MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

November 6, 2008

MEMORANDUM

TO: Montgomery County Planning Board

VIA: Glenn Kreger, Acting Chief
Vision Division

Khalid Afzal, Team Leader
East Transit Corridor Team
Vision Division

FROM: Frederick Vernon Boyd, Community Planner (301.495.4654)
East Transit Corridor Team
Vision Division

SUBJECT: Mandatory Referral No. 08607-DEP-1: Gude Landfill Gas-to-Energy Facility

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RECOMMENDATION: Add the following comment:

1. The Division of Solid Waste Services should survey the landfill to determine the percentage of recoverable landfill gases actually being collected and, if necessary, add to the existing system of recovery pipelines.

BACKGROUND

The Planning Board discussed two landfill gas-to-energy facility proposals on October 23. The Board and the applicant, the Division of Solid Waste Services of the County's Department of Environmental Protection, agreed to defer a decision on the proposals until the Division could respond formally to issues raised by the Gude Landfill Concerned Citizens in connection with the proposed facility at the former Gude Landfill. The group recommended that the Division focus its efforts on recovering larger amounts of landfill gas; asked for air quality monitoring in the Derwood South community; requested the inclusion of additional treatment methods, such as carbon filters and scrubbers, as part of the proposed project; asked about the Division's evaluation of alternative technologies as part of the proposal's development; suggested that the proposed facility would increase air pollution at the landfill; and inquired about the availability of carbon offset credits as part of the project.

RESPONSE

The Division's response is attached to this memorandum. The letter makes these points:

Recovery—It acknowledges the likelihood that some generated landfill gas avoids capture, but indicates that the Division believes that more than 60 percent of generated landfill gas is being collected. The Division also acknowledges the possibility of surveys to locate "fugitive" emissions.

Air quality—The Division notes that the toxins described by the Concerned Citizens—dioxins, furans and mercury—are "not normally associated with the combustion of and resultant emissions from landfill gas." The letter also describes the Division's review of landfill emissions with the Maryland Department of the Environment and notes that state requirements are more stringent than EPA requirements for some pollutants. The letter states that "MDE has concluded that the proposed facility will comply with all Federal, State and local air quality control requirements."

Additional treatment methods—The letter states that carbon filters and scrubbers used with landfill gas treatment facilities are used to remove gas components that would have a negative impact on the performance of the generating engines. The Division has determined through laboratory analysis that landfill gases do not contain levels of these components sufficient to require treatment.

Alternative technologies—The letter reports that microturbines, an alternative technology identified by the Concerned Citizens' letter, were evaluated by a firm responding to the original request for proposals. The Division indicates the quality of the gas generated favored a technology better equipped to manage gas quality fluctuations. In addition, the Division notes that the internal combustion engine chosen operates more reliably than microturbines. The letter goes on to report that a second alternative technology—fuel cells—has not proven reliable in pilot projects and is likely to be dropped from the inventory of available technologies for gas-to-energy projects.

Increases in air pollution—The letter asserts that the Concerned Citizens' statement that the gas-to-energy project will result in increased air pollution is based on the assumption that an energy generation project does not collect as much landfill gas as a system that collects and flares the gases. The letter notes that both systems are in use at the former landfill and that gas not used to generate electricity is still collected and flared. The result, in the Division's view, is an overall reduction in the emission of greenhouse gases.

Carbon offset credits—The letter states that neither former landfill is eligible for carbon offset credits.

CONCLUSION

The Division's formal response makes a persuasive case that the proposed technology is environmentally sound and economically feasible. The projects as proposed will meet all air quality control requirements, use technologies that are both effective and up-to-date, and reduce greenhouse gas emissions. The Planning Department recommends that the Division undertake additional surveys of the landfill to determine the extent to which "fugitive" emissions are occurring at the former Gude Landfill and, if needed, construct additional pipelines to collect and dispose of such gases. This recommendation should be added to the two comments proposed for the initial Planning Board discussion.

FVB:ha: G:\BOYD\gude supplemental.doc

Attachments:
1. Division of Solid Water Services to Chairman Hanson dated October 31, 2008
2. October 23, 2008 Planning Board staff report

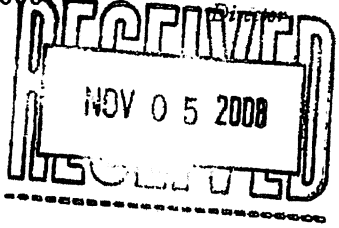
ATTACHMENT 1

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Isiah Leggett
County Executive

October 31, 2008

Robert Hoyt
Director



Royce Hanson, Planning Board Chairman
M-NCPPC
8787 Georgia Avenue
Silver Spring, MD 20910

Dear Mr. Hanson:

We discussed the proposed landfill gas-to-energy projects at Oaks Landfill and Gude Landfill at the Planning Board hearing on October 23, 2008. At the end of the discussion, you requested that the Department of Environmental Protection, Division of Solid Waste Services respond to a number of questions raised by Ms. Julia Tillery of the Derwood Station South Homeowners Association. This letter summarizes the questions from her testimony and provides our responses to these items.

1. ***Approximately 40 percent of the landfill gas at Gude Landfill escapes into the air. If the goal is to minimize greenhouse gases at this site-to make the air cleaner, overall, wouldn't the first action be to sink a lot of new wells, to cut down the fugitive emissions, and capture more gas?***

The Gude Landfill is a pre-regulatory era landfill with no liner system and no synthetic cap system. In other words, the Gude Landfill pre-dated all modern landfill design, construction, operation, and post-closure care regulations. Fugitive landfill gas emissions resulting from the natural decomposition of waste are a known problem with landfills from this era. While the current landfill gas collection and management system follows best management practices for retrofitting older landfills, we agree that there would be environmental benefits associated with capturing additional landfill gas from the site. We suspect that we are presently collecting more than sixty percent of the recoverable amount of landfill gas. However, it may be possible to survey the surface of the landfill to assess whether any specific areas have significant levels of fugitive emissions and make additions to the landfill gas collection system to provide a mechanism to capture the landfill gas being generated in those areas.

2. ***According to General Electric (GE) information, the proposed Jenbacher engine will emit, on a daily basis, 10.03 pounds of particulate matter, 3.23 pounds of sulfur oxides, 37.32 pounds of nitrogen oxides, 180.27 pounds of carbon monoxide and 43.51 pounds of volatile organic compounds. What does this mean in terms of toxic compounds such as dioxins, furans and mercury? Is the community safe? Has the County tested near homes to see if toxins are already present? Would these additional emissions add to those toxins?***

The County has not performed ambient air quality monitoring in the Derwood Station South community; however, the Maryland Department of the Environment (MDE) Air and Radiation Management Administration operates an air-monitoring network throughout the State in accordance with the Environmental Protection Agency's (EPA) guidelines. The air-monitoring network measures the concentrations of the criteria pollutants (particulate matter, carbon monoxide, nitrogen oxide, sulfur dioxide, ozone, and lead) in the ambient air. "EPA regulates these pollutants by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels." (http://www.epa.gov/air/urbanair/)

We reviewed the emissions from the proposed landfill gas to energy facilities with the staff of MDE while going through the state air permit application process. MDE's emission limits for nitrogen oxides and volatile organic compounds, which are also measured throughout the State, are more stringent than EPA's limits. MDE has concluded that the proposed facility will comply with all Federal, State, and local air quality control requirements. Federal and State air quality requirements are established by a number of factors, including potential health effects on the local citizens. The Jenbacher engine employs Best Available Control Technology (BACT) for landfill gas management, as determined by MDE, using EPA guidelines.

There is a potential for minor increases in certain pollutants; however, regulatory agencies responsible for assessing local air quality effects do not consider these to be significant. Chemical compounds such as dioxins and furans and mercury are not normally associated with the combustion of and resultant emissions from landfill gas.

It is important to put this project into perspective. It is an extremely small project. Any attempts to assess its specific effects at a significant distance from the facility would be insignificant when compared to the thousands of other emissions sources in this area including thousands of automobiles, lawnmowers, and furnaces. Coal-burning powers plants from as far away as the Ohio Valley significantly impact air quality in our region. Fireplaces emit dioxins due to their low temperatures and inefficient combustion. In summary, it is extremely difficult to measure the effect of a facility this small on ambient air quality hundreds of feet away.

Conversely, the environmental benefits in terms of reduction in greenhouse gases from a project the size of the proposed Gude Landfill engine for generating electricity relative to obtaining the same amount of energy from a coal-burning power plant are significant. Carbon dioxide emissions would be reduced by 4,557 tons per year. This is the equivalent of planting 9,506 acres of trees or removing 6,671 passenger vehicles from the highways. This facility would meet the need of powering 509 homes in Montgomery County every year. In addition, toxins such as mercury, for which coal burning power plants are major sources, would be reduced from the combustion of a cleaner fuel.

3. ***Why aren't carbon filters, scrubbers or other devices used in the proposed design to remove toxins?***

Carbon filters and scrubbers do exist to pre-treat the landfill gas before entering the engine; however, this equipment is primarily used to remove specific constituents from the landfill gas that would degrade the engines, such as siloxanes (carbon filters) and hydrogen sulfide (scrubbers). Specific laboratory analyses of the landfill gas were performed for these constituents in the development of the landfill gas to energy projects, and they were not detected at levels that would require pre-treatment.

The proposed engines and existing flares are efficient combustion units and reduce pollutant emissions to levels below regulatory limits. Additionally, there is no commercially available treatment of the exhaust gas from the engines to further reduce their emissions because the technologies have not been proven to be viable. The engines are considered Best Available Control Technology.

4. ***Did the County consider microturbines which could be added and removed in small increments to make use of all of the gas?***

The Northeast Maryland Waste Disposal Authority, at the County's request, issued a Request for Proposal (RFP) for the beneficial use of landfill gas at the Oaks and Gude Landfills in October 2006. This included the design, construction, operation, and maintenance of the landfill gas to energy facilities; however, the RFP did not specify the technology or equipment to beneficially use the landfill gas. This means that the Proposers were to evaluate industry proven technologies that would produce a viable project at each landfill site given the specific characteristics and volumes of gas from each landfill.

It is our understanding that Microturbines were evaluated by at least one of the Proposers and were not deemed a feasible option because of the scale of the project and the fluctuations in the quality of gas being produced by the landfill. Given the current gas quantity (e.g. scale of the project) at the Gude Landfill, it was more feasible to install a single reciprocating engine that operates 90 to 95 percent of the time including regularly scheduled maintenance activities. In comparison, microturbines typically cost approximately 50 percent more and operate at 30 percent lower efficiencies. Microturbines are not as reliable as reciprocating engines. Microturbines operate 70 to 80 percent of the time, after accounting for scheduled and unscheduled maintenance. In addition, the reciprocating engines are designed for and better equipped to handle fluctuations in landfill gas quality that may result from daily or seasonal changes in weather.

Additionally, the project was designed to utilize the higher quality gas that is available from the center of the landfill in the engine, while keeping the perimeter gas

separated. The lower quality perimeter gas will continue to be managed in the existing landfill flare system. This allows the dual ability to control emissions and gas migration, while making beneficial use of an energy source.

5. ***Did the County consider innovative technologies such as fuel cells reportedly used by Connecticut Power and Light which can extract hydrogen from methane in landfill gas and produce energy with no emissions? How about boilers with low NOx and CO emissions to produce heat? How about heating the Mens' Shelter?***

The specific project mentioned above was a test pilot project and has not been operational since 2000. It is SCS Engineers' understanding that a few projects similar in nature to the one referenced above have been attempted and that all of the projects have failed for various reasons. It is also our understanding that the EPA will be releasing a new document about the different technologies for landfill gas-to-energy and that due to the past failures of projects, fuel cells are no longer being considered.

In light of this information and previous evaluations performed during the RFP process, it is not surprising that this technology was not among the technologies proposed in response to the RFP. With respect to the Men's' Shelter, the peak demand for heat or hot water is not continuous, and when present, is relatively small. Therefore, the beneficial use of landfill gas in either a boiler or microturbine at this location would not be the most efficient or productive method.

6. ***According to the Center for a Competitive Waste Industry, landfills that generate electricity produce between 19.3% and 39.2 % more greenhouse gases than flaring in the long term, and in the short term, 34.1% to 53.7%....Why would the County pay $2 million to install equipment that will add air pollution at the landfill?***

Given the fact that the Gude Landfill is a pre-regulatory era landfill, if there were no landfill gas collection system installed, the most potent greenhouse gas, methane, would be free-venting to the atmosphere and migrating off site. According to EPA, methane is an approximately 21 times more destructive greenhouse gas than carbon dioxide. Therefore, with just the addition of the landfill gas collection system, there is a net reduction in greenhouse gas emissions at the Gude Landfill. This is in addition to the health and safety benefits of preventing gas migration to neighboring residential properties.

The quantity of greenhouse gases being emitted from a landfill gas flare as compared to a reciprocating engine (energy project) following the intake and combustion of landfill gas are of similar magnitude. The percentages referenced in the above question are based on an assumption that an energy project is not collecting as much landfill gas as a project that utilizes a flare. However, this is not the case as both

types of equipment (engine and flare) are available and are designed to capture and destroy whatever volume of gas is collected from the landfill. It is true that the engine will only process approximately 300 standard cubic feet per minute (scfm) at the Gude Landfill; however, the County will be operating the landfill gas system and landfill flares to prevent gas migration and control emissions for the gas that is not needed for the engine.

As mentioned above, the project results in a net greenhouse gas emission reduction.

7. ***In light of the recent article in the Wall Street Journal, is the County going to benefit from carbon offset credits? How much money is the County expecting to get from this program? How much of that money goes back into the landfill budget as additional funding to treat pollution?***

Because of the age of the existing landfill gas collections systems, neither the Gude nor Oaks Landfill projects are eligible for carbon offset credits, thus this is not a consideration. It is not possible to take credit for a reduction in methane emissions from the landfill, since the landfills have been collecting methane, and burning it, for many years.

Please feel free to contact me at peter.karasik@montgomerycountymd.gov if you have any further questions regarding these projects.

Sincerely,

Peter R. Karasik

Peter R. Karasik, P.E.
Section Chief

STL:DD:PK

cc: Nick Radonic, President, Derwood Station South Homeowners Association
Ed Tydings, Representing the Former Oaks Landfill Advisory Commission
Amanda Moore, Northeast Maryland Waste Disposal Authority
Darrin Dillah, SCS Engineers
Daniel Locke, Chief, DEP/DSWS

ATTACHMENT 2

MCPB Item # 10/23/08

MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

October 9, 2008

MEMORANDUM

TO: Montgomery County Planning Board

VIA: Glenn Kreger, Acting Chief GK
Vision Division

Khalid Afzal, Team Leader, East Transit Corridor Team KA
Vision Division

FROM: Frederick Vernon Boyd, Community Planner (301.495.4654)
East Transit Corridor Team FVB
Vision Division

SUBJECT: Mandatory Referral No. 08607-DEP-1: Gude Landfill Gas-to-Energy Facility, 600 East Gude Drive, Rockville, R-200 Zone, Upper Rock Creek Area Master Plan

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STAFF RECOMMENDATION: Approval, with the following comments:

1. The Division of Solid Waste Services should report regularly to neighboring civic and homeowners associations about ongoing operations at the gas-to-energy facility.
2. The Division should undertake additional noise level measurements and report its findings to neighboring civic and homeowners associations.

PROJECT SUMMARY

The Division of Solid Waste Services of the Department of Environmental Protection, working with state agencies and private firms, is proposing to design, build and run a facility at the former Gude Landfill that will convert landfill gas now being generated by decomposing waste into electricity. This facility will replace an existing facility that served the same purpose until 2006.

PROJECT BACKGROUND

The former Gude Landfill is located on East Gude Drive, east of its intersection with Crabbs Branch Way, in the Upper Rock Creek Planning Area. The Gude Men's Shelter, the subject of Mandatory Referral reviews in 1999 and 2007, is in the southwest corner of the site, nearest Gude Drive.

The landfill included four parcels, totaling 162 acres and is in the R-200 Zone. Waste disposal activities took place from 1965 until 1982 on approximately 100 acres of the property and the County operated an incinerator on a portion of the site from 1965 until 1975. In 1983, the County leased rights to collect and recover landfill gas being generated by decomposing waste and a private firm constructed a system of wells and pipes, as well as an onsite power plant, which began to operate in 1985. Generation of electricity from this system ceased in 2006.

The site continues to produce more than 800 standard cubic feet per minute of landfill gas, which currently is drawn through vertical extraction wells, travels via above ground gas collection pipes, and is combusted at two enclosed ground flare locations. About 75 extraction wells continue to operate at the site and landfill gas condensate extracted from the area is treated at a pretreatment plant at the former Oaks Landfill. DEP monitors ground and surface water around the site perimeter and maintains perimeter wells, which are monitored for the presence of landfill gas.

PROJECT DESCRIPTION

The Landfill Gas-to-Energy Facility will be designed, built and run by a private firm, SCS Engineers, under a lease with the Division of Solid Waste Services, which is also working with the Northeast Maryland Waste Disposal Authority. SCS will locate the facility in the southwest corner of the property, behind the former power plant building and behind a noise wall now used to separate the enclosed ground flares from other activities. It is also adjacent to the men's shelter. The proposed facility is about 450 feet from the nearest house.

The facility will take landfill gas now combusted by the ground flares and use methane occurring in the gas to run a generator that will produce electricity. The power generation unit will be enclosed in a container to reduce noise. A second unit will maintain adequate pressure, quantity and quality of landfill gas to allow the generator to run at optimal efficiency. The gas collection and recovery system will continue to operate and computerized controllers that manage operation of the ground flares will be integrated into an overall control and data acquisition system that will monitor both the landfill gas combustion and electricity generating systems. The facility will have a transformer that "steps up" generated electricity so that it can be connected into the local PEPCO electric distribution system. The interconnection point is located behind the existing building.

The facility will not require daily staffing. A single operator will be responsible for this facility and for a similar facility at the former Oaks Landfill in Olney, the subject of a separate Mandatory Referral review. Two support technicians will also be available, insuring that response time in emergencies does not exceed four hours. SCS has created an online control and data acquisition system that will allow the Gude facility to be operated remotely from the Oaks facility.

A technician will be available at the site one day a week to monitor and inspect the gas collection and recovery system's equipment.

The Division of Solid Waste Services estimates that landfill gas production is likely to continue for at least 10 years.

ANALYSIS

Master Plan

The 2004 Upper Rock Creek Area Master Plan notes that the former Gude Landfill site has been designated as the proposed Gude Recreational Park and that a schematic development plan for the park included ballfields, picnic and playground areas, an amphitheater and gravel parking. The Plan acknowledges the ongoing production of landfill gas at the site and recommends preparation of an engineering assessment when landfill gas recovery activities end. The likelihood of continuing landfill gas production and recovery, as well as continued settling and instability of the land, make future development of the recreational park "problematic," in the words of the Plan.

Transportation

The Transportation Planning unit worked with the Division of Solid Waste Services to evaluate trip generation expected to occur when the gas-to-energy facility is operational. The unit agrees that three or fewer peak hour trips will be generated at the facility and that the project need not undergo Local Area Transportation Review or Policy Area Mobility review studies.

Environment

The gas-to-energy facility is exempt from submission requirements of the Forest Conservation Law. Locating the plant behind an existing sound wall and an existing building contributes to noise reduction, as does placement of the generator inside a container. The Division of Solid Waste Services should undertake noise measurements, using equipment similar to that proposed for this facility, and provide the results of those measurements to neighboring civic associations. The Division has indicated that it plans to take such measurements at its proposed gas-to-energy facility at the Oaks Landfill.

The Division of Solid Waste Services has calculated that the facility's generation of electricity from landfill gas will mean a reduction in carbon dioxide emissions, because the facility can offset electricity production by traditional methods. The Division estimates that carbon emissions will be reduced by more than 4,500 tons each year.

Community Outreach

The Division of Solid Waste Services held a public information meeting on the project in April 2008. The Division also discussed the project with the Derwood Station South Homeowners Association in May 2008, as part of a broader discussion of public uses proposed for the property. Derwood Station South homeowners have expressed significant concerns about the increasing use of the former landfill for public projects some have described as "hard-to-locate." This concern centers on identification of the landfill as a potential site for relocation of Montgomery County Public Schools' bus maintenance and storage operations from the Shady Grove area. As noted above, the landfill site is a proposed recreational park. The County has located a men's shelter on a portion of the landfill, continues to extract and process landfill gas and is considering further public uses for the property.

The Parks Department is aware of these concerns. The Department continues to recommend an engineering evaluation of the land when it no longer produces landfill gas and continued monitoring of environmental conditions on the property.

CONCLUSION

The Planning Department recommends approval of this proposed project. It continues environmentally beneficial conversion of landfill gas to electricity by the County's government. The Department also acknowledges the concerns raised by neighboring residents about increasing public use of land designated for future recreational activities. Staff recommends that the Division of Solid Waste Services report regularly to neighboring civic and homeowners associations about the facility's operations and work to provide estimates of the length of time it expects the facility to operate. The Department also recommends the additional noise measurements outlined earlier in this report.

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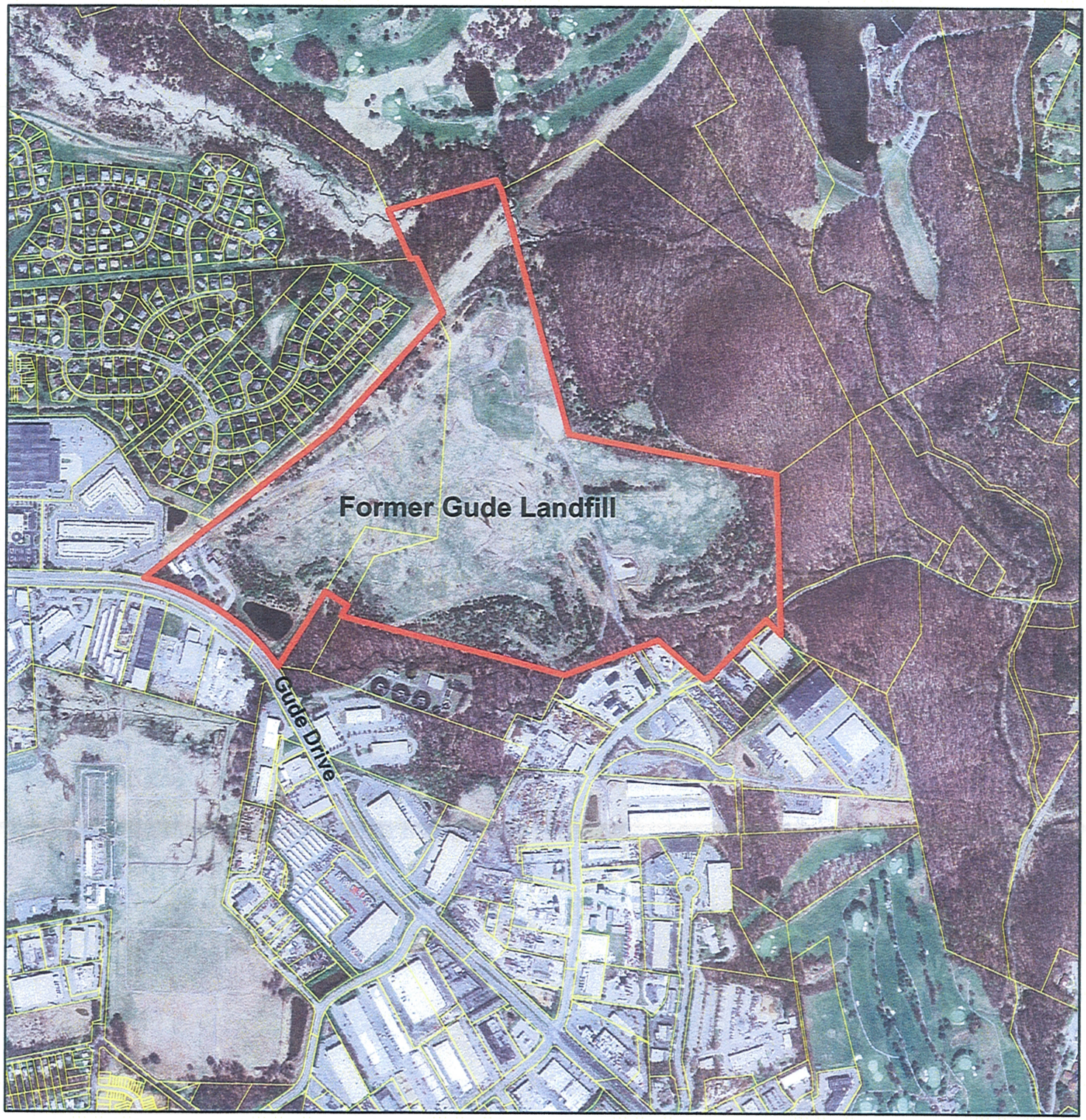
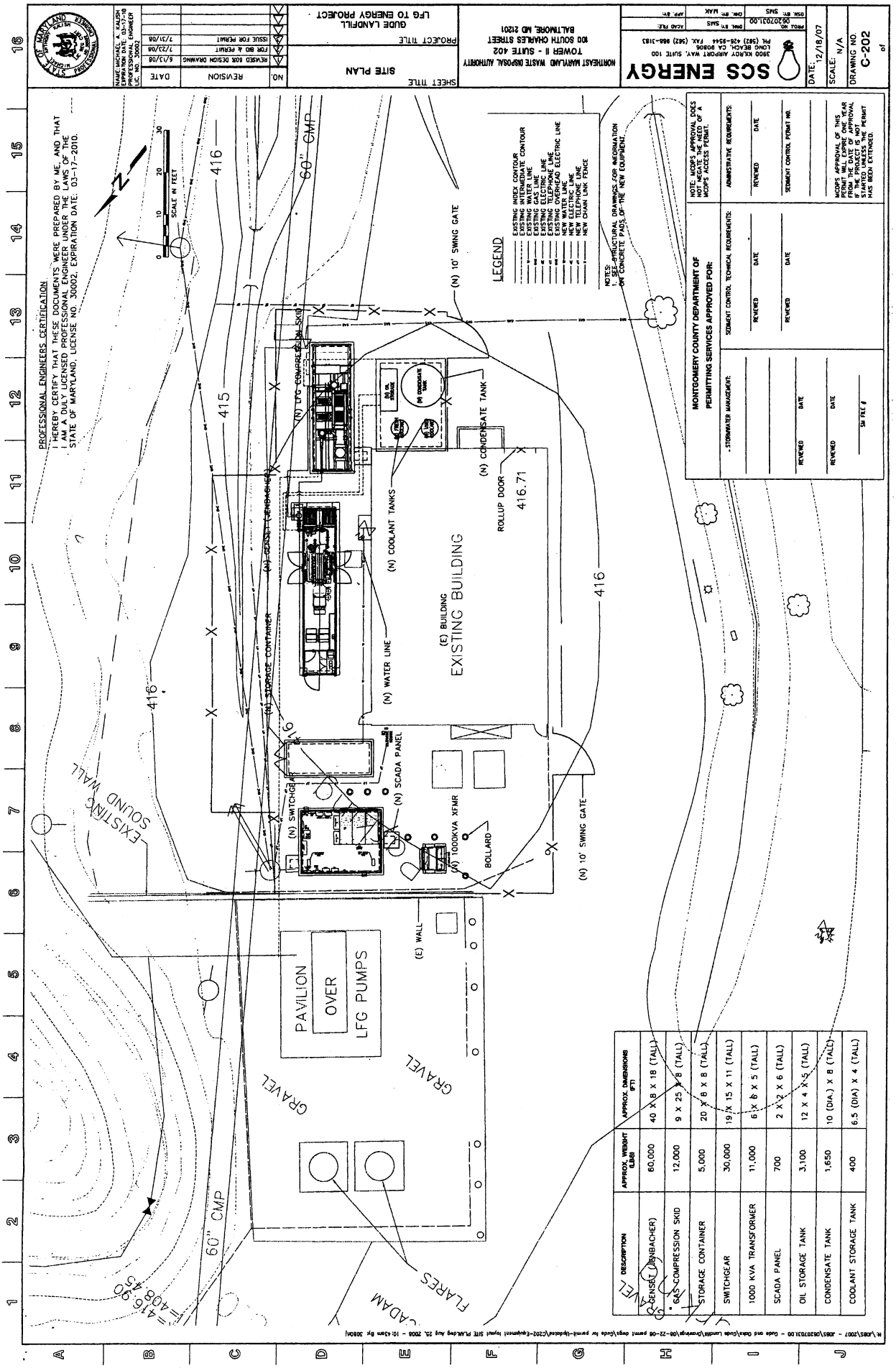
Attachments
1. Vicinity Map
2. Site Plan
3. Memorandum from the Park Planning and Stewardship Division

ATTACHMENT 1

Former Gude Landfill



ATTACHMENT 2



ATTACHMENT 3

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEMORANDUM

October 8, 2008

TO: Fred Boyd, Community-Based Planning Division

VIA: John Hench, Chief, Park Planning and Stewardship Division

FROM: Brooke Farquhar, Acting Park and Trail Planning Supervisor

SUBJECT: **GUDE LANDFILL FACILITY- MANDATORY REFERRAL #08607-DPWT-1**

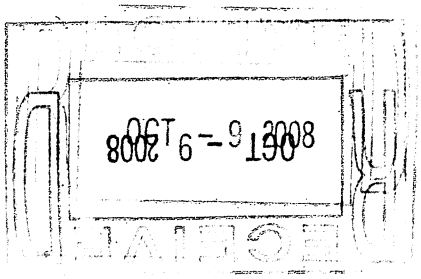
The Park Planning and Stewardship Division has reviewed the Mandatory Referral Project for the Landfill Gas-to-Energy Facility at the Gude Landfill. We support the effort to beneficially use the methane gas produced in the landfill by converting it to generate electricity, and find that this proposal has no adverse impacts on the adjacent Upper Rock Creek Regional Park.

There is an existing natural surface trail that is located on a gas line adjacent to the landfill and goes through a part of the landfill to Rock Creek Regional Park. It is desirable that this section be transferred to MNCPPC as parkland in the future. (See attached map). Currently this trail ends near a private parking lot, and an alternative trailhead on park property should be explored when the park is developed in the future. The trail is part of a future hard surface trail that is on the Countywide Park Trails Plan to connect Gude Drive, through Rock Creek Regional Park to Needwood Road and the ICC bikepath.

The future use of Gude Landfill as a park has been recommended for many years and a rough site plan was developed in 1983. The unstable condition and continual sinking of the landfill as well as the methane recovery pipes have delayed indefinitely any proposal for the park. It is important that the edges of the landfill be sealed as they currently have broken glass, rusted cans, etc . The Upper Rock Creek Area Master Plan indicates that once the methane recovery and subsequent lease has expired, an engineering assessment should be undertaken that will re-evaluate the park concept plan. Also as ground conditions change over time, an updated environmental analysis and inventory would be undertaken to ensure that proposed activities and their locations meet current environmental regulations and guidelines.

Attachments

Cc: Mary Bradford
Mike Riley
Gordon Rosenthal
Jim Humerick
Mitra Pedoeem
Bob Turnbull



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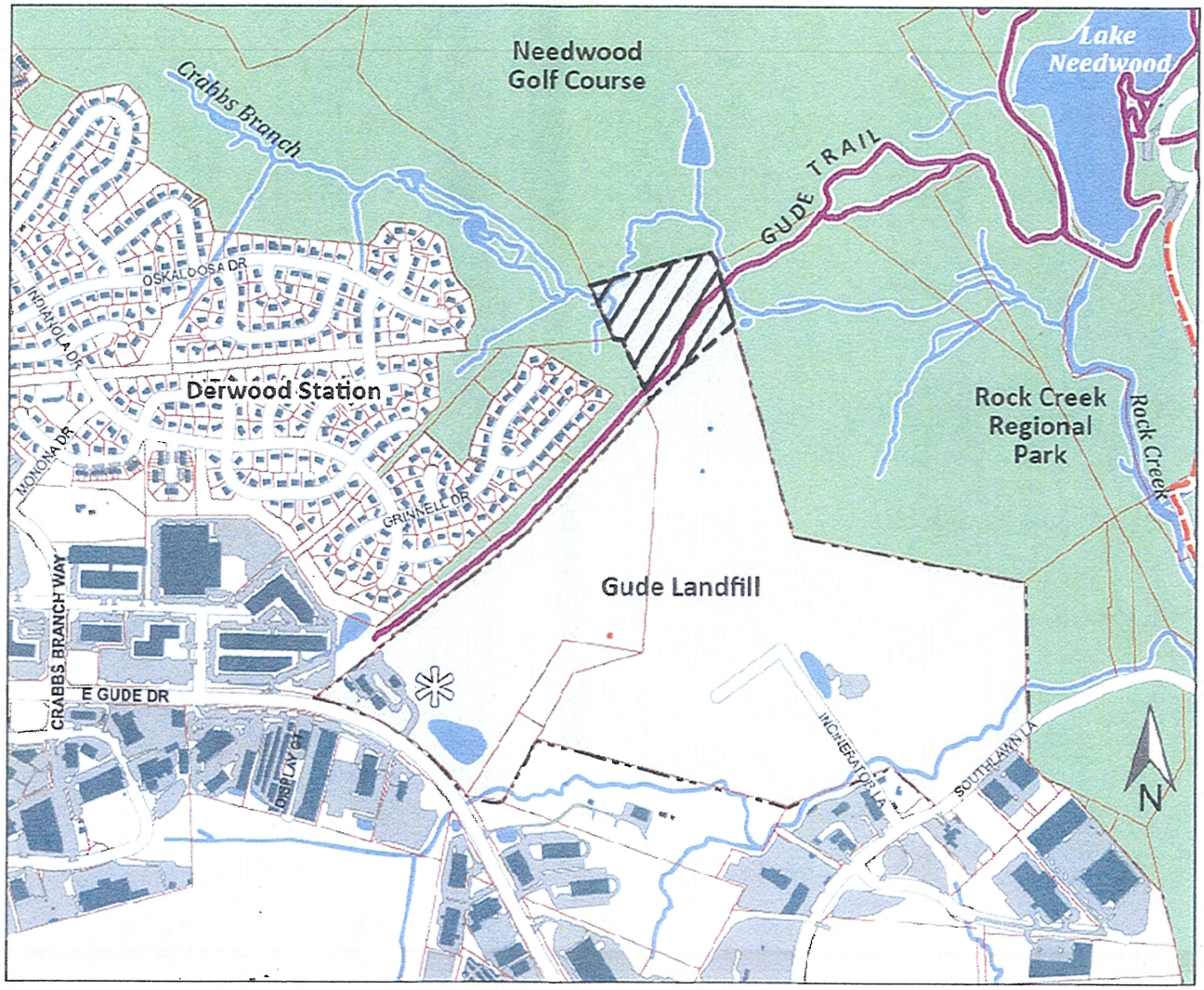
Park and Trail Context for Gude Landfill (Mandatory Referral # 08607-dpwt-1)



Legend

- New Proposed Power Plant
- Desired Future Parkland
- Existing Parks
- Gude Landfill
- Natural Surface Trails
- Hard Surface Trails
- Buildings
- Parking Lots
- Property Boundaries
- Roads
- Lakes, Ponds & Streams

0 0.2 Miles

Montgomery Parks
Park Planning & Stewardship Division
Park Planning Section