MACTEC

July 30, 2004

Mr. Don Winn
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Subject: **Report of Geotechnical Exploration**
Proposed Regional Distribution Center
Janesville, Wisconsin
MACTEC Project Number 6234-04-2228

Dear Mr. Winn:

MACTEC Engineering and Consulting, Inc. (MACTEC) has completed the requested geotechnical exploration for your project. Our services were provided in accordance with our Proposed scope of work, dated June 1, 2004.

The attached report presents a review of the project information provided to us, a description of the site and subsurface conditions encountered, and a summary of our foundation, earthwork and pavement recommendations for the proposed distribution center. The Appendix to the report contains a site location map, a boring location plan and the results of our field and laboratory testing.

MACTEC appreciates this opportunity to provide our services to you and we look forward to serving as your geotechnical consultant throughout this project. Please contact us if you have any questions regarding the information presented.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

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Project Engineer

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Attachment: Report of Geotechnical Exploration

Cc: J. Mark Smith; MACTEC – Charlotte, NC
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1. PURPOSE AND SCOPE OF EXPLORATION

The purpose of this exploration was to obtain specific subsurface data at the site, review available geologic information, and to develop foundation, earthwork and pavement recommendations for the proposed project. The scope of our field activities included drilling 32 soil test borings to obtain subsurface information.

2. PROJECT INFORMATION

Project information was provided by Mr. Jim Smith of our Columbia office to Mr. Ryan Jeffries of our Louisville office in the form of several telephone conversations and electronic mail transmittals. We were provided with the following documents:

- *Conceptual Site Plan, Lowe's RDC of Janesville,* undated, prepared by Thomas James Civil Design Group, Inc.
- Untitled, undated drawing, depicting the existing site topographic information, prepared by Freeland & Associates, Inc.

We understand that Lowe's is planning the construction of a new Regional Distribution Center located near Janesville, Wisconsin. The proposed site is located near the intersection of Beloit Avenue (County Road "G") and Avalon Road in Rock County. The site encompasses a total area of approximately 200 acres which has previously been used for agricultural purposes.

The proposed building footprint will encompass a total area of 1,359,692 square feet with an additional 537,983 square feet allotted for future expansion. Information provided by Mr. J.D. Taylor of CE Solutions, Inc. indicates the anticipated column loads will range from 160 to 175 kips with exterior wall loads ranging from 2.5 to 4.5 kips per linear foot. Design floor slab load is 125 pounds per square foot (psf). Maximum storage rack post load is 15 kips.

The facility will include 1354 trailer parking spaces and 670 employee parking spaces. The loading dock aprons will be rigid concrete pavement. Several detention pond areas are planned with a total area of approximately 42 acres.

Topographic information, provided to us, indicates that the existing site elevations range from a low of about 815 feet NGVD (National Geodetic Vertical Datum), near the southeast property corner, to a high of about 830 feet NGVD near the northern property boundary. Existing elevations within the proposed building footprint range from about 826 feet NGVD to 830 feet NGVD. Preliminary finished floor elevation (FFE) has be estimated at about 830 feet NGVD, which indicates approximately 4 feet of fill will be required to achieve the planned grades within the building footprint. Detailed site grading information had not been provided to us at the time of this report.

3. EXPLORATORY FINDINGS

3.1 SURFACE CONDITIONS

We conducted a site reconnaissance from June 2 through June 5, 2004, to observe and document surface conditions at the site. The information gathered was used to help us interpret the subsurface data, and to detect conditions which could affect our recommendations.

The subject site is located in central Rock County, near Janesville, Wisconsin. The subject site is bordered by Beloit Ave to the east, agricultural crop fields to the south and west, and agricultural crop fields and an abandoned residential property to the north (south of Avalon Road). The site encompasses approximately 200 acres of land, with approximately 3,400 linear feet of frontage along Beloit Avenue. In general the site is mostly level, however becomes gently rolling on the southern portion of the property. We estimate about 15 feet of total elevation difference across the site and approximately 4 feet of relief within the proposed building footprint. An existing drainage ditch is located parallel to Beloit Avenue, which appears to flow towards the south.

Surface cover consisted of planted corn over the southern third of the property, while soybean plants covered a majority of the northern two-thirds of the property. A line of mature hardwood trees ran parallel to and about 20 feet west of Beloit Avenue. Small clusters of mature hardwood trees also existed in the northeast corner of the property. An irrigation system existed near the southwest portion of the property. The system included an electric circuit box, a water pump, and irrigation system which consisted of metal framing, water pipes, and rubber tires. The irrigation system stretched for about a thousand feet in the western direction.

Project Osprey - Janesville, WI
Certified Site - Soil Summary

An abandoned residential property was located in the northeast corner of the property, near Beloit Avenue. Several debris piles exist near the residence including piles of wood, a stack of rubber tires, roof shingles, rusted barrels and other miscellaneous debris. A metal silo, approximately 20 feet in diameter and about 15 to 20 feet in height, was also located near the abandoned residence.

3.2 SITE GEOLOGY

Site geologic information was provided by Mr. Lee Clayton of the Wisconsin Geological and Natural History Survey through an electronic mail transmittal, dated July 16, 2004. The information provided was based on subsurface data obtained from water well logs located within ½ mile Northeast and ½ mile Southeast of the intersection of Beloit Avenue and Avalon Road. According to Mr. Clayton, six logs show more than 100 feet of Pleistocene sand and gravel. None of the well logs are deep enough to reach bedrock, which in this general region consists of flat-lying dolomite and sandstone. Depth to bedrock in this area varies greatly over short distances; an old depth-to-bedrock map of the state indicates that there could be two or three hundred feet of Pleistocene sand and gravel at the site area. The sand and gravel is glacial outwash deposited when the glacier had its maximum extent about 10 miles north of the site area, during the Wisconsin Glaciation. There could be other types of Pleistocene sediment between the sand and gravel and the bedrock, such as glacial-lake silt and clay, or possible pre-Wisconsin till.

3.3 SUBSURFACE CONDITIONS

The subsurface conditions were explored with 32 soil test borings drilled according to the procedures presented in the Appendix. The boring locations and depths were selected by MACTEC. The actual boring locations were determined by our engineer who paced distances in the field relative to property corners surveyed by others. The boring elevations were determined by interpolation between contours on the drawing provided to us. The boring locations and elevations shown in the Appendix should be considered approximate.

The subsurface conditions encountered at the test boring locations are shown on the Test Boring Records in the Appendix. These Test Boring Records represent our interpretation of the subsurface conditions based on the field logs, visual examination of field samples by an engineer, and tests of the field samples. The interface between various strata on the Test Boring Records represents the approximate interface location. In addition, the transition between strata may be gradual. Water levels shown on the Test Boring Records represent the conditions only at the time of our exploration.

In general, our borings encountered 3 soil strata underlying about 10 to 12 inches of topsoil. Stratum I consisted of dark brown, sandy, lean clay to depths ranging from about 2 to 6 feet. Some organic material, consisting primarily of small roots, was observed in the upper 2 to 3 feet. The Stratum I soils were encountered in all of our borings. Standard penetration test (SPT) resistances (N-values) ranged from 4 blows per foot (bpf) to 22 bpf, with an average value of about 7 bpf. These values are indicative of cohesive soils with soft to very stiff consistency, but were typically considered firm to stiff. Soil plasticity tests (Atterberg limits) performed on three selected samples of the Stratum I soils from various borings, each from a depth of about 2 feet, indicated Liquid Limits ranging from 26 to 35 percent with corresponding Plasticity Indices ranging from 13 to 17 percent. These values correspond to lean clays or "CL" type soils, according to the Unified Soil Classification System (USCS). The moisture content of the samples tested ranged from 7.8 to 18.4 percent. Organic content determinations were performed on seven selected samples of the Stratum I soils, at depths ranging from 0 to 3 feet. The organic content of the samples tested ranged from 1.1 to 3.8 percent.

Underlying the Stratum I soils, the Stratum II consisted of brown, poorly-graded, medium grained sand to typical depths ranging from about 6 to 10 feet. Stratum II was also encountered at greater depths interbedded with the underlying Stratum III soils in borings B-6, B-7 and P-20. SPT N-values ranged from 4 to 60 bpf, with an average value of about 12 bpf. These values are indicative of cohesionless soils with loose to very dense consistency, but were typically considered loose to firm. A sieve analysis with No. 200 wash was performed on two selected samples of the Stratum II soils at depths ranging from about 5 to 10 feet. The analysis indicates the soil is poorly-graded and contains 4.7 to 8.1 percent silt- or clay-size particles. These results indicate the soils are "SP" type soils, according to the USCS. The moisture content of the samples tested ranged from 3.3 to 5.6 percent.

Underlying the Stratum II soils, the Stratum III consisted of light brown to brown, well-graded, medium-grained, gravelly sand to the termination depths ranging from about 10 to 20 feet. The

Stratum III was encountered in each of our borings, except boring P-22. SPT N-values ranged from 7 to 99 bpf, with an average value of about 31 bpf. These values are indicative of cohesionless soils with loose to very dense consistency, but were typically considered very firm to dense. A sieve analysis with No. 200 wash was performed on two selected samples of the Stratum III soils at depths ranging from about 8 to 10 feet. The analysis indicates the soil is well-graded and contains 3.2 to 6.8 percent silt- or clay-size particles. These results indicate the soils are "SW" type soils, according to the USCS. The moisture content of the samples tested ranged from 2.6 to 4.5 percent.

The borings within the proposed building footprint were terminated at a predetermined depth of about 20 feet. The borings within proposed pavement and detention areas were terminated at predetermined depths ranging from about 5 to 15 feet. Refusal material was not encountered at the termination depths.

3.4 GROUND WATER CONDITIONS

Water was not detected in our borings at the time of drilling. Typically, water conditions affecting construction projects in the site area are related both to hydrogeologic characteristics and rainfall activity. In addition, some trapped or perched water, which occurs in irregular, discontinuous locations within the soil overburden, may be encountered at higher elevations. When these water bearing strata are exposed in excavations, such as cut slopes, utility or footing trenches, they can produce widely varying seepage durations and rates depending on recent rainfall activity and other hydrogeologic characteristics of the area. These perched water sources are often not linked to the more continuous relatively stable ground water table that typically occurs at lower elevations. Ground water levels may vary from those measured at the time of our field activities.

3.5 SEISMIC SITE CATEGORIZATION

The 2000 edition of the *International Building Code* (IBC) was reviewed to determine geotechnical information related to seismic conditions. Based on the subsurface conditions encountered in our borings, the results of our laboratory testing, empirical correlations for the soil types encountered, and our experience, the site corresponds to a Site Class D (stiff soil profile).

4. GEOTECHNICAL EVALUATION

Based on the subsurface conditions encountered in our borings, our analyses, and our experience, we believe the site is suitable for construction of the proposed distribution center; however, there were some site and subsoil conditions, which pose concerns from a geotechnical standpoint.

4.1 PLOW ZONES

As previously mentioned, the measured topsoil thickness, encountered in our borings was 10 to 12 inches. Some small organic material was observed in several borings to depths up to 3 feet. Our experience indicates that areas previously used for agricultural activity often have a plow zone 18 inches to 3 feet thick of soft soil with organics due to repeated deep plowing and water infiltration. During site clearing and grubbing operations, topsoil materials may be encountered to depths greater than indicated by our borings. Some undercutting of soft, wet or organic laden soils may be required prior to fill placement activities. Undercut material may be used as fill material provided it conforms to the recommendations of this report. Detailed proofrolling by trained geotechnical personnel can identify soft, unstable subgrade areas prior to structural fill, slab, or pavement construction.

4.2 SOFT SOILS

Soft Stratum I soils ($N \leq 5$ bpf) were encountered in 11 of our borings to depths up to 4 feet. Loose Stratum II soils ($N = 4$ bpf) were encountered in 5 of our borings to depths up to 6 feet. We anticipate that other soft or loose soils will be encountered in low lying areas across the site depending upon rainfall activity. These soft or loose soils may not be suitable for foundation or pavement support or support of the first lift of structural fill. Construction planning should anticipate limited undercutting of these soils in foundation excavations and pavement subgrade areas. Detailed proofrolling of the site area and foundation inspections should be performed by qualified geotechnical personnel should be performed to delineate soft areas in accordance with later sections of this report.

Construction traffic should traverse the site only on stabilized pads of granular material to avoid deterioration of soil subgrades. Rubber-tired traffic should not be allowed to traverse over unprotected soil subgrades, so the construction of haul roads and prepared building pads should be among the first items of work (after storm water protection measures). Haul roads that use a granular base material should be constructed to protect and confine the silty subgrade soils in any area where significant construction traffic is anticipated. If haul roads are not constructed, we anticipate significant and repeated undercutting of softened and deteriorated subgrade soils will be required.

If widespread soft subgrade soils are encountered, extensive subgrade stabilization is often required. There are several methods available to stabilize areas of unstable subgrade soil that include undercutting and replacement, bridging using granular material and geotextiles, and lime stabilization. We believe the appropriate method to stabilize soft subgrades is dependent on several factors and should be field determined during construction. We suggest the construction of test strips to determine the effectiveness of the selected stabilization technique prior to widespread application. Localized softer or wetter areas may require additional treatment.

4.3 FROZEN GROUND

During periods of inclement weather, soil subgrades may become frozen if construction occurs during the winter months. New fill should not be placed over frozen ground. The Stratum I clay soils are very subject to heaving and disturbance by freezing. While fill soil placed over a frozen subgrade may be temporarily stable while the subgrade remains frozen, when it does thaw, the strength of the subgrade will likely be significantly reduced. If construction must continue prior to thawing, the frozen subgrade should be scraped off and stockpiled. Any snow accumulation must be scraped off the working area prior to placement of fill.

5. GEOTECHNICAL RECOMMENDATIONS

5.1 EARTHWORK

Our recommendations for earthwork construction are provided in the following subsections.

5.1.1 Site Preparation

- Strip all organic material and debris from the construction area. Waste these materials from the site or use as topsoil in landscape areas.

- Scarify and recompact the existing subgrade soils to a depth of at least 6 inches prior to fill placement or pavement construction.

- Proofroll the exposed subgrade to detect unstable conditions.
- Proofroll after a suitable period of dry weather to avoid degrading the subgrade.
- Perform proofrolling with a loaded dump truck or similar equipment judged acceptable by the geotechnical engineer.
- Make several passes over each section with the proofrolling equipment.
- Remove and replace soft, organic, or highly plastic soil encountered during proofrolling with properly compacted fill.
- Retain the geotechnical engineer to observe the proofrolling operations and make recommendations for any unstable or unsuitable conditions encountered.

5.1.2 Suitability of Proposed Fill Material

We anticipate that the majority of the available onsite fill materials will be the Stratum II and Stratum III sands and gravels. Our experience indicates field density testing in sand and gravel is highly influenced by the gradation, namely the quantity of gravel, in the fill. Often, a series of laboratory compaction curves are developed for varying amounts of gravel. The proper laboratory compaction curve is selected by trained geotechnical personnel based on observational methods.

Two bulk samples of the proposed fill materials were collected and tested to determine their laboratory compaction characteristics, plasticity or grain-size distribution, and natural moisture content. Also, a California Bearing Ratio (CBR) test was performed on each sample. The bulk samples obtained consisted of Stratum I soil materials from boring P-19 and Stratum II soil materials from boring B-16. Our laboratory test results are presented in Table 1. The natural moisture content of the samples tested was typically below the optimum moisture content. These results indicate that the material would be suitable for use as fill, if the water content can be adjusted prior to fill placement and compaction operations.

Table 1. Laboratory Test Results

Material	Location	Depth (feet)	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)	CBR Value (percent)
Stratum I (CL)	P-19	1.5-2.5	112.8	15.1	3.0
Stratum II (SP)	B-16	5.0-15.0	118.4	11.5	13.0

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Checked By: *NGS*

5.1.3 Compacted Fill

Prior to beginning fill construction, we recommend representative samples of the proposed fill materials be collected and tested to determine their laboratory compaction characteristics, plasticity, and natural moisture content. These tests are needed to determine if the proposed fill material is acceptable and for quality control during compaction.

The following criteria are recommended for structural fill construction:

- Limit the fill materials to a maximum particle size of 3 inches and less than 3 percent by weight fibrous, organic matter; gravel particles larger than 3 inches should be placed at least 2 feet below finish subgrade. Sand and gravel fill materials should be limited to less than 15 percent fines (passing the No. 200 sieve); clay fill materials should be limited to a Plasticity Index less than 35. Most of the onsite materials should meet these criteria.

- Construct compacted fill by spreading suitable soil in maximum 8-inch-thick loose lifts.

- Compact the fill within structural areas to at least 98 percent of the standard maximum dry density (ASTM D698). Compact backfill or fill within paved areas to at least 95 percent of the standard maximum dry density.

- Heavy compaction equipment should not operate within 5 feet of below grade walls to avoid inducing excessive lateral pressures on the wall.

- Maintain the moisture content of the fill soils to within ±2 percentage points of the soils' optimum moisture content.

- Perform one in-place density test in every 5,000 square feet for each one-foot-thick fill layer.

- Retain the geotechnical engineer to observe, document and test the fill placement and compaction operations.

5.3.2 Storm Water Detention Ponds

We advanced six soil test borings within the proposed storm water detention pond areas. Each of these borings encountered Stratum III gravelly, sands to a depth of about 15 feet. Ground water was not detected in these borings at the time of drilling.

Detailed design information for the proposed detention ponds was not provided to us at the time of this report. Based on the subsurface conditions encountered in our borings, the detention pond excavations will expose highly permeable, sandy soils which will allow seepage into the sand layers. If the detention ponds are designed to be "wet" ponds, we recommend using a minimum 2-foot-thick layer of "select fill" for pond liner material. Pond slopes should be constructed at a rate of 3H:1V or flatter. If a clay liner is necessary, the Plasticity Index of the lean clay soil, as measured by Atterberg limits testing, should be between 15 than 35. The onsite Stratum I soils should meet these criteria. All pond liner clay should be placed in lifts and compacted in accordance with Section 5.1.3 of this report. The side slopes should be protected from erosion by sodding or other means immediately after construction. A 6-inch-thick layer of topsoil should facilitate establishing vegetative cover.

It is also possible that the detention pond excavations will encounter groundwater seepage. Based on the conditions encountered in our borings and test pits, we anticipate ground water encroaching upon construction excavations can be removed by placing a sump near the source of seepage and then pumping from the sump. Should heavy seepage occur, or should there be evidence of soil particle migration, such as silting of the sump, then the geotechnical engineer should be contacted.

5.1.4 General

- Maintain positive surface drainage to prevent water from ponding on the surface during all earthwork operations.
- Roll the fill surface with a rubber-tired or steel-drummed roller to improve surface runoff, if precipitation is expected.
- Contact the geotechnical engineer should the subgrade soils become excessively wet, dry, or frozen.

5.2 SHALLOW SPREAD FOOTING FOUNDATIONS

5.2.1 Design Considerations

We recommend the proposed buildings be supported by conventional shallow spread footings bearing on firm to stiff, native soil or newly placed and properly compacted soil fill. Column footings bearing on these materials may be sized for a maximum allowable net bearing pressure of 2,500 psf. Continuous wall footings bearing on these materials may be sized for a maximum allowable net bearing pressure of 2,000 psf.

Settlement analyses, using Schmertmann's method for foundations on sand, were performed to evaluate the maximum anticipated column load of 175 kips with a contact pressure of 2,500 psf. We estimate that total settlements of foundations bearing on firm, Stratum II or Stratum III soils will be less than about 1 inch with differential settlements less than about ½ inch. The estimated total settlement is based on the loading information provided us, our interpretation of the subsurface stratigraphy, our laboratory test results, and consolidation theories for cohesionless soils. We recommend the structure be designed to accommodate these settlement magnitudes. Our experience and published data indicate these settlement magnitudes should be within the tolerable range for this structure. However, if these settlements are considered excessive, or if the structure is settlement sensitive, we recommend a more detailed settlement analysis using laboratory consolidation testing be performed.

Additional design considerations for project foundations are outlined as follows:

- Design continuous wall footings with a minimum width of 16 inches.
- Design column footings with a minimum horizontal dimension of 24 inches.
- Found all exterior footings at least 48 inches below finished exterior grade to provide protective embedment and help reduce the potential damage from frost heave or shrinkage or swelling due to moisture fluctuations.
- Interior footings not subjected to freezing weather, severe drying, or severe wetting either during or after construction may be founded at nominal depths.
- Include control joints at suitable intervals in the walls of structures and in areas where changes in support from native soil to fill are anticipated, to help accommodate differential foundation movements.

5.2.2 Construction Considerations

The soils encountered in this exploration may lose strength if they become wet during construction. Therefore, we recommend the foundation subgrades be protected from exposure to water. The following guides address protection of footing subgrades and our recommended remediation for any soft soils encountered.

- Protect foundation support materials exposed in open excavations from freezing weather, severe drying, and water accumulation.
- Remove any soils disturbed by exposure prior to foundation concrete placement.
- Place a "lean" concrete mud-mat over the bearing soils if the excavations must remain open overnight or for an extended period of time.
- Level or suitably bench the foundation bearing area.
- Remove loose soil, debris, and excess surface water from the bearing surface prior to concrete placement.
- Retain the geotechnical engineer to observe all foundation excavations and provide recommendations for treatment of any unsuitable conditions encountered.

5.3 GRADE-SUPPORTED FLOOR SLABS

A grade-supported floor slab is suitable for the proposed distribution center, provided the subgrade is prepared according to the recommendations contained within this report. The effective modulus of subgrade reaction available for slab support at the time of construction should be at least 200 pounds per square inch per inch (pci) when using 6 inches of crushed stone base compacted over stable Stratum I soil materials. The following features are recommended as part of the floor slab construction:

- Provide joints in the slabs around columns and along footing supported walls.
- Use joints containing dowels or keys to permit rotation between parts of the slab while reducing sharp vertical displacements. This detail does not apply to joints at foundation elements.
- Place a layer of clean, compacted gravel or crushed stone beneath the slab to enhance support and provide a working base. The actual thickness of the gravel layer should be based on design requirements.
- Keep the crushed stone or gravel moist, but not wet, immediately prior to grade slab concrete placement to minimize curling of the slab due to differential curing conditions between the top and bottom of the slab.
- Retain the geotechnical engineer to review subgrade conditions prior to slab construction and make recommendations for any unsuitable conditions encountered.

5.4 GROUND WATER CONTROL

Typically, ground water encroaching upon construction excavations can be removed by placing a sump near the source of seepage and then pumping from the sump. Should heavy seepage occur, or should there be evidence of soil particle migration, such as silting of the sump, then the geotechnical engineer should be contacted.

5.5 LOADING DOCK WALLS

In order to mobilize either the active or passive earth pressure condition, some rotation at the top of the wall will occur. The amount of movement is small and depends on the backfill material and wall height, but the resulting movement could be undesirable or detrimental to the proposed structure. We recommend the loading dock walls be designed for the long-term, at-rest pressure condition because they will be laterally restrained by a structural connection to the first floor slab. Loading dock walls not restrained at the top may be designed for the active earth pressure condition. It may be necessary to provide temporary bracing if the wall cannot accommodate construction phase stresses.

The following guides are recommended for wall construction:

- The granular backfill zone should be separated from clayey soil by a non-woven, geotextile filter fabric to prevent silting of the pervious backfill.
- The backfill zone should be drained using a perforated pipe placed at the base of the footing and removing accumulated water using a gravity or sump system. Alternatively, the backfill may be drained by installing a series of weep holes near the base of the wall.

Two alternatives for wall backfill are presented below:

5.5.1 Granular Backfill

- Backfill against the loading dock walls may be constructed using a compacted granular material. The granular material should preferably be "SP" or "GW" as classified by the USCS, so that it will be clean, free draining, and exhibit an angle of shear resistance of 38 degrees or more. Materials including open-graded crushed limestone aggregate and some of the onsite Stratum II and Stratum III soils should meet these criteria.
- To utilize the following granular material earth pressure values, the granular material must occupy a triangular shaped minimum backfill zone. The minimum zone starts at the base of the wall from the outside face of the footing. At the top of the backfill, the zone should extend from the edge of footing a distance of three-fifths of the backfill height.
- The following table presents granular backfill, earth pressure design parameters for Equivalent Hydrostatic Pressures (EHP) and Earth Pressure coefficients. The values given assume the backfill surface is level, the backfill is drained, the zone of backfill conforms to the minimum zone size given above, and no surcharge is placed on the backfill.

Table 2. Granular Backfill Material
Equivalent Hydrostatic Pressures (EHP) and Earth Pressure Coefficients

Condition	EHP (pcf)	Coefficients
Active	40	$K_a = 0.30$
At Rest	50	$K_o = 0.40$
Passive	375	$K_p = 3.00$

Prepared By: *RKJ*
Checked By: *NGS*

5.5.2 Cohesive Soil Backfill

- Backfill against the loading dock walls may also be constructed using the on-site Stratum I clay soil material. The clay fill material should conform with recommendations presented in previous sections of this report. The Plasticity Index of the backfill material, as measured by Atterberg limits testing, should be less than 25.
- To provide drainage behind the wall, a vertical section of crushed stone or gravel approximately 18 inches wide may be placed behind the wall.
- The following table presents cohesive backfill earth pressure design parameters for Equivalent Hydrostatic Pressures (EHP) and Earth Pressure Coefficients. The table assumes the backfill surface is level, the backfill is drained and no surcharge is placed on the backfill.

Table 3. Cohesive Soil Backfill
Equivalent Hydrostatic Pressures (EHP) and Earth Pressure Coefficients

Condition	EHP (pcf)	Coefficients
Active	50	$K_a = 0.40$
At Rest	75	$K_o = 0.60$
Passive	275	$K_p = 2.50$

Prepared By: *RKJ*
Checked By: *NGS*

6. PAVEMENT RECOMMENDATIONS

6.1 GENERAL

In order for a pavement to perform satisfactorily, the subgrade soils must have sufficient strength and be stable enough to avoid deterioration from construction traffic and support the paving equipment. In addition, the completed pavement sections must resist freeze/thaw cycles and wheel loads from traffic. Generally, construction traffic loading is more severe than the traffic after construction. The recommended pavement sections given below are based on the assumption that the pavement subgrade soils have been compacted to at least 95 percent of the soil's standard maximum dry density at moisture contents as recommended in this report. This will require scarifying the subgrade soils to a depth of 6 to 12 inches, adjusting the moisture content if necessary, recompacting, and maintaining the recommended subgrade moisture content until the crushed stone base is placed. We have also assumed a detailed proofrolling of the subgrade soil will be performed to delineate soft areas. On this site, we anticipate some undercutting or stabilization of soft subgrade soils will be required to achieve a stable subgrade.

Minimizing infiltration of water into the subgrade and rapid removal of subsurface water are essential for the successful long-term performance of the pavement. Both the subgrade and the pavement surface should have a minimum slope of one-quarter inch per foot to promote surface drainage. Edges of the pavement should be provided a means of water outlet by extending the aggregate base course through to daylight or to surface drainage features such as storm inlets.

The materials should conform and be placed and compacted in accordance with the applicable sections of the Wisconsin Department of Transportation (WisDOT) Standard Specifications, latest edition.

6.2 DESIGN METHODOLOGY

We have used the American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993) as a basis for our pavement thickness analysis. The AASHTO design guide was developed based on the findings of the American

Association of State Highway Officials (AASHO) Road Test. It defines pavement performance in terms of the present serviceability index (PSI), which varies from 0 to 5. The PSI of newly constructed flexible (asphaltic concrete) and rigid (concrete) pavements was found to be about 4.2 and 4.5, respectively, in the Road Test. The end of service life was considered to be reached at a terminal PSI value of 2.0. Serviceability loss (ΔPSI), the required input parameter, is the difference between the initial and terminal serviceabilities.

The AASHTO design guide incorporates a reliability factor to account for uncertainties in traffic prediction and pavement performance. The reliability factor (R) indicates the probability that the pavement will not reach the terminal serviceability level before the end of the design period. We have assumed a design reliability of 85 percent at an overall standard deviation (S_0) of 0.45 for flexible pavements and 0.35 for rigid pavements.

6.3 FLEXIBLE PAVEMENT

The total flexible pavement thickness requirement is a function of the resilient modulus (M_r) of the subgrade soils. We have estimated M_r through the empirical correlation with the California Bearing Ratio (CBR) suggested by AASHTO for fine-grained soils with a soaked CBR of 10 or less. Our laboratory CBR tests results, performed on two representative samples of the onsite soil materials, were presented in Table 1. Based on the subsurface conditions encountered at the site, we anticipate that the predominant pavement subgrade material will be the Stratum I clay soils. Based on our laboratory CBR test results and our experience, a CBR value of 3 is appropriate for design.

The total pavement thickness requirement is obtained from the AASHTO nomograph in terms of a structural number (SN), a weighted sum of the pavement layer thicknesses accounting for their structural and drainage properties. We have assumed layer coefficients of 0.44 and 0.14 for plant mix asphalt and crushed stone, respectively, and a drainage coefficient of 1.2 for the crushed stone base. The possible effect of drainage on the asphaltic concrete surface is not considered.

Based on the vehicle loading information provided to us we have assumed less than 1,500 passenger cars per day will pass over the light duty pavement during the 20-year analysis period. We have assumed 215 semi-tractor trailer trucks per weekday and 140 trailer trucks per day on weekends will pass over the heavy duty pavement. Based on this assumed average daily traffic and axle weight data, the estimated 18-kip equivalent single axle load (ESAL) applications during the 20-year analysis period are less than 40,000 for light duty flexible pavements and 3,500,000 for heavy duty flexible pavements. Based on these assumptions and our experience with similar projects, we recommend the following pavement thicknesses:

Table 4. Flexible Pavement

Material	Light Duty Employee Parking	Heavy Duty Drive Lanes and Truck Parking	Wisconsin DOT Specification
Asphalt	3 inches	6 inches	Section 450
Crushed Stone Base	8 inches	12 inches	Section 301

Prepared By: *RKJ*
Checked By: *NGS*

6.4 RIGID PAVEMENT

We anticipate reinforced concrete pads will be used in areas where the pavements is subjected to high stresses such as aprons for the loading docks, fueling area, dumpster pads, and trailer parking. The total rigid pavement thickness requirement is a function of the modulus of subgrade reaction (k). An effective modulus of subgrade reaction is used in design to account for the depth to rock, the characteristics of the subbase layer, and the resilient modulus (M_r) of the subgrade soils. We have estimated M_r through the empirical correlation with the California Bearing Ratio (CBR) suggested by AASHTO for fine-grained soils with a soaked CBR of 10 or less. As previously mentioned, based on our laboratory test results and our experience, a CBR value of 3 is appropriate for design. The effective modulus of subgrade reaction available for pavement support at the time of construction should be at least 300 pci when using 9 inches of crushed stone base compacted over stable Stratum I soil materials.

The elastic modulus (E_c) and modulus of rupture (S'_c) of concrete are required pavement material input parameters. We have estimated E_c and S'_c through empirical correlations with the 28-day compressive strength (f'_c) of concrete. We have assumed the concrete will have a 28-day compressive strength of 4,000 pounds per square inch (psi) and an S'_c value of at least 580 psi. The load transfer coefficient (J) is a factor used to account for the ability of concrete pavement to distribute load across discontinuities. We have assumed a load transfer coefficient of 3.2 for reinforced concrete pavement with doweled joints, and a drainage coefficient of 1.2 for the crushed stone base. The required slab thickness is obtained from the AASHTO nomograph.

Based on the traffic loading information provided to us, which was previously discussed in Section 6.3, the estimated 18-kip equivalent single axle load (ESAL) applications during the 20-year analysis period are less than 5,700,000 for the rigid pavement truck-dock aprons. Based on this information and our experience with similar projects, we recommend the following rigid pavement thicknesses:

Table 5. Rigid Pavement

Material	Truck Aprons	Dumpster Pad	Wisconsin DOT Specification
Concrete	8 inches	6 inches	Section 415
Crushed Stone Base	9 inches	6 inches	Section 301

Prepared By: *RKJ*
Checked By: *NGS*

Prior to placing the crushed stone base for the rigid pavement, the approach areas should be thoroughly proofrolled. We recommend the concrete pads be large enough to accommodate the entire length of a truck while loading or unloading. In addition, we recommend a thickened curb be constructed around the perimeter of the pads to reduce the potential for further pad damage typically associated with overstressing of the pad edges.

Reinforcement for the rigid pavements should consist of a wire mesh or fiber-reinforced concrete. If wire mesh is utilized, the mesh should be located in the middle third of the concrete section. Based on our experience and a review of the Design and Control of Concrete Mixtures, published by the Portland Cement Association (PCA), we recommend that control joints be placed at 15-foot intervals each way in the apron and pad areas to control cracking. These control joints should be filled with a fuel resistant seal to prevent intrusion of liquids into the subgrade.

7. BASIS FOR RECOMMENDATIONS

The recommendations provided are based in part on project information provided to MACTEC only apply to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information is available, you should convey the correct or additional information to us and retain us to review our recommendations. We can then modify our recommendations if they are inappropriate for the proposed project.

The assessment of site environmental conditions or the presence of contaminants in the soil, rock, surface water or ground water of the site was beyond the scope of this exploration.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to solve the problems created. We recommend that the owner retain MACTEC to provide this service based upon our familiarity with the project, the subsurface conditions and the intent of the recommendations.

We recommend that this complete report be provided to the various design team members, the contractors and the project owner. Potential contractors should be informed of this report in the "instructions to bidders" section of the bid documents. The report should not be included or referenced in the actual contract documents.

We wish to remind you that our exploration services include storing the samples collected and making them available for inspection for 30 days. The samples are then discarded unless you request otherwise.

APPENDIX:

Site Location Map

Boring Location Plan

Field Testing Procedures

Key to Symbols and Descriptions

Interpretation of Subsurface Stratigraphy

Test Boring Records

Laboratory Testing Procedures

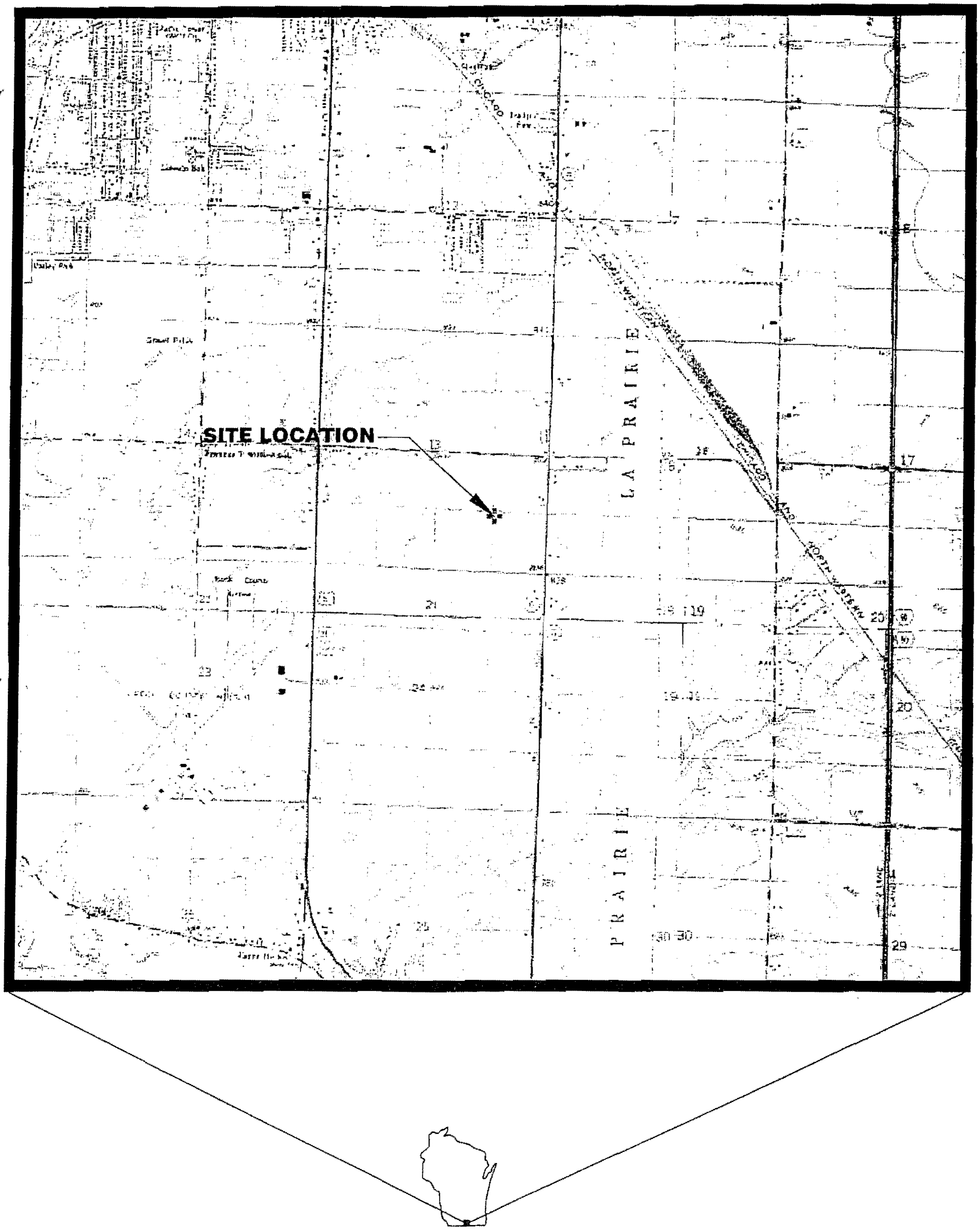
Summary of Laboratory Test Data

Atterberg Limits Results

Grain Size Distribution

SOURCE: WWW.TOPOZONE.COM, JANESVILLE WEST QUADRANGLE, ROCK COUNTY, WISCONSIN

N



WISCONSIN
QUADRANGLE LOCATION

LOWE'S HOME CENTERS, INC. NORTH WILKSBORO, NC	MACTEC 13425 Eastpoint Centre Drive, Ste 122 Louisville, KY. 40223 Phone: 502-253-2500 Fax: 502-253-2501	SITE LOCATION MAP LOWE'S RDC-JANESVILLE, WI
PROJECT NO. 6234-04-2228.01	CHECKED BY: R.JEFFRIES RKJ PREPARED BY: G.HAYS	CADD FILE: 042228.01_SLM PLOT DATE: 6/29/04 FIGURE 1

DEPTH (ft)	DESCRIPTION SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	830.0					SURFACE COVER: SOYBEAN FIELD
	STIFF, dark brown, sandy CLAY (CL) with some organics		SS-1		1-4-6 (N = 10)	14	
	STIFF, dark brown, sandy CLAY (CL)		SS-2		3-6-7 (N = 13)	14	
5	FIRM, light brown, poorly graded, gravelly SAND (SP)	825.0	SS-3		6-9-9 (N = 18)	17	
	VERY DENSE to DENSE, light brown, poorly graded, gravelly SAND (SP)		SS-4		16-32-28 (N = 60)	17	
10		820.0	SS-5		3-19-22 (N = 41)	17	BORING CAVED IN AT 10.0 FEET
	DENSE to VERY DENSE, light brown, well graded, gravelly SAND (SW)						
15		815.0	SS-6		9-18-20 (N = 38)	14	
20		810.0	SS-7		19-27-28 (N = 55)	12	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		805.0					

START DATE: 6/3/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RFJ

Boring No.: B-3

MACTEC

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	DESCRIPTION	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	830.0					SURFACE COVER: SOYBEAN FIELD
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-1		3-3-4 (N = 7)	10	
			SS-2		4-5-5 (N = 10)	10	
	FIRM, light brown, well graded, gravelly SAND (SW)						
5		825.0	SS-3		5-6-6 (N = 12)	10	
	VERY FIRM, light brown, poorly graded, gravelly SAND (SP)		SS-4		7-9-12 (N = 21)	17	
	DENSE to VERY DENSE, light brown, well graded, gravelly SAND (SW)						
10		820.0	SS-5		12-13-19 (N = 32)	14	
	C						BORING CAVED IN AT 13.9 FEET
15		815.0	SS-6		16-27-22 (N = 49)	14	
20		810.0	SS-7		27-41-38 (N = 79)	18	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		805.0					

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-6

MACTEC

DEPTH (ft)	DESCRIPTION SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	828.0				SURFACE COVER: SOYBEAN FIELD
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-1	3-4-4 (N = 8)	12	
			SS-2	4-4-6 (N = 10)	17	
	FIRM, light brown, poorly graded, gravelly SAND (SP)					
5		823.0	SS-3	5-7-7 (N = 14)	18	
	DENSE, light brown, well graded, gravelly SAND (SW)		SS-4	7-15-16 (N = 31)	18	
	FIRM to VERY FIRM, light brown, poorly graded, gravelly SAND (SP)		SS-5	3-7-10 (N = 17)	18	
10		818.0				
15		813.0	SS-6	10-13-13 (N = 26)	14	
	C					BORING CAVED IN AT 16.8 FEET
	DENSE, light brown, well graded, gravelly SAND (SW)		SS-7	15-16-16 (N = 32)	2	
20		808.0				
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
25		803.0				

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-7

MACTEC

LAW_SOILROCK 0228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	829.0					SURFACE COVER: SOYBEAN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		2-2-4 (N = 6)	14	
			SS-2		3-4-4 (N = 8)	14	
	DENSE to VERY DENSE, light brown, well graded, gravelly SAND (SW)						
5		824.0	SS-3		12-17-19 (N = 36)	18	
			SS-4		19-26-38 (N = 64)	18	
10	C	819.0	SS-5		22-26-34 (N = 60)	18	BORING CAVED IN AT 10.2 FEET
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)						
15		814.0	SS-6		14-15-15 (N = 30)	17	
20		809.0	SS-7		12-15-22 (N = 37)	17	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		804.0					

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-8

MACTEC

LAW_SOIL/ROCK ...-0228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (12 INCHES)	828.0	SS-1	3-4-5 (N = 9)	12	SURFACE COVER: SOYBEAN FIELD
	STIFF to FIRM, dark brown, sandy CLAY (CL) with some organics		SS-2	2-3-5 (N = 8)	12	
	VERY LOOSE, brown, poorly graded, medium SAND (SP) with some gravel and dark brown clay		SS-3	2-2-2 (N = 4)	13	
5		823.0				
	FIRM to VERY FIRM, light brown, well graded, gravelly SAND (SW)		SS-4	4-7-9 (N = 16)	10	
			SS-5	6-10-11 (N = 21)	2	
10		818.0				
	FIRM, light brown, well graded, gravelly SAND (SW)					
			SS-6	6-5-5 (N = 10)	6	
15		813.0				
						BORING CAVED IN AT 16.9 FEET
			SS-7	7-7-5 (N = 12)	14	
20		808.0				
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
25		803.0				

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RFJ
Boring No.: B-9

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD / % REC	RECOV (in.)	REMARKS
0	TOPSOIL (12 INCHES)	828.0	SS-1		2-3-5 (N = 8)	10	SURFACE COVER: SOYBEAN FIELD
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-2		2-4-5 (N = 9)	12	
	FIRM, dark brown, sandy CLAY (CL)						
5		823.0	SS-3		3-4-4 (N = 8)	17	
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)		SS-4		10-18-19 (N = 37)	12	
10		818.0	SS-5		8-12-16 (N = 28)	14	
15		813.0	SS-6		10-14-15 (N = 29)	18	
	C						BORING CAVED IN AT 17.2 FEET
20		808.0	SS-7		12-19-29 (N = 48)	18	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		803.0					

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-10

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

TEST BORING RECORD

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD / % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	828.0					SURFACE COVER: SOYBEAN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		2-2-6 (N = 8)	6	
	FIRM, light brown, well graded, gravelly SAND (SW) with some dark brown clay		SS-2		6-10-6 (N = 16)	8	
	DENSE, light brown, well graded, gravelly SAND (SW)						
5		823.0	SS-3		6-10-16 (N = 26)	12	
			SS-4		15-19-21 (N = 40)	18	
10		818.0	SS-5		14-19-21 (N = 40)	14	
	C						BORING CAVED IN AT 13.0 FEET
15		813.0	SS-6		8-12-25 (N = 37)	18	
20		808.0	SS-7		8-21-26 (N = 47)	18	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		803.0					

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-11

MACTEC

LAW_SOIL/ROCK 0228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)		827.0					SURFACE COVER: SOYBEAN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics			SS-1		2-2-3 (N = 5)	12	
				SS-2		2-3-3 (N = 6)	12	
	LOOSE, brown, poorly graded, medium SAND (SP)							
5			822.0	SS-3		3-2-2 (N = 4)	16	
	DENSE, light brown, well graded, gravelly SAND (SW)							
				SS-4		12-15-16 (N = 31)	10	
10			817.0	SS-5		8-14-19 (N = 33)	16	
15			812.0	SS-6		11-15-16 (N = 31)	12	
		C						BORING CAVED IN AT 17.2 FEET
20			807.0	SS-7		11-15-20 (N = 35)	16	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL							BORING DRY UPON COMPLETION OF DRILLING
25			802.0					

START DATE: 6/4/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-12

MACTEC

LAW_SOIL/ROCK -0228.01.GPJ LAW_GIBB.GDT 7/22/04

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	DESCRIPTION	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)		827.0	SS-1		1-2-3 (N = 5)	10	SURFACE COVER: CORN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics							
	LOOSE, brown, poorly graded, medium SAND (SP)			SS-2		2-3-4 (N = 7)	14	
5			822.0	SS-3		3-3-4 (N = 7)	17	
	LOOSE, light brown, well graded, gravelly SAND (SW)			SS-4		3-4-3 (N = 7)	12	
	VERY FIRM, light brown, well graded, gravelly SAND (SW)							
10			817.0	SS-5		9-12-12 (N = 24)	17	
15			812.0	SS-6		7-10-13 (N = 23)	14	BORING CAVED IN AT 14.7 FEET
20			807.0	SS-7		6-8-12 (N = 20)	14	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL							BORING DRY UPON COMPLETION OF DRILLING
25			802.0					

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-13

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD / % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	828.0				SURFACE COVER: CORN FIELD
	SOFT to FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1	1-1-3 (N = 4)	8	
			SS-2	1-2-3 (N = 5)	10	
	LOOSE, brown, poorly graded, medium SAND (SP) with some gravel					
5		823.0	SS-3	3-3-3 (N = 6)	12	
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)					
			SS-4	5-15-17 (N = 32)	16	
10		818.0	SS-5	6-14-14 (N = 26)	16	
	C					BORING CAVED IN AT 12.8 FEET
15		813.0	SS-6	8-14-16 (N = 30)	12	
20		808.0	SS-7	15-20-15 (N = 35)	16	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
25		803.0				

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-14

MACTEC

LAW_SOIL/ROCK ...0228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	826.0				SURFACE COVER: CORN FIELD
	SOFT to FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1	2-2 (N = 4)		
			SS-2	2-2-3 (N = 5)	7	
	LOOSE, brown, poorly graded, medium SAND (SP) with some gravel		SS-3	2-2-2 (N = 4)	12	
5		821.0				
	LOOSE, light brown, well graded, gravelly SAND (SW)		SS-4	2-3-6 (N = 9)	14	
	FIRM to VERY FIRM, light brown, well graded, gravelly SAND (SW)		SS-5	5-6-5 (N = 11)	18	
10		816.0				
			SS-6	8-14-15 (N = 29)	14	
15		811.0				
	C					BORING CAVED IN AT 17.1 FEET
			SS-7	6-9-14 (N = 23)	12	
20		806.0				
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
25		801.0				

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-15

MACTEC

LAW_SOIL/ROCK -0228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	829.0				SURFACE COVER: CORN FIELD
			SS-1	2-4-5 (N = 9)	10	
	STIFF to FIRM, dark brown, sandy CLAY (CL) with some organics					
			SS-2	2-3-4 (N = 7)	7	
	DENSE to VERY DENSE, light brown, gravelly SAND (SP)					
			SS-3	15-16-22 (N = 38)	12	
5		824.0				A BULK SAMPLE OF THE STRATUM II SOILS WAS OBTAINED FROM THE AUGER CUTTINGS AT A DEPTH OF 5 TO 15 FEET
			SS-4	15-23-27 (N = 50)	17	
			SS-5	22-26-29 (N = 55)	17	
10		819.0				
	DENSE, light brown, well graded, gravelly SAND (SW)					
	C					BORING CAVED IN AT 12.8 FEET
			SS-6	16-18-14 (N = 32)	12	
15		814.0				
			SS-7	18-15-22 (N = 37)		
20		809.0				
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
25		804.0				

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-16

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	826.0	SS-1	X	4-3 (N = 7)	12	SURFACE COVER: CORN FIELD
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-2	X	3-4-5 (N = 9)	12	
	FIRM, brown, well graded, gravelly SAND (SW)		SS-3	X	3-6-6 (N = 12)	12	
5		821.0					
	FIRM to VERY FIRM, light brown, well graded, gravelly SAND (SW)		SS-4	X	6-8-8 (N = 16)	14	
10		816.0	SS-5	X	6-6-6 (N = 12)	12	
15		811.0	SS-6	X	5-6-9 (N = 15)	14	
	C						BORING CAVED IN AT 17.4 FEET
20		806.0	SS-7	X	9-9-13 (N = 22)	17	
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		801.0					

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-17

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	827.0					SURFACE COVER: CORN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		1-3-4 (N = 7)	12	
			SS-2		2-3-4 (N = 7)	12	
	VERY LOOSE, brown, poorly graded, medium SAND (SP) with some light brown gravel		SS-3		2-2-2 (N = 4)	16	
5		822.0					
	DENSE, light brown, well graded, gravelly SAND (SW)		SS-4		13-16-18 (N = 34)	14	
			SS-5		13-15-22 (N = 37)	12	
10		817.0					
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)						
			SS-6		10-12-16 (N = 28)	14	
15		812.0					
							BORING CAVED IN AT 16.8 FEET
			SS-7		12-14-19 (N = 33)	18	
20		807.0					
	BORING TERMINATED AT 20.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
25		802.0					

START DATE: 6/5/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: B-18

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	829.0					SURFACE COVER: SOYBEAN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		2-3-4 (N = 7)	18	POCKET PENETROMETER = 4.0 TSF
			SS-2		3-3-3 (N = 6)	17	A BULK SAMPLE OF THE STRATUM I SOIL WAS OBTAINED FROM 1.5 TO 2.5 FEET POCKET PENETROMETER = 4.0 TSF
	LOOSE, brown, poorly graded, medium SAND (SP)						
	FIRM, light brown, well graded, gravelly SAND (SW)						BORING CAVED IN AT 3.9 FEET
5		824.0	SS-3		2-5-7 (N = 12)	12	
	BORING TERMINATED AT 5.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
10		819.0					
15		814.0					
20		809.0					
25		804.0					

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: P-19

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD / % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)		828.0					SURFACE COVER: SOYBEAN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics			SS-1		4-3-3 (N = 6)	18	POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT POCKET PENETROMETER = 3.5 TSF
	FIRM, light brown, well graded, gravelly SAND (SW)	C		SS-2		3-4-7 (N = 11)	11	POCKET PENETROMETER = 2.0 TSF BORING CAVED IN AT 3.6 FEET
	VERY FIRM, brown, poorly graded, medium SAND (SP)			SS-3		5-9-14 (N = 23)	13	
5			823.0					
	BORING TERMINATED AT 5.5 FEET; NO REFUSAL							BORING DRY UPON COMPLETION OF DRILLING
10			818.0					
15			813.0					
20			808.0					
25			803.0					

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: P-20

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)
0	TOPSOIL (10 INCHES)	828.0
	SOFT to FIRM, dark brown, sandy CLAY (CL) with some organics	
	VERY FIRM, light brown, well graded, gravelly SAND (SW)	
5		823.0
	C	
10		818.0
	BORING TERMINATED AT 10.5 FEET; NO REFUSAL	
15		813.0
20		808.0
25		803.0

SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD % REC	RECOV (in.)	REMARKS
SS-1		2-2-2 (N = 4)	17	SURFACE COVER: SOYBEAN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT POCKET PENETROMETER = 1.5 TSF
SS-2		3-3-4 (N = 7)	12	POCKET PENETROMETER = 1.75 TSF
SS-3		7-7-13 (N = 20)	14	
SS-4		6-10-17 (N = 27)	16	BORING CAVED IN AT 7.5 FEET
SS-5		4-7-14 (N = 21)	12	
				BORING DRY UPON COMPLETION OF DRILLING

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: P-24

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	828.0				SURFACE COVER: CORN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	SOFT, dark brown, sandy CLAY (CL) with some organics		SS-1	2-2-2 (N = 4)	10	POCKET PENETROMETER = 1.0 TSF
			SS-2	1-2-2 (N = 4)	14	POCKET PENETROMETER = 1.0 TSF
	LOOSE, light brown, well graded, gravelly SAND (SW)					
5		823.0	SS-3	2-3-4 (N = 7)	14	
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)					
	C		SS-4	6-10-12 (N = 22)	16	BORING CAVED IN AT 6.9 FEET
10		818.0	SS-5	6-14-19 (N = 33)	5	
	BORING TERMINATED AT 10.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
15		813.0				
20		808.0				
25		803.0				

START DATE: 6/7/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: P-25

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	828.0					SURFACE COVER: CORN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-1		2-3-3 (N = 6)	12	POCKET PENETROMETER = 1.0 TSF
			SS-2		2-3-6 (N = 9)	8	POCKET PENETROMETER = 1.75 TSF
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)						
5		823.0	SS-3		11-12-13 (N = 25)	16	
			SS-4		11-15-17 (N = 32)	17	BORING CAVED IN AT 7.0 FEET
			SS-5		4-11-15 (N = 26)	16	
10		818.0					
	BORING TERMINATED AT 10.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
15		813.0					
20		808.0					
25		803.0					

START DATE: 6/7/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: P-26

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)		828.0					SURFACE COVER: SOYBEAN FIELD
	FIRM, dark brown, sandy CLAY (CL) with some organics			SS-1		2-2-3 (N = 5)	18	POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT POCKET PENETROMETER = 1.5 TSF
	FIRM to DENSE, light brown, well graded, gravelly SAND (SW)			SS-2		2-4-11 (N = 15)	12	POCKET PENETROMETER = 1.75 TSF
				SS-3		5-8-13 (N = 21)	16	
5			823.0					
				SS-4		12-20-24 (N = 44)	13	
				SS-5		11-18-21 (N = 39)	12	
10		C	818.0					BORING CAVED IN AT 10.1 FEET
				SS-6		7-10-14 (N = 24)	11	
15			813.0					
	BORING TERMINATED AT 15.5 FEET; NO REFUSAL							BORING DRY UPON COMPLETION OF DRILLING
20			808.0					
25			803.0					

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: D-28

MACTEC

LAW_SOILROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	826.0	SS-1	3-3-5 (N = 8)	17	SURFACE COVER: CORN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT POCKET PENETROMETER = 1.5 TSF
	FIRM to STIFF, dark brown, sandy CLAY (CL) with some organics		SS-2	3-5-7 (N = 12)	13	
	VERY DENSE, light brown, well graded, gravelly SAND (SW)					
5		821.0	SS-3	11-27-24 (N = 51)	14	
			SS-4	17-40-59 (N = 99)	17	
10		816.0	SS-5	50/2	1	
	C					BORING CAVED IN AT 11.1 FEET
			SS-6	100/4	4	BORING DRY UPON COMPLETION OF DRILLING
	BORING TERMINATED AT 14.4 FEET; NO REFUSAL					
15		811.0				
20		806.0				
25		801.0				

START DATE: 6/7/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: D-29

MACTEC

TEST BORING RECORD

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	DESCRIPTION	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	826.0					SURFACE COVER: CORN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		2-3-6 (N = 9)	14	PP = 1.0 TSF
			SS-2		2-5-7 (N = 12)	16	
	FIRM to VERY FIRM, light brown, well graded, gravelly SAND (SW)						
5		821.0	SS-3		6-9-8 (N = 17)	5	
			SS-4		7-16-20 (N = 36)	17	
10		816.0	SS-5		12-17-17 (N = 34)	18	
	C						BORING CAVED IN AT 11.5 FEET
15		811.0	SS-6		6-12-15 (N = 27)	18	
	BORING TERMINATED AT 15.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
20		806.0					
25		801.0					

LAW_SOILROCK 62[illegible]228.01.GPJ LAW_GIBB.GDT 7/22/04

START DATE: 6/7/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RFJ
Boring No.: D-30

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	829.0				SURFACE COVER: SOYBEAN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1	3-3-4 (N = 7)	18	POCKET PENETROMETER = 2.5 TSF
			SS-2	3-3-3 (N = 6)	10	
	LOOSE, brown, poorly graded, medium SAND (SP)					
5		824.0	SS-3	2-2-5 (N = 7)	12	
	VERY FIRM to FIRM, light brown, well-graded, gravelly SAND (SW)					
			SS-4	6-12-15 (N = 27)	16	
	C					BORING CAVED IN AT 8.1 FEET
10		819.0	SS-5	6-11-10 (N = 21)	14	
15		814.0	SS-6	6-8-10 (N = 18)	12	
	BORING TERMINATED AT 15.5 FEET; NO REFUSAL					BORING DRY UPON COMPLETION OF DRILLING
20		809.0				
25		804.0				

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: D-31

MACTEC

DEPTH (ft)	DESCRIPTION (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW)	ELEV (ft)	IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6") / RQD % REC	RECOV (in.)	REMARKS
0	TOPSOIL (10 INCHES)	829.0					SURFACE COVER: CORN FIELD POCKET PENETROMETER READINGS MEASURED IN TONS PER SQUARE FOOT
	FIRM, dark brown, sandy CLAY (CL) with some organics		SS-1		2-2-4 (N = 6)	12	POCKET PENETROMETER = 2.25 TSF
			SS-2		3-9-13 (N = 22)	11	POCKET PENETROMETER = 1.25 TSF
	VERY FIRM to DENSE, light brown, well graded, gravelly SAND (SW)						
5		824.0	SS-3		9-20-35 (N = 55)	16	
			SS-4		8-54-50/4	7	
10		819.0	SS-5		17-23-23 (N = 46)	1	
	C						BORING CAVED IN AT 11.6 FEET
15		814.0	SS-6		6-10-13 (N = 23)	12	
	BORING TERMINATED AT 15.5 FEET; NO REFUSAL						BORING DRY UPON COMPLETION OF DRILLING
20		809.0					
25		804.0					

START DATE: 6/8/2004
CONTRACTOR: STS EXPLORATION
DRILLER: MARK SCHULZ
EQUIPMENT: DIEDRICH D-50
METHOD: HOLLOW STEM AUGER
HOLE DIA.: 3.25 I.D.
REMARKS: AUTOMATIC HAMMER

TEST BORING RECORD

Project: Lowes RDC- Janesville, WI
Project No: 6234-04-2228.01
Checked By: RKJ
Boring No.: D-32

MACTEC

LAW_SOIL/ROCK 6234-04-2228.01.GPJ LAW_GIBB.GDT 7/22/04

FIELD TESTING PROCEDURES

Field Operations: The general field procedures employed by MACTEC Engineering and Consulting, Inc., (MACTEC) are summarized in ASTM D420 which is entitled "Investigating and Sampling Soils and Rocks for Engineering Purposes." This recommended practice lists recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Borings are drilled to obtain subsurface samples using one of several alternative techniques depending upon the subsurface conditions. These techniques are:

a. Continuous 2½ or 3¼ inch inside diameter (I.D.) hollow stem augers;
b. Wash borings using roller cone or drag bits (using drilling mud or water);
c. Continuous flight augers (ASTM D1425).

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

The subsurface conditions encountered during drilling are reported on a field test boring record by the chief driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soils in general accordance with the procedures outlined in ASTM D2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designating the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

The detailed data collection methods used during this exploration are discussed below.

Soil Test Borings: Soil test borings were made at the site at locations shown on the attached Boring Plan. Soil sampling and penetration testing were performed in accordance with ASTM D1586.

The borings were made by mechanically twisting a hollow stem steel auger into the soil. At regular intervals, soil samples were obtained with a standard 1.4 inch I.D., 2 inch outside diameter (O.D.), split tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, then driven

LABORATORY TESTING PROCEDURES

Soil Classification: Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current situations. In our investigations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our "Test Boring Records."

The classification system discussed above is primarily qualitative and for detailed soil classification two laboratory tests are necessary: grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D2487). Each of these classification systems and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties determined are presented in this report.

Atterberg Limits: Portions of the samples are taken for Atterberg Limits testing to determine the plasticity characteristics of the soil. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. It is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil becomes sufficiently "wet" to flow as a heavy viscous fluid. The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into tiny threads. The liquid limit and plastic limit are determined in accordance with ASTM D4318.

Grain Size Tests: Grain Size Tests are performed to determine the soil classification and the grain size distribution. The soil samples are prepared for testing according to ASTM D421 (dry preparation) or ASTM D2217 (wet preparation). The grain size distribution of soils coarser than a number 200 sieve (0.074 mm opening) is determined by passing the samples through a standard set of nested sieves. Materials passing the number 200 sieve are suspended in water and the grain size distribution calculated from the measured settlement rate. These tests are conducted in accordance with ASTM D422.

Percent Finer Than 200 Sieve: Selected samples of soils are washed through a number 200 sieve to determine the percentage of material less than 0.074 mm in diameter.

Moisture Content: The Moisture Content is determined according to ASTM D2216.

Organic Content: The Organic Content is determined according to ASTM D2974. The moisture content is first determined by drying portions of the sample at 105 degrees Celsius. The ash content is then determined by igniting the oven-dried sample from the moisture content determination in a muffle furnace at 440 degrees Celsius. The substance remaining after ignition is the ash. The organic content is expressed as a percentage by subtracting the percent ash from one hundred.

Compaction Tests: Compaction tests are run on representative soil samples to determine the dry density obtained by a uniform compactive effort at varying moisture contents. The results of the test are used to determine the moisture content and unit weight desired in the field for similar soils.

LABORATORY TESTING PROCEDURES (continued)

Proper field compaction is necessary to decrease future settlements, increase the shear strength of the soil and decrease the permeability of the soil.

The two most commonly used compaction tests are the standard Proctor test and the modified Proctor test. They are performed in accordance with ASTM D698 and D1557, respectively. Generally, the standard Proctor compaction test is run on samples from building or parking areas where small compaction equipment is anticipated. The modified Proctor compaction test is generally performed for heavy structures, highways, and other areas where large compaction equipment is expected. In both tests a representative soil sample is placed in a mold and compacted with a compaction hammer. Both tests have three alternate methods.

The moisture content and unit weight of each compacted sample is determined. Usually 4 to 5 such tests are run at different moisture contents. Test results are presented in the form of a dry unit weight versus moisture content curve. The compaction method used and any deviations from the recommended procedures are noted in this report.

California Bearing Ratio: The California Bearing Ratio (CBR) is a punching shear test which provides data that is a semi-empirical index to the strength and deflection characteristics of the soil, and has been widely correlated with pavement performance to establish criteria for selecting pavement thicknesses. The test is performed on a 6-inch diameter, 5-inch thick disk of compacted soil that is confined in a steel cylinder. The sample is first compacted in accordance with Method B or D of ASTM D698 or D1557. The samples may be tested unsoaked or in a soaked condition. For the soaked test, the sample is inundated under a confining pressure to approximate the weight of future pavement, in order to evaluate the potential swell characteristics of the soil.

The test is performed by forcing a piston approximately 2 inches in diameter into the soil sample at the rate of 0.05 inch per minute to a depth of 0.5 inch to determine the resistance to penetration. The CBR is the ratio, expressed as a percentage, of the actual load required to penetrate the soil to a 0.1 inch depth compared to the load it takes to penetrate a standard crushed stone to the same depth.

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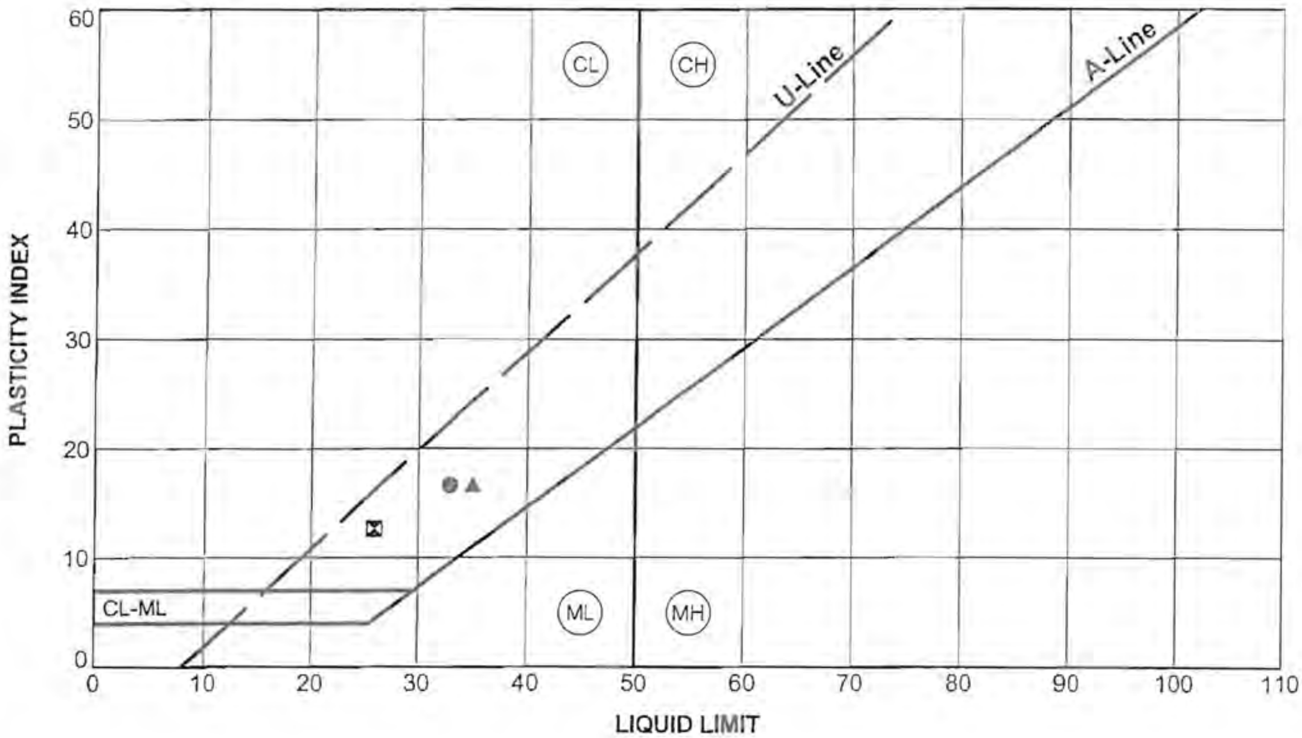
Project: Lowe's RDC - Janesville, Wisconsin
Project No.: 6234-04-2228.01
By: RKJ Date: 07/15/04
Checked By: SLM Date: 07/15/04

Summary of Laboratory Test Data

Boring	Depth (feet)	Sample Type	Natural Moisture Content (%)	Atterberg Limits			% Finer than No. 200 Sieve	USCS Classification	Unconfined Compressive Strength (psf)	% Organic Content	Unit Weight (pcf)		Compaction Tests		
				LL	PL	PI					Wet	Dry	Max. Dry Density (pcf)	Opt. Moisture Content (%)	CBR
B-01	1.5-3.0	SS	12.1				28.3	SC							
B-01	4.0-5.5	SS	4.1												
B-01	6.5-8.0	SS	3.9												
B-01	9.0-10.5	SS	3.6												
B-04	0-1.5	SS	18.4							3.8					
B-04	1.5-3.0	SS	17.8												
B-04	4.0-5.5	SS	2.8												
B-04	6.5-8.0	SS	2.7												
B-04	9.0-10.5	SS	3.3												
B-04	14.0-15.5	SS	4.3												
B-04	19.0-20.5	SS	4.1												
B-08	0-1.5	SS	15.7							3.7					
B-08	1.5-3.0	SS	13.5	26	13	13		CL							
B-08	4.0-5.5	SS	4.5												
B-08	6.5-8.0	SS	2.6				6.8	SW							
B-08	9.0-10.5	SS	3.4												
B-16	5.0-15.0	BG	3.3				8.1	SP					118.4	11.5	13
B-18	1.5-3.0	SS	14.9	33	16	17		CL							
B-18	4.0-5.5	SS	5.6				4.7	SP							
B-18	6.5-8.0	SS	3.4												
B-18	9.0-10.5	SS	3.3				3.2	SW							
P-19	0-1.5	SS	14.9							2.9					
P-19	1.5-2.5	BG	7.8	35	18	17		CL		1.8			112.8	15.1	3
P-22	1.5-3.0	SS	11.4							1.6					
P-23	1.5-3.0	SS	11.7							1.1					
P-26	0-1.5	SS	17.6							3.2					

* Graphical presentations of results of Atterberg Limits, Grain Size, Proctor, CBR, Consolidation, Triaxial, and/or other tests follow this summary.

** Sample types: SS = Split-Spoon Sample (ASTM D1586); UD = Undisturbed Sample (ASTM D1587); BG = Bulk/Bag Sample
Revised 03192001



Symbol	Location	Depth, feet	LL	PL	PI	Natural Moisture Content, %	LI	USCS	Soil Classification
●	B-18	1.5-3.0	33	16	17	14.9	-0.1	CL	Dark brown, sandy, lean CLAY
⊠	B-8	1.5-3.0	26	13	13	13.5	0.0	CL	Dark brown, sandy, lean CLAY
▲	S-1	1.5-2.5	35	18	17	7.8	-0.6	CL	Dark brown, sandy, lean CLAY

Remarks:

Test Method - ASTM D4318

LL=Liquid Limit; PL= Plastic Limit; PI=Plasticity Index; LI=Liquidity Index

ATTERBERG LIMITS RESULTS

Project: Lowes RDC- Janesville, WI

Project No: 6234-04-2228.01

Checked By: RKJ

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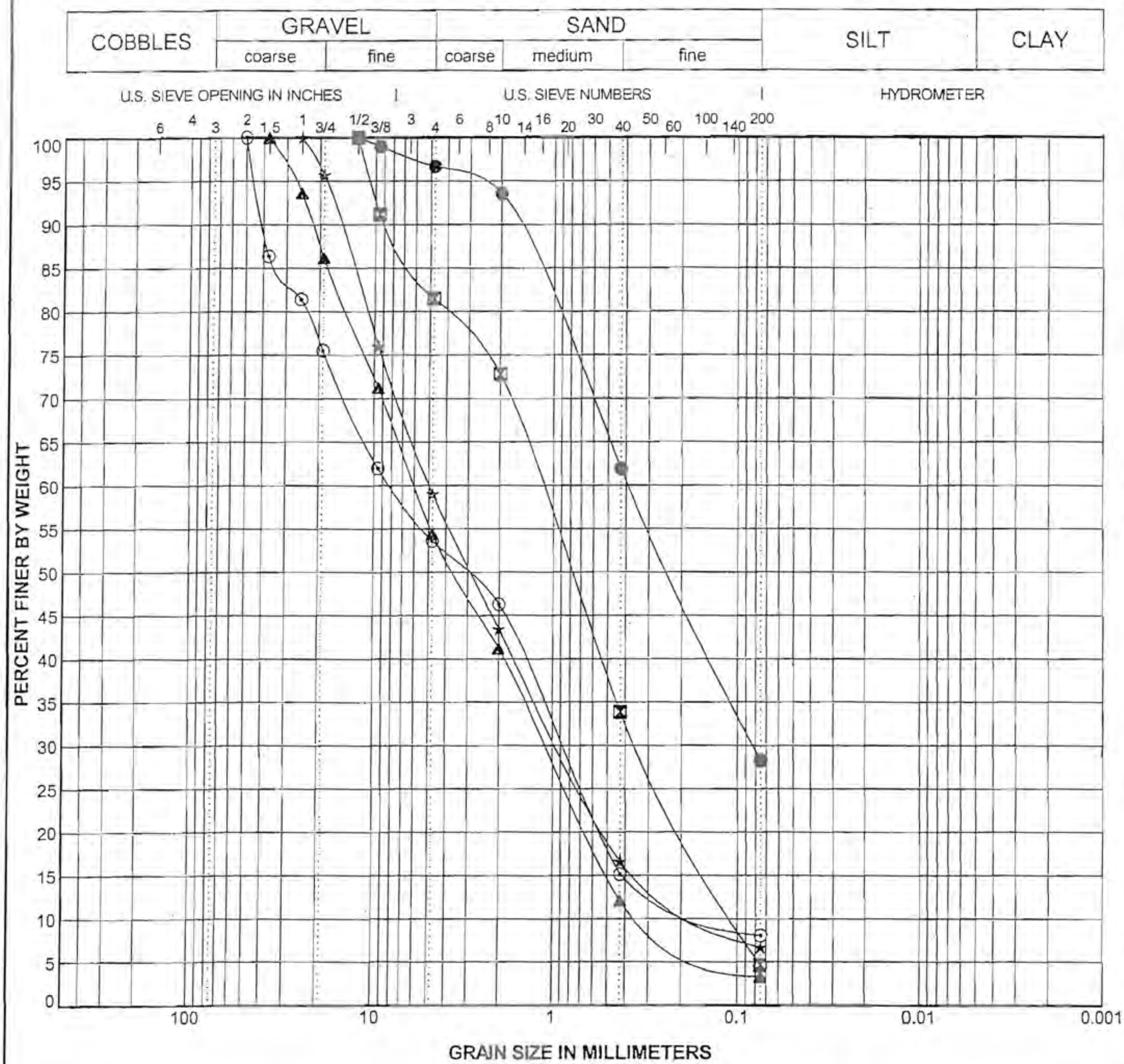
LAW_ATTERBERG_LIMITS 6234-04-0228.01.GPJ LAW_GIBB.GDT 7/1/04



Symbol	Location	Depth, feet	Soil Classification	USCS	D_{100}, mm	D_{60}, mm	D_{30}, mm	D_{10}, mm	C_c	C_u
●	B-1	1.5-3.0	Dark brown, clayey SAND	SC	12.5	0.384	0.082			
⊠	B-18	4.0-5.5	Brown, medium SAND	SP	12.5	1.203	0.338	0.103	0.92	11.67
▲	B-18	9.0-10.5	Light brown, gravelly SAND	SW	37.5	5.981	1.104	0.283	0.72	21.12
★	B-8	6.5-8.0	Light brown, gravelly SAND	SW	25	4.945	0.922	0.134	1.28	36.82
⊙	S-2	5.0-15.0	Brown SAND with gravel	SP	50	8.06	0.89	0.121	0.81	66.51

Remarks:

Test Method - ASTM D422

GRAIN SIZE DISTRIBUTION

Project: Lowes RDC- Janesville, WI

Project No: 6234-04-2228.01

Checked By: RKS

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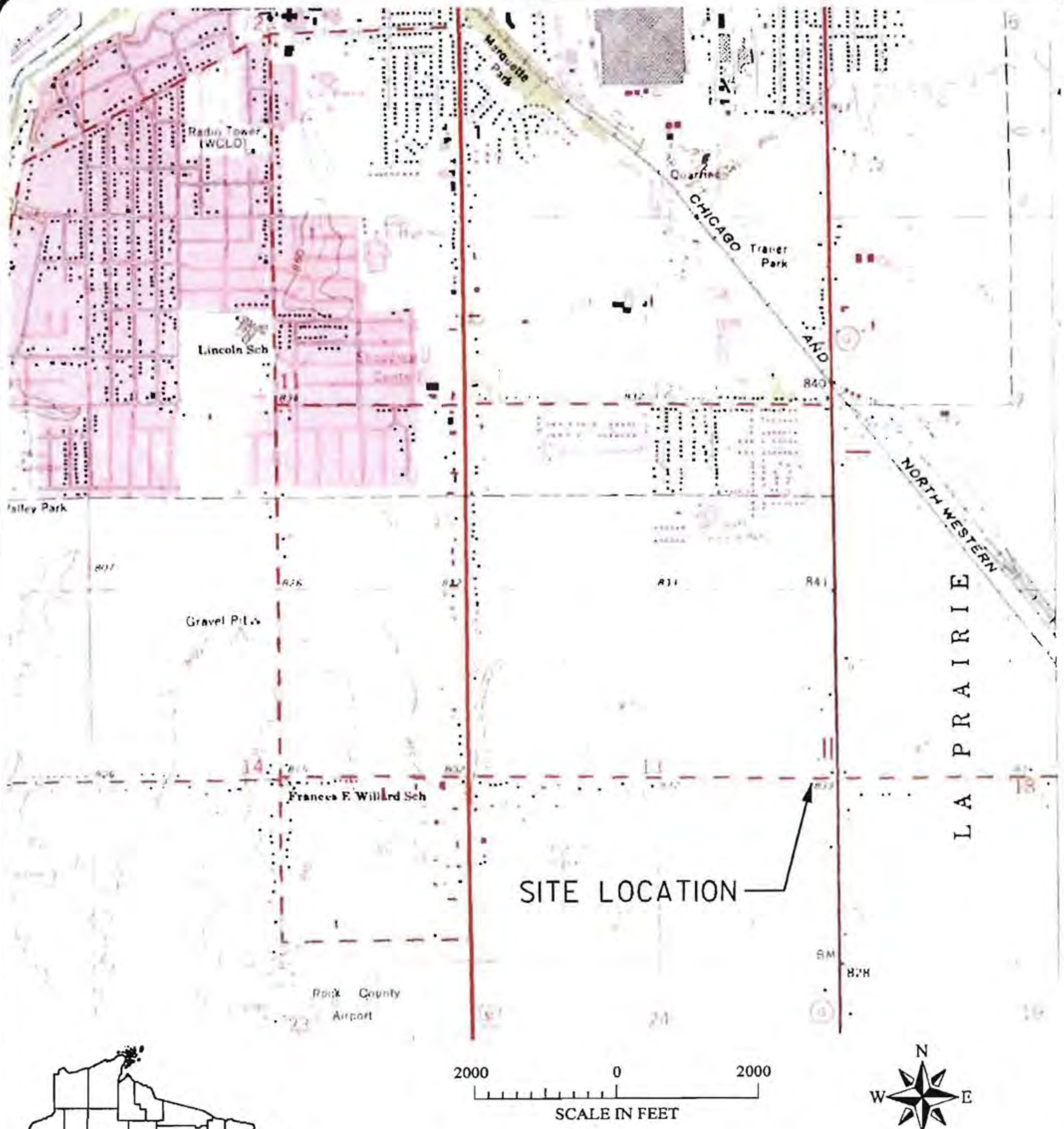
LAW_GRAIN_SIZE 6234-04-0228.01.GPJ LAW_GIBB.GDT 7/15/04

REFERENCES CITED

1. ASTM International, Standards on Environmental Site Assessments for Commercial Real Estate, Publication E 1527-05
2. Environmental Protection Agency, 40 CFR Part 312 – Standards and Practices for All Appropriate Inquiries; Final Rule, November 1, 2005

FIGURES



Janesville West Quadrangle
Wisconsin - Rock County
7.5 Minute Series (Topographic)

Contour Interval 10 Feet
1961
Photorevised 1971 & 1976

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FIGURE 1
SITE LOCATION MAP
3598 Beloit Avenue
Janesville, WI 53546

APPENDIX A

Copy of Proposal Between MSA and the City of Janesville