, it tends to follow thin seams of more permeable material, frequently sand and/or gravel. This is the condition that exists in area 1C. In addition to the above listed technologies, these seams of tar saturation in Area 1C can also be treated using in-situ chemical oxidation (ISCO), if the seams are thin enough to allow the oxidizing chemical to fully contact the tar. The Department does not believe that MNA or enhanced biological treatment would be effective in this area without addressing the tar seams ahead of time. While enhanced biological treatment would be expected to bring down groundwater contamination concentrations in the short term, those concentrations would be expected to rebound to original levels if the source material were not adequately addressed. In evaluating the available technologies, the Department recognizes that both ISCO and excavation could potentially permanently eliminate the contamination from Area 1C. This makes both of these options preferable to ISS, since they would be more effective in the long term, more effective in reducing toxicity and volume, and more effective at eliminating potential human health exposure. If ISCO can be effectively implemented in Area 1C, then it would be preferable to excavation because it could be implemented with less disruption of the community. The Department supports the use of ISCO in this area since it would permanently destroy the contamination with the minimum impact to the community.

Beyond the saturated tar seams, tar may be present as individual “blebs” or droplets of tar or in very fine “rootlets”. Contamination may also be present in soil where there is no separate phase tar but there is other evidence of contamination including odors, sheens, staining, and elevated levels of organic chemicals either recorded by field instruments or from laboratory analysis. All of area 2 and area 1 exclusive of 1A, 1B, and 1C fall into this category. Under ideal conditions, these impacts would naturally attenuate by a number of mechanisms, particularly digestion by naturally occurring bacteria. If conditions are not ideal, that process can be helped along by enhancing the process. For MGP related chemicals, this most commonly involves adding oxygen. A program of monitored natural attenuation (MNA) is proposed which sets definite goals for natural degradation, and requires enhancement of the process if these goals are not met. This program will achieve the remedial goals for this site with the least amount of disruption to the community, with the least impact to the environment and at the lowest cost.







Legend

Remediation Status

- OU-1 Remediation Complete
- OU-1 Markles Flats Remediation Pending
- OU-2 Remediation Complete
- OU-2 Not remediated

Figure 1

Location Map

NYSEG Ithaca Court Street MGP 755008

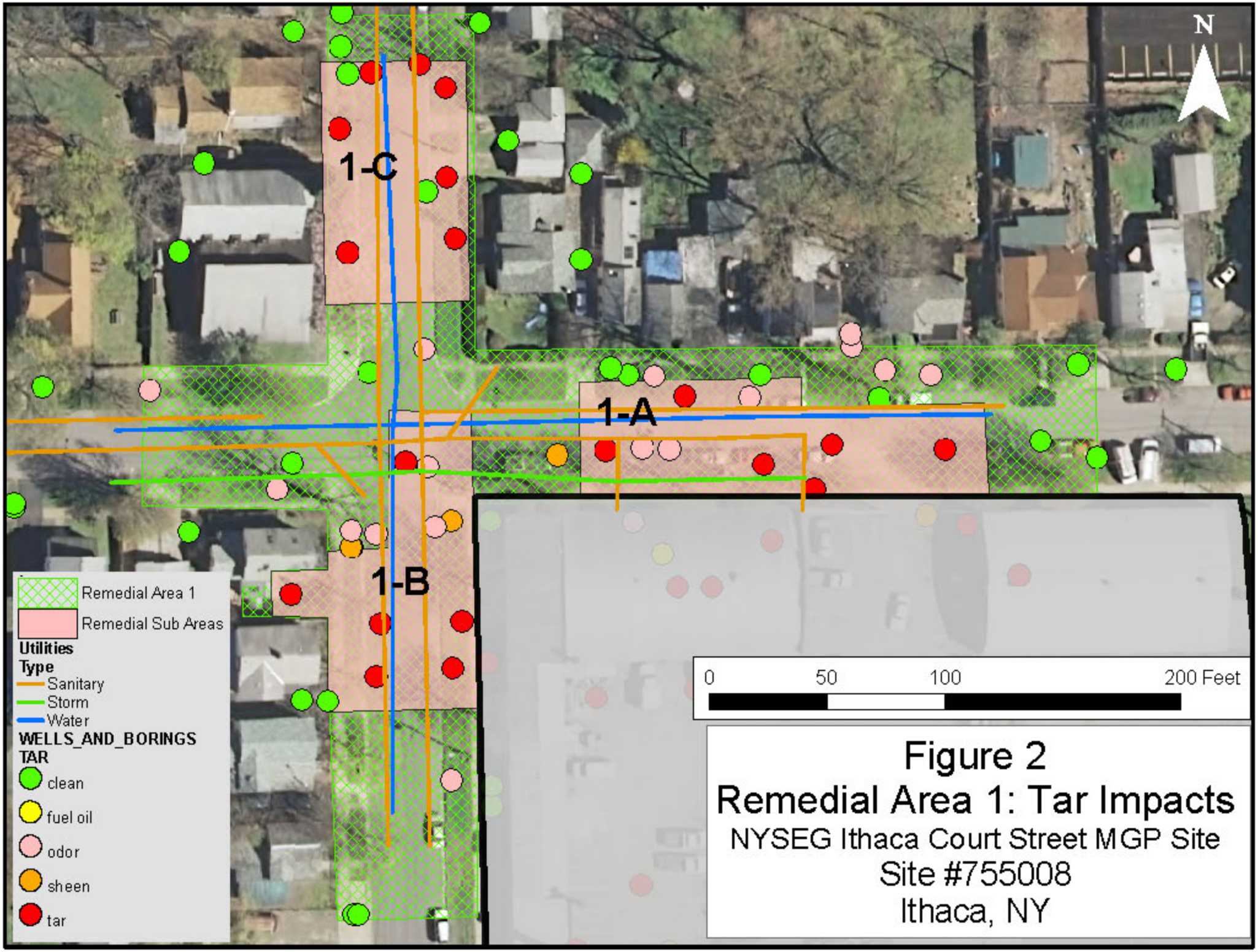


Figure 2
Remedial Area 1: Tar Impacts
NYSEG Ithaca Court Street MGP Site
Site #755008
Ithaca, NY

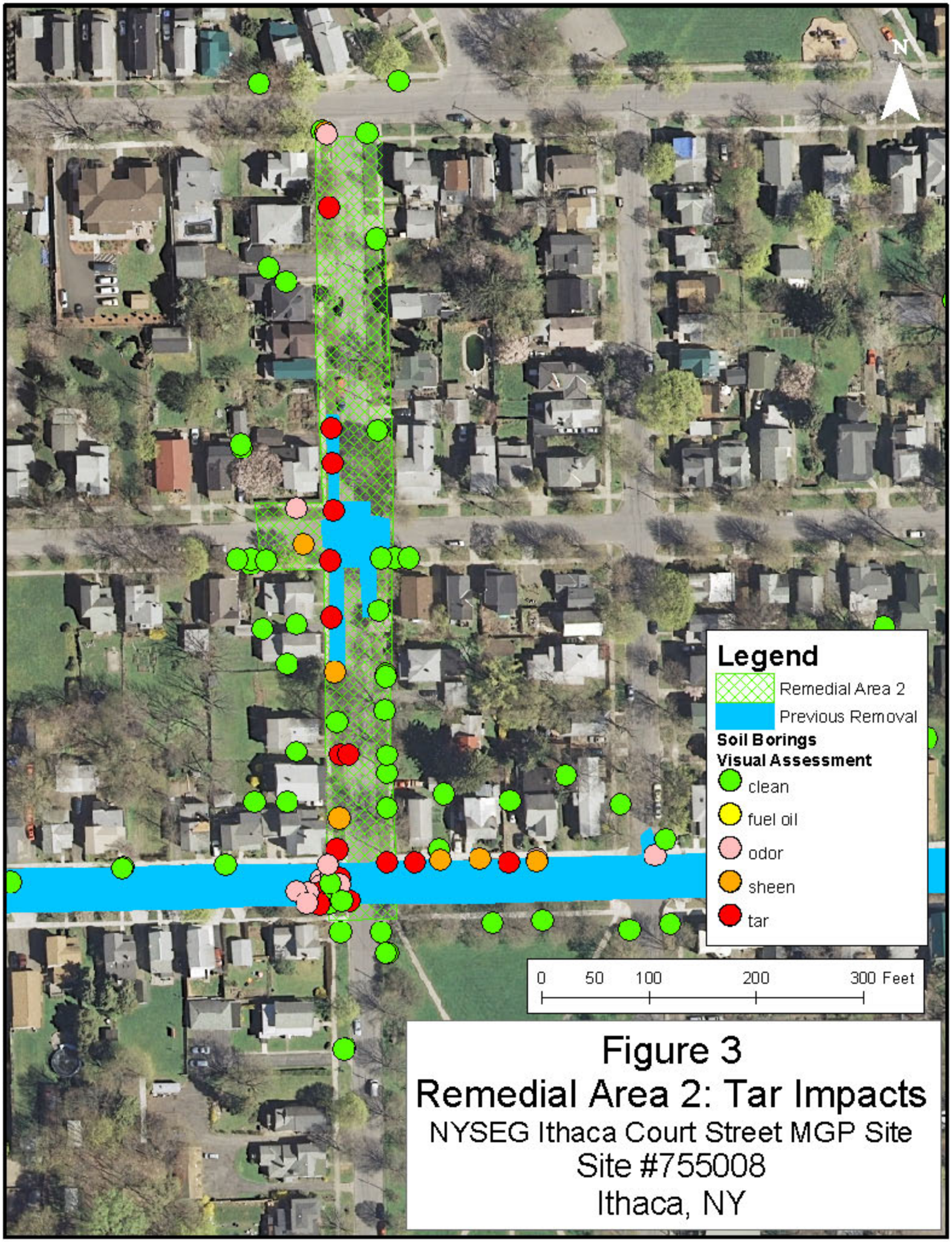


Figure 3
Remedial Area 2: Tar Impacts
NYSEG Ithaca Court Street MGP Site
Site #755008
Ithaca, NY

Figure 4
Groundwater Results
NYSEG Ithaca Court Street MGP Site
Site #755008
Ithaca, NY

Figure 5
Locations Surveyed for Potential
Soil vapor Intrusion
NYSEG Ithaca Court Street MGP Site
Site #755008
Ithaca, NY

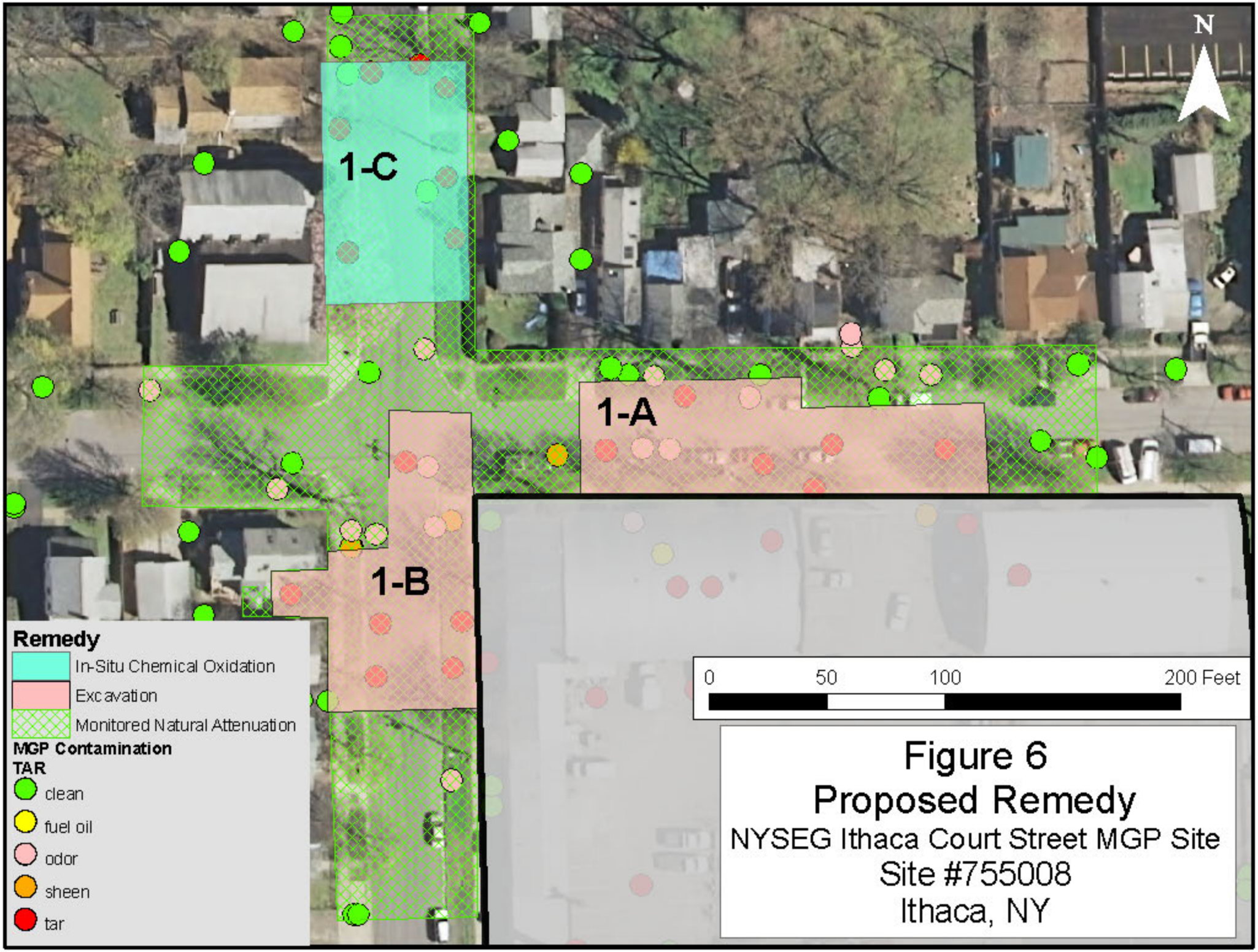


Figure 6
Proposed Remedy
NYSEG Ithaca Court Street MGP Site
Site #755008
Ithaca, NY