PROPOSED REMEDIAL ACTION PLAN
Former Fulton Manufactured Gas Plant Site

Oswego County, New York
Site No. 738034

February 2009

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

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Oswego **County, New York**
Site No. 7-38-034
February 2009

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 Former Fulton Manufactured Gas Plant (MGP). The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the operation of a manufactured gas plant at the former MGP site has resulted in the disposal of hazardous wastes, including coal tar containing benzene, toluene, ethylbenzene, xylene and polycyclic aromatic hydrocarbons (PAHs). These wastes have contaminated the soil and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to contaminated soil and groundwater

- a significant environmental threat associated with the impacts of contaminants to soil and groundwater

To eliminate or mitigate these threats, the Department proposes the following remedy:

Excavation and removal of former MGP related subsurface structures and the impacted soil surrounding them, followed by backfilling with clean soil over a demarcation layer, installation of soil cover, groundwater treatment through introduction of oxygen (or other amendment) into the subsurface, storm sewer rehabilitation and institutional controls including an environmental easement.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially 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.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to 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 document is a summary of the

information that can be found in greater detail in the May 2006 "Remedial Investigation Report" the September 2008 "Feasibility Study (FS) Report", and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Fulton Public Library
160 South First Street
Fulton, NY 13069
Hours: M, F& S - 9 am to 5 pm
T, W & Th – 9 am to 7 pm
Attention: Ms. Penny Kerfien
Phone: (315) 592-5159

NYSDEC Regional Office
615 Erie Blvd. West
Syracuse, NY 13204
Hours: 8:30 am to 4:45 pm
Attention: Gregg Townsend
Phone: (315) 426-7365

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 20, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 25, 2009 at the Fulton School District Administrative Building, 167 South Fourth Street, Fulton, NY 13069 beginning at 6:30 pm to 8:00 pm.

At the meeting, the results of the RI/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 to Amen M. Omorogbe at 625 Broadway, Albany, NY 12233-7014 or by email at amomorog@gw.dec.state.ny.us through March 20, 2009..

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 all of the alternatives identified here.

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.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Fulton MGP site occupies approximately 1.04 acres in a residential section of the City of Fulton, Oswego County, New York, approximately 10 miles south of Lake Ontario. The Oswego River (which at this point is also a branch of the New York State Barge Canal) adjoins the site's western boundary. South First Street passes through the site, dividing it into parcels designated Areas 1 and 2. Area 1 lies to the east of South First Street, with Area 2 to the west. Both areas are currently vacant, and both are currently owned by National Grid (See Figure 2).

There are four main geologic units beneath the site including (from the ground surface downward) fill, sand and silt, sand and gravel, and till. The water table is shallow, located approximately 1.5 feet to 8 feet below the ground surface (bgs). Shallow groundwater flows to the south and west beneath the site, and into the Oswego River.

The sand deposits are good sources of groundwater, and have been designated as Principal Aquifers by the Department. The aquifer is used as a source of public water supply for the City of Fulton; however, the nearest public wells are located approximately one mile upstream (south) of the site, well outside the area which could be impacted by the site. No private water supply wells exist near the site, as determined by a well survey conducted as part of the remedial investigation.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

A gas manufacturing operation began at the site in 1903 and continued until 1932 when it ceased operation due to availability of natural gas. The manufacturing process involved heating coal and petroleum products to produce a combustible gas. The gas was cooled, purified and then piped to homes and businesses in the surrounding area where it was used for heating and cooking in much the same way that natural gas is used today.

The former MGP facility included a number of different stages of operation and infrastructures, the gas holder, gas tank, oil tank, oil house, coke shed, tar well, and concentrator house. In general, Area 2 contained the gas production facilities and Area 1 contained facilities for storing and distributing the gas. As the gas was cooled and purified prior to distribution, a dark, oily liquid known as coal tar would condense and accumulate in various structures within the MGP. Over the years, tar leaked or was released from the former holders and other structures into the subsurface soils, resulting in the contamination of soil and groundwater.

3.2: Remedial History

In 2003, the Department entered into a multi-site consent order with National Grid. The order obligates National Grid to conduct remedial investigation and remediate the site relative to site contamination resulting from the operation of the former MGP at the site.

National Grid conducted a Preliminary Site Assessment (PSA) study between July 1996 and September 1996. Following up on the PSA, a more detailed Remedial Investigation (RI) was conducted between July 1998 and November 2005.

SECTION 4: 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. National Grid, the current owner of the site and the corporate successor to the operators of the MGP, is the only identified PRP.

The investigative activities, including a PSA, were conducted under a 1992 Order between the Department and Niagara Mohawk Power Corporation, a predecessor of National Grid. The Department and National

Grid entered into a Consent Order (index # A-0473-0000) in November 2003 that obligates National Grid to implement a full remedial program at the former MGP site. After the remedy is selected, National Grid would be required to implement the remedy pursuant to this 2003 Consent Order.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between July 1998 and December 2008. The field activities and findings of the investigation are described in the RI report, which is available in the document repositories listed in Section 1.

Several field programs consisting of soil, groundwater, sediment evaluation and soil vapor sampling were performed at the site to evaluate the nature and extent of impacts to these media of concern.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on 6 NYCRR subpart 375-6- Remedial Program Soil Cleanup Objectives..

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated. As described in the RI report, many soil and groundwater samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil. Air samples are reported in micrograms per cubic meter ($\mu g/m^3$).

Table 1 and Figure 3 summarize the degree of contamination for the contaminants of concern in soil 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.

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 and 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 heavier than water and does not readily dissolve in water. When released into the subsurface, it may sink through the groundwater until it reaches fine-grained 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 coal tar 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 may become contaminated with BTEX compounds. This contaminated groundwater can then move through the subsurface along with the ordinary groundwater flow.

The principal coal tar SVOCs 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 proximity to the tar from which they are derived. The specific semivolatile organic compounds of concern in soil and groundwater are the following PAHs:

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

In this document, PAH concentrations are referred to as either total PAHs (TPAHs) or carcinogenic PAHs (cPAHs). The TPAH concentration is the sum of the concentrations of each (italicized and non-italicized) PAH listed above. The cPAH concentration is the sum of the concentrations of each italicized PAH listed above.

All of the BTEX and PAH contaminants which may 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 would take place more rapidly when abundant oxygen is present in the groundwater, and can in many cases be expedited by the introduction of additional oxygen.

Surface Soil

Surface soil is defined as the soil located at depths from zero to two inches below the ground surface. These are the soils most likely to be encountered by casual users or visitors to the affected areas. Surface soil samples were collected on the site and in background areas nearby, beyond the area of potential influence of the former MGP.

The levels of VOCs detected in surface soil at the site are comparable to sampling results obtained from background samples. BTEX concentrations range from non-detect to 0.01 ppm.

Concentrations of PAHs found in on-site soils were higher than those found in background samples. On-site surface soils show Total PAH concentrations ranging from 0.1 ppm to 271 ppm.

Cyanide was detected in on-site surface soils at concentrations above the Part 375 unrestricted soil clean up objective (SCO) of 27 ppm. Cyanide concentrations detected on site ranged from non-detect to 810 ppm.

Surface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Subsurface Soil

Subsurface soil contamination was generally limited to the site boundaries. The heaviest contamination in the subsurface soils was found immediately adjacent to former MGP structures that contained tar (see Figure 3). Subsurface contamination was observed at depths ranging from 4 to 28 feet bgs, with the highest levels of contamination found between 4 and 12 feet. Total PAH concentration range from non-detect to 11,341 ppm.

It should be noted that non-MGP related fill materials including cinders, ash and slag were observed at two off-site locations, at depths ranging from surface to 4 feet below grade.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Groundwater

Total BTEX concentrations in groundwater range from non-detect to a maximum of 2,463 ppb. TPAH concentrations range from non-detect to 8,972 ppb.

No significant groundwater contamination was detected in Area 1. Groundwater contamination was observed in Area 2, largely limited to the shallow zone immediately below the water table. The sole exception was one location in MW-6, where PAHs were detected above SCG values in the deep groundwater zone.

Monitoring wells placed between the site and the Oswego River did not identify any site-related contaminants, thus, it appears that site-related groundwater contamination does not reach the river. These contaminants are known to be biodegradable by ordinary soil bacteria, and this degradation process may explain the lack of observed impacts.

Some contaminated groundwater may be infiltrating into the storm sewer located adjacent and southwest of Area 2. Analytical results of samples obtained from storm sewer manholes located upstream and downstream of the site show the presence of low level concentrations of BTEX.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

Sediments

Sediment samples collected from the Oswego River during the RI showed no evidence of site-related contamination. Concentrations of constituents detected were below criteria and comparable with upstream background levels.

No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediment.

Soil Vapor

Analytical results from soil vapor investigation conducted at the site to determine the potential for soil vapor intrusion into adjacent structures indicated that there is no complete pathway for soil vapor intrusion. Therefore, no remedial alternatives need to be evaluated for soil vapor.

5.2: 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 completion of the RI/FS. There were no IRMs performed at this site during the RI/FS.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5 of the RI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.
No complete exposure pathways currently exist at this site. However, potential exposure pathways are:

- Dermal contact with contaminated soil or contaminated groundwater;
- Incidental ingestion of contaminated soils or groundwater; and
- Inhalation of contaminated soil vapors or dust.

Exposure to contaminated groundwater is unlikely since the area is served by public water. However, the potential for exposure to contaminated groundwater in the future exists if wells were to be installed or construction was to occur below the shallow groundwater table. The potential for exposure to contamination in soils would be addressed by excavating contaminated soil and placing soil cover over the excavation area. However, redevelopment of the site, subsurface utility work or building maintenance work in the future could bring workers into contact with contaminated material or bring contaminated soils to the surface. Where site-related contamination was detected in surface soil, the levels were generally comparable to background soil samples collected from off-site locations.

Analytical results from soil vapor intrusion investigation conducted at the site to evaluate the potential for exposures related to soil vapor into residences off-site indicate there is no complete pathway. Therefore, no further action is necessary. However, the potential for soil vapor intrusion would be evaluated for any future buildings developed on the site, including mitigation of any impacts identified

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following potential environmental exposure pathways and ecological risks were investigated:

Analytical results from groundwater samples indicate that shallow groundwater beneath Area 2 of the site is impacted by contaminants resulting from the operation of the former MGP. Although this groundwater impact has resulted in significant damage to the groundwater resource at the site, the contamination has not moved beyond the site boundary and is not reaching the adjacent Oswego River.

Groundwater at the site is not currently being used as a source of potable water, and there are no identified environmental exposure routes for the contaminated groundwater. Soil contamination is generally limited to on-site areas and does not appear to present an exposure risk to ecological receptors under current conditions.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- ingestion/direct contact with contaminated soil;
- inhalation of contaminants volatilizing from contaminated soil;
- eliminate through removal, treatment and/or containment source areas in soil;
- migration of contaminants into the adjacent surface water;

- eliminate through removal, treatment and/or containment, the impact of soil to groundwater;
- potential infiltration of COCs into the storm sewer.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected 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. Potential remedial alternatives for the former Fulton MGP Site were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth 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.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soils and groundwater at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. Although this alternative would not require active remediation, it would include groundwater monitoring, an environmental easement and a site management plan. A periodic site review would be performed to 1.) insure that the current site cover (asphalt parking lot and a concrete building foundation floor) provides acceptable level of protectiveness for human health; and 2.) assess any changes in the risk to human health and the environment posed by the site.

The cost to implement Alternative 1, based on an annual operation and maintenance (O&M), for a period of 30 years has been estimated as follows:

Present Worth: *$502,000*
Capital Cost: *$102,000*
Annual Cost (OM&M) *$26,000*

Alternative 2: Limited Excavation, Soil Cover and Sewer Rehabilitation

This Alternative would include removal of MGP related structures and foundations to full depth and impacted soil immediately surrounding the foundations to the extent practicable (see Figure 4). The components of Alternative 2 would include the following:

- Removal of former MGP structures and foundations and surrounding soil in Areas 1 and 2 determined to contain MGP related contaminants/coal tar
- Excavation of grossly contaminated soil in Areas 1 and 2 to a depth of up to 7 feet below ground surface. A visible demarcation barrier would be installed at the bottom of the excavation to mark the extent of soil removal prior to backfilling.
- Installation and maintenance of soil cover over Areas1 and 2. The soil cover shall consist of a minimum of two feet of clean material that meets NYSDEC's backfill criteria and would be required in the top two feet of the excavated area.
- Enhancement of natural biodegradation processes in groundwater through introduction of oxygen (or other nutrients) into soil in Areas 1 and 2, if deemed necessary.
- Rehabilitation of the adjacent storm sewer west of Area 2 to reduce groundwater infiltration into the storm sewer; and prevent off-site migration of impacted groundwater
- Institutional Controls including an Environmental Easement to restrict future use of the site consistent with the proposed remedy
- Site management plan that would include groundwater monitoring.

The cost to implement Alternative 2, based on the site management plan, for a period of 30 years has been estimated as follows:

Present Worth: *$3,943,000*
Capital Cost: *$3,583,000*
Annual Cost (OM&M) *$24,000*

Alternative 3: Excavation, Capping and Cutoff Wall

This Alternative would include a combination of soil removal, capping and installation of containment wall (see Figure 5). The components of Alternative 3 would include the following:

- Excavation and removal of MGP-related structures and grossly contaminated soil in areas 1 and 2 to a depth of up to 7 feet bgs
- Installation and maintenance of a low permeability cover over Area 2 to reduce infiltration of rain water into the subsurface impacted material not removed by excavation as well as to mitigate potential exposure to impacted material
- Installation of a sheet pile cutoff wall to prevent off-site migration of impacted material
- Institutional controls including an Environmental Easement to restrict future use of site consistent with the proposed remedy; and
- Site management plan to include groundwater

The cost to implement Alternative 3, based on site management plan, for a period of 30 years has been estimated as follows:

Present Worth: *$5,739,000*
Capital Cost: *$5,319,000*
Annual Cost (OM&M): *$27,300*

Alternative 4: Excavation of Soil Above Soil Cleanup Objectives

This Alternative would include extensive soil removal for the purpose of restoring the site to pre-release conditions to the extent practicable. Soil containing individual constituents greater than part 375-6 NYCRR Unrestricted Use soil cleanup objective (SCOs) would be excavated to a depth up to 33 feet bgs (see Figure 6). MGP related subsurface structures and their foundations would be removed to full depth. The components of Alternative 4 would include the following:

- Excavation of approximately 12,000 cubic yards of impacted materials to a depth up to 33 ft bgs
- Removal of former MGP related structures to full depth
- Restoration of Area 1 and 2 to include installation of soil cover at a minimum.
- Groundwater dewatering in the excavation area for off-site treatment and disposal.
- Environmental easement to preclude site groundwater use

The cost to implement Alternative 4 has been estimated as follows:

Present Worth: *$12,356,000*
Capital Cost: *$12,036,000*
Annual Cost (OM&M): *$21,000*

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York 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 five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.
3. Short-term 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.

4. 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.

5. 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.

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-Effectivness. 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. The costs for each alternative are presented in Table 2.

This final criterion 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.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports 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.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 2, which would include removal of MGP related structures and foundations including surrounding soil in Areas 1 and 2 to a depth of up to 7 ft bgs, installation of soil cover, oxygen enhancement treatment of groundwater if deemed necessary, adjacent sewer rehabilitation, environmental easement and a site management plan as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. The proposed remedy, when fully implemented, would mitigate the threats to public health and the environment presented by the contaminated materials at the site. The proposed remedy would achieve the remedial action objectives (RAOs) and comply with applicable environmental laws, regulations and other standards and criteria.

Alternative 1 would not include active remedial actions and thus would not provide additional

protection to human health and the environment over what currently exists. This alternative would not comply with SCGs, since source materials and other MGP-related structures would remain in place and continue to pose a threat to both human health and the environment. This alternative was therefore eliminated from further evaluation.

Alternatives 2, 3 and 4 would all provide some level of protection to public health and the environment and are retained for consideration. Balancing criteria are used to evaluate the alternatives in relation to one another.

Alternative 2, which would include soil excavation, including removal of former MGP related structures and foundations, storm sewer rehabilitation, site cover and groundwater treatment would provide protection to human health and the environment. Although some levels of contamination would remain under this alternative, the contamination would be located at depth, below the water table, where future contact with human or ecological receptors is unlikely. The combination of excavation, groundwater treatment and site cover would address the SCGs and meet remedial action objectives (RAOs) established for the site.

Alternative 3, which would include excavation and removal of soil and MGP related structures, capping, cutoff wall and oxygen application would provide protection to human health and the environment. This alternative, similar to Alternative 2 would address SCGs and meet RAOs. The cutoff wall component of this remedy would provide a higher level of protection against off-site migration of site contaminants compared to Alternative 2. However, there is no evidence of NAPL migrating off-site. In addition, the wall installation would result in greater impacts in the surrounding neighborhood, including noise impacts, and would require a longer period of construction. Also, the cut-off wall would modify existing groundwater flow paths and thus could create groundwater mounding effects that could result in basement flooding at adjacent properties. The added level of protection, at a site where the contamination is having relatively little impact, would not justify the additional time, expense, and short & long term impacts to the surrounding community. Alternative 3 would be less desirable when compared to the proposed Alternative.

Alternative 4, which would include complete removal of contaminated materials above 6 NYCRR unrestricted use levels, would provide a greater degree of protection for human health and the environment than Alternatives 2 and 3. However, the increased protection is modest, and would require far more extensive construction activities with far greater community impacts. The excavation would be much deeper which would require extensive groundwater dewatering. The sharp increase in the amount of soil excavated, would result in a significant increase in truck traffic compared to the other alternatives. While this alternative would result in a reduction in volume of contaminated source materials on site, it would create greater short-term adverse impacts on nearby residents during construction (i.e. heavy traffic, noise, odors), while providing only minimal additional protection of human health and the environment over the proposed remedy. The incremental cost of over $8 million and the significantly increased community disruption associated with this alternative over the proposed alternative would not be justified by the marginal increase in protection to human health and the environment. In addition, Alternative 4 would be very difficult to implement given the site constraints. Alternative 4 would be less desirable than the proposed remedy.

Alternative 2 is being proposed as it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. Alternative 2 would provide adequate and comparable level of protection to human health and the environment as Alternatives 3 and 4 with less disruption to the community. Alternative 2 would achieve the remediation goals for the site as it would remove the grossly contaminated materials through excavation and off site disposal. Alternative 2 would prevent or reduce the

potential for off-site migration of MGP related contaminants through storm sewer rehabilitation, and groundwater treatment using oxygen compounds or other amendments if determined necessary. Alternative 2 is readily implementable and would permanently reduce the toxicity, mobility and volume of impacted material at the site. Alternative 2 would provide the most balanced and cost effective remedy to address the site contamination.

The estimated present worth cost to implement the remedy is $ 3,943,000. The cost to construct the remedy is estimated to be $ 3,583,000 and the estimated average annual costs for O& M over a period of 30 years is $ 24,000.

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.
2. Excavation and removal of all former MGP related structures and foundations in Areas 1 and 2 determined to contain MGP related contaminated materials to their full depth. Impacted soil in the immediate vicinity of the structures would be removed to the extent practicable.
3. Excavation and removal of approximately 2,822 cubic yards of MGP grossly contaminated soils. Materials would be removed to depths up to 7 feet bgs or to the extent practicable due to dewatering limitations. The material to be removed would include soil containing visible coal tar or separate phase materials. The approximate excavation boundaries are shown on Figure 4. The actual depth of removal would be based on visual observations in the field; with the concurrence of the NYSDEC.. A visible demarcation barrier would be installed at the bottom of the excavation to mark the extent of soil removal prior to backfilling.
4. Excavation areas would be backfilled with clean soil from off-site locations that meet NYSDEC's backfill criteria for intended site use. Excavated soil may be used to backfill the lower portions of the excavation if they meet NYSDEC criteria.
5. Installation and maintenance of soil cover over Areas 1 and 2. The soil cover shall consist of a minimum of two feet of clean material that meets NYSDEC's backfill criteria and would be required in the top two feet of Areas 1 and 2. The type and nature of soil cover to be installed would be determined pursuant to 6 NYCRR subpart 375.
6. Groundwater treatment through introduction of oxygen (or other nutrients, if necessary) in Areas 1 and 2 to enhance aerobic biodegradation of contaminants in groundwater in-situ.
7. Rehabilitation of the storm sewer adjacent to and west of Area 2 to reduce groundwater infiltration into the storm sewer and prevent off-site migration of impacted groundwater. Measures to reduce migration of groundwater through soil beddings underneath the sewer line would be implemented.
8. An institutional control in the form of an environmental easement would be required for the site. The environmental easement would:
   (a) restrict the use of the site to restricted residential use, which would include commercial/industrial uses;
   (b) restrict the use of groundwater at the site;
   (c) require the management of the site in accordance with the provisions of the site management plan, to be approved by the Department; and
   (d) require the property owner complete and submit to the Department a periodic certification.
9. A site management plan (SMP) would be developed and implemented. The SMP would identify the institutional controls and engineering controls (IC/ECs) required for the proposed remedy and detail their implementation. The SMP for the proposed remedy would include:

(a) An IC/EC control plan to establish the controls and procedures necessary to; (i) manage remaining contaminated soils that may be excavated from the site during future activities, including procedures for soil characterization, handling, health and safety of workers and the community as well as, disposal/reuse in accordance with applicable Department regulations and procedures; (ii) evaluate the potential for soil vapor intrusion for any future buildings developed on the site, including mitigation of any impacts identified (iii) maintain use restrictions regarding site development or groundwater use identified in the environmental easement; and (iv) require the property owner to provide an institutional control/engineering control (IC/EC) certification on a periodic basis.

(b) A monitoring plan to monitor the effectiveness of the oxygen injection in groundwater and to monitor the effectiveness of the proposed remedy and the trend of contaminant concentrations in the groundwater.

(c) An operation and maintenance plan to provide the detailed procedures necessary to operate and maintain the remedy, including the oxygen injection and cover system. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

TABLE 1
Nature and Extent of Contamination

Groundwater	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - 980	1	15 of 51
	Toluene	ND – 93	5	13 of 51
	Ehtylbenzene	ND - 590	5	15 of 51
	Xylene (Total)	ND - 800	5	15 of 51
	Total BTEX	ND – 2,463	NA	NA
Semivolatile Organic Compounds (SVOCs)	Acenaphthene	2J - 460	20	12 of 51
	Naphthalene	1J - 4800	10	16 of 51
	Benzo(a)anthracene	2.5J - 200	0.002	7 of 51
	Total CPAH	ND – 942 J	NA	NA
	Total PAH	ND – 8972 J	NA	NA
Inorganic	Cyanide	ND – 5300 J	200	11 of 31

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND – 0.0037 J	4.8	0 of 18
	Toluene	ND – 0.0026 J	100	0 of 18
	Ethylbenzene	ND	41	0 of 18
	Xylene (total)	ND – 0.0007 J	100	0 of 18
Semivolatile Organic Compounds (SVOCs)	Acenaphthene	0.005 J – 0.48 J	100	0 of 32
	Naphthalene	0.007 – 2.4 J	100	0 of 32
	Benzo(g,h,i)perylene	0.006 J - 16	100	0 of 32
	Dibenz(a,h)anthracene	0. 079 J – 4.1 J	0.33	3 of 32
	Chrysene	0.011 J - 25	3.9	6 of 32

TABLE 1
Nature and Extent of Contamination

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND – 11 J	4.8	2 of 115
	Toluene	ND – 20 J	100	0 of 115
	Ethylbenzene	ND - 63	41	2 of 115
	Xylene (total)	ND – 120	100	2 of 115
	Total BTEX	ND – 193.5 J	10	10 of 115
Semivolatile Organic Compounds (SVOCs)	Acenaphthene	0.016 J – 450	100	2 of 201
	Naphthalene	0.024 J – 2100	100	16 of 201
	Benzo(a)anthracene	0.015 J - 950	1	64 of 201
	Total CPAH	ND – 4370 J	10[c]	56 of 201
	Total PAH	ND – 11341 J	500[c]	22 of 201
Metals	Cyanide	ND – 2000 J	27	0 of 26

Soil Vapor	Contaminants of Concern	Concentration Range Detected (mcg/m^3)	SCG[b] (mcg/m^3)	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,2,3-Trmethylbenzene	ND – 290 J	N/A	N/A
	Benzo(b)thiophene	ND – 92 J	N/A	N/A
	Indane	ND – 52 J	N/A	N/A
	Indene	ND – 930 J	N/A	N/A
	1,2,4,5-Tetramethylbenzene	ND – 130	N/A	N/A

ppm – parts per million (mg/kg)
ppb – parts per billion (ug/kg)
mcg/m^3 - micrograms per cubic meter
J – Estimate Value
ND – Not detected
NA – Not applicable
SCGs – Standards, Criteria and Guidance values
[a] New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 1998.

TABLE 1
Nature and Extent of Contamination

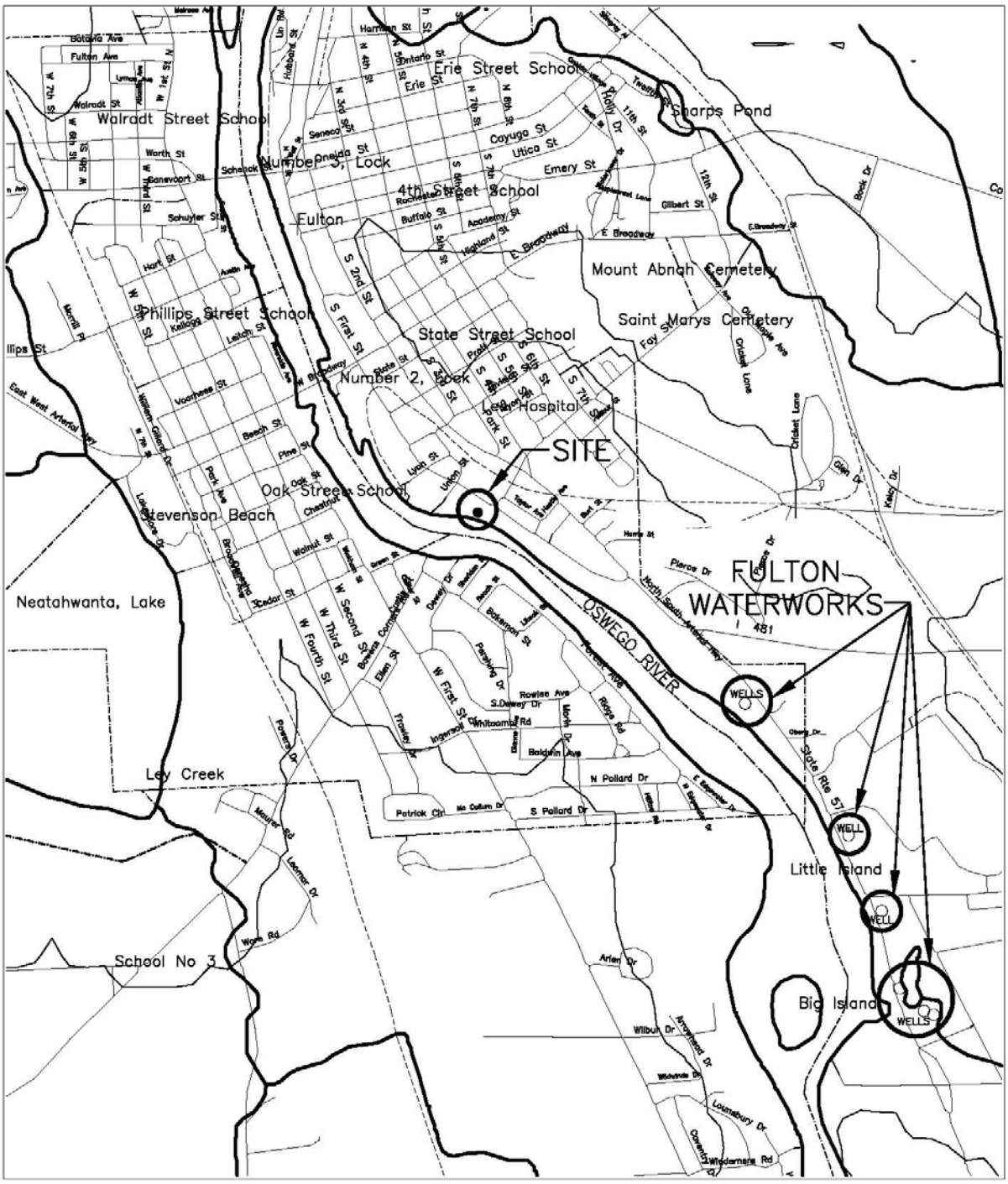
[b] 6 NYCRR Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Protection of Public Health, Residential, December 14, 2006

[c] New York State Department of Environmental Conservation, Technical and Administrative Guidance Memorandum (TAGM) 4046: Recommended Soil Cleanup Objectives, January 11, 2001.

Table 2
Remedial Alternative Costs

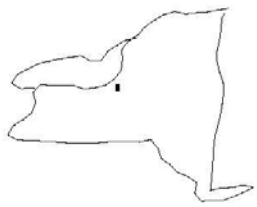
Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative 1: No Action	$102,000	$26.000	$502,000
Alternative 2: Limited Excavation, Capping and Sewer Rehabilitation	$3,583,000	$24,000	$3,943,000
Alternative 3: Excavation, Capping and Cutoff Wall	$5,319,000	$27,300	$5,739,000
Alternative 4: Excavation of soil above soil cleanup objectives	$12,036,000	$21,000	$12,356,000

FIGURE 1



NATIONAL GRID
SOUTH FIRST STREET SITE
FULTON, NEW YORK

SITE LOCATION MAP



QUADRANGLE LOCATION

2000 0 2000

SCALE IN FEET

O'BRIEN & GERE ENGINEERS, INC.

FILE NO. 1118-35165.002

Jan 05, 2009 - 3:33pm

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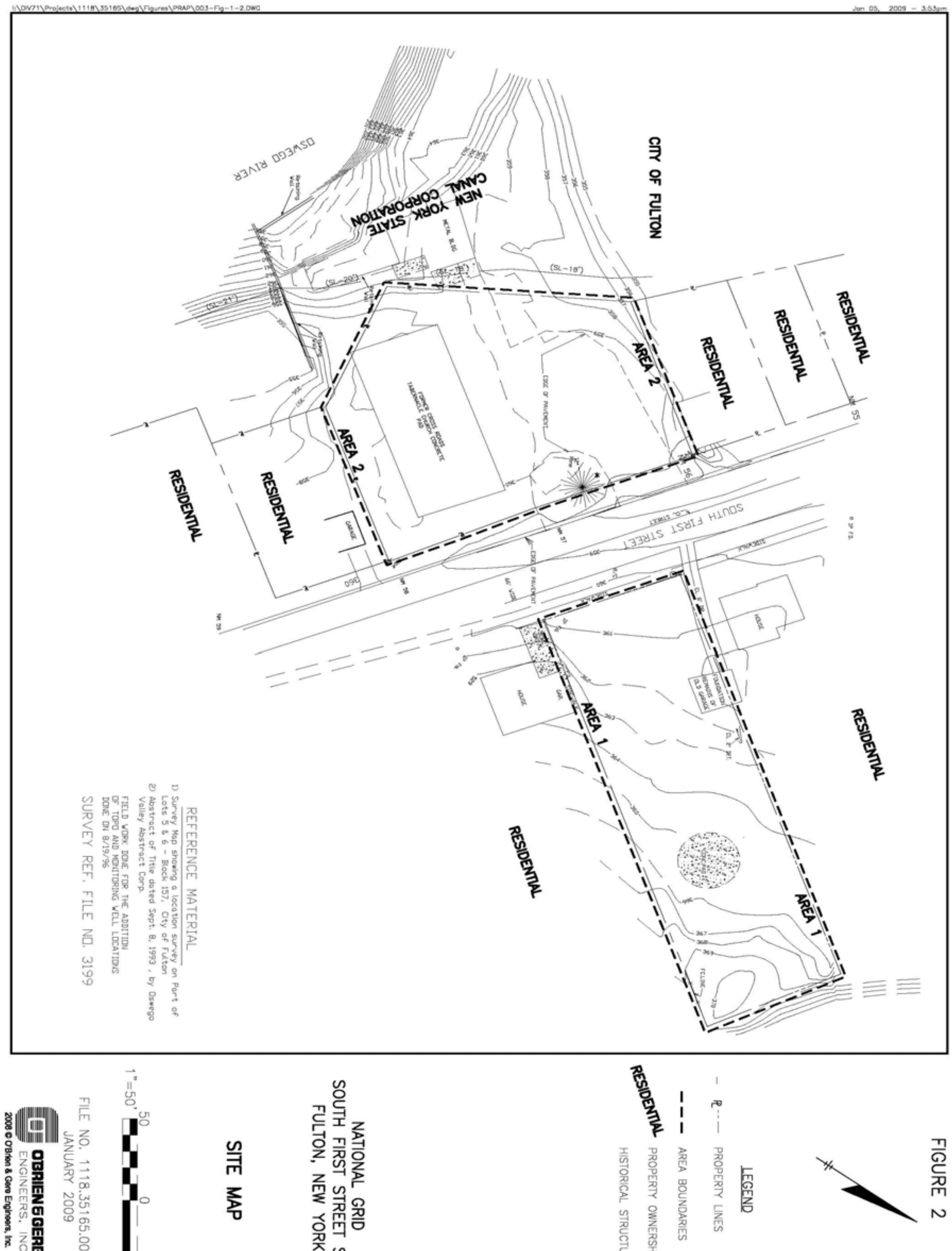

FIGURE 2
SITE MAP
NATIONAL GRID
SOUTH FIRST STREET SITE
FULTON, NEW YORK
LEGEND
PROPERTY LINES
AREA BOUNDARIES
PROPERTY OWNERSHIP
HISTORICAL STRUCTURES
FILE NO. 1118.35165.003
JANUARY 2009
1"=50'
O'BRIEN & GERE ENGINEERS, INC.
2008 © O'Brien & Gere Engineers, Inc.
CITY OF FULTON
NEW YORK STATE CANAL CORPORATION
OSWEGO RIVER
SOUTH FIRST STREET
AREA 1
AREA 2
RESIDENTIAL
REFERENCE MATERIAL
1) Survey Map showing a location survey on Part of Lots 5 & 6 - Block 157, City of Fulton
2) Abstract of Title dated Sept. 8, 1993, by Oswego Valley Abstract Corp.
FIELD WORK DONE FOR THE ADDITION OF TOPO AND MONITORING WELL LOCATIONS DONE ON 8/19/96
SURVEY REF. FILE NO. 3199

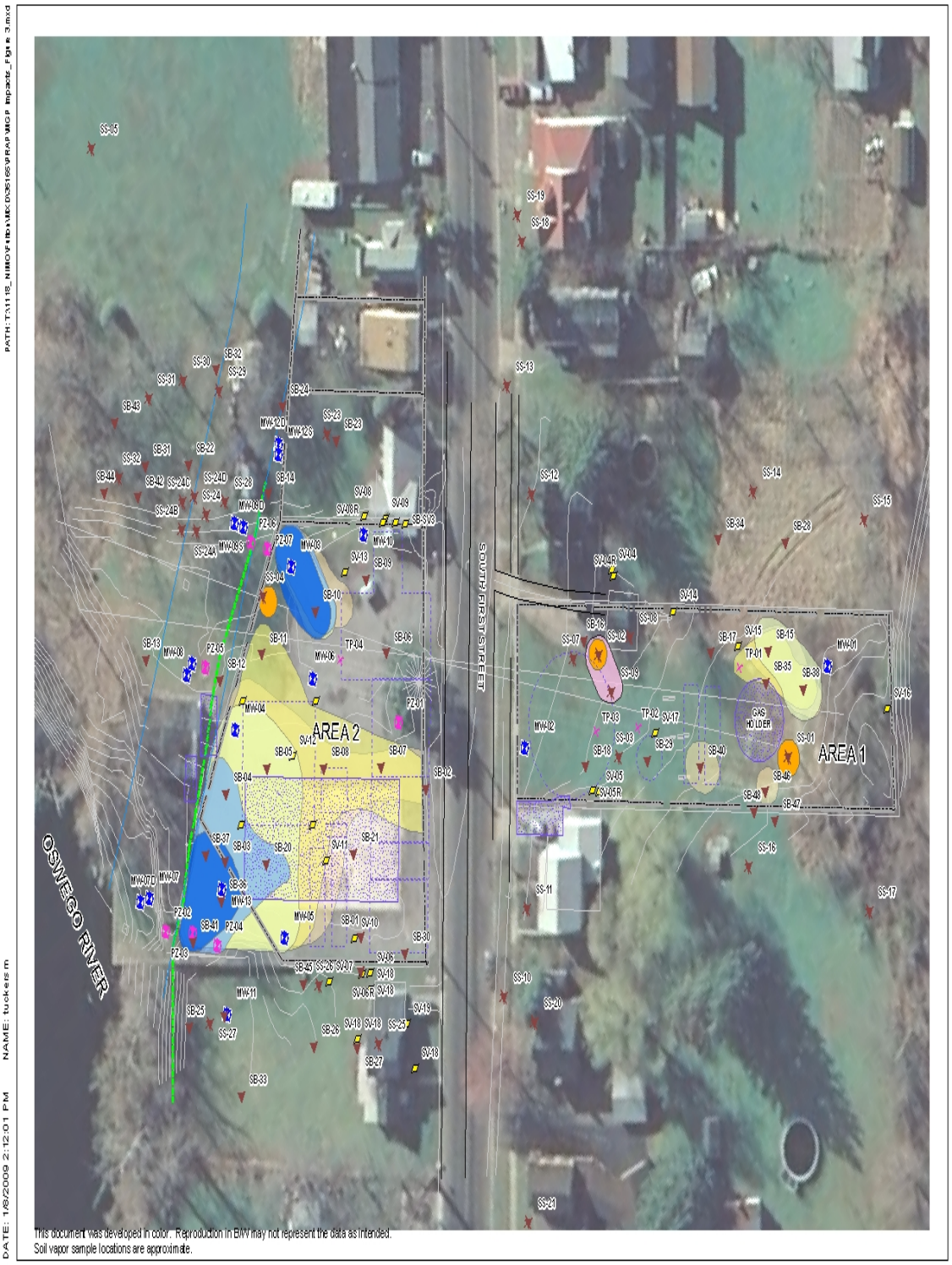

FIGURE 3

LEGEND

HISTORICAL BUILDINGS
CONCRETE PAD
HISTORICAL FEATURES
PAVED AREA
PROPERTY LINE
APPROXIMATE BOUNDARY OF FORMER CANAL
APPROXIMATE SHORELINE

SAMPLE LOCATIONS

MONITORING WELL
PIEZOMETER
SOIL BORING
SOIL VAPOR
SURFACE SOIL
TEST PIT

MGP Impact Depth Intervals

>16 FT
12-16 FT
8-12 FT
4-8 FT
0-4 FT
SURFACE SOIL (TOTAL CPAH & PAH)
0-2 FT Cyanide

NATIONAL GRID
SOUTH FIRST STREET
FULTON, NEW YORK

EXTENT OF MGP-IMPACTED MATERIAL IN SUBSURFACE SOIL AND SURFACE SOIL

0 25 50 100
Feet

JANUARY 2009
1118.35165

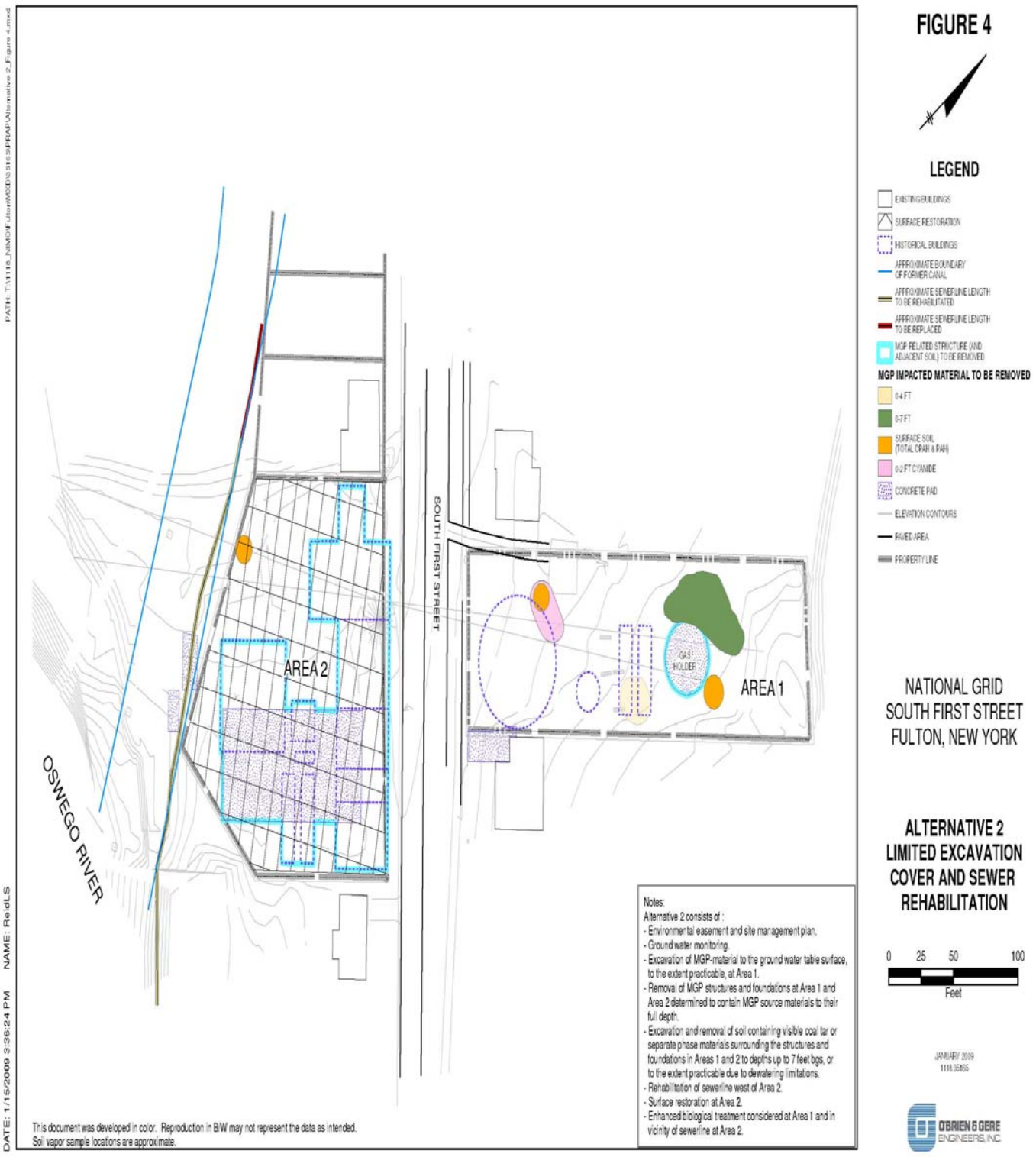
FIGURE 4
LEGEND
EXISTING BUILDINGS
SURFACE RESTORATION
HISTORICAL BUILDINGS
APPROXIMATE BOUNDARY OF FORMER CANAL
APPROXIMATE SEWERLINE LENGTH TO BE REHABILITATED
APPROXIMATE SEWERLINE LENGTH TO BE REPLACED
MGP RELATED STRUCTURE (AND ADJACENT SOIL) TO BE REMOVED
MGP IMPACTED MATERIAL TO BE REMOVED
0-4 FT
0-7 FT
SURFACE SOIL (TOTAL CPAH & PAH)
0-2 FT CYANIDE
CONCRETE PAD
ELEVATION CONTOURS
PAVED AREA
PROPERTY LINE
AREA 2
AREA 1
GAS HOLDER
SOUTH FIRST STREET
OSWEGO RIVER
Notes:
Alternative 2 consists of :
- Environmental easement and site management plan.
- Ground water monitoring.
- Excavation of MGP-material to the ground water table surface, to the extent practicable, at Area 1.
- Removal of MGP structures and foundations at Area 1 and Area 2 determined to contain MGP source materials to their full depth.
- Excavation and removal of soil containing visible coal tar or separate phase materials surrounding the structures and foundations in Areas 1 and 2 to depths up to 7 feet bgs, or to the extent practicable due to dewatering limitations.
- Rehabilitation of sewerline west of Area 2.
- Surface restoration at Area 2.
- Enhanced biological treatment considered at Area 1 and in vicinity of sewerline at Area 2.
This document was developed in color. Reproduction in B/W may not represent the data as intended.
Soil vapor sample locations are approximate.
NATIONAL GRID
SOUTH FIRST STREET
FULTON, NEW YORK
ALTERNATIVE 2
LIMITED EXCAVATION
COVER AND SEWER
REHABILITATION
0 25 50 100
Feet
JANUARY 2009
O'BRIEN & GERE ENGINEERS, INC
DATE: 1/15/2009 3:36:24 PM NAME: ReidLS

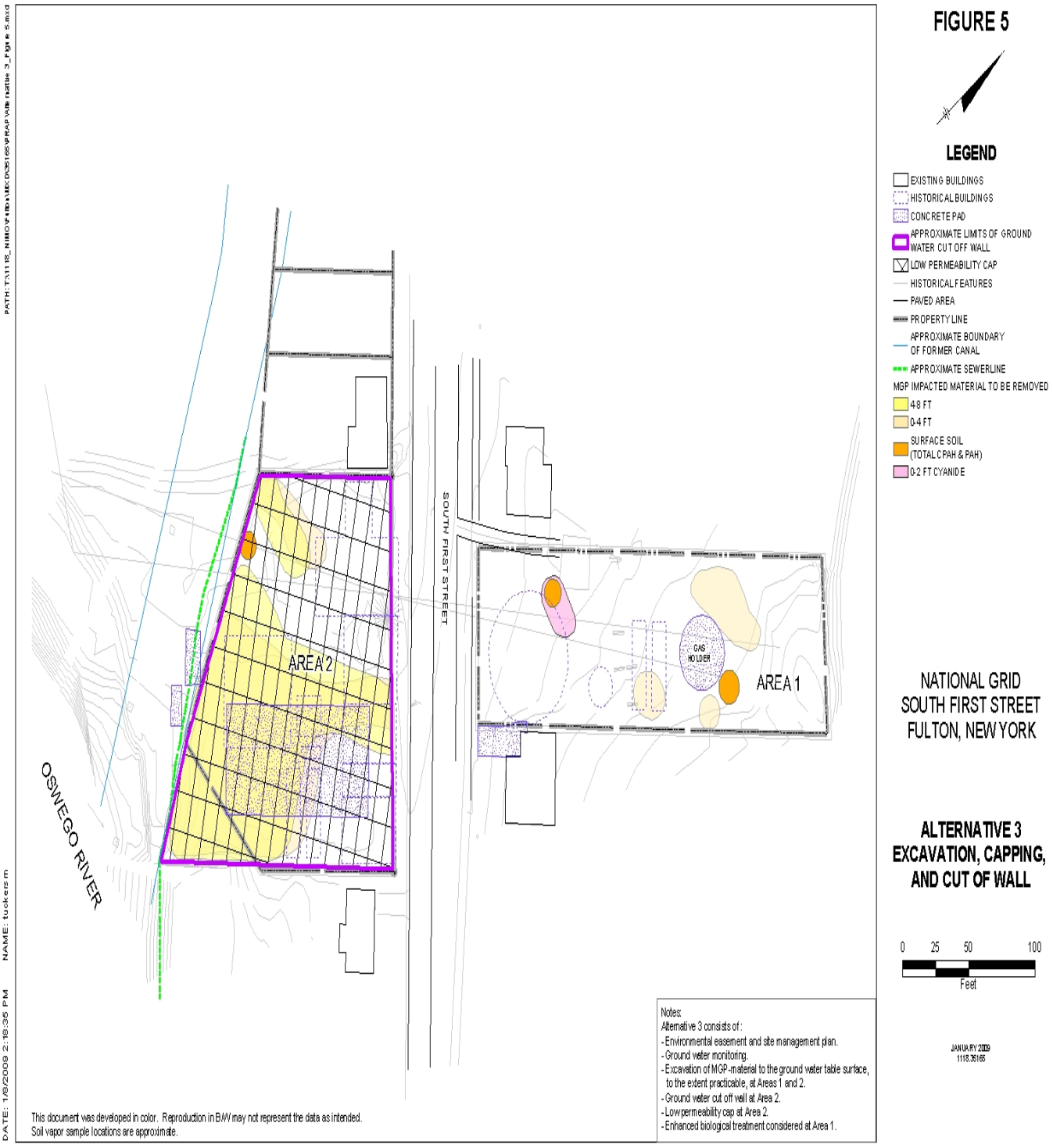
FIGURE 5
LEGEND
EXISTING BUILDINGS
HISTORICAL BUILDINGS
CONCRETE PAD
APPROXIMATE LIMITS OF GROUND WATER CUT OFF WALL
LOW PERMEABILITY CAP
HISTORICAL FEATURES
PAVED AREA
PROPERTY LINE
APPROXIMATE BOUNDARY OF FORMER CANAL
APPROXIMATE SEWERLINE
MGP IMPACTED MATERIAL TO BE REMOVED
4-8 FT
0-4 FT
SURFACE SOIL (TOTAL CPAH & PAH)
0-2 FT CYANIDE
AREA 2
AREA 1
SOUTH FIRST STREET
GAS HOLDER
OSWEGO RIVER
NATIONAL GRID
SOUTH FIRST STREET
FULTON, NEW YORK
ALTERNATIVE 3
EXCAVATION, CAPPING, AND CUT OF WALL
0 25 50 100
Feet
JANUARY 2009
1118.35165
Notes:
Alternative 3 consists of:
- Environmental easement and site management plan.
- Ground water monitoring.
- Excavation of MGP-material to the ground water table surface, to the extent practicable, at Areas 1 and 2.
- Ground water cut off wall at Area 2.
- Low permeability cap at Area 2.
- Enhanced biological treatment considered at Area 1.
This document was developed in color. Reproduction in B/W may not represent the data as intended.
Soil vapor sample locations are approximate.
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FIGURE 6
LEGEND
EXISTING BUILDINGS
HISTORICAL BUILDINGS
CONCRETE PAD
ASPHALT COVER
APPROXIMATE BOUNDARY OF FORMER CANAL
APPROXIMATE SEWERLINE
HISTORICAL FEATURES
PAVED AREA
PROPERTY LINE
MGP IMPACTED MATERIAL EXCEEDING PART 375 SCOs TO BE REMOVED
EXISTING BUILDINGS
>16 ft
12-16 ft
8-12 ft
4-8 ft
0-4 ft
SOUTH FIRST STREET
AREA 2
AREA 1
GAS HOLDER
OSWEGO RIVER
NATIONAL GRID
SOUTH FIRST STREET
FULTON, NEW YORK
ALTERNATIVE 4
EXCAVATION AND COVER
0 25 50 100
Feet
JANUARY 2009
1118.35165
Notes:
Alternative 4 consists of:
- Environmental easement and site management plan.
- Excavation of MGP-material exceeding 6NYCRR Part 375 SCOs for Unrestricted Land Use, to the extent practicable, at Areas 1 and 2.
- Asphalt cover at Area 2.
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Soil vapor sample locations are approximate.