R. W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

01 October 2009

Geoffrey R. Aleva, P.E.
Civil Consultants
P.O. Box 100
South Berwick, Maine 03906-0010

Subject: Geotechnical Evaluation
Proposed Scrap Metal Recycling Facility
Portland, Maine
RWG&A Project No. 427-49

Dear Mr. Aleva:

R. W. Gillespie & Associates, Inc., (RWG&A) is pleased to present the results of our geotechnical evaluation for Prolerized New England Company, LLC's proposed scrap metal recycling facility located on Riverside Street in Portland, Maine. This work was performed in general accordance with RWG&A's revised proposal to you dated 08 April 2009 (note: RWG&A Proposal No. P-6512GI). The purpose of the geotechnical evaluation was to obtain information regarding subsurface soil conditions and properties on which to provide recommendations for design and construction of a stormwater management pond, truck scales, building foundations, ground floor slabs, flexible pavements inside buildings, and seismic characteristics.

The attached report presents the results of RWG&A's subsurface explorations, laboratory testing, and engineering evaluations, and provides geotechnical design recommendations. In summary, subsurface conditions generally consist of either fill or topsoil over naturally deposited silty clay and silty sand extending to refusal. Up to 3 feet of fill was encountered in explorations performed in the proposed office, processing, and bailer building; up to 6 feet of fill was encountered in boring B-8 in the proposed flat auto storage building; and, up to 14 feet of fill was encountered in explorations in the proposed stormwater management pond footprint. Groundwater was not observed in the test borings.

Existing fill should be removed in its entirety and replaced with compacted structural fill beneath proposed building locations. The proposed office, processing, and bailer building area

should be preloaded to reduce post-construction settlement. The proposed buildings may be supported on spread and/or continuous footings bearing on structural fill and/or naturally deposited soils, and the floors may be slab-on-grade construction. Although groundwater was not observed in the test borings, surface water is expected to perch on top of naturally deposited silty clay soils near exterior finish grades and collect in perimeter foundation backfill. Therefore, perimeter foundation drainage is recommended. Test pits and proofrolling should be performed to evaluate existing fill beneath stormwater management pond subgrade

We have enjoyed working with Civil Consultants on this project. If you have any questions or if we may be of further service, please contact us.

Very truly yours,
R. W. GILLESPIE & ASSOCIATES, INC.

Scott R. Dixon, P.E., C.G.
Senior Geotechnical Engineer

Robert W. Gillespie, P.E.
Principal Geotechnical Engineer

SRD/EJW/RWG:md
In quadruplicate

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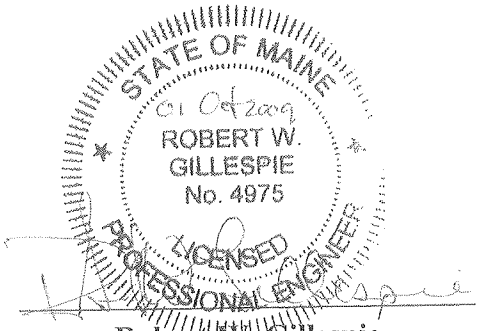
Report
of
GEOTECHNICAL EVALUATION
for
PROPOSED SCRAP METAL RECYCLING FACILITY
PORTLAND, MAINE

Prepared
for
CIVIL CONSULTANTS
SOUTH BERWICK, MAINE

Prepared
by
R. W. GILLESPIE & ASSOCIATES, INC.
SACO, MAINE



Robert W. Gillespie
Maine PE No. 4975

RWG&A Project No. 427-49

01 October 2009

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1.0 INTRODUCTION

1.1 Background

The proposed buildings are part of a project to redevelop an approximately 12.9 acre parcel that is located within a larger, 53.5-acre property formerly occupied by the Lucas Tree Expert Co., facility. The property is located at 636 Riverside Street. Our understanding of the current site conditions and proposed construction is based on communications with Civil Consultants and review of the following documents:

- Sheet No. C-2, titled "Site Plan," dated 14 February 2008, revised 06 November 2008, prepared by Civil Consultants.
- Sheet No. C-3, titled "Site Plan," dated 04 September 2009, of the 2009 Sitework Contract bid set plans, prepared by Civil Consultants.
- Sheet No. A-100, titled "Proposed Building Elevations," dated 02 July 2007, prepared by Civil Consultants.

Sheet C-2 shows a combined office, metal recycling processing, and bailer building in the central part of the site, a non-ferrous storage building at the east side of the site, and a flat auto storage building in the west part of the site. It is understood that the buildings will be pre-engineered, metal buildings with ground floor slabs and no below grade spaces. The plans indicate the office, processing, and bailer building will be two stories high. The non-ferrous storage and flat auto storage buildings will be three-sided structures. It is understood that the bailer area and the flat auto storage building will not be constructed as part of initial site and building development. Flexible asphalt pavements are proposed to be used in the processing and bailer areas and at the flat auto storage building. The non-ferrous storage building is proposed to have a concrete ground floor slab.

Additional building design information such as foundation locations, column spacings, structural loads, settlement tolerances of the structures or manufacturing equipment, and other special design features were not available when this report was prepared. Evaluation and recommendations presented are based on column loads of 60 kips and tolerable total settlements of 1-inch and tolerable differential settlements of 3/4-inch between adjacent columns. R.W. Gillespie & Associates, Inc. (RWG&A) should be notified if the design loads or tolerable settlement amounts (Note: as determined by the building designers) or site grading differ from those in geotechnical evaluations.

The proposed stormwater management pond is located in the west part of the site at the top of an existing fill slope pitched at about 2 horizontal to 1 vertical. The pond bottom elevation is 57 feet which is about 7 feet below current ground surface and the top of the perimeter containment berm would be at elevation 66 feet which corresponds to about 2 feet above existing grade.

RWG&A conducted test pit explorations at the site in June 2007 as part of a geotechnical investigation for design and construction of onsite pavement sections (RWG&A Project No. 427-44). Refer to the Report of Geotechnical Investigation dated 21 August 2007 for additional information. Logs of explorations from the August 2007 report are provided in Appendix B for informational purposes only.

1.2 Scope

This evaluation was performed to develop site-specific soil and laboratory data, and to make geotechnical evaluations for the proposed construction. As performed, our scope of services included the following items:

- Prepared a program of subsurface explorations to obtain information for foundation and earthwork design.
- Arranged to have the subsurface explorations performed by a local contractor. Provided technical monitoring of the exploration activities so that depths, locations, and sampling methods could be modified in response to the subsurface conditions encountered.
- Performed laboratory tests on selected soil samples recovered from the subsurface explorations to aid in soil description and for determination of engineering properties needed for foundation design and site development evaluations.
- Conducted engineering evaluations of the geotechnical aspects of foundation and slab design, and stormwater management pond design and location.
- Prepared this report presenting the findings, conclusions, and recommendations of the geotechnical evaluation.

As requested by Civil Consultants, three of the four soil borings planned for the flat auto storage building were removed from the field exploration program since the building will not be constructed as part of initial site development. It is understood that additional explorations and geotechnical evaluations will be needed prior to final design and construction of the flat auto storage building.

RWG&A's scope of services for this geotechnical evaluation did not include an Environmental Site Assessment relative to oil and hazardous materials or evidence of a potential release or threat of oil or hazardous materials on, below, or around the site, nor an assessment of their impacts on site development. Any statement in this report, or on the exploration logs, regarding odors or unusual or suspicious conditions is for informational purposes only and is not intended to constitute an environmental assessment.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of eleven test borings designated B-1 through B-8 and B-12 through B-14 drilled during 12 to 14 August 2009 by Northern Test Borings, Inc., of Gorham, Maine, using a track-mounted drill rig. The test borings were advanced to depths ranging from 17 to 42.3 feet below local ground surface. Split-barrel sampling with standard penetration testing (*ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*) was performed at approximately 5-foot intervals. Borings B-1 through B-6 and B-14 were advanced with hollow stem augers. Borings B-7, B-8, B-12, and B-13 were advanced with wash rotary techniques within steel cased and/or open boreholes. In lieu of split-barrel sampling, field vane tests (ASTM D2573, *Standard Test Method for Field Vane Shear Test in Cohesive Soil*) were performed in stiff to soft cohesive soils encountered in borings B-7, B-12, and B-13. Two thin-walled tubes samples (ASTM D1587, *Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils*) of medium stiff to soft cohesive soils were taken in boring B-7.

Exploration activities were coordinated and monitored by RWG&A personnel who prepared the exploration logs. The soils were described in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).* Logs of the test boring explorations are included in Appendix A. Logs of test pit explorations are provided in Appendix B for informational purposes only. The descriptions represent RWG&A's interpretation of subsurface conditions at the exploration location on the particular date the explorations were made. Stratification lines shown on the exploration logs represent the estimated boundaries between the different soil types encountered and approximate refusal depths; the actual transitions will be more gradual and vary over short distances.

Figure 2, *Exploration Location Plan*, shows the locations of the test boring and June 2007 test pit explorations. Exploration locations were selected by RWG&A prior to drilling and were surveyed in the field by Civil Consultants, except for boring B-1 which was estimated by RWG&A by taping and/or pacing from features visible at ground surface and shown on plans provided to us. Exploration locations should be considered accurate only to the degree implied by the methodology used to determine them.

3.0 LABORATORY TESTING

Laboratory testing was performed on select soil samples recovered from the explorations to aid in soil description and for determination of engineering properties for use in foundation design and site development analysis. The laboratory testing program consisted of sieve analyses, natural moisture content determinations, measurements of undrained shear strength using a Geonor vane tester, and a one-dimensional consolidation test. The tests were performed in general accordance with the following methods and procedures:

- *ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.*
- *ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.*
- *ASTM D2435, Standard Test Method for One-Dimensional Consolidation Properties of Soils.*

The Geonor® vane shear strength tests were performed in accordance with the equipment manufacturer's recommended procedures. Moisture content test results are presented on the exploration logs. Results of the other laboratory tests are presented in Appendix C, *Laboratory Test Results*. All tests were conducted at the RWG&A soil and materials testing laboratory in Saco, Maine, which is accredited by the American Association of State Highway and Transportation Officials (AASHTO) for the test performed.

4.0 SUBSURFACE CONDITIONS

4.1 Subsurface Soils

Four different soil units were encountered in the explorations: topsoil, fill, silty clay, and silty sand. In general, the conditions encountered consisted of either fill or topsoil at current ground surface underlain by silt clay marine deposits, which in turn are underlain by silty sand extending to refusal. A layer of topsoil ranging from approximately 4 to 9 inches thick was encountered at the ground surface at borings B-1, B-2, B-3, B-5, and B-6. Fill was encountered at ground surface at the remaining boring locations, and underlying topsoil at borings B-2 and B-5. Fill extended to depths below current ground surface ranging from 1.5 feet at B-2 and B-4 to 14 feet at B-13. Fill generally consisted of silty sand with gravel; fill encountered at borings B-8 and B-12 contained wood, organic matter, pieces of asphalt, and pockets of silty clay. A fill layer of sandy silt with clay was encountered from about 10 to 14 feet depth at boring B-13.

Where drilling advanced through the entire layer, naturally deposited silty clay soils of marine origin ranged from about 22 feet thick at B-1 to 33 feet thick at B-7. A layer of silty sand

underlying silty clay ranged from about 1.5 to 7 feet thick. The consistency of silty clay soils was typically stiff in the upper part of the deposit and became softer with increasing depth.

Five explorations (Note: B-1, B-7, B-8, B12, and B-13) were extended to refusal at depths of about 26.5 to 42.3 feet below current ground surface. The refusal surfaces are interpreted to represent either possible bedrock or boulders/cobbles in glacial till. Please refer to the test boring exploration logs in Appendix A for detailed descriptions at specific locations.

Buried construction debris was encountered in test pits RWG&A conducted in June 2007 as part of a geotechnical investigation for design and construction of onsite pavement sections (RWG&A Project No. 427-44). Please refer to the test pit exploration logs in Appendix B for detailed descriptions at specific locations.

4.2 Groundwater

Free water was not observed in the test borings. Although groundwater was not observed in the test borings, infiltrated surface water is expected to perch on top of naturally deposited silty clay soils near exterior finish grades and collect in perimeter foundation backfill. In general, groundwater levels at the site will fluctuate due to season, temperature, rainfall and construction activity in the area.

5.0 EVALUATION OF GEOTECHNICAL DATA

5.1 General

Engineering evaluations for this project are based on the subsurface explorations, laboratory testing data, and the conceptual construction information currently available to RWG&A. This report is considered suitable for planning and design of the office and processing building, the non-ferrous storage building, and the stormwater management pond, and considered suitable for planning of the bailer addition, flat auto storage building, and truck scales. It is recommended foundation design and construction be in compliance with the requirements of all applicable ordinances, regulations, and codes.

5.2 Proposed Construction

It is understood that the buildings will be pre-engineered, metal buildings with ground floor slabs and no below grade spaces. The plans indicate the office, processing, and bailer building will be two stories high and have a finished floor elevation at 75.5 feet, which ranges from approximately 1.5 feet to 7.5 feet above current ground surface. It is understood that flexible

asphalt pavement is planned in the processing and bailer areas. The office and processing part of the building will be approximately 60 feet by 180 feet in plan area and the bailer area will be approximately 80 feet by 100 feet in plan. The bailer area is planned as a future addition to the office and processing building.

The non-ferrous storage building will be a three-sided structure approximately 130 feet by 30 feet in plan area with five storage bins. Proposed finished floor level is elevation 74 feet which is 1 to 2 feet above existing ground surface. The east wall of the building would retain about 6 feet of fill. Plans indicate that reinforced concrete pavement is proposed at the non-ferrous storage building. The flat auto storage building will have a plan area of 50 feet by 80 feet and will be a three-sided structure. The proposed ground floor elevation of 68 feet is approximately 2 feet above current grades. Flexible asphalt pavement is planned at the flat auto storage building. The flat auto storage building is planned as a future addition to the site. Both storage buildings are planned to be unheated.

Additional building design information such as foundation locations, column spacings, structural loads, settlement tolerances of the structure or manufacturing equipment, and other special design features were not available when this report was prepared. Footing settlement for the office and processing building was estimated using a maximum column loading of 60 kips, with allowable total post-construction settlement of 1-inch and post-construction differental settlement of 3/4-inch between adjacent columns. RWG&A should be notified if the design loads or tolerable settlement amounts (Note: as determined by the building designers) or site grading differ from those in geotechnical evaluations.

The proposed stormwater management pond is located in the west part of the site at the top of a fill slope pitched at about 2 horizontal to 1 vertical. Inside slopes will be pitched no steeper than 3H:1V. The pond bottom elevation is 57 feet which is about 7 feet below current ground surface and the top of the perimeter containment berm would be at elevation 66 feet which corresponds to about 2 feet above existing grade.

5.3 Pavement Design Considerations

Loader traffic and AASHTO methods assuming one Caterpillar, Inc., Model 980 rubber-tired wheel loader, operating continuously, 12 hours per day, 6 days per week were used to evaluate pavement sections for the interior ground floor surfaces. It is RWG&A's opinion that concrete ground floor slabs designed to support proposed loading will perform better (e.g., less rutting, shoving, delaminating, etc.) and require less maintenance than flexible asphalt pavement.

The AASHTO method uses equivalent single axle loads (ESAL) to determine both rigid and flexible pavement thicknesses. The ESALs are calculated by converting given axle loads into

18,000 pound axle loads using AASHTO methods. Silty clay is expected at subgrade beneath flexible pavement inside the processing and bailer areas. Pavement sections were developed using a CBR value of 3 for silty clay. The following table shows the ESALs calculated for both 10 year and 20 year design life.

Design Life	Heavy Duty Rigid Pavement	Heavy Duty Flexible Pavement
10 Years	10,300,000	9,300,000
20 Years	20,500,000	18,600,000

The AASHTO method uses pavement serviceability index, which is an indicator of the level of service provided to users; the index is related to cracking, patching, and rut depth. An initial pavement serviceability index of 4.2 for new pavement and a terminal serviceability index of 2.0 were used in evaluations. The terminal serviceability index of 2.0 corresponds to 85 percent of drivers/passengers rating the pavement and ride condition as unacceptable.

The on-site soils are highly to moderately frost susceptible. In the event that some portions of the processing and bailer building are exposed to freezing temperatures, full-depth frost protection of interior pavements exposed to freezing temperatures would require a total pavement section of about 4 feet.

5.4 Foundation Considerations

Fill was encountered in four of the borings in the proposed office, processing, and bailer building footprint (Note: B-2, B-4, B-5, and B-7), and extended to depths of about 1.5 to 3 feet below current ground surface. Fill extended to depths of about 6 feet below current ground surface at boring B-8 in the proposed flat auto storage building footprint, and at boring B-14 near the proposed truck scales locations. Subgrade preparation prior to placement of this existing fill in areas of proposed construction, and methods used to place and compact the fill are uncertain. Existing fills encountered in explorations are not considered suitable to support shallow spread or column footing foundations. Since site preparation earthwork and building construction might occur independently of one another, and foundation dimensions and locations are uncertain at this time, RWG&A recommends that the fill beneath proposed buildings and scales should be excavated to naturally deposited, inorganic soil and replaced with compacted structural fill.

With appropriate site preparation, the naturally deposited soils or compacted structural fill are considered suitable for support of conventional spread footing foundations. Post-construction total and differential settlements of less than 1-inch and 3/4-inch between columns, respectively,

are expected in areas where less than about 5.5 feet of new fill is placed to achieve design final grades. In areas where more than about 5.5 feet of new fill is planned, the new loads from fill and building foundations are expected to induce consolidation in underlying silty clay marine deposits on the order of 1 to 2 inches. RWG&A recommends a delay in office, processing, and bailer building foundation construction following placement of new fill up to proposed finished floor level to reduce post-construction settlement. It is estimated that a preload duration of approximately 1 to 2 months would be needed.

Settlement platforms should be used to determine the amount and rate of settlement that occurs and to verify conclusion of the preload period. Two suggested settlement platform locations, with each location consisting of a deep and surface settlement platform pair, are indicated on Figure 2; typical installation details of the settlement platforms are shown on Figure 3. It should be noted that the above preload duration does not include the time to place the fill. The estimated preload duration is approximate; the actual duration may be shorter or longer. To the extent practicable, it is recommended that the preload fill be placed early in the construction schedule and left in place as long as possible

The future location of planned buildings should be considered relative to the locations of currently planned site improvements. Construction activities expected for future building additions, such as overexcavation and replacement of unsuitable fill soils beneath buildings and preloading, should be considered in project planning. Future earthwork should not be allowed to disturb or undermine existing structures or the stormwater management pond.

5.5 Foundation Drainage

Although groundwater was not observed in the subsurface explorations, it is anticipated that infiltrated surface water and/or seasonal high groundwater will tend to perch on native soils and collect around building foundations. It is recommended perimeter footing drains be provided around the proposed buildings and scales to reduce accumulation of water and fugitive moisture.

5.6 Interior Areas Exposed to Freezing Temperatures

Due to open-sided construction at the non-ferrous and flat auto storage buildings, it is anticipated that interior locations might be exposed to freezing temperatures; portions of the processing and bailer building, such as near traffic entrances, might also be exposed to freezing temperatures. Footings in these buildings exposed to freezing temperatures should be constructed 4 feet below finish floor for frost protection. Interior floor surfaces exposed to freezing temperatures where frost heaving would be problematic should be underlain by a minimum of 4 feet of structural fill or recommended pavement section base materials.

5.7 Stormwater Management Pond

Proposed grading for the stormwater management pond indicates that cuts for pond subgrade will extend into uncontrolled fill containing pervious sands (Note: encountered at borings B-12 and B-13). The pond bottom and sides should be lined with textured low linear density polyethylene (LLDPE) underlain by18 inches of compacted clay. Liner design and construction considerations include venting of gases below the liner due to fluctuating groundwater levels below the liner, protection against uplift due to hydrostatic pressure from groundwater, liner protection against damage during construction and maintenance, pipe and other structure penetrations through the liner, and stability of fill overlying the liner.

Based on grading provided on site plans, the pitch of the existing fill slope located west of the proposed pond footprint varies from about 1.6H:1V (Note: horizontal to vertical) to 1.9H:1V. This slope is susceptible to shallow surface sloughing at its current pitch. Alternatives to improve slope stability include decreasing slope pitch, excavating and replacing existing fill with compacted and/or reinforced fill, and placing a layer of riprap on the slope surface. Based on communications with Civil Consultants, it is understood that grading the existing slope to 2H:1V and placing a layer of riprap is the preferred alternative for slope protection.

5.8 Construction Considerations

Site Preparation: Up to 3 feet of fill was encountered in explorations performed in the proposed office, processing, and bailer building; up to 6 feet of fill was encountered in boring B-8 in the proposed flat auto storage building and boring B-14 at the truck scales locations; and, up to 14 feet of fill was encountered in explorations in the proposed stormwater management pond footprint. The composition of, and methods used to place and compact the fill are uncertain. Fill containing organic material was encountered in borings B-8 and B-12. RWG&A recommends that existing fill be removed in its entirety and replaced with compacted structural fill beneath proposed buildings in a zone extending at a 1H:1V line down and outward from building perimeter to the top of the naturally deposited, inorganic soil or a minimum of 10 feet laterally from the building perimeter, whichever is greater.

RWG&A recommends that test pits and proofrolling be performed to evaluate existing fill beneath the stormwater management pond subgrade to evaluate if fill is suitable to remain in place or needs to be excavated and replaced with suitable materials. Identified areas of loose fill, organic material, and/or areas that yield excessively during proof rolling should be over excavated and replaced with structural fill. Test pits should also be backfilled with compacted fill

Both existing fill and native soils have high fines (i.e., silty and clay particles) contents and are expected to be susceptible to disturbance by construction traffic where exposed at subgrade prior to

fill placement or foundation construction. It is the Contractor's responsibility to maintain the integrity of exposed subgrade soils for subsequent construction activities. Exposed subgrade soils disturbed prior to foundation construction should be removed and replaced with compacted structural fill.

Construction Dewatering: The on-site soils are very sensitive to disturbance when wet. To reduce disturbance of exposed subgrade soils, it will be important to divert runoff, provide positive grading to shed seepage and runoff from flat areas, and compact exposed soils to reduce rutting, ponding, and surface water infiltration.

Groundwater was not observed in the explorations. If required, RWG&A anticipates groundwater control can be accomplished through the use of ditches, sumps, and open pumping. Temporary detention ponds, trenches, ditches, and dewatering sumps should not be made within or near areas to be filled.

Use of On-site Soils: It is anticipated that the surficial topsoil will be stripped and either incorporated into proposed landscaped areas, where practical, or hauled off-site. Topsoil and organic materials are not considered suitable for use as common fill.

The on-site, inorganic fill soils are considered suitable for use as common fill beneath landscaped areas, but are not suitable for use beneath or within 10 feet of buildings. Structural fill should be used as fill beneath the proposed and future buildings up to design floor slab or interior pavement section base.

The naturally deposited soils from foundation and pond excavations will generally consist of sandy, silty, clayey soils that are not suitable for use in pavement sections or as structural fill but, with proper moisture conditioning and earthwork handling, might be used as common fill in landscaped areas. If on-site fill or naturally deposited soil is proposed for use other than common fill, the soil should be stockpiled separately and tested to determine if it meets specification requirements for its intended use.

The sandy, silty, clayey soils are moisture sensitive due to their high fines content and will be difficult to place and compact when they are wet. Moisture-density relationships should be established during construction to provide guidance for appropriate working moisture contents. Working moisture content for moisture sensitive soils typically ranges from about minus three to plus one percent of optimum moisture content.

6.0 RECOMMENDATIONS

The recommendations presented below are provided for use in planning and design of new building foundations, ground floor slab, and interior pavements at the office and processing building and the non-ferrous storage building, and of the stormwater management pond at Prolerized New England Co., LLC's proposed scrap metal recycling facility. The recommendations are considered suitable for planning of the bailer addition, flat auto storage building, and truck scales. RWG&A recommends foundation design and construction be in compliance with the requirements of all applicable ordinances, regulations, and rules. Currently, it is understood that the adopted building code for the City of Portland and for this project is the 2003 *International Building Code*® (IBC 2003)

6.1 Site Preparation

1. All topsoil, peat, organic material, debris, rubbish, frozen soils, muck, loose, or disturbed soils and other unsuitable materials should be removed from areas within 10 feet of proposed buildings. Topsoil may be stockpiled outside the construction area for reuse in landscaped areas. Unsuitable materials include uncontrolled fills (i.e., fills placed without systematic densification and moisture control to an acceptable in-place density), asphaltic pavement, and deleterious substances.

   The existing fill beneath proposed buildings and scale foundations should be excavated down to naturally deposited, inorganic soil and replaced with compacted structural fill in a zone defined by a 1H:1V line extending down and outward from building perimeter to the top of the naturally deposited, inorganic soil or a minimum of 10 feet laterally from the building perimeter, whichever is greater. Excavations in naturally deposited silty clay should be made with equipment fitted with smooth-edged buckets

   A combination of test pits and proof rolling should be performed in the proposed stormwater management pond area to evaluate existing on-site fill for reuse either as fill to remain in place, or as fill to be excavated, placed, and compacted at other locations. Test pits should be performed at a frequency of one per every 2,000 square feet of the pond footprint and be advanced to naturally deposited, inorganic soil. Identified areas of loose fill, organic material, and/or areas that yield excessively during proof rolling should be over excavated and replaced with compacted structural fill.

   After the topsoil and unsuitable fill have been removed from the proposed building areas, the subgrade should be compacted with several passes each way with a vibratory, smooth drum compactor and be proof rolled with a fully loaded dump truck prior to the placement

of new fill. If high groundwater is present during subgrade preparation, then the subgrades should be compacted with a smooth drum roller in the "static" mode only. Naturally deposited silty clay should not be proofrolled. Soft areas or areas that yield excessively during proofrolling should be overexcavated and replaced with compacted structural fill.

2. Site grading should provide positive drainage away from constructed facilities both during and after construction.

3. Depending on the depths of excavations and season, dewatering might be needed. It should be practical to dewater excavations extending to 1 foot below groundwater by open pumping methods. Excavations deeper than 1 foot below groundwater may require the use of side trenches within or adjacent to excavations, or other dewatering methods. Surface runoff and infiltration of groundwater should be controlled so that excavation, filling, and foundation construction can be completed in-the-dry.

6.2 Site Filling

4. The on-site inorganic soils are not suitable for use in pavement sections or as structural fill but may be used as common fill in landscaped areas. In addition, the on-site inorganic soils are generally highly frost susceptible and moisture sensitive and will be difficult to place and compact. The moisture content will need to be tightly controlled for placement and compaction to the required density without excessive weaving, pumping, or other types of instability.

5. Common fill should consist of inorganic mineral soil free of ice, loam, organic, or other unsuitable materials. Common fill may contain cobbles up to 2/3 of the lift thicknesses used to place and compact it; recommended maximum lift thickness for common fill before compaction is 12 inches.

6. Only compacted structural fill is recommended for use as fill beneath the proposed buildings up to floor section subgrade and as backfill around foundations. Compacted structural fill below the building should extend to the lateral limits defined by a 1H:1V line extending down and outward from building perimeter to the top of the naturally deposited, inorganic soil or a minimum of 10 feet laterally from the building perimeter, whichever is greater.

7. Structural fill should be a well-graded sand and gravel mixture free of roots, topsoil, loam, organic material, and any other deleterious materials, as well as clods of silt or clay, and meet the following gradation requirements:

Screen or Sieve Size	Percent Passing
6 inches	100
3 inches	70 - 100
No. 4	35-70
No. 40	5-35
No. 200	0-5

(Note: Maximum particle size should be limited to 3 inches within 2 feet of foundation walls, footings, and floor slabs.)

8. In open areas, structural fill should be placed in level, uniform lifts not exceeding 12 inches in uncompacted thickness and be compacted with self-propelled compaction equipment. In confined areas and within 4 feet of foundation walls, structural fill should be placed in lifts not exceeding 6 inches in uncompacted thickness and be compacted with hand-operated compaction equipment. All fill placed for footing and slab support should be structural fill compacted to at least 95 percent of the maximum dry density as determined by *ASTM Standard D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))*.

9. Fill required for the proposed office, processing, and bailer building should be placed to subgrade level early in the construction schedule to preload underlying silty clay marine deposits and reduce post-construction settlement of building foundations. The area for preload fill placement should extend a minimum of 20 feet laterally outside the building perimeter.

10. Settlement platforms to measure the rate and amount of settlement should be installed before fill placement. Planned locations of the settlement platforms are indicated on Figure 2; details are shown on Figure 3. The deep settlement platforms should be set on undisturbed, native soil subgrade. Fill should be placed to seat the settlement platform bases prior to taking initial survey readings. Depending on fill thickness, the settlement platforms might need to be extended as the filling progresses.

11. Platform and top of fill elevations should be surveyed at each location twice per week during placement of permanent fill, and for a period of one month, followed by a frequency of twice per month thereafter for the duration of the preload. Scheduled settlement readings should be taken by RWG&A. The Owner's project surveyor might also take independent readings when requested. Survey readings should be evaluated by RWG&A to determine when the preload period can be concluded. It is estimated that a preload duration of

approximately 1 to 2 months would be needed. The Contractor should be responsible for protecting the settlement platforms from damage and vandalism.

12. The above estimated preload duration is considered approximate; the actual duration of the preload period might be shorter or longer and will depend on the amount and rate of settlement as determined by the settlement platforms. Estimated preload duration was based on fill with an average, in-place total (i.e., moist) unit weight of 125 to 135 pounds per cubic foot. Fill with a higher or lower unit weight will require re-evaluation and changes to the preload duration. In any event, the preload period should continue until RWG&A indicates in writing that it can be concluded.

6.3 Foundations

13. With proper site preparation, the proposed buildings may be supported on spread and/or continuous footings bearing on the naturally deposited materials or compacted structural fill. The footings should be proportioned for an allowable contact pressure of 1,500 pounds per square foot where silty clay is at foundation subgrade and 3,000 pounds per square foot where foundations are underlain by a minimum of 2 feet of compacted structural fill. Total settlements of less than 1-inch and differential settlements of less than 3/4-inch between adjacent columns are anticipated provided that the office and processing building and future bailer building are preloaded and adequate settlement has occurred. Minimum footing width should be in accordance with concrete design and building code requirements, and no less than 2 feet.

14. Final subgrade preparation should include recompaction of fill subgrades with hand-guided, vibratory compaction equipment. Following recompaction and prior to placement of concrete, care should be taken to limit disturbance of the bearing surfaces. Any loose, softened, or disturbed material due to construction traffic should be removed prior to placement of concrete. Native soil subgrades are moisture sensitive and expected to be susceptible to disturbance from construction traffic; these soils should not be recompacted with vibratory compaction equipment.

15. For heated buildings, it is recommended that design bottom of footing level for exterior footings bearing on structural fill or naturally deposited soil be a minimum of 4 feet below lowest adjacent ground surface exposed to freezing. At heated interior locations, footings may be designed to bear a minimum of 2 feet below top of ground floor slab. If exposure to freezing is anticipated, either during or following construction, then both exterior and interior footings should be placed a minimum of 4 feet below lowest adjacent surface exposed to freezing.

16. The integrity of natural soils and structural fill must be maintained during cold weather conditions. Footing and slab subgrades should not be allowed to freeze. The existing fill and naturally deposited soils are considered moderately to highly frost susceptible. Freezing of subgrade soils beneath footings and floor slabs may result in frost heaving and post-construction settlement. The Contractor should make every effort to prevent freezing of subgrade soils. In the event frost penetration occurs, structural fill or naturally deposited soils should be removed and replaced to the depth of the frozen soils. At no time should frozen material be placed as fill.

17. The building should be designed to withstand lateral, uplift, and overturning forces due to earthquake. The in-place soils encountered in the explorations are not considered susceptible to liquefaction. In accordance with the IBC 2003, the soil profile at the site is classified as Site Class D.

18. Lateral loads from wind and earthquake may be resisted by friction or adhesion between the bottoms of footings and supporting granular or fine-grained subgrades, respectively, and by passive earth pressures against the sides of the foundation. A friction coefficient of 0.35 should be used in design of footings constructed on compacted structural fill, and sliding resistance of 250 psf should be used in design of footings constructed on medium stiff to stiff naturally deposited, inorganic soils. An equivalent fluid pressure of 175 pcf against sides of footings should be used.

19. Only compacted structural fill should be used as backfill of footings, piers, and foundation walls.

6.4 Foundation Drainage

20. Perimeter footing drains should be installed around buildings. The drains should be installed at the exterior bottom of footing level or at least 18 inches below the adjacent finished floor level, whichever is lower. The drains should consist of 4-inch (minimum) diameter perforated pipes bedded in 2 cubic feet of MaineDOT 703.22 Underdrain Backfill material Type C per linear foot. The drainage stone should be completely wrapped in a filter fabric such as Mirafi 140N.

21. Flow from the foundation drains should be conveyed by gravity to a surface drainage feature or storm drain that will be free flowing at all times and under all conditions. Multiple outlets should be provided so as not to be dependent on a single flow path. Roof drains should not be connected to the foundation drains.

6.5 Cast-in-Place Concrete Retaining and Foundation Walls

22. Structural fill should be used as backfill next to retaining walls such as are proposed at the non-ferrous storage building. Only vibratory plate compactors and/or walk behind rollers should be used to compact backfill within 4 feet of retaining and foundation walls.

23. Retaining walls that are able to rotate may be designed for active earth pressure conditions. The walls should be designed to withstand an active equivalent fluid unit weight of 45 pounds per cubic foot ($K_a = 0.33$). Lateral load from vehicle surcharge can be accounted for by applying a uniform vertical pressure equal to 250 pounds per square foot multiplied by the active earth pressure coefficient.

    The above equivalent fluid unit weights assume provisions are made to prevent the rise of water above the bottom of wall (i.e., footing drains) and that the walls are backfilled with structural fill.

24. All fully drained foundation walls with unbalanced earth pressures acting upon them should be designed to withstand an at-rest equivalent fluid unit weight of 65 pounds per square foot ($K_o = 0.5$). Any retaining walls that cannot be allowed to move or are otherwise restrained, such as ones attached to building foundations at loading docks, should be designed for at-rest conditions as well. Lateral load from vehicle surcharge can be accounted for by applying a uniform vertical pressure equal to 250 pounds per square foot multiplied by the at-rest earth pressure coefficient.

25. It is also recommended that retaining walls be designed with the resultant load within the middle third of the footing and that a maximum contact pressure at the toe of wall be no greater than the maximum allowable bearing pressures for the buildings provided above.

6.6 Ground Floor Slabs

26. Interior floor slabs may be slab-on-ground construction based on a subgrade modulus of 150 pounds per cubic inch. The slab should be underlain by a minimum of 12 inches of compacted structural fill. A vapor retarder should be provided below the floor slab to minimize moisture infiltration. It is anticipated design and construction details of the floor slab, including concrete thickness, reinforcing, bedding, control joint depth and spacing, and the vapor retarder type and thickness, will be provided by the project Structural Engineer.

27. Exterior slabs at entrances, vehicle access doors, and other locations should be underlain by a minimum of four feet of underdrain stone. Underdrain stone should consist of *State of Maine Department of Transportation Standard Specifications Revision of December 2002*, 703.22 Underdrain Backfill Material Type C. The surrounding area should be pitched to

drain away in order to reduce available moisture for ice and frost lense generation. The underdrain stone should be completely wrapped in a filter fabric to prevent the migration of fines from surrounding soils.

6.7 Ground Floors in Processing Areas

28. Paved areas inside buildings subject to loader and processing equipment should be provided with the following pavement sections. Pavement sections were developed using AASHTO design methods. Materials and placement methods should meet the current Maine Department of Transportation requirements.

Flexible Pavement

Component	Thickness in Inches	
	10 Year Design Life	20 Year Design Life
Surface Course (MDOT Type 12.5 mm)	2	2
Binder Course (MDOT Type 19 mm)	5	5
Gravel Base (MDOT 703.06 Type A)	12	14
Subbase (Structural Fill[1])	19	22
Totals	38	43

Rigid Pavement

Component	Thickness in Inches	
	10 Year Design Life	20 Year Design Life
Concrete (5000 psi compressive strength)	9	10
Gravel Base (Structural Fill[1])	12	12
Totals	21	22

Specifications are referenced to *State of Maine Department of Transportation Standard Specifications Revision of December 2002.*

[1] Structural Fill requirements provided in Paragraph #7 above.

29. Pavement section subgrade for new paved areas inside proposed buildings should be sloped toward adjacent foundation backfill to provide a drainage path for free water entering the pavement section.

30. Load transfer dowels or other load transfer device should be provided at rigid pavement joints.

6.8 Stormwater Management Pond

31. The detention pond should be lined with textured low linear density polyethylene (LLDPE) liner of 40-mil thickness underlain by a relatively impervious, 18-inch thick, compacted clay liner to reduce seepage through the pond bottom and embankments. The compacted clay should have a maximum permeability of $1x10^{-6}$ centimeter per seconds when tested in accordance with ASTM D 5084 *Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter*. The base of the clay liner should be sloped to reduce gas buildup. A venting medium such as a geonet or sand layer should be placed beneath the entire bottom and side slopes of the pond and vented to the atmosphere, as needed.

    The liner should be installed in accordance with the liner supplier's specifications and applicable ASTM and industry standards. In particular, care should be taken in attaching the liner to protrusions using appropriate gaskets, seals, and boots to prevent water leakage which might lead to internal erosion and eventual failure of the embankment

32. The textured LLDPE liner should be covered with an 18-inch thick layer of soil for protection against ultraviolet light, physical degradation, damage from animals, and pond maintenance equipment. The protective soil cover should consist of a sandy material with a maximum particle size not exceeding 1-inch. Pitch of internal pond embankments should 3H:1V or flatter for soil cover stability. The liner should be extended above the maximum design pond level and provided with an anchor trench around the entire lined area. Venting should be provided to prevent gas buildup at the anchor trench turndown.

33. An underdrain should be provided below the pond liner to reduce hydrostatic pressure from high groundwater. Underdrains should consist of 4-inch diameter perforated pipe (minimum) bedded in 2 cubic feet of MaineDOT 703.22 Underdrain Backfill Material Type C per linear foot and wrapped in a filter fabric. The underdrain system should be provided with a minimum of two outlet pipes so as not to be reliant upon a single flow path. Drains should be outletted by gravity to surface drainage features or storm drains that will be free flowing under all conditions.

34. Pond fill embankments should be constructed by placement and compaction of fill in successive horizontal layers the full width of the design fill section. Each lift in the embankment should be uniform in soil composition. Prior to placement of any fill against existing embankments, the area to receive fill should be wetted or dried, as needed, recompacted, and scarified to provide for proper bonding between existing soils and new fill. Prior to placement of the next lift, the surface of the previously placed lift should be

scarified and wetted or dried, as needed, for proper bonding. Pond embankment fill should consist of material meeting the requirements of MaineDOT 703.19 Granular Borrow Material for Embankment Construction.

35. The crest of the embankment should be pitched toward the inside of the pond to direct runoff to the inside. The crest should be uniform in elevation to prevent runoff from flowing along the crest of the embankment to low places where it could concentrate and cause severe erosion.

36. The embankment slopes should be grassed immediately after final shaping. Slopes should be inspected periodically (twice per year, e.g., April and October) by a qualified representative for signs of seepage, erosion, or sloughing of the embankment. Embankments should be repaired and unstable areas addressed shortly after they occur.

37. The existing fill slope west of the pond should be cleared of vegetation and graded to a pitch of 2H:1V or flatter and covered with a layer of riprap to provide erosion protection and improve surficial slope stability. The riprap layer should be a minimum of 2 feet thick at the toe of slope and taper to a minimum thickness of 1 foot at the top of slope. Riprap should be sound, durable, angular rock with the following gradation:

Particle Size (inches)	Percent of Total Weight Smaller than Given Size
12	100
4	50
1-1/2	10

6.9 Temporary Excavations

38. Soils at this site, encountered within the anticipated depths of excavations, consist of topsoil, fill, and naturally deposited silty sand and silty clay. We anticipate that foundation and utility excavations can be accomplished using sloped, open-cut techniques. It is also anticipated that dewatering can be accomplished using sumps and open pumping methods.

The Contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

As a safety measure, it is recommended that all vehicles and spoil piles be kept a minimum lateral distance from the top of excavations equal to no less than 100 percent of the slope height. Exposed slope faces should be protected against the elements.

6.10 Geotechnical Observation

The geotechnical recommendations provided as the basis for design of this project were developed using limited numbers of observations and tests. The Owner should be sensitive to the potential need for adjustment in the field. We recommend that the Owner retain RWG&A to observe geotechnical construction aspects of the project. These services should include observing general compliance with the design concepts, specifications and recommendations, and assisting in development of design changes should subsurface conditions differ from those anticipated prior to the start of construction. Observation improves the likelihood that the design intent will be carried out during construction. In addition, it allows RWG&A to confirm its design recommendations. For this project, geotechnical observation of the following aspects is recommended:

- Observe site stripping, assess suitability of exposed subgrades, and observe test pits and proofrolling.
- Observe installation of settlement platforms provided and placed by the Contractor.
- Survey settlement platforms. Evaluate rate and amount of settlement, and determine when office and processing building construction may commence.
- Perform laboratory and field testing of structural fill and pavement base and subbase.
- Observe fill placement and compaction.
- Observe installation of pavement.

In addition to geotechnical observation, RWG&A can also provide full service construction inspection and materials testing. This would include soils, portland cement and asphaltic concrete, structural steel and welding inspections, destructive and non-destructive testing, and special inspection services in fulfillment of building code requirements.

7.0 CLOSURE

This report has been prepared for specific application to the building areas and stormwater management pond at the proposed Scrap Metal Recycling Facility in Portland, Maine, for the exclusive use of Civil Consultants. This work has been completed in accordance with generally accepted soil engineering practices. No other warranty, expressed or implied, is made. In the event

that any changes are made in the nature, design, or location of the proposed construction, the conclusions and recommendations of this report should be reviewed by RWG&A.

The recommendations presented are based on the results of widely spaced explorations. The nature of variations between the explorations may not become evident until construction has begun. If variations are encountered, it will be necessary for RWG&A to re-evaluate the recommendations presented in this report. RWG&A requests an opportunity for a general review of the final design and specifications in order to determine that earthwork and pavement recommendations have been interpreted in the manner in which they were intended.

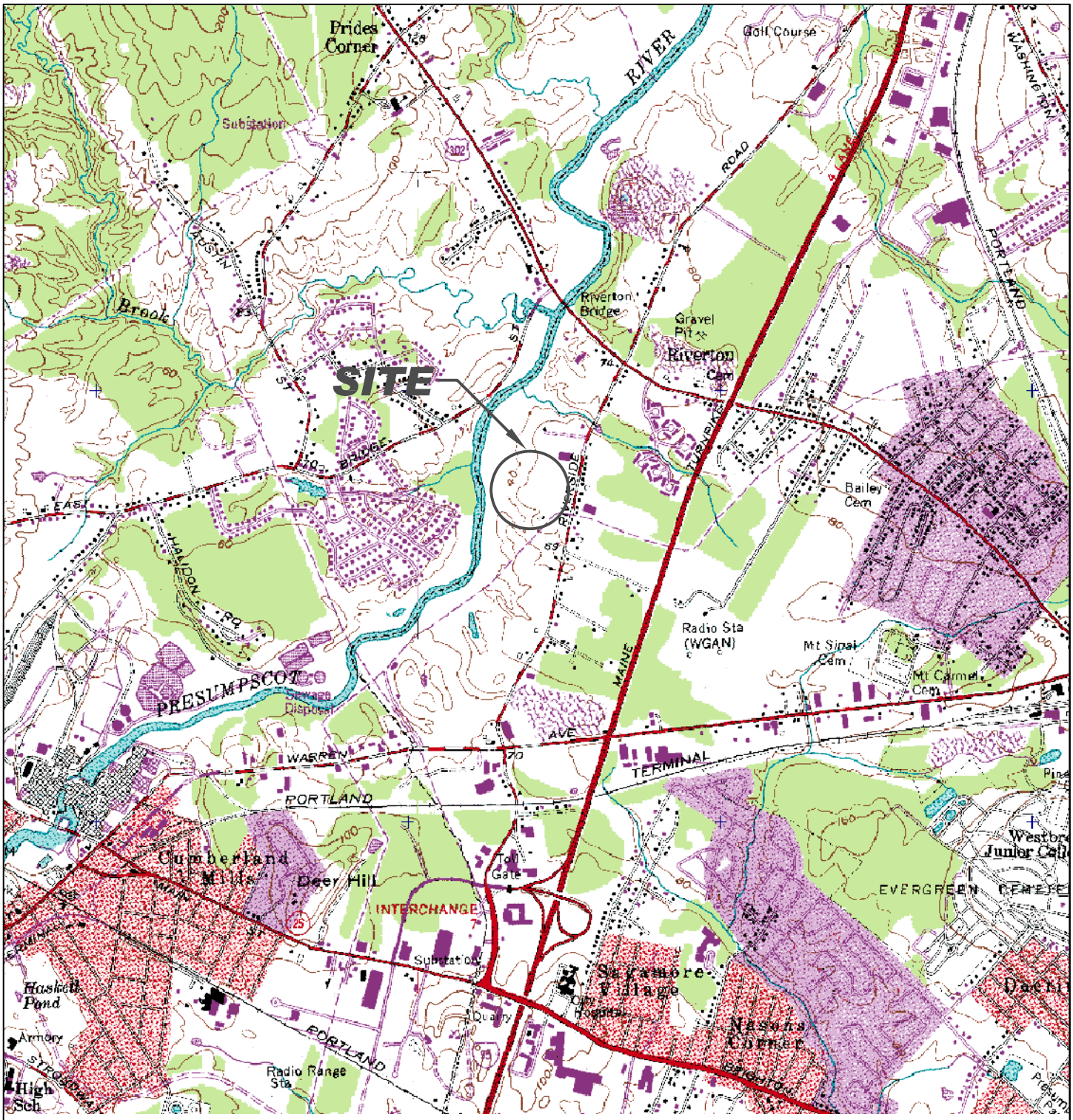


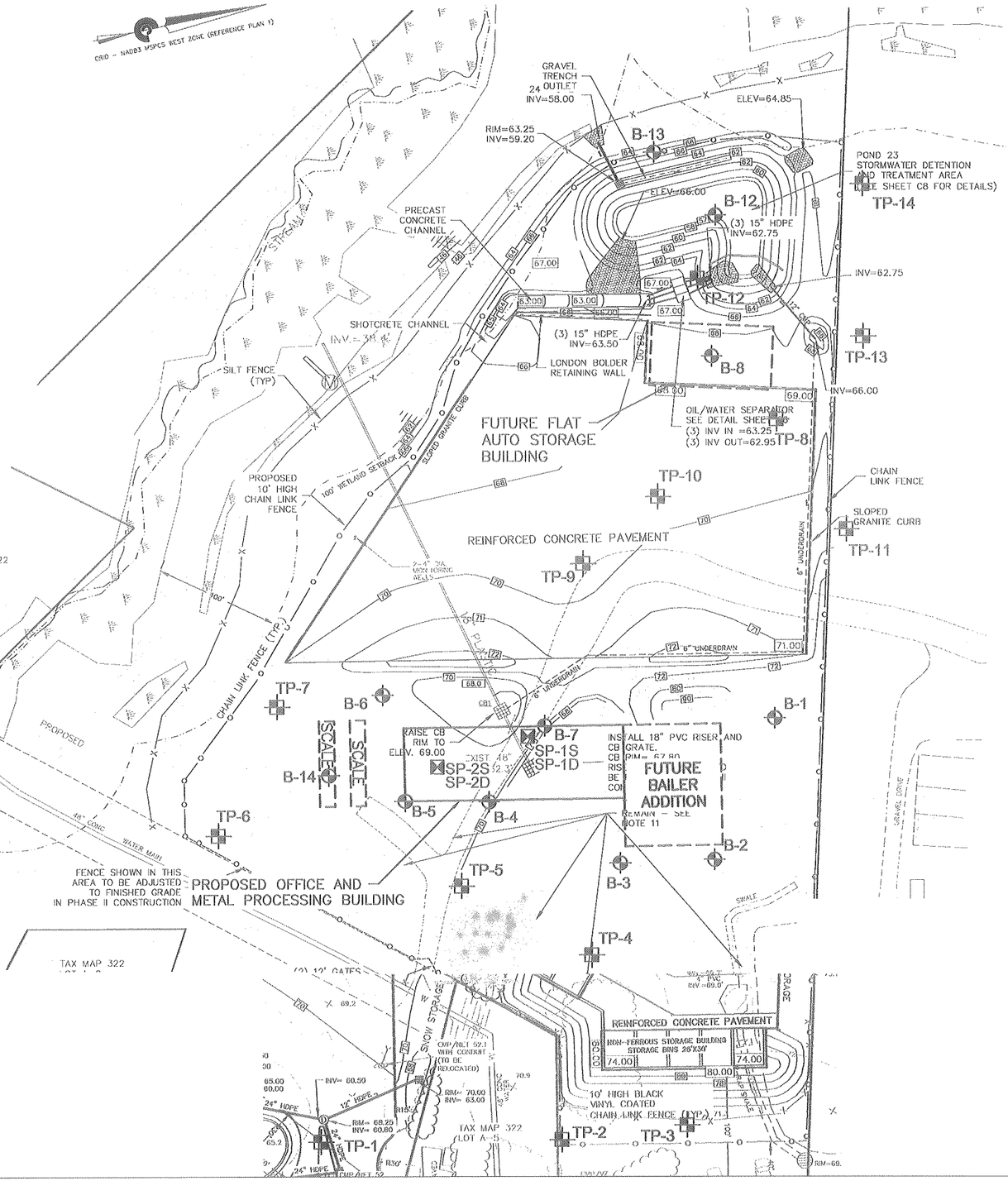
FIGURE 1
LOCUS MAP
PROPOSED SCRAP METAL
RECYCLING FACILITY
PORTLAND, MAINE

SEPTEMBER 2009 PROJECT NO. 427-49

SOURCE:

USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLES OF PORTLAND WEST, MAINE, DATED 1978.

R.W.Gillespie & Associates, Inc.
CONSULTING GEOTECHNICAL & ENVIRONMENTAL SPECIALISTS
86 Industrial Park Rd., Suite 4 Saco, Maine 04072 (207) 286-8008
Fax: (207) 286-2882 E-mail: rwg-a@rwg-a.com



LEGEND:

B-1	TEST BORING LOCATIONS BY RWG&A DURING AUGUST 2009 (RWG&A PROJECT NO. 427-49)
TP-10	TEST PITS PERFORMED BY RWG&A DURING JUNE 2007 (RWG&A PROJECT NO. 427-44)
SP-1S SP-1D	SETTLEMENT PLATFORM INSTRUMENTATION LOCATIONS AND DESIGNATIONS (SHALLOW AND DEEP)

SOURCES:

1. SHEET C-3 AND SHEET C-4 TITLED "SITE PLAN" AND "GRADING PLAN" BY CIVIL CONSULTANTS, BOTH DATED 04 SEPTEMBER 2009
2. SHEET C-4 TITLED "GRADING PLAN" BY CIVIL CONSULTANTS, DATED 14 FEBRUARY 2009, REVISED 30 JUNE 2008.
3. SHEET C-1 TITLED "EXISTING CONDITIONS" BY CIVIL CONSULTANTS, DATED 30 APRIL 2007, REVISED 17 JULY 2007

N

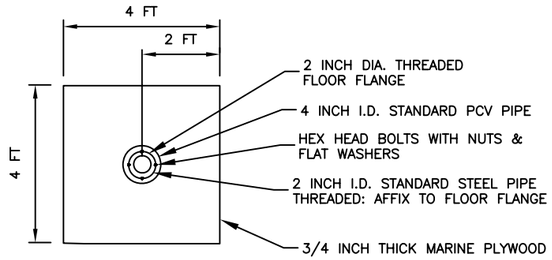
0 100 150 200

SCALE, FEET

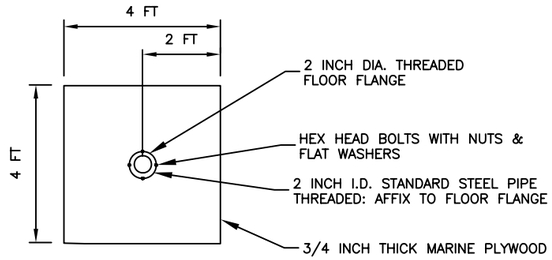
FIGURE 2
EXPLORATION LOCATION PLAN
PROPOSED SCRAP METAL RECYCLING FACILITY
PORTLAND, MAINE

OCTOBER 2009 PROJECT NO. 427-49

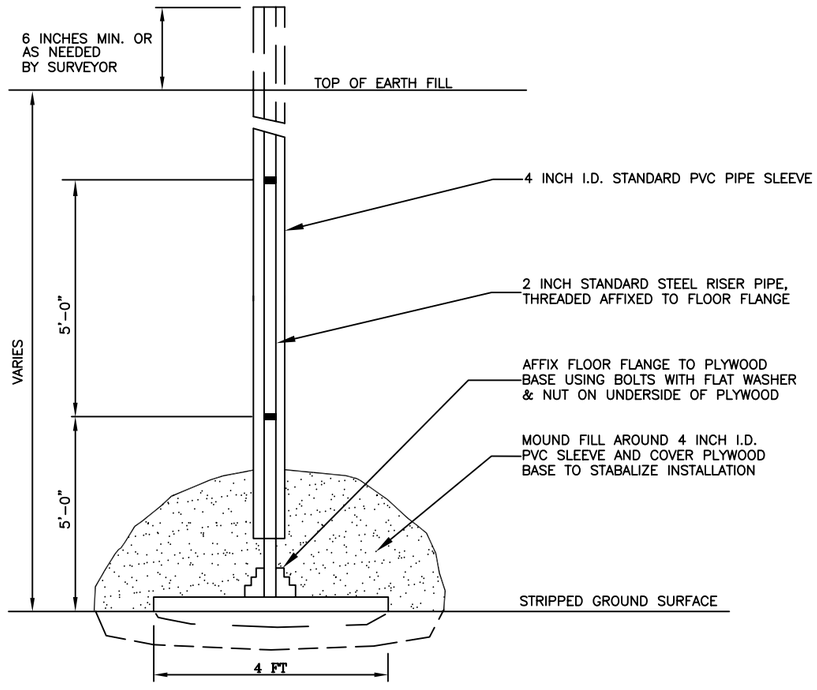
R.W. Gillespie & Associates, Inc.
CONSULTING GEOTECHNICAL & ENVIRONMENTAL SPECIALISTS
86 Industrial Park Rd., Suite 4 Saco, Maine 04072 (207) 286-8008
Fax: (207) 286-2882 E-mail: rwg-a@rwg-a.com



PLAN VIEW



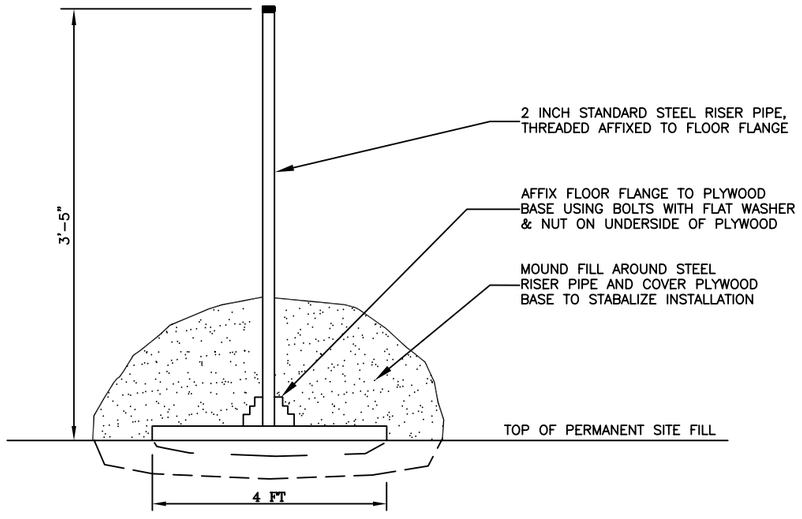
PLAN VIEW



SECTION VIEW

DEEP SETTLEMENT PLATFORM

NOT TO SCALE



SECTION VIEW

SURFACE SETTLEMENT PLATFORM

NOT TO SCALE

FIGURE 3

SETTLEMENT PLATFORM DETAIL

PROPOSED SCRAP METAL RECYCLING FACILITY

PORTLAND, MAINE

OCTOBER 2009 PROJECT NO. 427-49

R.W. Gillespie & Associates, Inc.

CONSULTING GEOTECHNICAL & ENVIRONMENTAL SPECIALISTS

86 Industrial Park Rd., Suite 4 Saco, Maine 04072 (207) 286-8008

Fax: (207) 286-2882 E-mail: rwg-a@rwg-a.com

APPENDIX A

TEST BORING EXPLORATION LOGS

Geotechnical Evaluation
Proposed Scrap Metal Recycling Facility
Portland, Maine

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-1
Total Depth (ft): 26.5
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/13/09
Date Completed: 08/13/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANICS.	18	6 4 7 8	11		
				SILTY CLAY (CL); Stiff to soft, moist to wet, silty clay, brownish olive to blueish gray.					
5			S-2	Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 ksf.	24	6 6 8 9	14	27.4	MC
10			S-3	Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.75 ksf.	24	2 3 3 4	6		
15			S-4		24	2 2 2 2	4		
20			S-5		24	1 2 2 2	4		
				SILTY SAND (SM); Medium dense, wet, fine to medium sand, some silt, light brown.					
25			S-6		12	7 9 50/4	59		
				Bottom of exploration at 26.5 ft; auger refusal, possible bedrock.					
30									

Notes:

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-2
Total Depth (ft): 27
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/13/09
Date Completed: 08/13/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANICS.	24	2 3 5 6	8		
				SAND (FILL); Loose, moist, fine to medium sand, trace silt, light brown.					
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
5			S-2		24	5 8 10 12	18		
10			S-3		24	4 4 4 5	8		
15			S-4		20	1 2 1 2	3		
20			S-5		24	1 2 2 1	4		
25			S-6		24	1 2 1 2	3		
				Bottom of exploration at 27 ft; not refusal.					
30									

Notes:

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-3
Total Depth (ft): 27
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/13/09
Date Completed: 08/13/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANICS.	12	2 2 2 3	4	35.3	MC
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
5			S-2		24	5 7 8 10	15		
10			S-3		24	3 4 3 3	7		
15			S-4		24	2 1 1 2	2		
20			S-5		24	1 2 1 1	3		
25			S-6		20	1 1 1 1	2		
				Bottom of exploration at 27 ft; not refusal.					
30									

Notes:

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-4
Total Depth (ft): 27
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/14/09
Date Completed: 08/14/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	GRAVELLY SAND (FILL); Medium dense, moist, fine to medium sand, little gravel, trace silt, light brown.	6	11 10 9 7	19		
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
5			S-2		24	6 7 9 8	16		
10			S-3		24	4 4 4 5	8		
15			S-4		24	1 1 1 1	2		
20			S-5		24	1 1 2 1	3		
25			S-6		24	1 2 1 2	3		
				Bottom of exploration at 27.0 ft; not refusal.					
30									

Notes:

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-5
Total Depth (ft): 27
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/14/09
Date Completed: 08/14/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANICS.	12	1 2 1 1	3		
				SAND (FILL); Loose, moist, fine to medium sand, trace silt, light brown.					
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
5			S-2	Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	6 8 9 6	17		
10			S-3	Pocket Penetrometer: Undrained Shear Strength, Su = 2.0 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.0 ksf.	24	3 4 3 3	7		
15			S-4		24	2 2 1 2	3		
20			S-5		24	1 2 1 2	3		
25			S-6		20	1 1 2 1	3		
				Bottom of exploration at 27.0 ft; not refusal.					
30									

Notes:

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Geohydrology • Materials Testing Services

Boring Log: B-6
Total Depth (ft): 27
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/14/09
Date Completed: 08/14/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANICS.	24	7 8 10 12	18	7.2	MC
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
5			S-2	Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	3 5 6 6	11		
10			S-3	Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.75 ksf.	24	3 6 6 6	12		
15			S-4		24	3 3 2 3	5		
20			S-5		24	2 2 2 2	4		
25			S-6		24	2 2 2 2	4		
				Bottom of exploration at 27.0 ft; not refusal.					
30									

Notes:

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Boring Log: B-7
Total Depth (ft): 37.7
Sheet 1 of 2

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/13/09
Date Completed: 08/13/09
Surface Elevation: ()
Drilling Method: 4" Tri-cone Wash Rotary
Casing Type: 4" casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	GRAVEL (FILL); Medium dense, moist, gravel, fine to medium sand, trace silt, reddish brown, with pockets of sandy clay, trace gravel.	20	4 6 8 9	14		
				SILTY CLAY (CL); Stiff to soft, moist to wet, silty clay, brownish olive to blueish gray.					
5			S-2	Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	6 10 7 7	17	2.8	MC
10			S-3		24	4 4 4 4	8	4.8	MC
15			S-4	Field Vane (In-situ): Undrained Shear Strength: Su = 1.92 ksf, Residual = 0.43 ksf. Field Vane (In-situ): Undrained Shear Strength: Su = 2.11 ksf, Residual = 0.05 ks.f	24			39.2	MC
20			U-1	Field Vane (In-situ): Undrained Shear Strength: Su = 0.88 ksf, Residual = 0.08 ksf Field Vane (In-situ): Undrained Shear Strength: Su = 0.82 ksf, Residual = 0.09 ksf Field Vane (In-situ): Undrained Shear Strength: Su = 1.09 ksf, Residual = 0.17 ksf Field Vane (In-situ): Undrained Shear Strength: Su = 1.35 ksf, Residual = 0.09 ksf	24			40.9	CON GV
25			S-5				24	36.3	MC
30									

Notes: Sample Numbers S-4 and S-5 obtained after performing field vane tests.

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Boring Log: B-7
Total Depth: 37.7
Sheet 2 of 2

Project Name: Metal Recycling and Stormwater Management
Location: Portland, Maine
Client: Civil Consultants, Inc.
Observed Water Depth: Not Obs.

RWG&A Project No. 427-49
Surface Elevation: ()
Casing Type: 4" casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30			U-2		24.0				GV
35			S-6	SILTY SAND (SM); Medium dense, wet, fine to medium sand, some silt, grayish blue.	24	4 2 4 6	6		
				Bottom of exploration at 37.7 ft; rollercone refusal, possible bedrock.					
40									
45									
50									
55									
60									

Notes: Sample Numbers S-4 and S-5 obtained after performing field vane tests.

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Boring Log: B-8
Total Depth (ft): 37.5
Sheet 1 of 2

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/12/09
Date Completed: 08/12/09
Surface Elevation: ()
Drilling Method: 4" Tri cone Wash Rotary
Casing Type: 4" casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	GRAVELLY SILTY SAND (FILL); Medium dense, moist, fine to medium sand, with pockets of silty clay, trace fine gravel, light brown and blueish gray, with wood fibers.	24	4 4 10 10	14	14.1	GS MC
5			S-2		24	5 9 8 7	17	21.5	MC
				SILTY CLAY (CL); Stiff to soft, moist, silty clay, mottled, brownish olive to blueish gray.					
10			S-3	Pocket Penetrometer: Undrained Shear Strength, Su = 2.75 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf.	24	3 3 5 6	8	29.3	MC
15			S-4	Pocket Penetrometer: Undrained Shear Strength, Su = 2.25 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.25 ksf.	24	3 3 4 5	7		
20			S-5		18	3 1 2 1	3		
25			S-6		24	woh woh woh woh			
30									

Notes:

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Boring Log: B-8
Total Depth: 37.5
Sheet 2 of 2

Project Name: Metal Recycling and Stormwater Management
Location: Portland, Maine
Client: Civil Consultants, Inc.
Observed Water Depth: Not Obs.

RWG&A Project No. 427-49
Surface Elevation: ()
Casing Type: 4" casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30			S-7		24	woh woh woh woh			
35			S-8		18	woh woh 6 8	6		
				SILTY SAND (SM); Medium dense, wet, fine to medium sand, some silt, light brown.					
				Bottom of exploration at 37.5 ft; rollercone refusal, possible bedrock.					
40									
45									
50									
55									
60									

Notes:

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Boring Log: B-12
Total Depth (ft): 42
Sheet 1 of 2

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/12/09
Date Completed: 08/12/09
Surface Elevation: ()
Drilling Method: 4" Tri cone Wash Rotary
Casing Type: 4" casing

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	GRAVELLY SILTY SAND (FILL); Medium dense, moist, fine to medium sand, with pockets and layers of silty clay, trace fine gravel, dark brown and blueish gray, with wood fibers, organics and asphalt.	24	8 9 9 10	18		
5		S-2		12	3 4 5 8	9	18.1	GS MC
10		S-3		18	2 3 4 5	7		
			SILTY CLAY (CL); Stiff to soft, moist to wet, silty clay, brownish olive to blueish gray.					
15		S-4		22	4 10 12 11	22		
20		S-5	Pocket Penetrometer: Undrained Shear Strength, Su = 2.75 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.75 ksf.	24	5 6 8 9	14		
25		S-6		24	3 3 4 3	7		
30								

Notes: Sample S-7 obtained after performing field vane tests.

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Boring Log: B-12
Total Depth: 42
Sheet 2 of 2

Project Name: Metal Recycling and Stormwater Management
Location: Portland, Maine
Client: Civil Consultants, Inc.
Observed Water Depth: Not Obs.

RWG&A Project No. 427-49
Surface Elevation: ()
Casing Type: 4" casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30			S-7	Field Vane: Undrained Shear Strength: Su = 1.04 ksf, Residual = 0.08 ksf. Field Vane: Undrained Shear Strength: Su = 0.82 ksf, Residual = 0.10 ksf.				37	MC
35			S-8		18	1 1 1 1	2		
				SILTY SAND (SM); Medium dense, wet, fine to medium sand, some silt, trace fine gravel, gray.					
40			S-9		18	10 8 6 60/6	14		
				Bottom of exploration at 42 ft; split barrel refusal, possible bedrock.					
45									
50									
55									
60									

Notes: Sample S-7 obtained after performing field vane tests.

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Boring Log: B-13
Total Depth (ft): 42.3
Sheet 1 of 2

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/12/09
Date Completed: 08/12/09
Surface Elevation: ()
Drilling Method: 4" Tri cone Wash Rotary
Casing Type: 4" Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	GRAVELLY SILTY SAND (FILL); Medium dense to loose, moist to wet, fine to medium sand, trace fine gravel, dark brown.	18	5 5 5 5	10		
5			S-2		3	1 1 1 1	2		
10			S-3	SANDY SILT (FILL); Medium stiff, clayey silt, some sand, few gravel, blueish gray.	18	2 2 3 4	5	18.7	GS MC
15			S-4	SILTY CLAY (CL); Stiff to soft, moist to wet, silty clay, brownish olive to blueish gray. Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	4 4 10 11	14	24.7	MC
20			S-5	Pocket Penetrometer: Undrained Shear Strength, Su = 3.25 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	4 6 9 13	15	28.7	MC
25			S-6	Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf.	24	4 5 6 7	11	32.8	MC
30									

Notes:

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Boring Log: B-13
Total Depth: 42.3
Sheet 2 of 2

Project Name: Metal Recycling and Stormwater Management
Location: Portland, Maine
Client: Civil Consultants, Inc.
Observed Water Depth: Not Obs.

RWG&A Project No. 427-49
Surface Elevation: ()
Casing Type: 4" Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
30				Field Vane: Undrained Shear Strength: Su = 3.2 ksf, Residual = 0.56 ksf. Field Vane: Undrained Shear Strength: Su = 2.4, Residual = 0.5 ksf.					
35			S-7	SILTY SAND (SM); Medium dense, wet, fine to medium sand, some silt, trace fine gravel, grayish blue.	18	2 4 6 7	10		
40			S-8		6	18 14 7 6	21		
				Bottom of exploration at 42.3 ft; rollercone refusal, possible bedrock.					
45									
50									
55									
60									

Notes:

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Boring Log: B-14
Total Depth (ft): 17
Sheet 1 of 1

Project Name: Metal Recycling and Stormwater Management
RWG&A Project No. 427-49
Location: Portland, Maine
Client: Civil Consultants, Inc.
RWG&A Representative: G. Morrell
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfilled with cuttings
Observed Water Depth: Not Obs.

Drilling Contractor: Northern Test Boring
Drill Rig: Diedrich D-50 Track
Driller Rep.: Mike Nadeau
Date Started: 08/14/09
Date Completed: 08/14/09
Surface Elevation: ()
Drilling Method: 4 1/4" HSA
Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			S-1	GRAVELLY SILTY SAND (FILL); Medium dense, moist, silty fine to medium sand, few gravel, light brown.	18	7 7 7 6	14	12.9	GS MC
5			S-2		24	3 3 4 5	7		
				SILTY CLAY (CL); Stiff, moist, silty clay, mottled, brownish olive.					
10			S-3	Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 3.0 ksf.	24	6 5 8 8	13		
15			S-4		24	4 4 5 6	9		
				Pocket Penetrometer: Undrained Shear Strength, Su = 2.5 ksf. Pocket Penetrometer: Undrained Shear Strength, Su = 2.0 ksf.					
20				Bottom of exploration at 17.0 ft; not refusal.					
25									
30									

Notes:

APPENDIX B

TEST PIT
EXPLORATION LOGS

Geotechnical Evaluation
Proposed Scrap Metal Recycling Facility
Portland, Maine

R.W. Gillespie & Associates, Inc.
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TEST PIT LOG

Test Pit No. TP-1

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	67
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Silty clay, stiff, silty sand, trace gravel, brick, rock, organic, moist, olive brown.		
5			JT	TOPSOIL AND ORGANIC MATERIAL (24 inches).		
			CL	SILTY CLAY (CL); Very stiff, silty clay, moist, olive gray mottling.		
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-2

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	71
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			JT	TOPSOIL AND ORGANIC MATERIAL (10 inches).		
				SILTY CLAY (CL); Very stiff, silty clay, moist, gray.		
5			CL			
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-3

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	71
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			JT	TOPSOIL AND ORGANIC MATERIAL (12 inches).		
			SM	SILTY SAND (SM); Medium to fine sand, little silt, moist, reddish brown.		
			CL	SILTY CLAY (CL); Very stiff, silty clay, moist, olive gray.		
5						
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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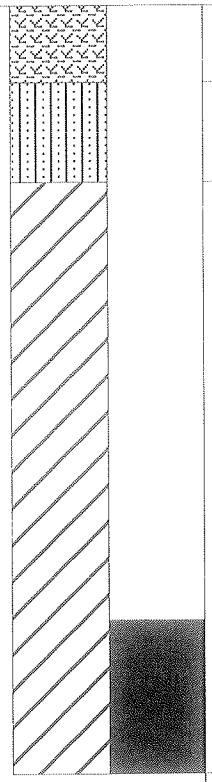
TEST PIT LOG

Test Pit No. TP-4

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	71
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:



Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			JT	TOPSOIL AND ORGANIC MATERIAL (12 inches).		
			SM	SILTY SAND (SM); Medium to fine sand, little silt, moist, light brown.		
5			CL	SILTY CLAY (CL); Very stiff, silty clay, moist, gray.		
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-5

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	70
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			JT	TOPSOIL AND ORGANIC MATERIAL (6 inches).		
			SM	SILTY SAND (SM); Medium to fine sand, little silt, moist, reddish brown.		
5			CL	SILTY CLAY (CL); Hard to very stiff, silty clay, moist, olive gray. Pocket Penetrometer: Undrained Shear Strength: Su >5.0 ksf.		
10				Bottom of Exploration at 8'; Not refusal.		
15						

NOTES

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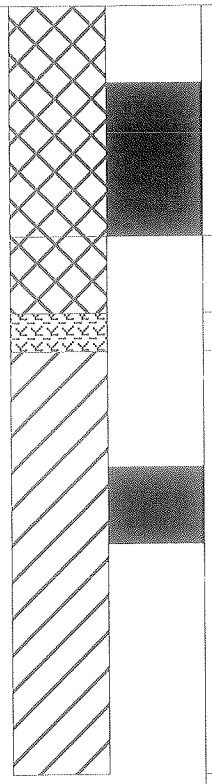
TEST PIT LOG

Test Pit No. TP-6

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	68
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs. When checked:	Caving:	



Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Silty sand, medium to fine sand, little silt, moist, light brown.	GS	6
			FILL	FILL; Silty sand, silty clay, with organics, wood fibers.		
			JT	TOPSOIL AND ORGANIC MATERIAL (6 inches).		
5			CL	SILTY CLAY (CL); Very stiff, moist, olive gray.		
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-7

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	70
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Sand, medium to fine sand, little gravel, little silt, moist, brown.	GS	3
			JT	TOPSOIL AND ORGANIC MATERIAL (6 inches).		
5			CL	SILTY CLAY (CL); Hard to very stiff, silty clay, moist, olive. Pocket Penetrometer: Undrained Shear Strength: Su > 5.0 ksf.		
10			CL	Pocket Penetrometer: Undrained Shear Strength: Su > 5.0 ksf.		
15				Bottom of Exploration at 12'; Not refusal.		

NOTES

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TEST PIT LOG

Test Pit No. TP-8

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	67
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs. When checked:	Caving:	

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			OL	Wood chips (6 inches).		
			FILL	FILL; Silty sand, medium to fine sand, little silty clay, trace gravel, trace organics, moist, light brown to gray.		
5			SM	SILTY SAND (SM); Medium to fine sand and silt, trace organic, moist, brown.		
			CL	SILTY CLAY (CL); Very stiff, silty clay, moist, olive brown. Pocket Penetrometer: Undrained Shear Strength: Su > 5.0 ksf.		
10				Bottom of Exploration at 10'; Not refusal.		
15						

NOTES

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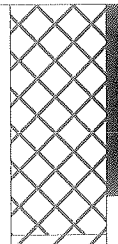
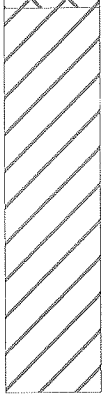
TEST PIT LOG

Test Pit No. TP-9

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	66
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs. When checked:	Caving:	

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Medium to fine silty sand, with silty clay, moist, light brown to blue gray.		
5			CL	SILTY CLAY (CL); Hard to very stiff, silty clay, moist, olive brown.		
10				Bottom of Exploration at 8'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-10

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	66
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Gravel, medium to fine sand, trace silt, moist, brown.		
			FILL	FILL; Gravel, mixed with asphalt, concrete, silty sand, moist, gray. Geotextile observed at 0.8'.		
5			CL	SILTY CLAY (CL); Hard to very stiff, silty clay, moist, olive brown.		
10				Bottom of Exploration at 8'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-11

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	70
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Silty sand, medium to fine sand, silt, brick, rock, roots, wood, moist, brown blue.		
5			CL	SILTY CLAY (CL); Stiff to very stiff, silty clay, moist, olive brown.		
10						
15				Bottom of Exploration at 12'; Not refusal.		

NOTES

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TEST PIT LOG

Test Pit No. TP-12

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	65
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs.	When checked:	Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			FILL	FILL; Silty sand with gravel, medium dense, medium to fine sand, little to some silt, trace gravel, moist, brown.		
5			FILL	FILL; Silty sand, dense, medium to fine sand, some silt, moist, gray. Mixed with silty clay, stiff, moist, blue gray.		
10			FILL	FILL; Silty clay and medium to fine sand, little rock, brick, concrete. Difficult to excavate.		
15				Bottom of Exploration at 11'; Not refusal.		

NOTES

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TEST PIT LOG

Test Pit No. TP-13

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	67
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM
DEPTH TO - Water:	Not Obs. When checked:	Caving:	

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0			OL	Wood chips (8 inches).		
			FILL	FILL; Medium to fine silty sand and silty clay, mixed with brick, rock, concrete, trace wood fibers and organics, moist, blue gray. Difficult to excavate.		
5			FILL	FILL; Sand, medium to fine sand, some to little silt, trace organics, moist to wet, brown.		
10			CL	SILTY CLAY (CL); Very stiff, silty clay, moist, olive gray.		
				Bottom of Exploration at 11'; Not refusal.		
15						

NOTES

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TEST PIT LOG

Test Pit No. TP-14

PROJECT	Proposed Metal Recycling Facility	PROJECT NO.	427-44
CLIENT	Civil Consultants, Inc.	DATE	06/29/07
LOCATION	Portland, Maine	ELEVATION	66
EXCAVATION METHOD	Volvo SE210 Excavator	LOGGER	GSM

DEPTH TO - Water: Not Obs. When checked: Caving:

Depth (ft)	Symbol	Bulk Sample	USCS	Description	Lab Tests	Moisture Content
0				FILL; Silty sand, medium to fine sand, some silt, trace gravel, moist, blue gray. Railroad tie encountered from 4' to 4.5'.		
5			FILL			
10				Bottom of Exploration at 10'; Not refusal.		
15						

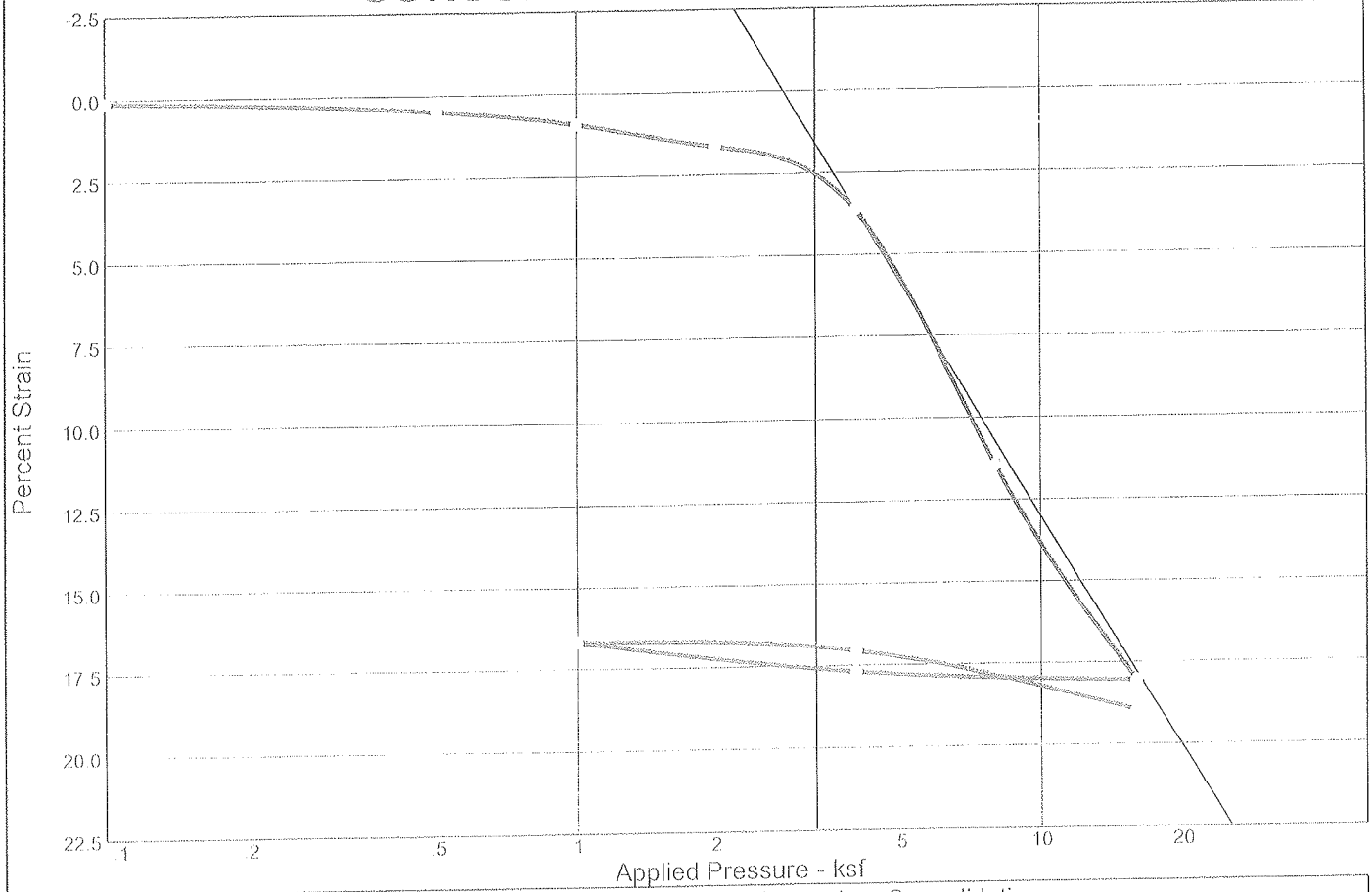
NOTES

APPENDIX C

LABORATORY TESTING

Geotechnical Evaluation
Proposed Scrap Metal Recycling Facility
Portland, Maine

CONSOLIDATION TEST REPORT



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
1	0.10	1.86		11	16.00	0.61					
2	0.50	0.90									
3	1.00	0.67									
4	2.00	1.27									
5	4.00	0.29									
6	8.00	0.07									
7	16.00	0.13									
8	4.00	1.92									
9	1.00	1.48									
10	4.00	0.44									

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (ksf)	C_c	Initial Void Ratio
Saturation	Moisture							
94.9 %	40.9 %	78.9			2.77	3.68	0.52	1.193

MATERIAL DESCRIPTION	USCS	AASHTO
Clay		

Project No. 427-49 **Client:** Civil Consultants, Inc.

Project: Metal Recycling Building & Stormwater Management Pond

Source: B-7 **Sample No.:** U-1 **Elev./Depth:** 20'-22'

Remarks:

R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 10939A

Laboratory Vane Shear Test Results

Project:	Metal Recycling Buildings	**Client:**	Civil Cosultants, Inc.
Project No.:	427-49	**Location:**	Portland, ME

Boring No.	B-7	**Lab No.**	10939a
Sample No.	U-1 (20'-22')		
Test No.	**S_u (Undisturbed)**	**S_u (Residual)**	**Moisture Content**
1	627 psf	209 psf	45.3%
2	752 psf	167 psf	44.9%
3	752 psf	104 psf	42.8%
4	741 psf	83 psf	

MTC

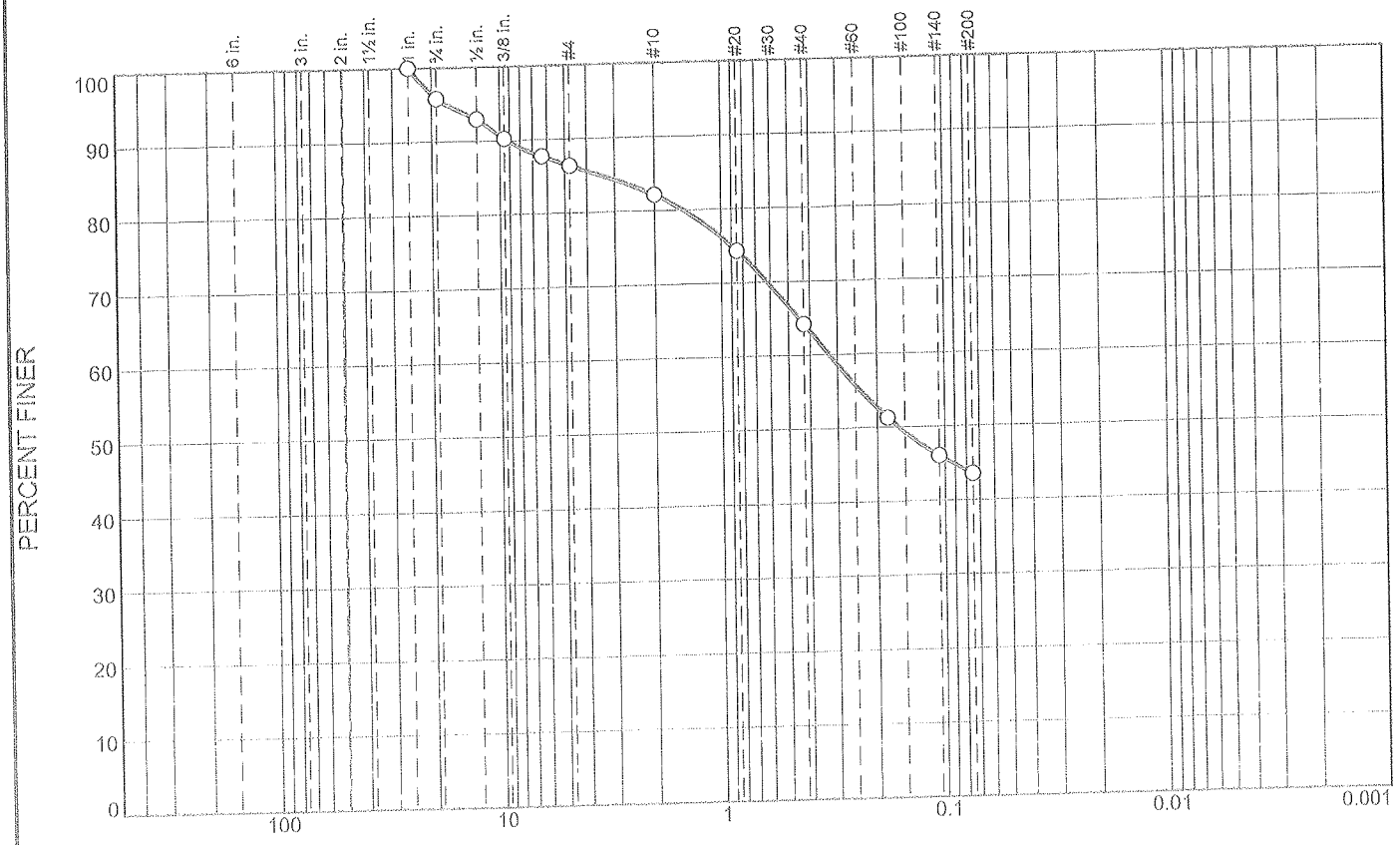
Laboratory Vane Shear Test Results

Project:	Metal Recycling Buildings	**Client:**	Civil Cosultants, Inc.
Project No.:	427-49	**Location:**	Portland, ME

Boring No.	B-7		**Lab No.**	10939b
Sample No.	U-2 (30'-32')			
Test No.	**S_u (Undisturbed)**	**S_u (Residual)**		**Moisture Content**
1	689 psf	42 psf		39.0%
2	710 psf	63 psf		32.9%
3	501psf	63 psf		33.9%
4	668 psf	63 psf		37.9%
5				38.4%
6				40.4%
7				40.6%

MTC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.2	9.4	4.2	18.0	20.6	43.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.8		
1/2"	93.0		
3/8"	90.2		
1/4"	87.8		
#4	86.4		
#10	82.2		
#20	74.3		
#40	64.2		
#80	51.3		
#140	46.1		
#200	43.6		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.4748 D_{60}= 0.3267 D_{50}= 0.1607
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Moisture Content:14.1%

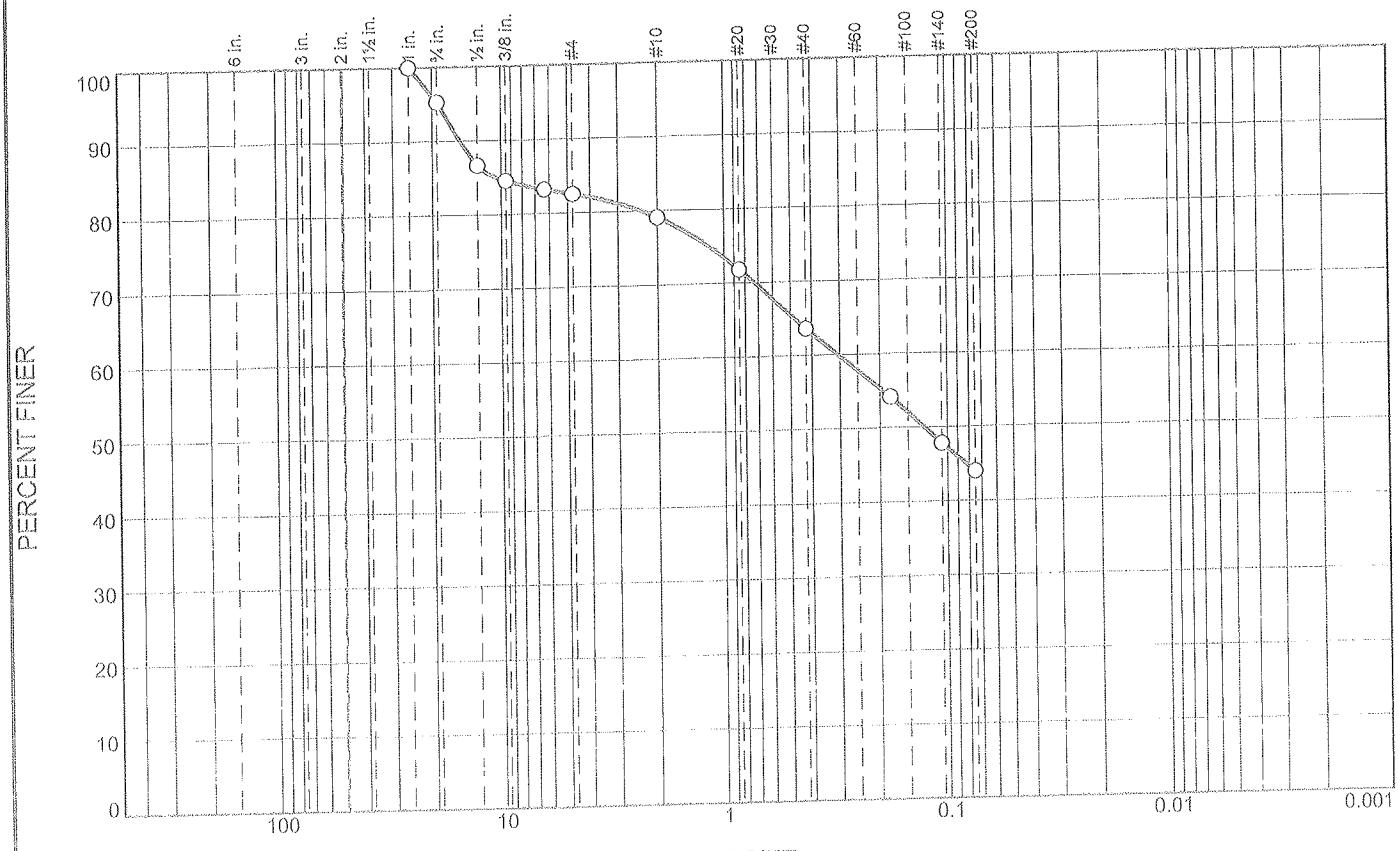
Sample No.: S-1 & S-2 **Source of Sample:** B-8 **Date:** 9/10/09
Location: Portland, Maine **Elev./Depth:** 0'-2' & 5'-7'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Civil Consultants, Inc.
Project: Metal Recycling Building & Stormwater Management Pond
Project No: 427-49 **Figure** 10955P

Tested By: JJH **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.8	12.6	3.5	15.5	19.6	44.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.2		
1/2"	86.7		
3/8"	84.5		
1/4"	83.2		
#4	82.6		
#10	79.1		
#20	71.8		
#40	63.6		
#80	54.2		
#140	47.8		
#200	44.0		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.5717 D_{60}= 0.3058 D_{50}= 0.1272
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Moisture Content:18.1%

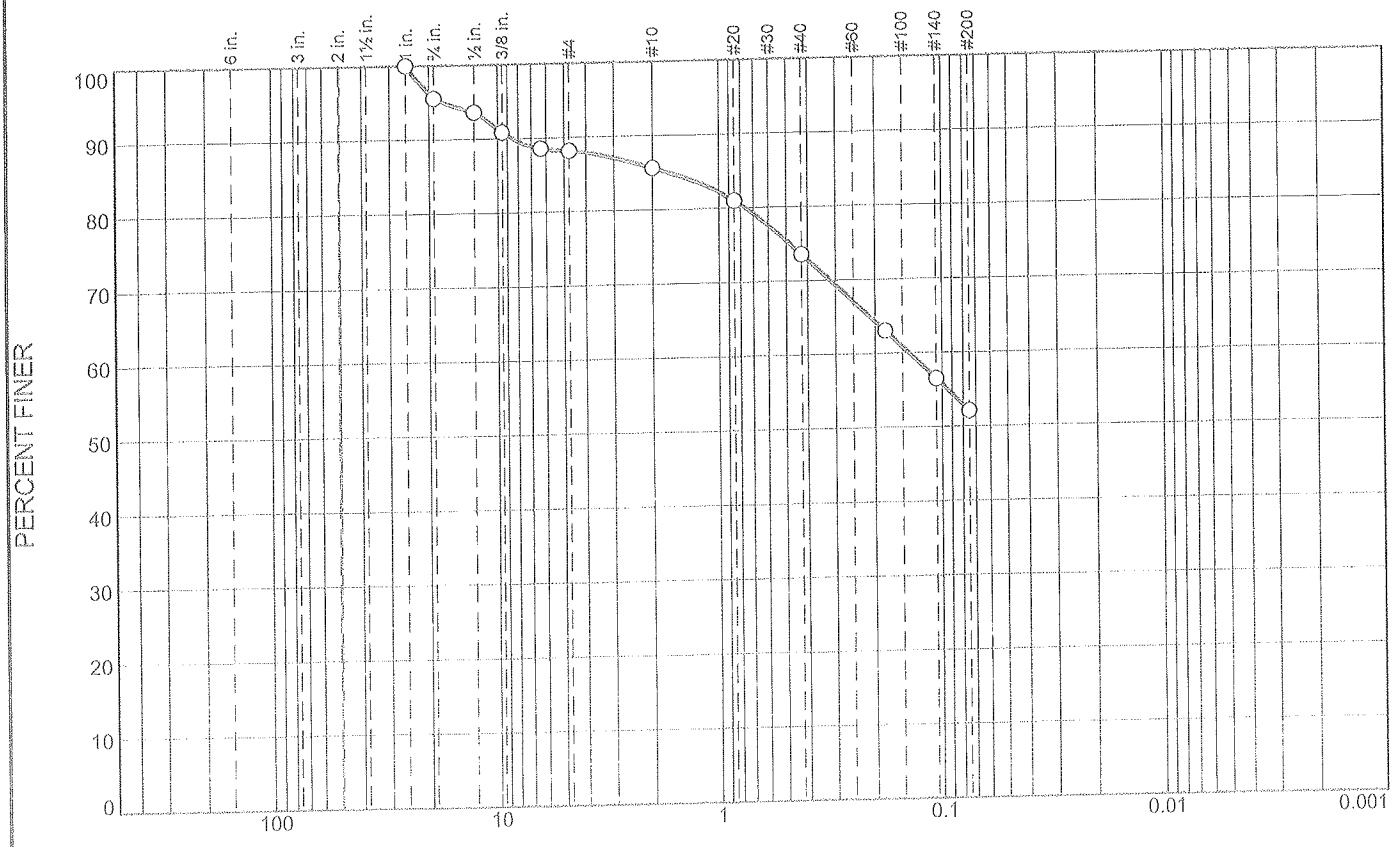
Sample No.: S-2 & S-3 **Source of Sample:** B-12 **Date:** 9/10/09
Location: Portland, Maine **Elev./Depth:** 5'-7' & 10'-12'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Civil Consultants, Inc.
Project: Metal Recycling Building & Stormwater Management Pond
Project No: 427-49 **Figure** 10955O

Tested By: JJH **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.5	7.3	2.6	12.0	21.5	52.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.5		
1/2"	93.6		
3/8"	90.9		
1/4"	88.6		
#4	88.2		
#10	85.6		
#20	81.0		
#40	73.6		
#80	63.1		
#140	56.5		
#200	52.1		

* (no specification provided)

Soil Description

sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.6995 D_{60}= 0.1402 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Moisture Content:18.7%

Sample No.: S-3 **Source of Sample:** B-13 **Date:** 9/10/09
Location: Portland, Maine **Elev./Depth:** 10'-12'

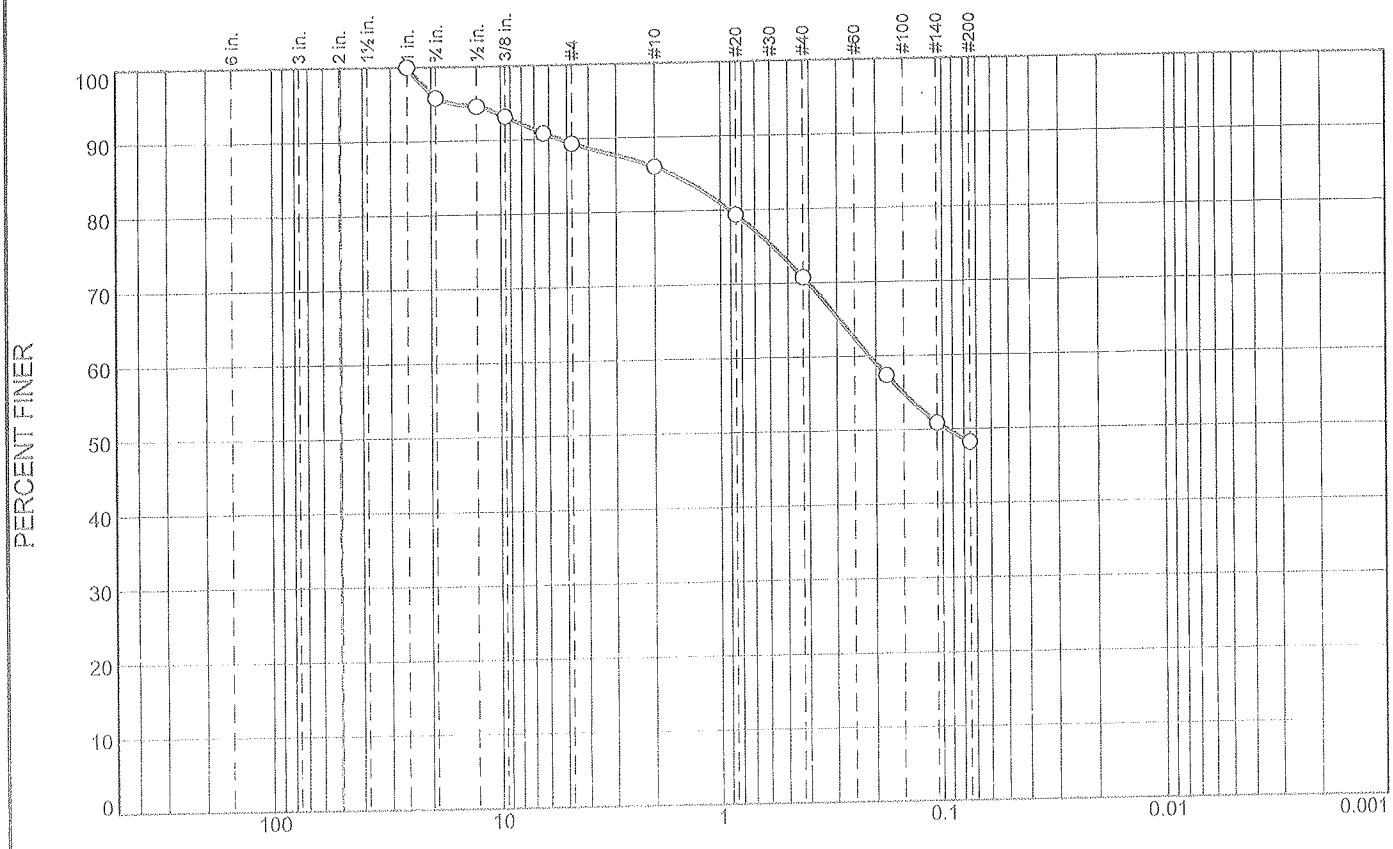
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Civil Consultants, Inc.
Project: Metal Recycling Building & Stormwater Management Pond

Project No: 427-49 **Figure** 10955G

Tested By: JJH **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.2	6.4	3.3	15.3	22.5	48.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.8		
1/2"	94.6		
3/8"	93.2		
1/4"	90.8		
#4	89.4		
#10	86.1		
#20	79.4		
#40	70.8		
#80	57.4		
#140	50.9		
#200	48.3		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.6598 D_{60}= 0.2131 D_{50}= 0.0955
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Moisture Content:12.9%

Sample No.: S-1 & S-2 **Source of Sample:** B-14 **Date:** 9/10/09
Location: Portland, Maine **Elev./Depth:** 0'-2' & 5'-7'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Civil Consultants, Inc.
Project: Metal Recycling Building & Stormwater Management Pond
Project No: 427-49 **Figure** 10955Q

Tested By: JJH **Checked By:** MTG