

Report No. UMTA-DC-06-0209-80-1

**MUCK UTILIZATION STUDY
GLENMONT ROUTE SECTIONS B009-B012
WASHINGTON, D.C.**

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SEPTEMBER 1980

FINAL REPORT

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16. Abstract A study was made of the potential for utilization of the excavated materials from subway construction in Washington, D.C. The project was sponsored by the U.S. Department of Transportation, Urban Mass Transportation Administration as part of an evaluation of methods to reduce the total construction cost and/or to provide additional public benefits from major urban transit construction projects. The contract documents for construction of Section B009 of the WMATA Glenmont Route were modified to include an optional pre-selected utilization project, the Montgomery County Gude Sanitary Landfill, in Rockville, Maryland. Although the utilization plan was not selected by the low bidder, the bid results and subsequent discussion of the concept with contractors indicate that the utilization approach can be useful and should be provided when appropriate. Future utilization programs, similar to the Section B009 plan, could be prepared by WMATA and Montgomery County provided the subway construction and other county landfill projects occur at the right time to match supply and demand. On projects such as these, where there is a clear benefit to the community, it is recommended that the contract documents mandate the disposal of muck at the pre-selected site.					
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METRIC CONVERSION FACTORS

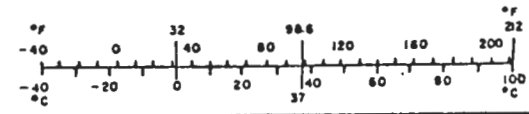
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
m	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
Tablespoon	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



*1 in = 2.54 (exact). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10 286.

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SUMMARY

A study of the potential for utilization of the excavated materials from subway construction in Washington D.C. was conducted from October 1978 to September 1980. Planning, engineering studies and coordination was provided by Haley & Aldrich, Inc. under contract with the Washington Metropolitan Area Transit Authority (WMATA). The project was sponsored by the U.S. Department of Transportation, Urban Mass Transportation Administration as part of an evaluation of methods to reduce the total construction cost and/or to provide additional public benefits from major urban transit construction projects.

The contract documents for construction of Section B009 of the WMATA Glenmont Route were modified to include an optional pre-selected utilization project, the Montgomery County Gude Sanitary Landfill, in Rockville, Maryland. During the bid period, the Contractors determined whether or not to use the Gude Landfill and indicated their choice on the bid form. Of the six joint venture bidders, the second low bidder chose to use the Gude Landfill disposal area.

Although the utilization plan was not selected by the low bidder, the bid results and subsequent discussion of the concept with contractors indicate that the utilization approach can be useful and should be provided when appropriate. Recommendations for improvement in the utilization approach include additional clarification of the contractor's responsibilities at the landfill site and some flexibility in the use of suitable excavated material for other purposes.

Future utilization programs, similar to the Section B009 plan, could be prepared by WMATA and Montgomery County provided the subway construction and other county landfill projects occur at the right time to match supply and demand. On projects such as these, where there is a clear benefit to the community, it is recommended that the contract documents mandate the disposal of muck at the pre-selected site. In addition, it is recommended that WMATA investigate the possibility of stockpiling excavated materials for later reuse on Metro construction.

1. INTRODUCTION

1.1. BACKGROUND

Construction of the Washington Metropolitan Area Transit Authority (WMATA) subway tunnels, stations and access or ventilation shafts required the removal of relatively large volumes of earth and rock materials. This report describes the implementation of a plan which established two alternates for the disposal of the excavated materials:

1. Traditional disposal of the material as a "waste" product.
2. Utilization of the material in other public works projects.

The plan provided contractors with access to a pre-selected disposal site for all construction debris and excavated materials resulting from construction of Section B009 of the WMATA, Metro, Figure 1. At the same time, the supply of materials to the Montgomery County Gude Sanitary Landfill also met the need for daily cover, final cover and grading materials for the landfill. The selection of the Gude Landfill for coordination with construction of Section B009 followed a planning effort completed from December 1979 to February 1980.

During that time period, anticipated soil and rock properties, volumes, potential uses, relative timing, etc. were evaluated to match the supply and demand for these two public projects. Several other public agencies and projects were surveyed in an attempt to locate the best match with the WMATA construction sequence and general construction practice in the Washington, DC area. The Gude Landfill site proved to be the best match with the construction of Section B009.

Project planning and implementation was completed primarily by Haley & Aldrich, Inc. for WMATA. Throughout the project, technical and administrative help was provided by WMATA and by DeLeuw, Cather & Company, Inc. (DCCO), general engineering consultant for WMATA. The U.S. Department of Transportation, Urban Mass Transportation Administration, sponsored the project as part of an attempt to simultaneously limit cost of mass transit construction and to increase benefits to the general public.

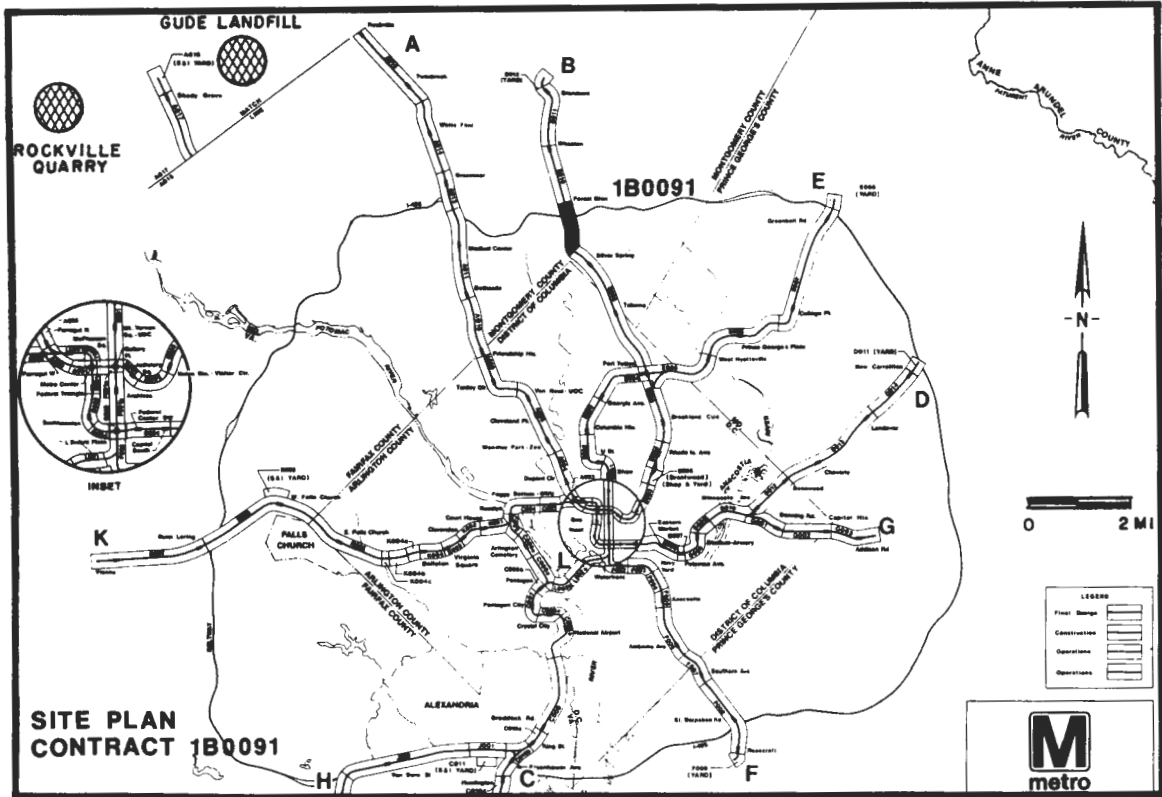


Figure 1 Project Location Plan (7)

1.2 PREVIOUS STUDIES

All soil and rock materials excavated from tunnels are commonly known by the miner's term "tunnel muck". Traditionally, these excavated materials have been considered to be waste materials of little or no value. For urban subway construction projects, all excavated materials from tunnels, shafts, and cut and cover excavations have been defined as "muck".

Muck utilization planning was described in a report prepared for the U.S. Department of Transportation in December 1977⁽²⁾. Potential uses for muck as a by-product rather than a waste product were evaluated. Based on case history data and on evaluation of typical construction practice, the most appropriate use was linked to landfill, backfill or crushed rock aggregate operations. Muck from urban areas typically has little or no inherent value as a mined resource such as metallic ore. Conversion of limestone to cement or possibly limited use of clay in a brickworks would be an unusual application for muck.

⁽²⁾ Number refers to publication in reference list.

In conjunction with the final report, a handbook for "Muck Utilization Planning" was prepared for subway system planners and designers (1). The handbook outlined the planning steps recommended to implement a muck utilization option within the framework of a subway construction contract. Key recommendations included:

1. Estimating type and quality of tunnel muck.
2. Evaluate rate of construction and muck production.
3. Evaluate contingency planning.
4. Establish a coordinating committee to officially link transit and potential user organizations.

These recommendations were implemented successfully for the B009 contract to produce an optional muck utilization plan in the contract documents.

1.3 MBTA Red Line Extension, Cambridge, MA

While the muck study was underway in Washington, subway construction was also in progress in the Cambridge, Massachusetts area for the Massachusetts Bay Transportation Authority (MBTA). A muck utilization plan was developed and implemented as part of construction of the Red Line Extension. A brief description of this project illustrates the muck utilization concept.

The MBTA plan required that all excavated earth and rock materials were to be used as final cover material over the old Cambridge City Dump⁽⁵⁾. The site would be graded to provide recreational areas, including athletic fields, a sledding hill, and park area. A detailed grading plan, shown in Figure 2, was established by the City following land use studies and analyses of the potential settlement of the 90-ft. thick trash deposit in the dump. Grades were established to accommodate all of the excavated material from six major tunnel, station and cut-and-cover projects, including:

<u>Contract</u>	<u>Primary Material</u>
Harvard Square Station	Earth and Rock
Porter Square Station	Rock
Davis Square Station	Earth
Harvard to Porter Tunnel	Earth and Rock
Porter to Davis Tunnel	Rock and Earth
Davis to Alewife De-pressed Track	Earth

The MBTA prepared a separate contract which provided for maintenance of the dump area, construction of methane ventilation ditches, spreading and compacting of muck, and maintaining the area as a storage yard, Figure 3, for the various contractors. A major part of the scheme included provision for rail transport of muck from the Porter and Davis Contracts to the dump area. Twenty side-dump, mine-ore cars were provided by the MBTA and a spur line was built from the main line B & M track into the dump area, Figure 4. Truck routes and separate haul roads were also established in the contract.

The utilization project thus provided the individual station and tunnel contractors with an accessible site disposal area while simultaneously developing an old dump site into desirable recreational land. The train loading area at the station sites, Figure 5, provided short-haul trucking over city roads and minimized traffic congestion in the urban area.

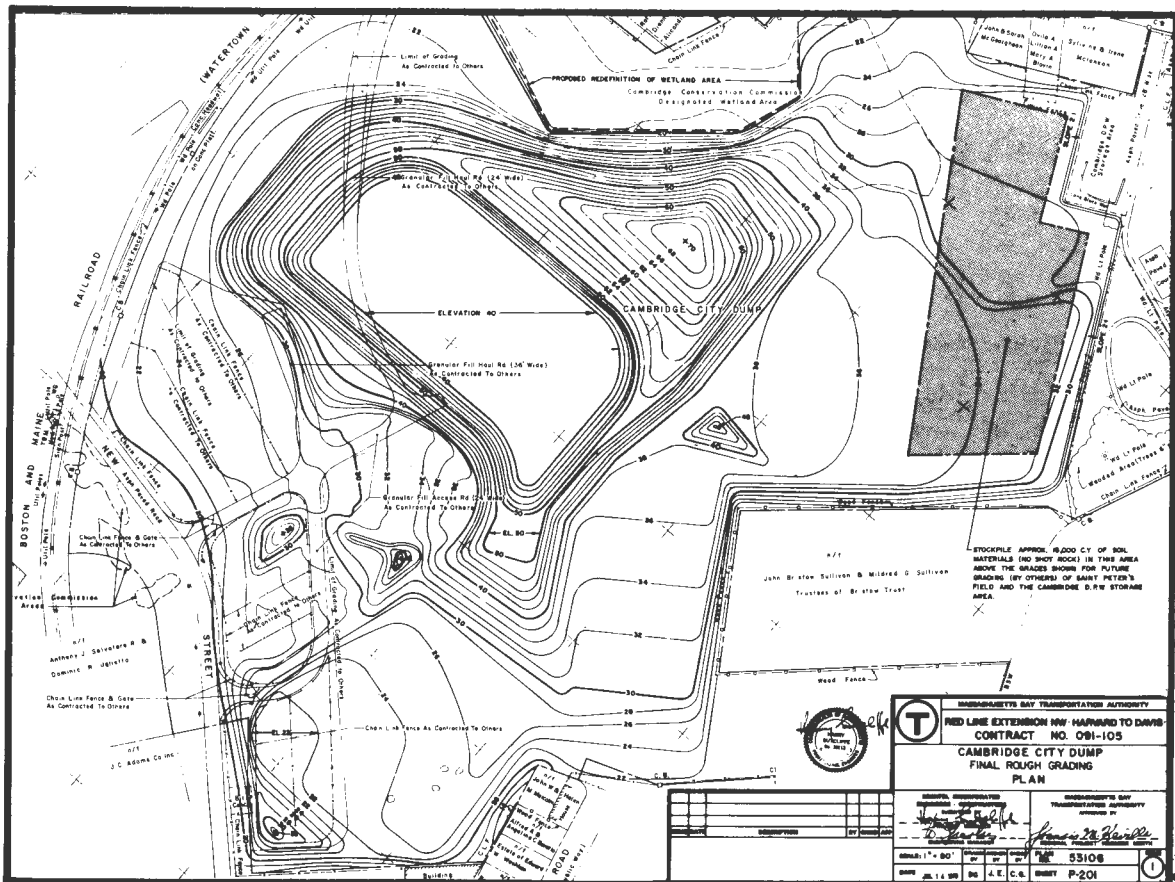


Figure 2 Final Grading Plan, Cambridge City Dump, Cambridge, MA (5)



Figure 3 Material Storage Area, Cambridge City Dump



Figure 4 Side Dumping of Muck at End of Spur Line.



Figure 5 Muck Train Loading Area.

2. PROJECT DESCRIPTION

2.1 Glenmont Route, Washington, D.C.

The proposed WMATA transit construction will extend the Glenmont Route from Silver Spring to Glenmont, Maryland, and will follow along Georgia Avenue in Montgomery County, as indicated on the Generalized Plan and Profile, Figure 6.

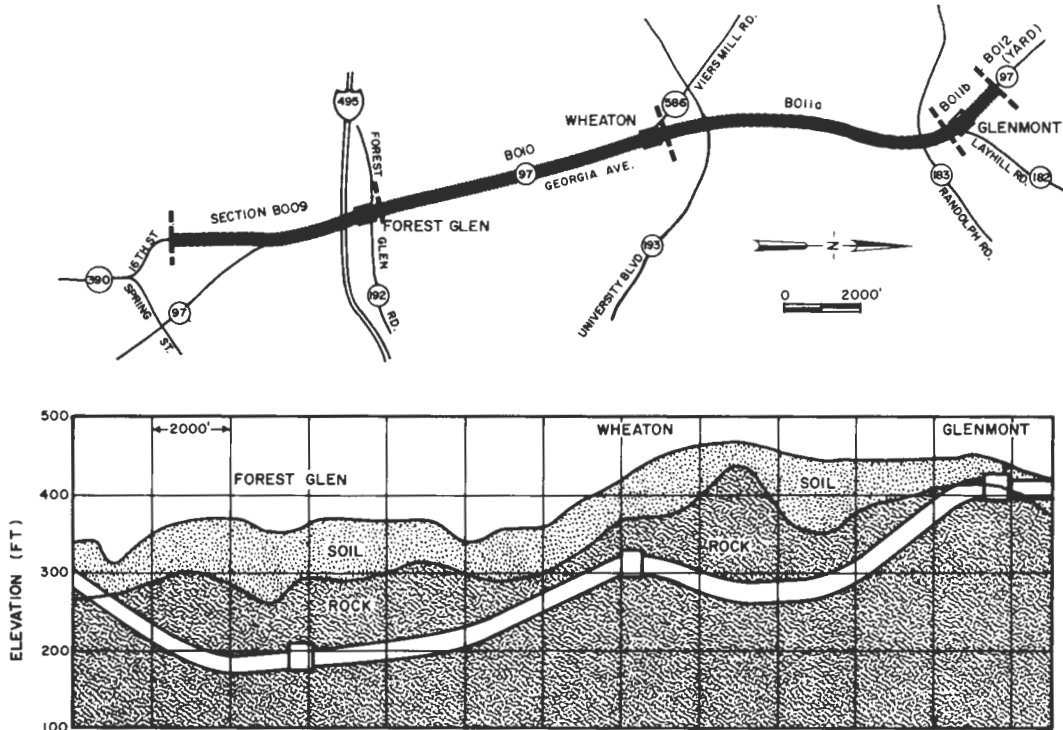


Figure 6 Generalized Plan, Profile
Glenmont Route, Sections B9-B12

Beginning at Silver Spring, twin subway tunnels will extend northward through three underground stations to a storage and maintenance yard in Glenmont. The construction involves excavation of nearly one million cubic yards of soil and rock materials from open cuts, mined tunnels and stations.

As indicated on Figure 6, the Glenmont route is divided into Sections B009, B010, B011a, B011b and B012. The first three sections will be mined tunnels, B011b will be mixed-face, cut-and-cover construction, and B012 will be a surface switching yard.

Subsurface conditions along this part of the Glenmont route consist of a surficial layer of soil materials overlying bedrock of the Wissahickon Formation. Soil materials include various manmade fills and residual soil derived from weathering of the bedrock. The upper portion of the rock is quite weathered and generally becomes less weathered with depth.

The in-place volumes of materials expected to be excavated, as estimated by DCCO, are shown in Table 1. A total of nearly one million cubic yards of material will be excavated.

Preliminary WMATA estimates indicated that construction would begin during 1981 and continue through 1983. The actual rate at which these materials will be produced cannot be predicted. However, Mass Diagrams developed from the preliminary schedule projections are shown on Figure 7, which can be used to illustrate how the availability of muck will depend on the construction schedule.

Table 1 Estimated in-place Excavation Volumes

ESTIMATED VOLUMES (CU. YD.)			
SECTION	COMMON (EARTH) EXCAVATION	TBM MUCK	DRILL & BLAST MUCK
B009	90,000	115,000	63,000
B010	24,000	180,000	51,000
B011	130,000	212,000	11,000
B012	110,000	-0-	-0-
TOTALS	354,000	507,000	125,000

GRAND TOTAL 986,000

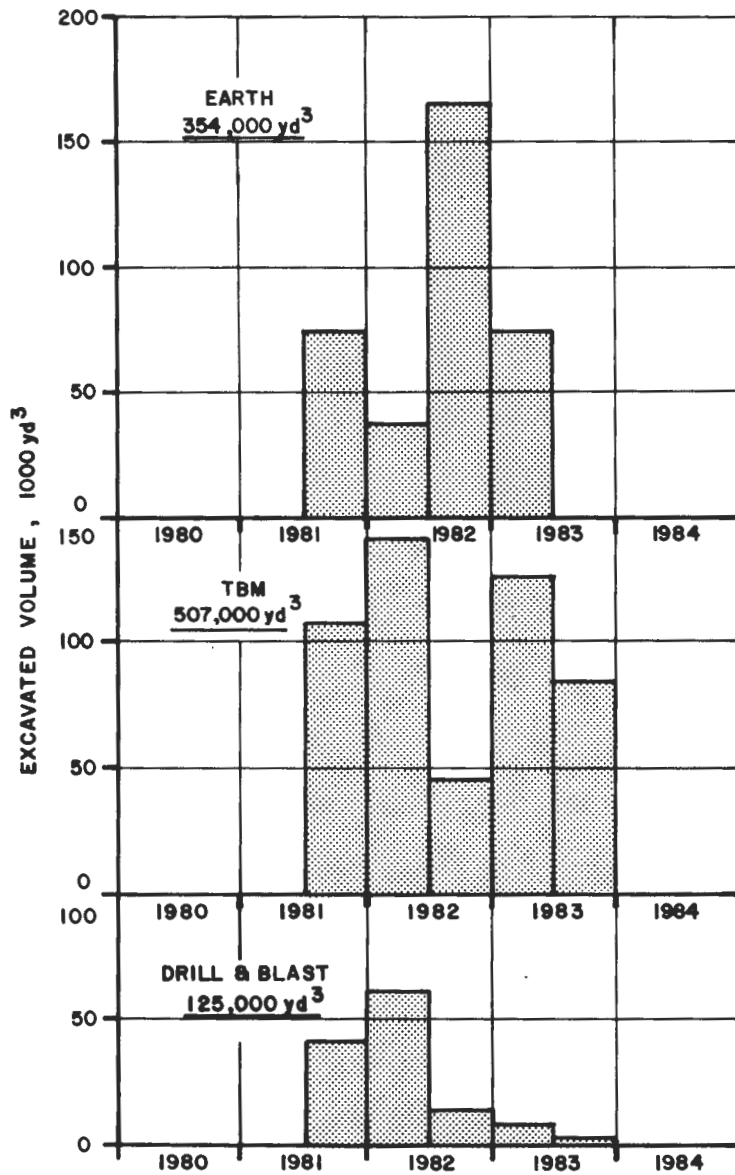


Figure 7 Mass Diagrams

3. MUCK CHARACTERISTICS

3.1 General Description

Each of the three types of muck materials are described as follows:

- a. Common (earth) Excavation. These materials will include manmade fill and decomposed rock which can generally be described as silty fine to medium sand with varying amounts of rock fragments and rubble. Typically, there are 20 to 40 percent silt or clay, as shown by the grain size curves included in Appendix A.
- b. TBM Muck. Tunnels excavated through rock by Tunnel Boring Machines (TBM) will yield muck material consisting of sandy gravel with a little silt. Grain size distributions of TBM muck obtained from previous tunneling on the Rockville Route are included in Appendix A. An assessment of the flat and elongated particle content of the muck samples is noted on the grain size distribution diagram. It is expected that TBM muck from the Glenmont Route will be similar to the samples tested. However, there will be variability in the grain size distribution and fragments larger than three inches are sometimes present.
- c. Drill and Blast Muck. Muck produced from drill and blast mining will be coarser than TBM muck. It is expected that this material will consist mostly of cobble and gravel sizes, with some sand.

It should be noted that a portion of the TBM and Drill and Blast muck will contain fragments of weathered rock. Based on available subsurface data, it is suggested that for planning purposes, an allowance of 10 to 20 percent weathered material be assumed in the estimated quantities of TBM and Drill and Blast muck. Also, each of the above three muck types will contain some miscellaneous construction debris, including rebar pieces, equipment parts (bolts, cutters, etc.), lumber, and other wasted materials.

3.2 Laboratory Test Data

A program of laboratory testing was completed to supplement available test data and to provide information relative to the suitability of excavated unweathered rock materials for reuse as construction materials. Standard aggregate acceptability tests were performed on four typical unweathered rock core samples recovered from borings located along the

Glenmont Route. For comparison, the same tests were performed on two TBM muck samples from the Rockville Route and on two rock core samples corresponding to the locations from which the TBM muck was mined. The samples were obtained from Rockville Route Section A010a and A011a, which are located about three miles west of the Glenmont Route. The results of these tests, which were performed by the Thompson & Lichtener Co., Inc. of Brookline, Massachusetts, are presented in Table 2.

Table 2. Standard Aggregate Acceptability Tests

SECTION	BORING NO.	SAMPLE TYPE	ROCK TYPE	SPECIFIC GRAVITY	% ABSORPTION	SOUNDNESS % LOSS	ABRASION % LOSS	
							100 REV.	500 REV.
A010A	A-33	CORE	GNEISS	2.75	0.3	0.0	5.9	25.4
A010A	-	TBM MUCK	GNEISS	2.74	0.5	0.0	7.8	30.5
A011A	AM-9U	CORE	GNEISS	2.77	0.4	0.0	4.8	20.9
A011A	-	TBM MUCK	GNEISS	2.81	0.3	0.0	7.9	31.1
B009	BRP-57	CORE	SCHIST	2.78	0.4	0.1	5.5	22.9
B010	B-16	CORE	SCHIST	2.67	0.6	0.0	6.6	27.6
B010	B-19U	CORE	SCHIST	2.67	0.6	0.0	8.4	32.8
B011A	MP-65	CORE	SCHIST	2.74	0.5	0.0	6.6	29.4

TEST METHODS:

ASTM C127, SPECIFIC GRAVITY AND ABSORPTION
 ASTM C88, SOUNDNESS USING SODIUM SULFATE
 ASTM C131, LOS ANGELES ABRASION

Petrographic analyses were made by Haley & Aldrich on thin sections cut from portions of the same four Glenmont Route rock core samples that were used for aggregate acceptability tests. The purpose of these analyses was to examine individual rock crystals to classify the rock and to identify mineral and textural characteristics that influence engineering properties. Results of the petrographic analyses are presented in Appendix A.

The results of some hardness tests performed on Glenmont Route rock core samples by Mueser, Rutledge, Johnson & Desimone are also included in Appendix A.

It should be noted that all the laboratory tests were performed on intact unweathered rock samples. As a result, the test data probably indicate a relatively favorable muck quality as compared to the average properties of the muck that will be produced.

4. POTENTIAL MUCK USES

Based on the available data, it appeared that the muck materials to be excavated from the Glenmont Route could be utilized for various construction materials as described below and as summarized in Table 3:

Table 3 Potential Muck Uses

	COMMON (EARTH) EXCAVATION	TBM	DRILL & BLAST
UNCONTROLLED FILL	X	X	X
CONTROLLED FILL	X	X	X
ENGINEERED, COMPACTED FILL		X	
SANITARY LANDFILL	X	X	
BITUMINOUS CONCRETE AGGREGATE*		X	X
PAVEMENT BASE COURSE*		X	X
MISCELLANEOUS RIPRAP			X

* RESIDENTIAL STREETS AND SECONDARY ROADS.

1. Uncontrolled Fill. Any of the three muck material types could be used for general landscaping, site grading activities, backfilling of basements from demolished structures, construction of surcharges or other filling operation where no significant controls are placed on the types of fill material or method of placement.
2. Controlled Fill. All three types of muck could be used for construction of stable embankments or soil structures conforming to design requirements where controls on material quality and compaction are not overly restrictive. Examples of controlled filling would include construction of highway and railroad embankments, backfilling trenches, construction of parking lots and restoration of gravel pits and quarries.
3. Engineered Compacted Fill. It was expected that most of the TBM muck would be suitable for use in construction

of structural fills, dikes and embankment dams, in backfilling around structures or other filling operations where materials must be placed in accordance with engineering designs, controls and construction methods to assure the quality of the end product.

4. Sanitary Landfill. The Common Excavation and TBM muck materials should be suitable for use as daily cover material for sanitary landfill.
5. Aggregate for Bituminous Concrete. Results of aggregate acceptability tests indicate that the TBM muck and the Drill and Blast muck excavated from unweathered rock will probably meet criteria normally required for use as bituminous concrete aggregate. Petrographic analyses indicate relatively high mica content with associated schistosity which suggests that there could be a tendency for degradation of the aggregate with time. The muck could not be considered high quality aggregate. However, depending on the availability and cost of more select materials, the TBM muck and Drill and Blast muck could be attractive for use in construction of residential and secondary roads.

It was expected that using these materials in asphalt concrete would provide some protection against particle degradation, since the aggregate would be sealed within a matrix of asphalt cement. In fact, TBM muck from Section A6a of the Rockville Route was processed by a private contractor and some of the resulting product was then used to produce asphalt concrete.

6. Pavement Base Course. Portions of the TBM and Drill and Blast muck could also be used as pavement base course materials. Again, these would not be select materials, but, they could be suitable for construction of light traffic roadways or parking lots. Some of the Rockville Route material was processed and used for this purpose.
7. Miscellaneous Riprap. Drill and Blast muck can sometimes be utilized as light riprap or as a slope erosion control. Rock muck from Metro construction was used to repair sections of the Rock Creek, in Washington, DC.

It was expected that little processing would be required to use muck as fill. The use of muck as aggregate would probably require processing to achieve a specific gradation and to remove deleterious materials. A local aggregate supplier is known to have installed a magnet to remove metal debris from Rockville Route muck prior to crushing and screening (2).

5. THE MUCK UTILIZATION COORDINATING COMMITTEE

A Muck Utilization Coordinating Committee (MUCC) was formed as a means of identifying public works projects which could benefit from muck utilization. Key committee members were Mr. Johan Sikkar (WMATA), who acted as chairman, Mr. Charles Daugherty (DCCO) and Douglas Gifford and John Critchfield of Haley & Aldrich, Inc.

To solicit participation by potential muck users, a report was prepared and distributed to fourteen agencies representing various governmental, environmental, parks and planning groups. The report, entitled "Report on Technical Data and Assessment of Muck Characteristics"⁽³⁾ contained information about expected muck characteristics and a discussion of potential uses, as described in the preceding sections.

Based on favorable responses to the initial inquiry, invitations were extended to the following six agencies to participate in the MUCC:

1. Montgomery County, Maryland
Department of Environmental Construction
2. Montgomery County, Maryland
Department of Environmental Protection
Division of Solid Waste
3. Maryland-National Capital Park and Planning
Commission
4. Maryland Department of Transportation
State Highway Administration
5. Office of Land Use Coordination
National Capital Region
6. U.S. Army Corps of Engineers

In addition, various WMATA personnel, engineering consultants and Section Designers were offered an opportunity to participate in the planning process.

On 12 December 1979, the first MUCC meeting was held at the WMATA offices in Washington DC. A presentation was made to further educate the interested parties about the goals of muck utilization. Possible means of utilizing muck were discussed along with some of the practical problems involved.

Two projects, the Gude Landfill and the Rockville Quarry, were identified as having good potential as muck utilization sites. Both projects are elements of solid waste disposal operations in Montgomery County, Maryland with general locations as shown in Figure 1.

The first project was the Gude Landfill located just north of Rockville, Maryland and operated by the Montgomery County Department of Environmental Protection, Division of Solid Waste. A detailed site location map is included in Appendix B. Current landfill operations require approximately 250,000 cubic yards per year of daily cover material. The projected closing date for the landfill is 30 June 1982.

After closing, at least four feet of final cover would be placed and the site will be turned over to the Maryland National Capital Park and Planning Commission for development of a 161-acre recreational facility. A site plan for the finished park is shown on Figure 8.

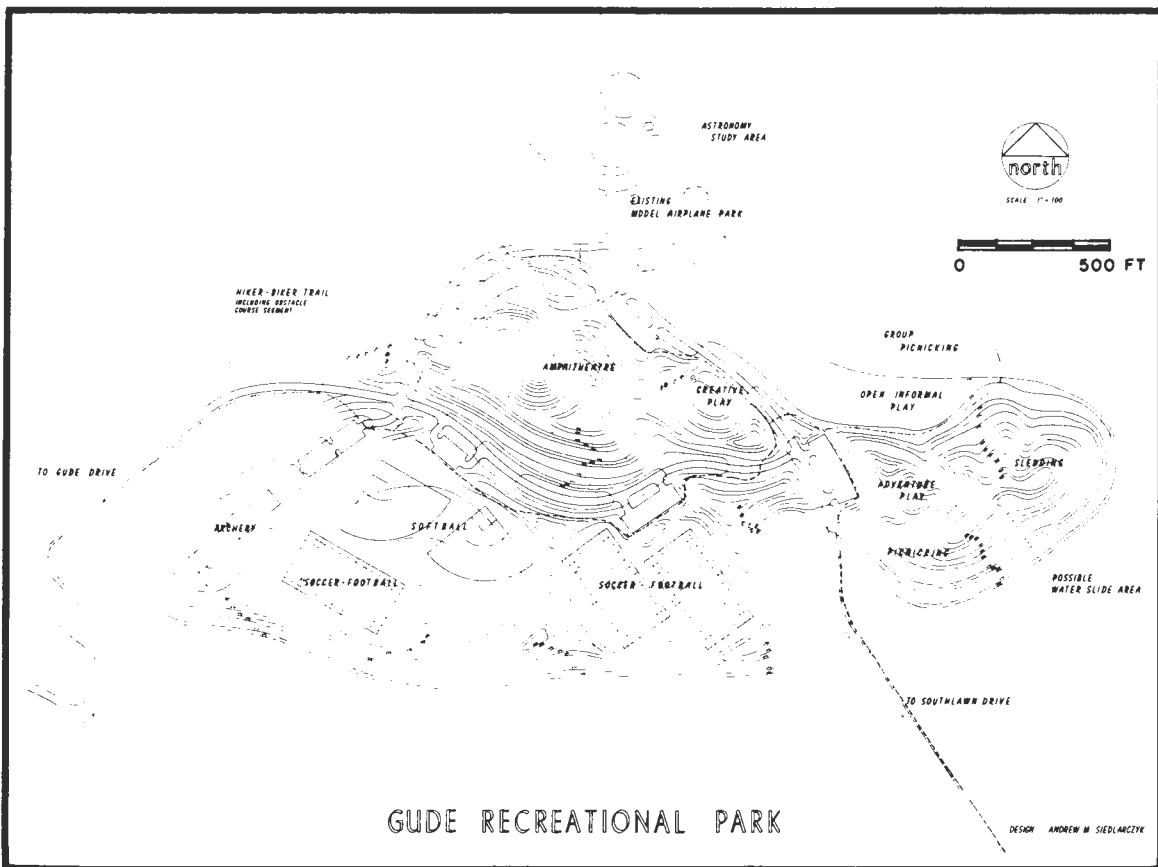


Figure 8 Gude Recreational Park Site Plan

The Gude site would offer an immediate opportunity for use of Glenmont Route muck as daily and final cover materials and for later use in park development.

The second project was the Rockville Quarry Balefill currently under preliminary design by the Montgomery County Department of Environmental Construction. The Rockville Quarry is an active producer of crushed stone products, located approximately three miles west of Rockville off Travilah Road, about one mile south of Route 28, as shown on Figure 9. Consideration is being given to using the 300-acre quarry as a site for long-term disposal of baled solid waste.

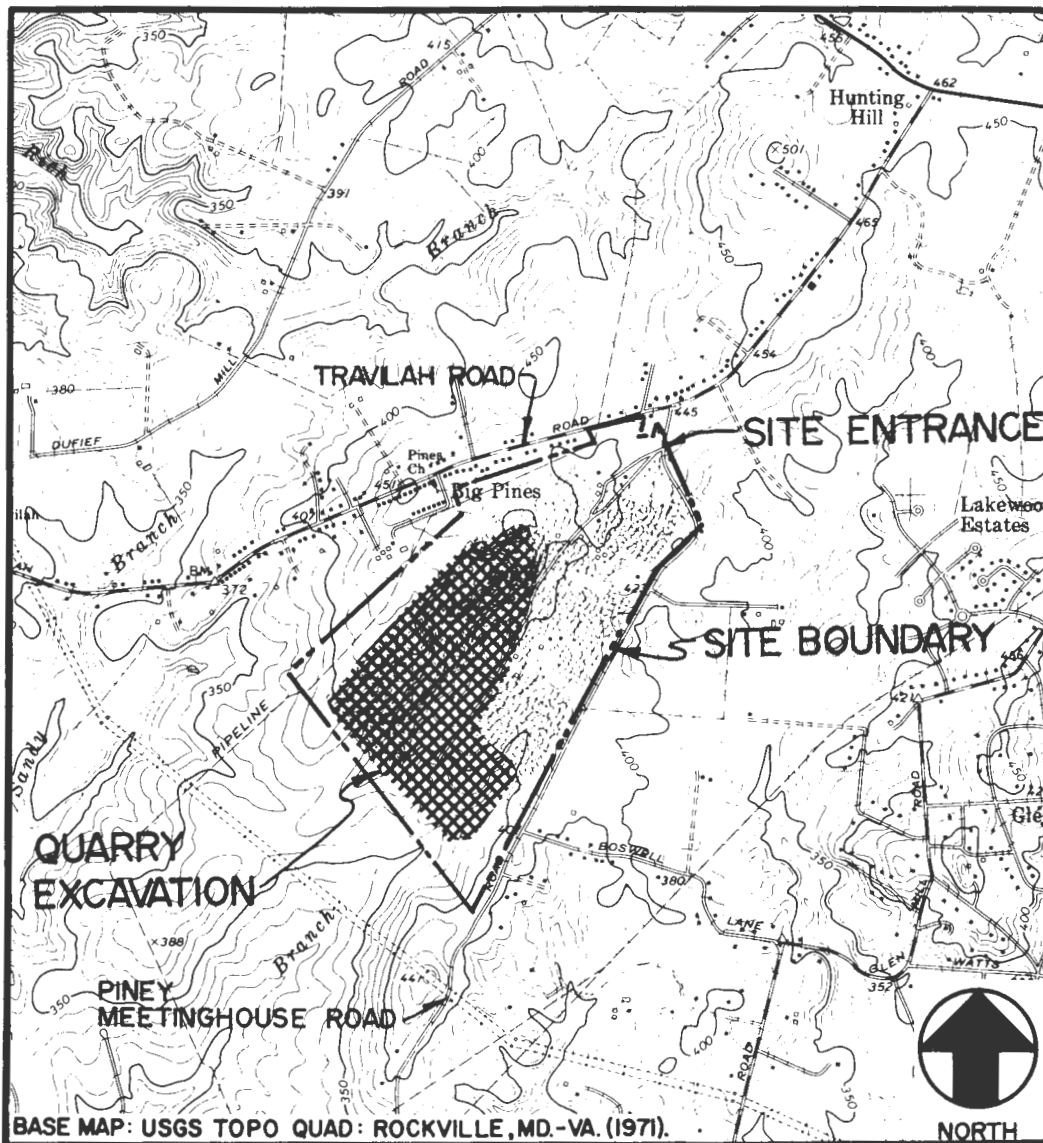


Figure 9 Rockville Quarry Location Map (4)

Figure 10 shows key details of a balefill operation. Preliminary estimates indicate that balefill operations could begin as early as 1983, while quarry mining continues. The expected life of the balefill would be at least 30 years. Initially, 400,000 tons of solid waste per year is expected, which would require about 100,000 cubic yards per year of cover material.

Since there is virtually no available fill material at the quarry, muck could be used to meet the projected long-term need for cover.

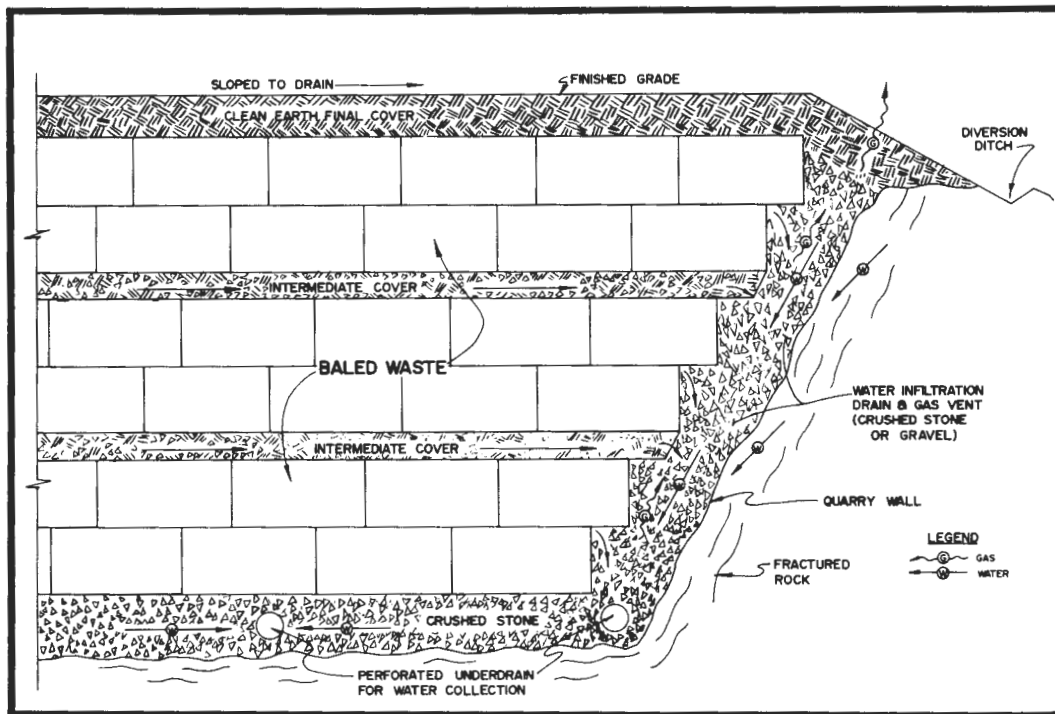


Figure 10 Typical Section of Baled Landfill (4)

6. THE GUDE LANDFILL OPTION

6.1 Gude Landfill, Montgomery County

A decision was made by WMATA to pursue the possibility of muck disposal at Gude Landfill on Section B009, which was to be advertised in February 1980. Haley & Aldrich, functioned as a negotiator between WMATA and Montgomery County.

Ordinarily, on other WMATA contracts, the Contractor is required to dispose of the muck in accordance with regulations outlined in the Standard Specifications.⁽⁶⁾ The standard regulations governing muck disposal are illustrated diagrammatically in Figure 11.

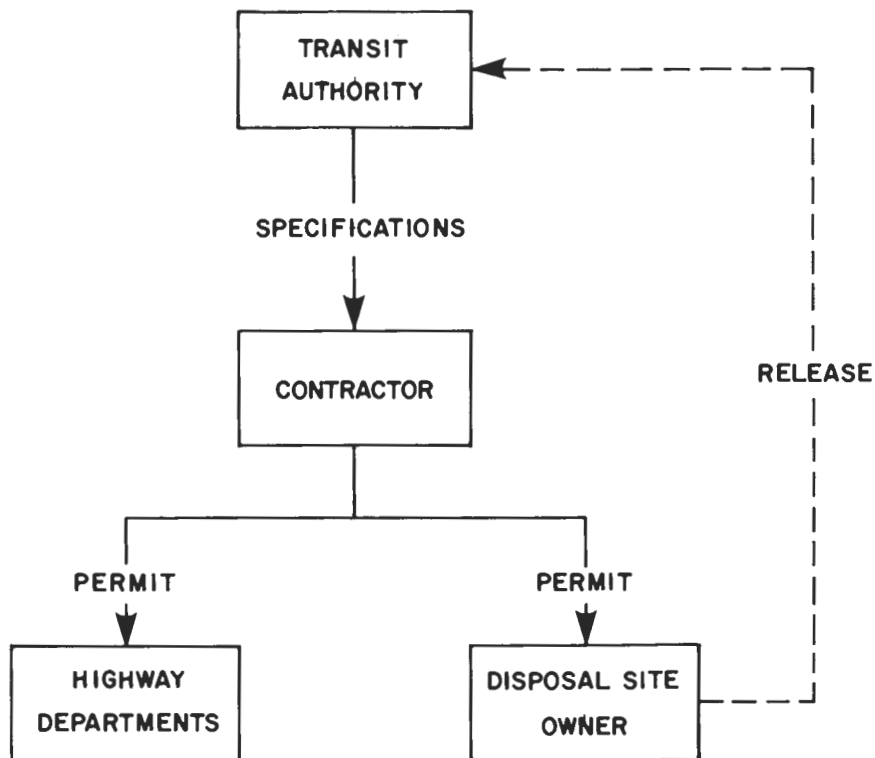


Figure 11 Flow Chart for Regulating Muck Disposal

Under the Standard Specifications, the Contractor must locate a disposal site and obtain permits from the site owner. A release document must be provided by the dump site owner absolving the transit authority of responsibility in connection with muck disposal at the site. The contractor must also obtain any necessary permits in connection with transporting muck to the dump site. In addition, the Contractor was responsible for any damage that may be done to adjacent property.

For WMATA, the important objectives in any muck disposal plan were to maintain control of the transit construction work and minimize the potential for delay. It was, therefore, desirable to stay as close as possible to the standard regulations for muck disposal.

The County was already accustomed to working with local excavation contractors in obtaining cover material. Often Contractors are allowed to dump refuse at no charge in exchange for useable cover material. The County does have written rules pertaining to dumping of refuse. However, arrangements and procedures for depositing excavated materials had always been somewhat informal.

The primary County concerns relative to muck disposal at Gude were separation of muck types at the dump and rate of delivery. In addition, the County requested that some testing be performed to estimate the permeability of TBM muck. Samples of TBM muck were obtained from a WSSC tunnel project currently under way near Section B009. Tests on these samples are summarized in Table 4. Based on these data, the County decided that the TBM muck would be suitable for daily cover and probably as a final cover material.

Table 4 Muck Permeability Data

DRY UNIT WEIGHT (pcf)	VOID RATIO	PERMEABILITY (cm/sec)
99	0.70	2.8×10^{-4}
110	0.53	5.5×10^{-5}
116	0.46	1.6×10^{-5}

Modifications to the Section B009 contract were developed by the MUCC to present the prospective Contractor with two options for disposal of excavated material. The options were outlined in the contract by adding a section to the specifications entitled, "Section 236, Disposal of Excavated Material, Refuse and Debris", which is included in Appendix B of this report.

According to Section 236, the Contractor may arrange for disposal of muck and other debris as already provided for in the Standard WMATA specifications, or he could elect to use the Gude Landfill. Regulations for using Gude were spelled out in an appendix to the contract documents entitled, "Appendix F, Regulations for Disposal of Excavated Materials, Clearing and Grubbing Debris and Construction Site Refuse at Gude Landfill". These regulations represent a streamlined and simplified version of the standard County regulations. The modified version was a result of negotiation between the agencies. This document is also included in Appendix B.

The Contractor would indicate his choice of disposal method by checking the appropriate box on the unit price schedule. If the Gude Option was selected, the Contractor was required to indicate a credit on the unit price schedule.

7. SECTION B009 CONSTRUCTION BIDS

Contract documents for Section B009 were issued on 11 February 1980. The Gude Landfill Option was issued on 4 April 1980 as a part of Amendment No. 3. Bids were opened on 30 April 1980.

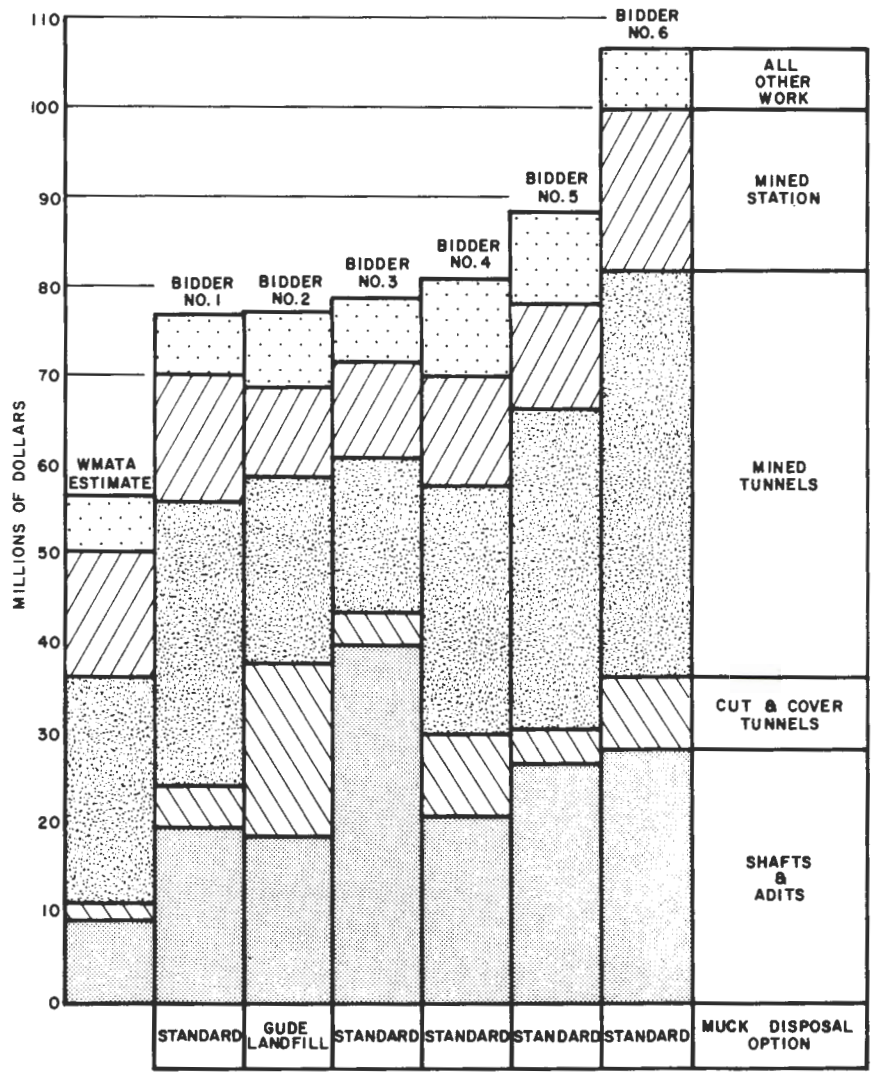
The results of bidding on Section B009 are summarized on Table IV and Figure 12. The muck disposal option selected by each contractor is also indicated. Only Bidder No. 2 elected to use the Gude Landfill Option. Bid No. 2 was less than one percent higher than the lowest bid. A credit of \$1000 was entered on the unit price schedule.

Table 5 Construction Bid Summary
Glenmont Route, Section B009

GENERAL WORK ITEMS	WMATA ESTIMATE		BIDDER NO. 1		BIDDER NO. 2		BIDDER NO. 3		BIDDER NO. 4		BIDDER NO. 5		BIDDER NO. 6	
	UNIT AMOUNT	%	UNIT AMOUNT	%	UNIT AMOUNT	%	UNIT AMOUNT	%	UNIT AMOUNT	%	UNIT AMOUNT	%	UNIT AMOUNT	%
1. SHAFTS & ADITS	9.0	16	19.5	25	18.5	24	39.8	51	20.8	26	26.5	30	28.2	26
2. CUT & COVER TUNNELS	2.0	3	4.6	6	19.2	25	3.6	5	9.0	11	4.0	5	8.0	8
3. MINED TUNNELS	25.2	45	31.6	41	20.9	27	17.3	22	27.8	34	35.7	40	45.5	43
4. MINED STATION	14.0	25	14.3	19	10.0	13	10.6	13	12.1	15	11.7	13	18.0	17
TOTAL	50.2	89	70.0	91	68.6	89	71.3	91	69.7	86	77.9	88	99.7	94
5. ALL OTHER WORK	6.2	11	6.8	9	8.4	11	7.3	9	11.1	14	10.4	12	6.9	6
TOTAL COST	56.4	100	76.8	100	77.0	100	78.6	100	80.8	100	88.3	100	106.6	100
MUCK DISPOSAL OPTION			STANDARD		GUDE LANDFILL		STANDARD		STANDARD		STANDARD		STANDARD	

NOTES:

1. UNIT AMOUNTS IN MILLIONS OF DOLLARS.
2. DATA SOURCE: WMATA ABSTRACT OF BID.



DATA SOURCE: WMATA RID ABSTRACT

Figure 12 Construction Bid Summary Chart

Follow-up discussions with several contractors indicated the following:

- Contractors did receive information about the Gude Landfill in Addendum No. 3.
- Sufficient time was available to evaluate the alternate.
- Primary responsibility for evaluation of the alternate was naturally assigned to the trucking subcontractors who normally handle muck disposal for WMATA projects.
- A pre-planned disposal area would be helpful for contractors entering a new geographical area.

Some other comments related to the practical problems of assembling bids, satisfying all contractual regulations while meeting the lowest cost objectives. For instance, the Gude option indicated that all excavated materials were to be brought to the landfill. This material was not available as backfill on other projects and thus some competitive edge was lost by selecting the Gude option. At the same time, it was noted that disposal of material near the end of a job can also become an expense when other disposal areas or backfill needs have been exhausted.

In general, the earth and rock materials are recognized as potentially valuable backfill or aggregate materials. Some contractors have experienced the return of "muck" to a job as backfill. However, normal operating room in an urban area prevents the convenient stockpiling of material so that the double handling or tracking cost becomes an accepted cost of urban construction.

In the WMATA area, disposal of material by local trucking firms has developed over the years into a minority-oriented subcontractor business. Use of the existing system for disposal is convenient and thus ultimate disposal use of the muck is often determined by the trucking contractor. Furthermore, past experience (flat tires, turn-around dumping times) made some contractors reluctant to commit to the landfill project. Further clarification of site maintenance might have eliminated these concerns. For example, if separate roads and dumping areas at the landfill were to be maintained by the contractor, these uncertainties about lost time in the dumping operation would be eliminated.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

The following conclusions are based on an analysis of the results of bidding on Section B009 and on bidders' reaction to the muck disposal option.

1. The fact that Bidder No. 2 chose to use the pre-selected disposal site indicates that the Gude Landfill scheme was a competitive option on the Section B009 contract.
2. Each of the bidders contacted confirmed that the muck is considered a valuable construction material which is often used on other projects.
3. Muck utilization planning offers WMATA a tool for stimulating competition which may result in direct cost savings on the remaining Glenmont Route Sections.
4. Regardless of any direct cost reduction which might result for WMATA, muck utilization planning can result in savings for the public in general if muck can be put to use on community projects such as the Gude Landfill.

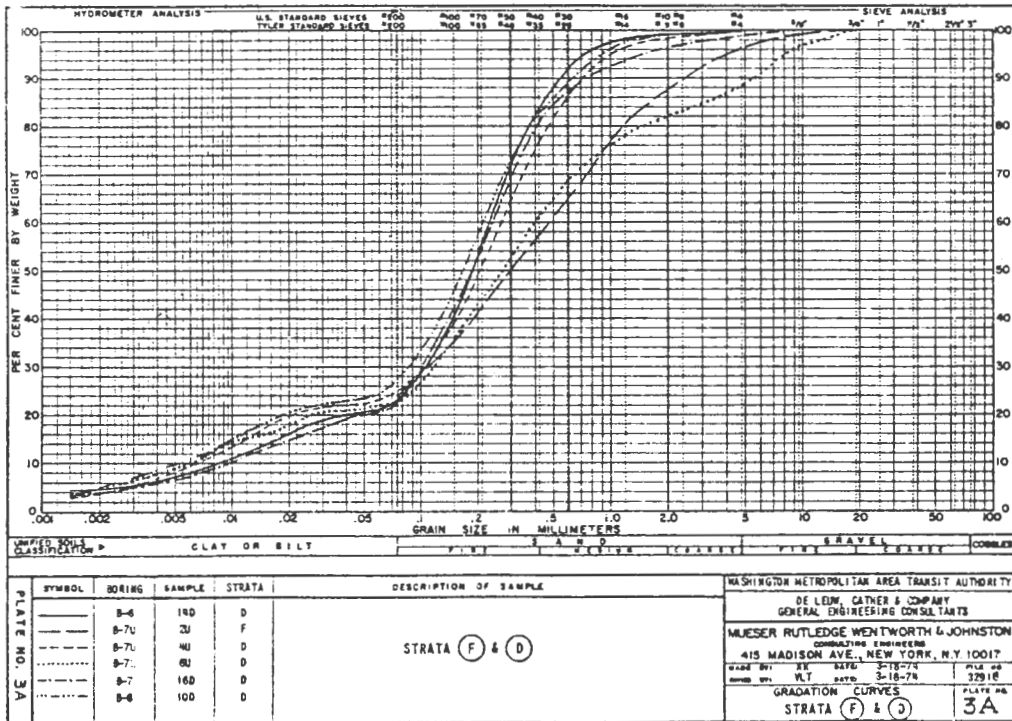
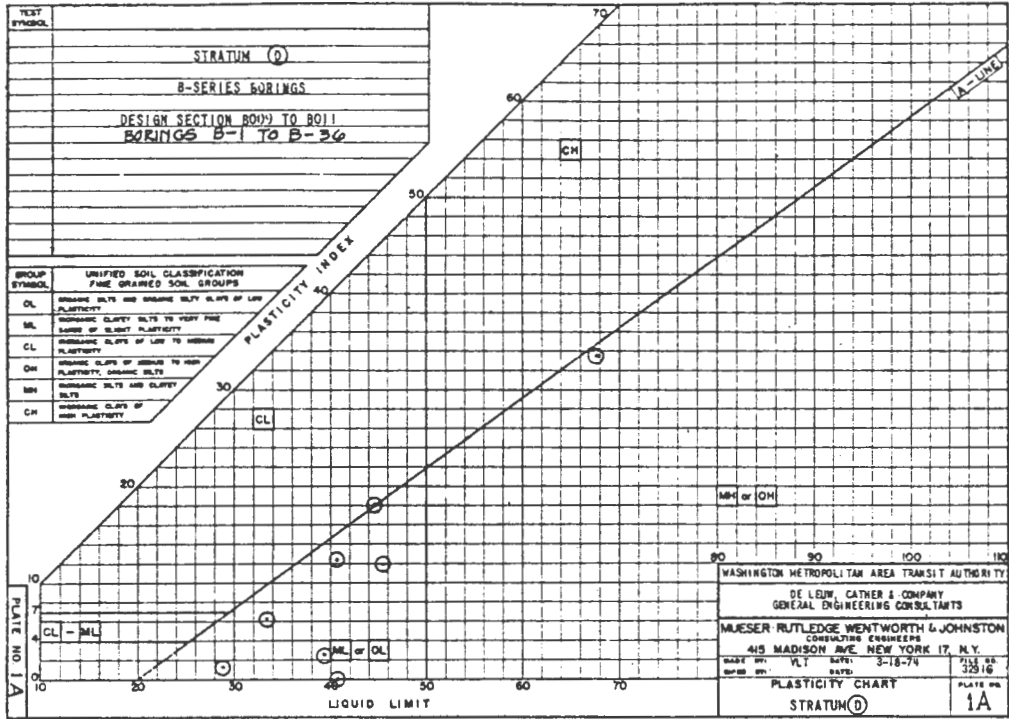
8.2 RECOMMENDATIONS

1. Two projects, the Gude Landfill and the proposed Rockville Quarry Balefill, have been identified as potential disposal sites. WMATA should maintain contact with Montgomery County relative to possible future muck utilization on these projects.
2. In addition, it is recommended that WMATA investigate the possibility of stockpiling muck for reuse on future Metro or other public works projects.

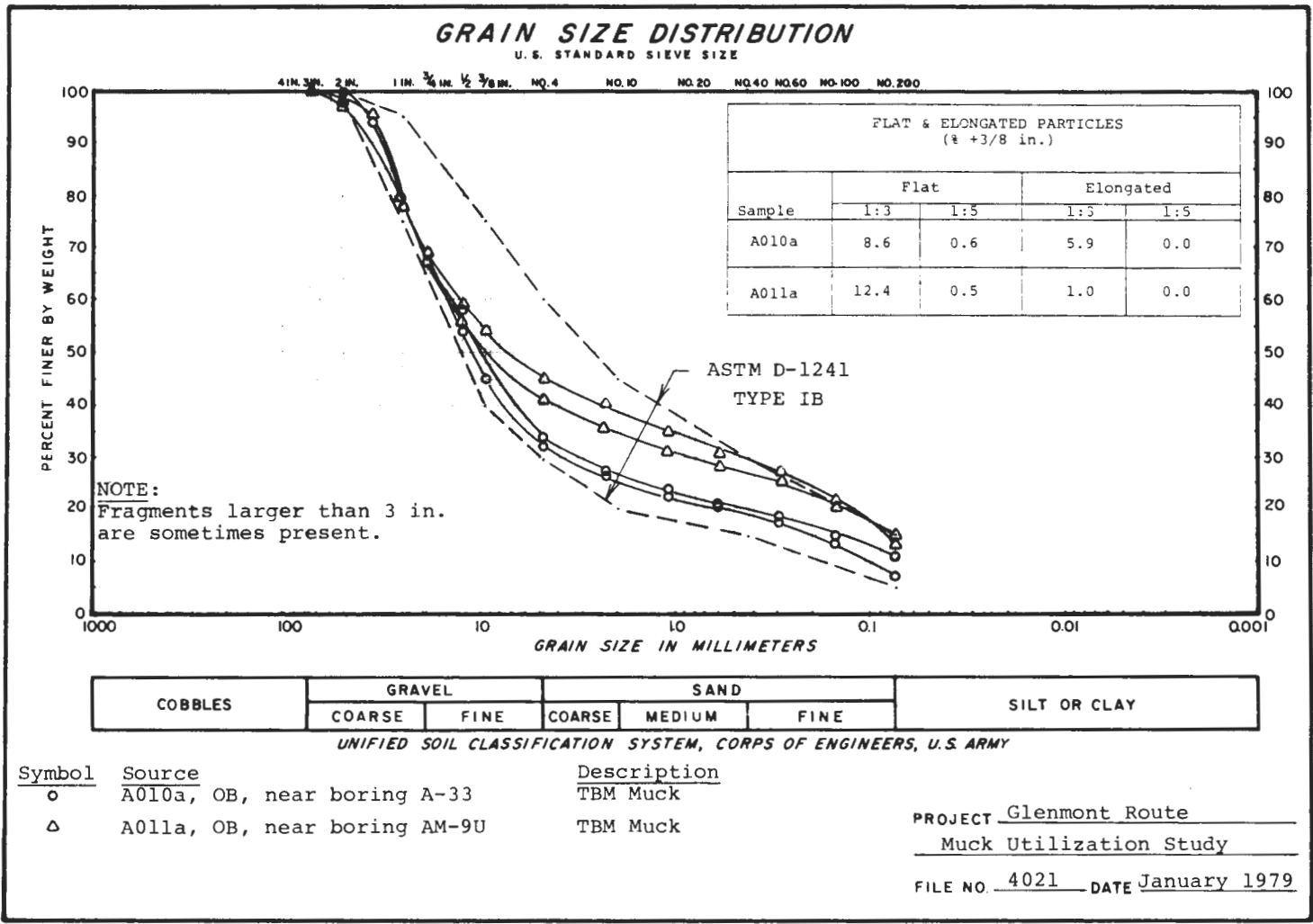
3. The following recommendations are offered relative to preparation of specifications for pre-selected disposal sites on future contracts:
 - a. If muck can be utilized on a public works project where the community receives a clear benefit, disposal of muck at the pre-selected site should be mandated.
 - b. If muck disposal must be presented as an option, eliminate the requirement for a credit on the unit price schedule. This requirement was an objectionable item for the B009 bidders and does not provide useful information about the relative cost of muck disposal options. In addition, the pre-selected site would be more attractive to prospective bidders if there was some provision for diverting a portion of the muck to other sites chosen by the contractor.
 - c. In any case, the Contractor must have control of and responsibility for the disposal area. This should eliminate the potential for conflicts relative to maintenance of the dump site.

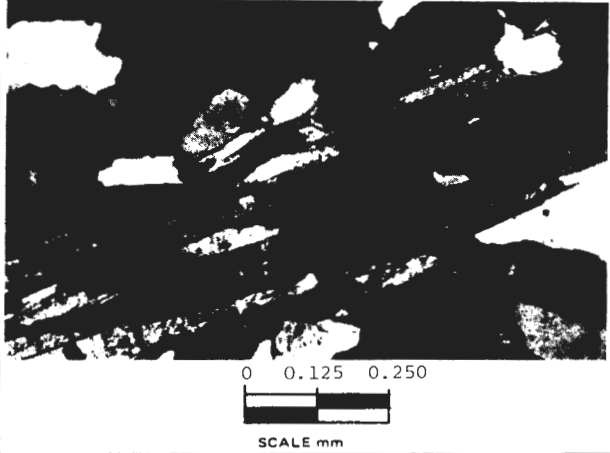
APPENDIX A

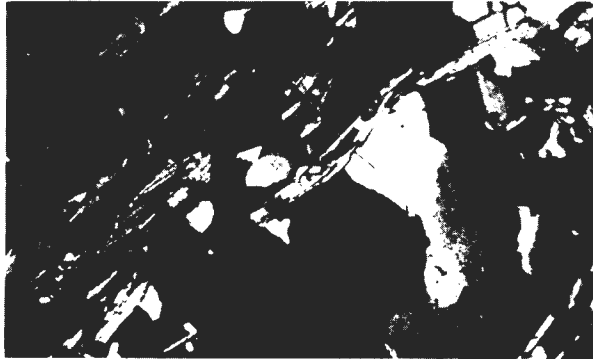

	<u>Page</u>
Grain Size Curves	A-2
Photographic Analyses	A-5
Rock Hardness Data	A-9

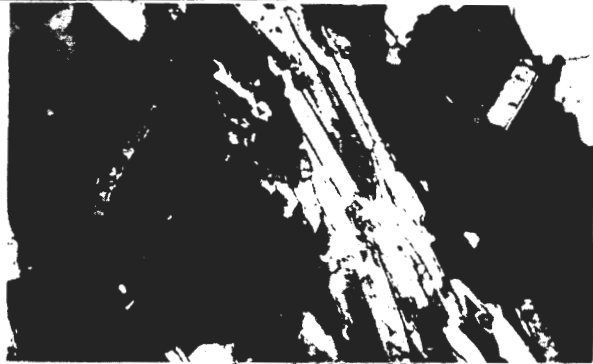



Typical Laboratory Test Data
Manmade Fill and Decomposed Rock



HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS	PETROGRAPHIC ANALYSIS	FILE NO. <u>024021</u> SHEET NO. <u>1</u> OF <u>1</u> SAMPLE NO. <u>BRP-57</u> SAMPLE <u>From Core Runs 25-27</u> DATE ANALYZED <u>Mar. 1979</u> ANALYZED BY <u>M. Scully</u> REVIEWED BY <u>A.W. Hatheway</u>
PROJECT <u>Muck Utilization Study</u> CLIENT <u>Washington Metropolitan Area Transit Authority</u> LOCALE <u>Glenmont Route B009</u> FORMATION <u>Wissahickon</u>		
I. CLASSIFICATION 1. CLASS Metamorphic 2. TEXTURE Schistose; lepidoblastic; segregated layering 3. ALTERATION Garnet to Chlorite Biotite to Chlorite; Sericitization 4. NAME Quartz-Mica Schist	II. MICROSCOPIC VIEW 	MAGNIFICATION 101.5x
III. DESCRIPTION OF INDIVIDUAL MINERALS		
MINERAL	ESTIMATED PERCENTAGE	PHYSICAL AND OPTICAL CHARACTERISTICS
Quartz	50	Colorless, anhedral inclusions; birefringence weak; first-order gray and white; strain extinction; uniaxial positive.
Muscovite	30	Colorless, as lathlike aggregates; perfect cleavage; upper second order; biaxial negative.
Plagioclase	5	Colorless, subhedral to anhedral; first order gray and white; albite twins; biaxial negative, sericitization.
Biotite	5	Pleochroic; brown; lathlike aggregates and isolated; cleavage perfect to second-order red; "birds-eye" structure; biaxial negative.
Garnet	5	Porphyroblasts; pale brown, subhedral; isotropic.
Chlorite	4	Pleochroic, green; alteration of biotite and garnet; cleavage perfect, extinction parallel.
Opaques	1	Subhedral to anhedral; occasional inclusions in garnet.
IV. FEATURES OF ENGINEERING SIGNIFICANCE Sub-parallel orientation of mica; irregular laminar structure of alternating mineral layers parallel to schistosity; (e.g. quartz-feldspar alternating with muscovite-biotite-chlorite); imparts planes; of weakness parallel to schistosity.		

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		PETROGRAPHIC ANALYSIS		FILE NO. <u>024021</u>
PROJECT <u>Muck Utilization Study</u>		CLIENT <u>Washington Metropolitan Area Transit Authority</u>		SHEET NO. <u>1</u> OF <u>1</u>
LOCALE <u>Glenmont Route B010</u>		FORMATION <u>Wissahickon</u>		SAMPLE NO. <u>B-16</u>
				SAMPLE From Core Runs <u>22-24</u>
				DATE ANALYZED <u>Mar. 1979</u>
				ANALYZED BY <u>M. Scully</u>
				REVIEWED BY <u>A.W. Hatheway</u>
I. CLASSIFICATION		II. MICROSCOPIC VIEW		MAGNIFICATION 101.5x
<p>1. CLASS Metamorphic</p> <p>2. TEXTURE Schistose; lepidoblastic; segregated layering</p> <p>3. ALTERATION</p> <p>4. NAME Quartz-Mica Schist</p>				
		<p>0 0.125 0.250</p>  <p>SCALE mm</p>		
III. DESCRIPTION OF INDIVIDUAL MINERALS				
MINERAL	ESTIMATED PERCENTAGE	PHYSICAL AND OPTICAL CHARACTERISTICS		
Quartz	50	Colorless, anhedral; first-order gray and white; strain extinction; uniaxial positive.		
Plagioclase	25	Porphyroblasts; distinctive gridiron structure; first-order gray; biaxial positive.		
Muscovite	20	Colorless; perfect cleavage; upper second order; twinning; biaxial negative.		
Biotite	3	Pleochroic, olive green; tabular crystals and lamellar aggregates; perfect cleavage; biaxial negative.		
Epidote	1	Colorless; granular aggregates.		
Microcline	1	Colorless; anhedral crystals.		
IV. FEATURES OF ENGINEERING SIGNIFICANCE Sub-parallel orientation of mica; irregular laminar structure of alternating mineral layers parallel to schistosity. (e.g. quartz-feldspar alternating with muscovite-biotite-epidote); imparts planes of weakness parallel to the schistosity.				

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		PETROGRAPHIC ANALYSIS		FILE NO. <u>024021</u>
PROJECT <u>Muck Utilization Study</u>		CLIENT <u>Washington Metropolitan Area Transit Authority</u>		SHEET NO. <u>1</u> OF <u>1</u>
LOCALE <u>Glenmont Route B010</u>		FORMATION <u>Wissahickon</u>		SAMPLE NO. <u>B-19U</u>
				SAMPLE From <u>Core Runs 29-31</u>
				DATE ANALYZED <u>Mar. 1979</u>
				ANALYZED BY <u>M. Scully</u>
				REVIEWED BY <u>A.W.Hatheway</u>
I. CLASSIFICATION		II. MICROSCOPIC VIEW		MAGNIFICATION 101.5x
<p>1. CLASS Metamorphic</p> <p>2. TEXTURE Schistose; lepidoblastic; segregated layering</p> <p>3. ALTERATION Biotite to Chlorite; Sericitization</p> <p>4. NAME Quartz-Mica Schist</p>		 <p>0 0.125 0.250</p>  <p>SCALE mm</p>		
III. DESCRIPTION OF INDIVIDUAL MINERALS				
MINERAL	ESTIMATED PERCENTAGE	PHYSICAL AND OPTICAL CHARACTERISTICS		
Quartz	35	Colorless, anhedral first-order gray and white strain extinction uniaxial positive.		
Plagioclase	20	Colorless; subhedral to anhedral minerals; first order gray and white, albite and albite/Carlsbad twins; biaxial negative, microfractures, sericitization.		
Biotite	20	Pleochroic, brown lathlike aggregates; cleavage perfect in second-order red; "birds-eye" structure; parallel extinction, biaxial negative.		
Muscovite	15	Colorless; lathlike aggregates; perfect cleavage to upper second-order; mica-law twins, biaxial negative.		
Epidote	6	Colorless, aggregates; middle first-order to upper third-order high relief; biaxial.		
Chlorite	3	Pleochroic, green; alteration of biotite; perfect cleavage; extinction is parallel to almost parallel.		
Opaques	1	Euhedral to anhedral.		
IV. FEATURES OF ENGINEERING SIGNIFICANCE Sub-parallel orientation of mica; irregular laminar structure; alternating mineral layers parallel to schistosity. (e.g. quartz-feldspar alternating with biotite-muscovite-epidote-chlorite); imparts planes of weakness parallel to schistosity.				

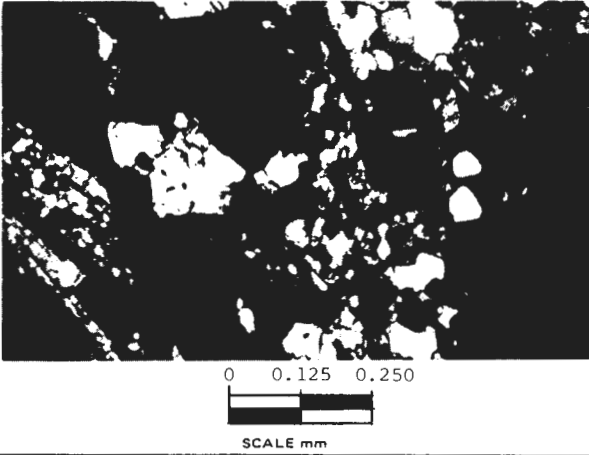
HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS	PETROGRAPHIC ANALYSIS	FILE NO. <u>024021</u> SHEET NO. <u>1</u> OF <u>1</u> SAMPLE NO. <u>MP-65</u> SAMPLE <u>From Core Runs 27-29</u> DATE ANALYZED <u>Mar. 1979</u> ANALYZED BY <u>M. Scully</u> REVIEWED BY <u>A.W. Hatheway</u>
PROJECT <u>Muck Utilization Study</u> CLIENT <u>Washington Metropolitan Area Transit Authority</u> LOCALE <u>Glenmont Route Bolla</u> FORMATION <u>Wissahickon</u>		
I. CLASSIFICATION	II. MICROSCOPIC VIEW	MAGNIFICATION 101.5X
1. CLASS Metamorphic 2. TEXTURE Schistose; lepidoblastic; segregated layering 3. ALTERATION Biotite to Chlorite 4. NAME Quartz-Mica Schist	 <p style="text-align: center;">0 0.125 0.250 SCALE mm</p>	
III. DESCRIPTION OF INDIVIDUAL MINERALS		
MINERAL	ESTIMATED PERCENTAGE	PHYSICAL AND OPTICAL CHARACTERISTICS
Quartz	50	Colorless, anhedral, first-order grey and white, strain extinction, uniaxial positive; some biaxial (strained).
Plagioclase	20	Colorless, subhedral to anhedral, first-order white and grey; albite twins; biaxial negative; (sericitization)
Biotite	13	Pleochroic, olive green; perfect cleavage; to second-order red; "bird's eye" structure; biaxial negative.
Epidote	10	Colorless; middle first-order to upper second-order; biaxial.
Chlorite	2	Pleochroic, green; alteration of biotite;
Garnet	2	Pale brown; subhedral to anhedral, poikiloblastic, isotropic.
Hornblende	1	Pleochroic green; subhedral to anhedral; cleavage 56°/124°.
Opagues	1	Subhedral to anhedral.
Calcite	1	Colorless to cloudy; anhedral aggregates; uniaxial negative.
IV. FEATURES OF ENGINEERING SIGNIFICANCE Sub-parallel orientation of mica; irregular laminar structure; alternating mineral layers (e.g. quartz-feldspar alternating with biotite-epodite-chlorite); imparts planes of weakness parallel to the schistosity.		

TABLE NO. - ROCK HARDNESS TEST METHODS AND CLASSIFICATION

HARDNESS TEST	DESCRIPTION	REMARKS
H_R = SCHMIDT HAMMER REBOUND HARDNESS	10 READINGS TAKEN WITH CORE MOUNTED IN ANVIL; THE HIGHEST READINGS ARE AVERAGED, USE CORRECTION FACTOR.	BEST FOR MASS PROPERTY MEASUREMENTS BECAUSE CONTACT POINT IS LARGER (ABOUT 1/2 INCH)
H_S = SHORE SCLEROSCOPE REBOUND HARDNESS	20 READINGS TAKEN WITH CORE MOUNTED IN ANVIL; THE 10 HIGHEST READINGS ARE AVERAGED, USE CORRECTION FACTOR	CONTACT POINT IS FINE, THEREFORE MEASUREMENTS ARE MORE ACCURATE FOR INDIVIDUAL GRAINS AND CRYSTALS. BUT STATISTICAL SAMPLING MUST BE TAKEN AND AVERAGE FOR MASS PROPERTIES; CAN BE USED TO ESTIMATE H_R IF NECESSARY.
H_A = ROCK ABRASION HARDNESS	2 NX SIZE DISKS ABRADED FOR 400 REVOLUTIONS ON EACH SIDE; DETERMINE WEIGHT LOSS; USE AVERAGE VALUE OF 2 DISCS. $H_A = 1/\text{AVERAGE WEIGHT LOSS (gms)}$	TEST IS SENSITIVE TO FACTORS THAT INFLUENCE SMALL-SCALE STRENGTH, SHEARING, CRUSHING, AND ABRASION.
A_R = ROCK ABRASIVENESS (TABER ABRASION TEST)	MEASURE WEIGHT LOSS OF 4 WHEELS AND AVERAGE. $A_R = 1/\text{AVERAGE WEIGHT LOSS (gms)}$	WEIGHT LOSS OF THE ABRADER WHEEL IS CAUSED BY ROCK ABRASIVENESS, NOT NECESSARILY BY HARDNESS. THE SAME IS TRUE IN THE CASE OF THE CUTTER

$$H_T = \text{TOTAL HARDNESS} = H_R \sqrt{H_A}$$

ROCK CLASSIFICATION SYSTEM BASED ON HARDNESS

TOTAL HARDNESS (H_T)	ROCK CLASSIFICATION
0 - 25	EXTREMELY SOFT
25 - 50	SOFT
50 - 75	MODERATELY SOFT
75 - 150	MODERATELY HARD
150 - 200	HARD
200+	EXTREMELY HARD

NOTES:

1. Rock hardness indices H_p , H_S , A_R , & H_T can be used to predict TBM penetration rates.
2. Rock Classification System based on hardness taken from Tarkoy, P.J., and Hendron, A.J., Jr., (1975), report titled "Rock Hardness Index Properties and Geotechnical Parameters for Predicting Tunnel Boring Machine Performance" University of Illinois.

TABLE NO. - SUMMARY OF HARDNESS TESTS ON ROCK CORES

SECTION	BORING	ROCK CORE	DEPTH OF SAMPLE Ft.	H _R	H _S	H _A	A _R	H _T	COMPRESSIVE STRENGTH KSI	ROCK TYPE	WEATHERING	ROCK CLASSIFICATION	COMMENTS
B009	BRP-14	9C	88.0	31.8	66.6	4.810	5.080	69.7	1.56*	QUARTZ MICA CHLORITE SCHIST	UnW Ex Jts	MODERATELY SOFT	
	BRP-18	26C	156.5	41.8	76.0	4.850	3.870	92.1		QUARTZ MICA CHLORITE SCHIST	UnW Ex Jts	MODERATELY HARD	
	BRP-21	23C	180.5	36.0	56.7	2.560	1.960	57.6		QUARTZ MICA CHLORITE SCHIST	UnW Ex Jts	MODERATELY SOFT	
	BRP-23	26C	187.0	45.6	94.5	8.060	5.180	129.5		QUARTZ	UnW Ex Jts	MODERATELY HARD	
	BRP-23	27C	192.5	38.2	54.3	3.500	2.880	71.5		QUARTZ MICA CHLORITE SCHIST	UnW Ex Jts	MODERATELY SOFT	
	BRP-27	27C	226.0	44.3	72.5	4.900	3.600	98.1	6.99*	QUARTZ MICA SCHIST TO GNEISS	UnW Ex Jts	MODERATELY HARD	
B010	MB-2	30C	186.0	41.2	54.0	3.861	2.386	81.0		SCHISTOSE GNEISS	UnW Inc Jts	MODERATELY HARD	
	MB-22	15C	120.0	26.2	17.0	1.156	1.400	28.2	0.20*	SCHISTOSE GNEISS	UnW Ex Jts	SOFT	LIGHT COLORED RELATIVELY POROUS
	MB-46	27C	163.0	49.9	82.4	10.1	5.102	158		QUARTZ	UnW Inc Jts	HARD	
	MB-46	29C	171.0	40.6	42.8	3.289	2.444	73.6		QUARTZ MICA CHLORITE SCHIST TO GNEISS	UnW Ex Jts	MODERATELY SOFT	
	MB-48	16C	132.5	40.8	45.6	4.545	2.941	87.0		QUARTZ BIOTITE SCHIST TO GNEISS	UnW Ex Jts	MODERATELY HARD	
B011	MP-3	21C	112.0	35.0	26.0	3.164	2.123	62.3		QUARTZ MICA SCHIST GNEISS	UnW Ex Jts	MODERATELY SOFT	
	MP-3	24C	124.5	33.2	43.3	2.583	2.375	53.4	4.58*	QUARTZ MICA SCHIST	UnW Ex Jts	MODERATELY SOFT	
	MP-8	17C	137.0	33.9	57.6	3.937	4.830	67.3		QUARTZ HORNBLende MICA CHLORITE SCHIST	S1W	MODERATELY SOFT	CHERTY
	MP-11	14C	143.5	43.9	66.3	5.494	3.745	102.9		QUARTZ MICA SCHIST	UnW Ex Jts	MODERATELY HARD	
	MP-15	14C	114.0	45.3	62.7	4.255	3.690	93.4		QUARTZ MICA CHLORITE SCHIST	UnW Ex Jts	MODERATELY HARD	

* NOTE: COMPRESSIVE STRENGTH VALUES ARE ON ROCK SAMPLES LOCATED APPROXIMATELY 5 FT. HIGHER OR LOWER THAN THE ROCK SAMPLES UTILIZED FOR THE HARDNESS TESTS.

APPENDIX B

Modifications to Section B009 Contract Documents

Section 236

DISPOSAL OF EXCAVATED
MATERIAL, REFUSE AND DEBRIS

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies optional procedures for disposal of the following materials:

1. Excavated earth and rock.
2. Clearing and grubbing debris.
3. Construction site refuse.

B. Related Work Specified Elsewhere:

1. Clearing and Grubbing: Section 202.
2. Site Grading: Section 203.
3. Excavation and Backfilling: Section 204.
4. Rock Tunneling: Section 227.
5. Earth Tunneling: Section 228.

C. Definitions:

1. Earth and rock materials are those resulting from earth and rock excavation.

2. Clearing and grubbing debris are those materials resulting from clearing and grubbing.

3. Construction site refuse is the debris and trash resulting from the Contractor's construction activities.

PART 2 - MATERIALS

NOT USED.

PART 3 - EXECUTION

3.1 GENERAL: The Contractor may dispose of excavated materials, clearing and grubbing debris and construction site refuse using either of the following optional procedures:

1B0091

New: AM:3
236-1

A. Standard Disposal Option: Dispose of excavated materials, clearing and grubbing debris, and construction site refuse in accordance with applicable contract requirements.

B. Gude Landfill Option: Dispose of excavated materials, clearing and grubbing debris, and construction site refuse at Gude Landfill. These materials shall be deposited at the landfill in accordance with regulations included in Appendix F.

PART 4 - MEASUREMENT AND PAYMENT

4.1 BASIS:

A. The Contractor shall indicate the disposal procedure to be used by checking the appropriate box in Item 52 of the Unit Price Schedule.

1. If the Gude Landfill option is selected, the Contractor shall identify the cost benefit by showing a credit on the Unit Price Schedule.

2. If the Standard Disposal option is selected, no cost shall be shown on the Unit Price Schedule.

APPENDIX F

REGULATIONS FOR DISPOSAL OF EXCAVATED MATERIALS,
CLEARING AND GRUBBING DEBRIS AND CONSTRUCTION SITE REFUSE
AT GUDE LANDFILL
ROCKVILLE, MARYLAND

Dispose of excavated materials, construction site refuse and clearing and grubbing debris at the Gude Landfill in accordance with the following regulations:

1. All vehicles are required to secure a landfill permit tag. The tag will be provided at no charge by:

Montgomery County
Department of Environmental Protection
Division of Solid Waste Management
16650 Crabbs Branch Way
Rockville, Maryland 20855

Such tag shall be valid for a period of one year beginning on July 1 of each year. Tags are not transferable and are to be attached to the front of each vehicle above or below the State License plate or at a visible location on the bumper. Vehicles without permit tags will not be permitted to use the landfill facilities. All vehicles required to obtain landfill permit tags must display the tare weight (empty weight with driver) in a manner visible to the operator of the scales. The tare weight will be determined by the County.

2. Normal operating hours for the landfill are 7:30 A.M. to 6:00 P.M., Monday through Saturday. Disposal at other times will be arranged through the Montgomery County Division of Solid Waste Management.

3. The projected date for closure of the landfill for disposal of refuse and debris is June 30, 1982. Disposal of excavated earth and rock materials beyond June 30, 1982 will be arranged through the Montgomery County Division of Solid Waste Management.

4. All vehicles transporting refuse are to comply with provisions of Chapter 87 of the Montgomery County Code, 1965 as amended. Violators may be prohibited the use of the County refuse disposal facilities.

180091

NEW:AM:3
101-F-1

5. Keep refuse debris or excavated materials in vehicles suitably covered or enclosed at all times to prevent the littering of streets and highways. Covers are to be removed only while in the discharging areas and are not to be removed on access roads or scales.

6. All vehicles are to observe and obey posted speed limit, directional signs and any other posted notices.

7. All vehicles approaching the platform scales are to obey the traffic signals and shall drive onto the scale at a slow speed, so as not to damage the scales.

8. Operators or other persons on vehicles are not to be allowed in any part of the landfill except the discharge areas.

9. Vehicles are not to be parked and/or left unattended at any time on the access roads of the landfill site except in designated parking areas.

10. No smoking is allowed in the discharge areas of the landfill.

11. Lighting of fires and burning for any purpose on the landfill are strictly prohibited.

12. Vehicles are required to use discharge areas directed by the discharge attendant.

13. Scavenging or junking on the landfill is prohibited at all times.

14. All haulers are to immediately clean up any spillage they create on the access roads or scale.

15. Use of alcoholic beverages on any part of the County property is strictly prohibited.

16. Construction site refuse and clearing and grubbing debris shall not be mixed nor hauled with excavated earth and rock materials. Construction site refuse, clearing and grubbing debris and excavated materials resulting from construction operations will be accepted for disposal at the landfill at no charge through the projected operating period of the landfill.

Trucks carrying refuse and debris shall be weighed on the County scales before dumping any materials at the landfill at location designated by the discharge attendant. Trucks carrying excavated earth and rock materials will not be weighed.

NEW: AM:3
101-F-2

180091

Excavated earth and rock materials shall be further separated, insofar as is practical, into the following types:

1. Earth excavation materials.
2. Rock materials excavated by blasting.
3. Rock materials excavated by rock excavation equipment.

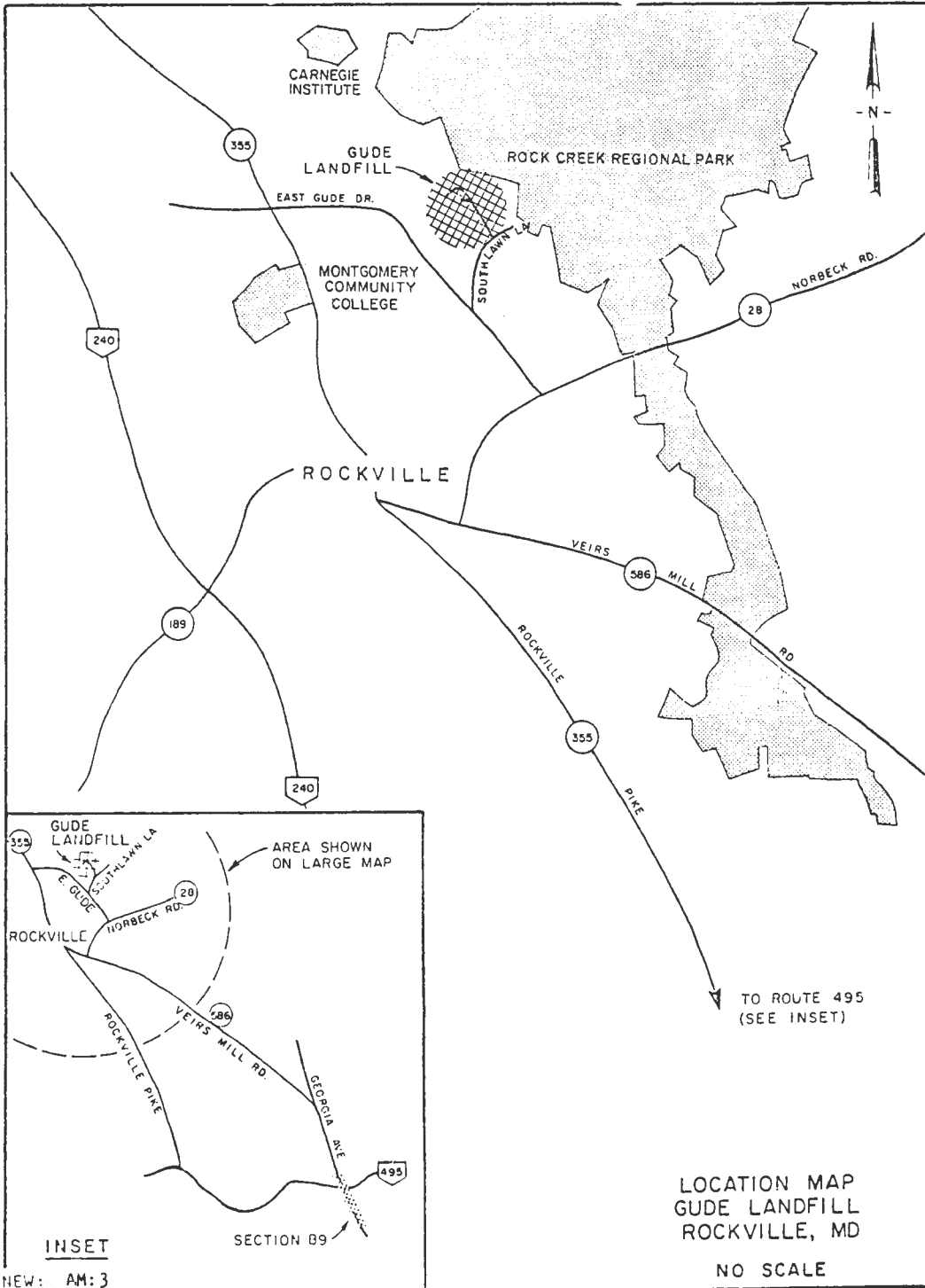
Separate dumping areas will be designated for each material by the discharge attendant.

17. Materials not acceptable for disposal at the landfill include the following:

1. Motor vehicles of any type or large parts thereof which include but shall not be limited to engines, drive trains, frames and major body parts such as fenders, doors, hoods, bumpers.
2. Explosives of any type.
3. Flammable liquids.
4. Materials, the handling of which would constitute a hazard to the landfill operating personnel or equipment.
5. Motor vehicle tires.

180091

NEW: AM:3
101-F-3



101-F-4*

18091

<u>Item No</u>	<u>Spec. Sect.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Estimated Amount</u>
51	1601 1602 1603 1604 1605 1606 1610 1613 1614 1617 1620 1621	Electrical Work	1	LS		\$ _____
52		<input type="checkbox"/> Disposal Procedure Using Standard Disposal Option				
	236	<input type="checkbox"/> Disposal Procedure Using Gude Landfill Option	1	LS (Credit)		\$ _____
TOTAL BASE BID PRICE FOR ITEMS 1 THROUGH 52 INCLUSIVE						\$ _____

NOTES TO BIDDERS:

1. All extension of the unit prices shown will be subject to verification by the Authority. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.
2. All quantities are estimated except where the item is given as Lump Sum.
3. The Contract will be awarded on the basis of the total lowest responsive and responsible Base Bid.
4. Failure to bid on all items will necessitate rejection of the bid.
5. Payment to the Contractor, if any, from Item 4, Safety Awareness Program Fund, will be determined pursuant to Article 7, B, of Section 101, General Requirements. Any monies remaining in this fund after such determination will be retained by the Authority.
6. Payment limits are shown on Drawings M400-162 through M400-173. These limits are indicative of the separation between pay items and are not to be construed as the actual configuration of the various structural elements which are defined on the plans. Payment for the various pay items is to be inclusive of all the work necessary to provide a functional facility as shown on the plans.
7. Indicate the disposal procedure to be used by checking the appropriate box in item 52.

11-10*
Reissued AM:1
Revised AM:3

180091



Montgomery County Government

February 28, 1980



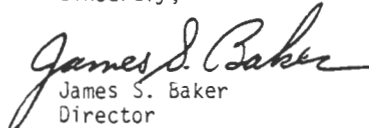
Mr. John S. Egbert
Assistant General Manager
Design and Construction
Washington Metropolitan
Area Transit Authority
600 Fifth Street, N.W.
Washington, D.C. 20001

Re: Disposal of Excavated Materials,
Clearing and Grubbing Debris and
Construction Site Refuse at
Gude Landfill
WMATA Contract No. 180091

Dear Mr. Egbert:

We agree to allow disposal of excavated materials, clearing and grubbing debris and construction site refuse from Contract 180091, in accordance with our requirements enclosed herein.

Sincerely,


James S. Baker
Director

JSB:ARB:pal

Enclosure

Department of Environmental Protection, Office of the Director

6110 Executive Boulevard, Room 338, Rockville, Maryland 20852, 301 468-4071

REFERENCES

1. Haley & Aldrich, Inc., "Muck Utilization Planning - Urban Transportation Tunneling: A Handbook of Rational Practices for Planners and Designers", Report No. UMTA-MA-06-0025-77-11, May 1977.
2. Haley & Aldrich, Inc., "Muck Utilization in Urban Transportation Process", Report No. UMTA-MA-06-0025-77-15, December 1977.
3. Haley & Aldrich, Inc., "Report on Technical Data and Assessment of Muck Characteristics, Muck Utilization Study, Glenmont Route B009-B012, Washington, D.C.", for WMATA, September 1979.
4. Harrington, Lacy & Associates, "Phase I Preliminary Site Investigation, Rockville Quarry Balefill, Montgomery County, Maryland", for Rockville Crushed Stone, Inc., October 1979.
5. Massachusetts Bay Transportation Authority, Contract Documents, Red Line Extension - Northwest, Contract 091-105, Part B, Cambridge City Dump and Materials Handling, 1980.
6. WMATA, "General Provisions and Standard Specifications for Construction Projects", 1973.
7. WMATA, "Special Provisions, Glenmont Route, Forest Glen Station and Line, Section B009, Contract 1B0091, Project B009", February 1980.



