Exhibit C:
Environmental Reports

Exhibit C.1 Geotechnical Engineering Report

Geotechnical Engineering Report

Proposed Riverview Suites Hotel and Parking Structure
119 West Mississippi Drive
Muscatine, Iowa
October 16, 2014
Terracon Project No. 07145073

Prepared for:
River Hotel Development
Cummings, Georgia

Prepared by:
Terracon Consultants, Inc.
Bettendorf, Iowa

Terracon

October 16, 2014

River Hotel Development
6635 Chelsea Garden Way
Cummings, Georgia 30040

Attention: Ms. Rebecca Howe

Re: Geotechnical Engineering Report
Proposed Riverview Suites Hotel and Parking Structure
Muscatine, Iowa
Terracon Project No. 07145073

Dear Ms. Howe:

Terracon Consultants, Inc. has completed the subsurface exploration for the proposed Riverview Suites Hotel and Parking Structure to be located at 119 West Mississippi Drive in Muscatine, Iowa. These services were performed in general accordance with our Agreement For Services with River Hotel Development and our revised proposal (Terracon Proposal No. P07140094) dated September 15, 2014. This report presents the findings of the subsurface exploration and provides geotechnical recommendations regarding earthwork including site preparation, the design and construction of deep foundations, floor slab/pavement subgrade preparation, an estimated minimum pavement thickness for the lower level parking structure, swimming pool and seismic considerations.

We appreciate the opportunity to be of service to you on this project and look forward to providing the recommended testing and observation services during construction. If you have any questions concerning this report, or if we be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.

W. Ken Beck

W. Ken Beck, P.E.
Iowa No.10684

for Kathleen E. Sgt

Greg J. Klein, P.E.
Iowa No. 20705

WKB/GJK/N:\Projects\2014\07145073\Project Documents\07145073 Report.docx

Attachments

cc: Mr. Brad Lang, AIA – Solum Lang Architects, LLC (PDF)
Mr. Tom Amosson – Rinderknecht Associates, Inc. (PDF)

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Terracon

EXECUTIVE SUMMARY

Based on the information obtained from our subsurface exploration, the proposed hotel and parking structure can be constructed at the site; however, the following geotechnical considerations were identified:

- Based on the proposed column loads and subsurface conditions observed at the boring locations, Terracon recommends that the proposed hotel and parking structure be supported on deep foundations. Deep foundations, such as augered, cast-in-place piles (ACIP) or straight-sided drilled shafts that extend into bedrock present at depths ranging from about 41 to 49 feet below existing grade at the boring locations could be considered for the project. Please refer to the **Deep Foundations** section (Section 4.3) of this report for recommendations regard the design and construction of deep foundations.

- Existing fill was present at some of the parking structure and all of the hotel boring locations to depths ranging from about 4 to 8 feet below current grades. Removal and replacement of the existing fill with engineered fill is recommended to provide positive support of the hotel's floor slab. Please refer to the **Geotechnical Considerations** and **Earthwork** sections (Sections 4.1 and 4.2) of this report for further information.

- If River Hotel Development accepts the risk of larger than normal settlements and associated damage in exchange for reduced construction costs, the existing fill could be left in place for support of the parking structure's lower level pavement. Recommendations to improve subgrade support are provided in the **Geotechnical Considerations** and **Earthwork** sections (Sections 4.1 and 4.2) of this report.

- At some boring locations, high plasticity sandy fat clay soils were encountered near the expected floor slab and pavement subgrade elevations. High plasticity clays have the potential to shrink and swell as their moisture contents fluctuate. To help reduce the risk of future floor slab and pavement movement, it is our opinion that where present, high plasticity clay soils should be removed to at least 12 inches below the floor slab and pavement subgrade elevations to allow placement of a layer of low volume change (LVC) engineered fill. Please refer to the **Geotechnical Considerations** section (Section 4.1) of this report for further information and recommendations.

- Due to the existing building, a boring could not be performed in the northwest area of the hotel where the swimming pool will be located. Based on the information from Boring 6 performed in the northeast corner of the hotel, high plasticity soils could be present beneath the pool's bottom and deck slabs. Please refer to the **Swimming Pool** section (Section 4.6) of this report for information regarding construction of the pool over high plasticity clays.

- The professional opinions and recommendations presented in this report are based on an evaluation of the data developed by testing and observation of discrete samples obtained from the borings. Site subsurface conditions have been inferred from available data, but actual subsurface conditions will only be revealed during future explorations and construction. So that variations in subsurface conditions can be addressed as they are encountered, we recommend that Terracon provide further testing and observation services during construction.

This summary must be used in conjunction with the entire report since some recommendations were not included or fully discussed in this section. The report must be read in its entirety for a comprehensive understanding of our recommendations for this project. The section titled **GENERAL COMMENTS** must be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
PROPOSED RIVERVIEW SUITES HOTEL AND PARKING STRUCTURE
119 WEST MISSISSIPPI DRIVE
BETTENDORF, IOWA

Terracon Project No. 07145073
October 16, 2014

1.0 INTRODUCTION

Terracon Consultants, Inc. has completed the subsurface exploration for the proposed Riverview Suites Hotel and Parking Structure to be located at 119 West Mississippi Drive in Muscatine, Iowa. These services were performed in general accordance with our Agreement For Services with River Hotel Development (RHD) and our revised proposal (Terracon Proposal No. P07140094) dated September 15, 2014. Nine (9) borings extending to depths of about 20 to 59 feet below existing grades were performed for this exploration, and their approximate locations are shown on the Boring Location Plan (Exhibit A-2) in Appendix A. Logs for the borings (Exhibits A-3 through A-11) are provided in Appendix A. The purposes of this report are to describe the subsurface conditions encountered at the boring locations, present the test data, and provide recommendations for the following:

- the design and construction of deep foundations
- earthwork including site preparation
- floor slab/pavement subgrade preparation
- swimming pool
- lateral earth pressures
- parking structure's lower level pavement
- seismic considerations

2.0 PROJECT INFORMATION

Terracon's understanding of the project information provided by Solum Lang Architects (SLA) is summarized in the following tables. Please contact Terracon if any of the following information is not consistent with the current project plans.

2.1 Project Description

ITEM	DESCRIPTION
Site layout	see attached Boring Location Plan (Exhibit A-2)
Structures	The hotel will have seven (7) stories with a roof terrace. Plan dimensions of the hotel will be about 125 feet by 141 feet. The first floor slab will be grade-supported. A swimming pool will be located in the northwest corner of the building. The parking ramp will have four (4) parking levels and plan dimensions of approximately 126 feet by 141 feet.
Building construction	Masonry or precast concrete load bearing walls are expected for the hotel. hollow core plank elevated floors for the hotel

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- the design and construction of deep foundations
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Building construction	Masonry or precast concrete load bearing walls are expected for the hotel. hollow core plank elevated floors for the hotel

ITEM	DESCRIPTION
	steel roof joists and metal deck roof for the hotel The parking structure will be precast concrete with a portland cement concrete first level slab.
Finished floor elevations	The ground floor of the hotel will be 556.5 feet. The first and second levels of the parking structure will be at the alley and West 2nd Street elevations of 563 and 570 feet, respectively.
Maximum loads	The maximum wall, column, and floor loads were not provided by SLA, but the following values were used in our analysis: Columns:.....600 kips - Parking Ramp .....1,000 kips - Hotel Hotel walls:.....5 kips per linear foot (klf) Floor:.....200 pounds per square foot (psf)
Grading	Not provided, but no appreciable fill placement is expected; grading cuts of less than 7 feet are anticipated for construction of the hotel's lower level; additional excavation depth is anticipated for the pool.

2.2 Site Location and Description

ITEM	DESCRIPTION
Location	The proposed hotel will be located at 119 West Mississippi Drive, at the northeast corner of Chestnut Street intersection in Muscatine, Iowa. The proposed parking structure will be located between West 2nd Street and the alley to the south, and will be adjacent to the hotel.
Existing improvements	A metal building is located on the north end of the hotel site. The parking structure site is vacant and used as a parking lot.
Current ground cover	Outside of the existing metal building, asphaltic and portland cement concrete.
Existing topography	The following is based on the information provided by SLA; The hotel site slopes downward from north to south with about 7 feet of elevation difference across the site. The parking lot site is relatively flat, but is about 4 feet below West 2nd Street.
Site history	Based on historical aerial photographs, the majority of the two sites were previously occupied by structures. Information regarding demolition of the previous structures was not provided. The photographs indicate demolition of the buildings likely occurred sometime after the 1960's.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Profile

Subsurface conditions at each boring location are described on the individual boring logs (Exhibits A-3 through A-11) in Appendix A. The stratification boundaries shown on the boring logs represent the approximate depths where changes in material types occur. In-situ, the transition between native materials is usually gradual. Based on the conditions observed at the boring locations, the

stratigraphy can generally be described as follows. Please refer to the boring logs in Appendix A for further information.

Strata	Approximate Depth to Bottom of Stratum	Material Encountered	Consistency/ Density
surface	2 to 8 inches	asphaltic and portland cement concrete	NA[1]
1[2] (fill)	4 to 8 feet	clay, sand, crushed limestone, gravel, brick, concrete	NA[1]
2[3] (native)	20 to 49 feet	sandy fat clay, sandy lean clay, lean clay, silty clay and silt (CH, CL, CL/ML, ML)	soft to hard
		sand and gravel with varying amounts of clay (SP, SC, GP, GC)	very loose to very dense
3[4] (bedrock)	not determined	highly to slightly weathered limestone and clay shale	NA[1]

1. not applicable
2. Borings 1, 2, and 6 through 9
3. Extended to the bottom of Borings 3, 4, 5, 7 and 9 at depths ranging from about 20 to 47½ feet; auger refusal was encountered at the terminal depth of Borings 5 and 9 at 47½ and 42½ feet on apparent bedrock, respectively.
4. Borings 1, 2, 6 and 8, extended to the bottom of these borings at depths ranging from approximately 51 to 59 feet

3.2 Water Level Observations

The borings were observed during and after the completion of drilling for the presence and level of water. The subsurface water levels observed at these times are indicated on the boring logs (Exhibits A-3 through A-11) in Appendix A and are summarized in the following table. It should be noted that water was used during drilling and coring of the rock in Borings 1, 2, 5, 6, 8 and 9, which can affect the after drilling water levels. For this reason, the after drilling water levels in these borings may not be a reliable indication of the water levels at the site at the time of our field exploration and were not recorded. Longer term observations in cased holes or piezometers would be necessary to better evaluate subsurface water levels at the site.

Boring Number	Observed Water Depth (feet)[1]	
	While Drilling	After Drilling
1	none while drilling to 35 feet	NR[2]
2	none while drilling to 28 feet	NR[2]
3	8	10
4	7	5
5	29½	NR[2]
6	28	NR[2]

Boring Number	Observed Water Depth (feet) [1]	
	While Drilling	After Drilling
7	none	none
8	23	NR[2]
9	24	NR[2]

1. Below existing grade
2. Water is introduced during the drilling and rock coring process. For this reason, the after drilling water levels may not be a reliable indication of the subsurface water levels at the time of our field exploration and were not recorded.

Water levels may fluctuate due to seasonal variations in the amount of rainfall, Mississippi River Stage, runoff, and other factors not evident at the time the borings were performed. Subsurface water levels during construction or at other times in the future may be different from the levels indicated on the boring logs. Trapped or "perched" water could occur above lower permeability soil layers. Water level fluctuations and perched water should be considered when developing design and construction plans and specifications for the project.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Based on the proposed column loads and subsurface conditions observed at the boring locations, Terracon recommends that the proposed hotel and parking structure be supported on deep foundations. In our opinion, deep foundations consisting of augered, cast-in-place piles (ACIP) or straight-sided drilled shafts (SSDS) that extend into bedrock present at depths ranging from about 41 to 49 feet below existing grade at the boring locations could be considered for the project. Upon request, we are available to provide recommendations for other deep foundation types. Please refer to the **Deep Foundations** section (Section 4.3) of this report for recommendations regarding the design and construction of ACIP and SSDS deep foundations.

Existing fill was present at some of the parking structure and all of the hotel boring locations to depths ranging from about 4 to 8 feet below current grades. Based on the historical aerial photographs, it is likely that the fill was placed during demolition of the previous structures located on the site. Documentation regarding placement/compaction of the existing fill was not provided to Terracon. Based on the information obtained from the borings, in our opinion, the fill does not appear to have been uniformly compacted to a high degree. For this reason, there is a risk that the hotel floor slab and parking structure's lower level pavement supported over undocumented fill will not perform predictably and could experience larger than normal settlements. To provide positive support of the hotel's floor slab, it is our opinion that the existing fill should be removed and replaced with engineered fill that is placed and compacted as recommended in this report.

Care must be exercised when removing the existing fill to avoid undermining existing adjacent improvements, foundations, floor slabs, utilities, etc. Excavation bracing and/or shoring may be

needed to reduce the risk of undermining existing improvements. Even with excavation bracing and shoring, some movement of the existing structures/utilities/improvements could occur. Due to the number of existing improvements, removal and replacement of the existing fill for the parking structure may be a particular concern. The scope of services for this report does not include design or recommendations for excavation bracing/shoring or underpinning of existing foundations. Upon request, we are available to discuss these services with you.

Provided RHD accepts the risk of larger than normal pavement settlements and associated damage in exchange for reduced construction costs, the existing fill could be left in place for support of the parking structure's lower level pavement. To help improve and provide more uniform support of the pavement, the existing fill materials exposed at subgrade level should be observed and tested by Terracon during construction. Where unsuitable conditions are observed, the materials should be improved by scarification/compaction, densification, or be removed and replaced with engineered fill. It may be possible to improve subgrade support by removing the existing fill to a depth of at least 12 inches below final grade, scarifying/compacting or densifying the resulting subgrade soil, and bringing the subgrade to final grade with engineered fill. In our opinion, further exploration with test pits should be performed prior to, or at the onset of construction, to better evaluate the condition and extent of the existing fill.

Native high plasticity sandy fat clay soils were encountered at Borings 3, 4, 5, 6 and 7 near the expected floor slab and the parking structure's lower level pavement subgrade elevations, and could be present in other areas to the site. High plasticity soils have the potential to shrink and swell as their moisture contents fluctuate. In our opinion, where high plasticity clay soils are encountered at/near subgrade levels in the proposed hotel and parking structure, these soils should be removed to at least 12 inches below the floor slab/pavement subgrade elevation to allow placement of a layer of low volume change (LVC) engineered fill. The engineered fill layer is intended to help reduce, but will not eliminate the risk of future subgrade and floor slab movement. Please refer to the **Earthwork** section (Section 4.2) of this report for further information.

Due to the existing metal building, a boring could not be performed in the northwest area of the proposed hotel where the swimming pool will be located. Based on the information from Boring 6 performed in the northeast corner of the hotel, high plasticity soils could be present beneath the pool's bottom and deck slabs. If present, measures can be taken to help reduce the potential risk of movement, but the risk of movement cannot be total eliminated without removal all of the high plasticity clays. Please refer to the **Swimming Pool** section (Section 4.6) of this report for information regarding construction of the pool over high plasticity clays.

Provided RHD accepts the risk of additional maintenance and a shorter useable life in exchange for a reduction in construction costs, the parking structure's lower level pavement could be supported over high plasticity native soils. Please refer to the **Earthwork** and **Parking Structure Pavement** sections (Sections 4.2 and 4.7) of this report for further information.

Uncontrolled fill materials that contain rubble and other miscellaneous materials can cause an increased rate of corrosion for buried ferrous metals such as utility pipes, etc. The potential for more rapid corrosion should be considered when developing the design specifications for this project.

Due to the proximity and age of existing structures adjacent to the proposed construction site, it is our opinion that a pre-construction condition survey should be performed to document the current condition of the existing structures. The structures should also be observed periodically, and during specific phases of construction, such as excavating in close proximity of the existing structures, compaction and deep foundation installation, for any indications of movement or damage. Vibration monitoring could also be considered, particularly during earthwork and foundation phases of the project, to evaluate if vibration levels are approaching limits that could damage existing structures. Upon request, we are available to discuss and prepare a proposal to provide these services.

4.2 Earthwork

The following presents recommendations for site preparation, excavation, and placement of engineered fill for the project.

4.2.1 Site Preparation

Pavements, foundations, utilities, floor slabs, existing fill and/or otherwise unsuitable materials should be removed from the proposed hotel and parking structure areas. Based on the information at the boring locations, removal depths on the order of 8 inches should be expected to remove the existing pavements and approximately 4 to 8 feet to remove the existing fill; however, surface materials and existing fill could extend to greater depths in areas not explored. Materials, such as the existing sand fill, which may appear suitable for use as engineered fill, should be stockpiled for further evaluation by Terracon.

After removing the surface materials, existing fill, unsuitable materials and high plasticity soils as recommended in this report, but before placing engineered fill, the exposed soils should be observed and tested by Terracon. Where recommended by Terracon, clay subgrade soils should be scarified to a depth of about 9 inches and be compacted as recommended in this report. Please note specific recommendations regarding compaction of the high plasticity clay soils in the following section. Relatively clean sand present at subgrade elevation should be densified using a large, steel-drum, vibratory roller. Scarification/compaction and densification of subgrade soils will help provide a firmer base for the compaction of new fill sections and help delineate soft or disturbed materials that may exist at shallow depths below grade. If unsuitable materials are observed that cannot be satisfactorily compacted in place, they should be removed and replaced with engineered fill as discussed in the **Earthwork Construction Considerations** section (Section 4.2.4) of this report. Care must be taken to avoid disturbance of soils supporting existing structures and improvements.

Improving the in-place subgrade soils for support of construction equipment may be required in some areas to place and compact new engineered fill. In general (weather permitting), scarifying, drying and compacting the exposed subgrades is expected to be the most economical means of improving the soils; however, this option is typically less effective where soft/wet soils are relatively thick, and when favorable weather conditions are not expected. Alternatives for improving subgrades could include removing unsuitable (wet, low strength, and/or disturbed) soils followed by the placement of crushed limestone aggregate. A geosynthetic (i.e., a geogrid or high-modulus geotextile) overlain with crushed limestone could be used in some areas to reduce removal depths and to develop stable subgrades for fill placement or new construction. The need for subgrade improvements and most appropriate method will be dependent upon the soil, subsurface water and weather conditions, as well as the proposed grading plan, the construction schedule and construction methods. We recommend that the budget includes an allowance for improvements to the subgrade soils.

4.2.2 Engineered Fill Materials Requirements

It is expected that a portion of the existing fill could possibly be used as engineered fill for the project. Engineered fill for the project should meet the following material property requirements:

Fill Type [1]	USCS Classification	Acceptable Location for Placement
Cohesive	CL, CL/ML, ML, ML/CL (LL ≤ 45 and PI ≤ 20)	all locations
Granular	GW, GP, GM, GC, SW, SP, SM, SC	all locations
Unsuitable	CL/CH, CH, MH, OL, OH, PT	non-structural locations

1. Engineered fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. Samples of materials proposed for use as engineered fill should be provided to Terracon for our review.
2. Any organic materials, rock fragments larger than 3 inches, and other unsuitable materials should be removed from any existing fill prior to use as engineered fill.
3. The on-site sandy fat clay (CH) native soils do not meet the criteria for engineered fill and should not be used as fill in within the proposed hotel or parking structure locations.

4.2.3 Compaction Requirements

Item	Description
Fill lift thickness	9 inches or less in loose thickness; thinner lifts will be required when using hand equipment (e.g., jumping jack, vibratory plate compactor, etc.)
Compaction of granular material and cohesive soil [1, 2]	at least 95% of the material's standard Proctor maximum dry density (ASTM D 698 fill placed within 12 inches of the final parking structure's lower level pavement subgrade elevation should be compacted to at least 98% of the material's maximum standard Proctor dry density

Item	Description
	the compaction effort should not exceed 100% of the material's standard Proctor maximum density for soils with LL>45 and/or PI>20
Moisture content of cohesive soil	within 2% below to 3% above the material's standard Proctor optimum moisture content at the time of placement and compaction for soils with LL>45 and/or PI>20, within 0 to 4% above the material's standard Proctor optimum moisture content as determined by the standard Proctor test
Moisture content of granular material [3]	workable moisture levels

1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
2. If the granular material is a coarse sand, crushed limestone, or gravel, is of a uniform size, or has a low fines content, compaction comparison to relative density (ASTM D 4253 and D 4254) may be more appropriate. In this case, granular materials should be compacted to at least 60% of the material's maximum relative density.
3. Specifically, moisture levels should be maintained to achieved compaction without bulking during placement or pumping when proofrolled.

4.2.4 Earthwork Construction Considerations

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during foundation construction, earthwork and backfilling of excavations.

The water contents of the on-site soils may be outside the recommended range for compaction in accordance with the standard Proctor test method. For this reason, adjustments to the on-site soils' water contents should be expected to obtain the degree of compaction recommended in this report.

Care should be taken to avoid disturbance of prepared subgrades. New engineered fill can become disturbed under construction equipment. Construction traffic should not operate directly on saturated or low strength soils. If the subgrade becomes saturated, desiccated, or disturbed, the affected materials should either be scarified and compacted or be removed and replaced as previously discussed. Subgrades should be observed and tested by Terracon prior to construction. If the sand fill is left in place, placing a layer of crushed limestone on sand subgrades should help reduce disturbance of the sand and improve support for rubber-tired vehicles.

The contractor is responsible for employing appropriate dewatering methods to control seepage and facilitate construction. In our experience, dewatering of excavations in clay type soils can typically be accomplished using sump pits and pumps. A greater dewatering effort should be expected for excavations extending below the subsurface water levels observed at the boring locations, especially those extending into granular soils and/or rock. The subsurface water level should be maintained at least 2 feet below the excavation bottom. Existing

buildings/improvements should be observed during dewatering, and if noticeable movement is observed, dewatering should be stopped and Terracon should be notified to review the site conditions.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, as well as other applicable codes, and in accordance with any applicable local, state, and federal safety regulations. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed those specified by these safety regulations. Flatter slopes than those dictated by these regulations may be required depending upon the soil conditions encountered and other external factors. These regulations are strictly enforced and if they are not followed, the owner, contractor, and/or earthwork and utility subcontractor could be liable and subject to substantial penalties. Under no circumstances should the information provided in this report be interpreted to mean that Terracon is responsible for construction site safety or the contractor's activities. Construction site safety is the sole responsibility of the contractor who shall also be solely responsible for the means, methods, and sequencing of the construction operations.

Utility trenches are a common source of water infiltration and migration. Due to the presence of high plasticity clays, all utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building. We recommend constructing a "trench plug" comprised of low plasticity clay engineered fill material that extends at least 5 feet out from the face of the building exterior and completely surrounds the utility line. The plug material should be compacted to the moisture content and density ranges recommended above.

4.2.5 Grading and Drainage

During construction, grades should be developed to direct surface water flow away from or around the site. Exposed subgrades should be sloped to provide positive drainage so saturation of subgrades is avoided. Surface water should not be permitted to accumulate on the site.

Final grades should slope away from the building areas to promote rapid surface drainage and to prevent accumulation of water. Accumulation of water adjacent to the construction areas could contribute to significant moisture increases in the subgrade soils and subsequent softening/settlement. Roof drains should discharge into a storm sewer or at least 10 feet away from the construction areas.

4.3 Deep Foundations

The proposed hotel and parking structure should be supported on SSDS or ACIP piles extending into bedrock. Recommendations for the design and construction of SSDS and ACIP pile foundations are provided in the following sections of this report.

4.3.1 Drilled Shaft and ACIP Pile Design Recommendations

Description	Value
Maximum allowable end bearing pressure	
Straight-sided drilled shafts	80,000 psf[1, 2]
ACIP Piles	30,000 psf[2, 3]
Approximate total settlement	<1 inch
Approximate differential settlement	<¾ inch

1. shafts should extend at least one (1) diameter or 3 feet into slightly weathered rock, whichever is greater
2. includes a factor of safety of approximately 3
3. should extend to auger refusal in the slightly weathered bedrock

Side friction values are provided below, and will likely be used primarily in designing to resist uplift loading. Upon request, we are available to discuss with your structural engineer the use of side friction for both uplift resistance and compressive loading.

Soil Description	Allowable Side Friction (psf)[1]	Allowable Passive Pressure (psf)[2, 3]
existing fill (below frost depth)	100	200
native sand/gravel[4]		
very loose	50	500
loose	200	1,000
medium dense	300	1,500
dense	800	7,000
silt and clay soil		
soft	100	500
medium stiff	300	2,500
stiff	500	4,500
very stiff	700	6,000
hard	900	12,000
rock within the rock socket	5,000	80,000

1. for compression in rock and soil, and uplift loading in rock; includes a factor of safety of about 2; 2/3 of the values provided can be used for uplift load resistance in soils; shafts/piles should be spaced at least 3 diameters apart (center to center) if friction is used in the design capacity; shafts/piles should be adequately reinforced to resist tensile and lateral loading
2. for individual shafts and includes a factor of safety of about 3, the allowable passive pressure applies to the projected diameter of the shaft/piles and requires some movement to mobilize resistance
3. because of the effects of frost, 50 psf should be used for lateral resistance within the frost depth; 3½ feet and 4½ feet below final grade for the hotel and parking structure, respectively
4. the allowable passive pressure varies with depth and the value provided is a nominal value, upon request, specific values can be provided on an individual boring basis

It should be noted that the maximum frost penetration in unheated areas, such as the parking structure, can extend to depths on the order of 4½ feet below grade. Grade beams below unheated areas and those that will be exposed to freezing conditions during drilled shaft construction should extend to at least this depth.

Individual shafts/piles can be designed to resist lateral loads using the allowable passive pressure provided in the above table, however, group action for lateral resistance of shafts/piles should be taken into account when center to center spacing is less than 8 diameters in the direction of loading. Design parameters for allowable passive resistance in the direction of the load should be reduced in accordance with the following table.

Passive Resistance Reduction Factors	
Shaft/Pile Spacing (Diameters)	**Reduction Factors**
8D	1.0
6D	0.7
4D	0.4
3D	0.25

Lateral loads perpendicular to a row of shafts/piles with center to center spacing of 3 diameters or less will cause the foundations to react essentially as a vertical wall. For this case, the values provided in the following table should be used for the projected shaft/pile diameter within the rock.

Description	Allowable Passive Pressure (Equivalent Fluid Weight, pcf)
Above groundwater level	150
Below groundwater level	70

4.3.2 Drilled Shaft Construction Considerations

Hard layers within the limestone/shale can be encountered that cannot be easily penetrated with conventional drilling equipment (e.g., soil augers). If present during installation, heavier duty rock augers, core barrels or relocation of the shaft may be required.

Shaft installations should be observed by Terracon to verify that the conditions in the drilled shaft excavations and the installation procedures for the shaft correspond with those discussed in this report. Coring may be required to extend the shaft to rock suitable for the recommended bearing pressure.

Drilled shafts for this project should have a minimum diameter of 30 inches to facilitate cleaning and observation of the bearing materials. The bottom of each drilled shaft excavation should be cleaned of loose material before placing reinforcing steel and concrete. If water is present in a shaft excavation and cannot be removed by conventional means (such as pumping), concrete should be placed using a tremie or concrete pump. Concrete should be placed as soon as possible after the foundation excavation is completed.

Temporary casing should be expected to complete the drilled shaft excavations, especially those adjacent to existing improvements. Care must be taken when removing the casing during concrete placement. During casing removal, the concrete level should be maintained a sufficient distance above the bottom of the casing to resist earth and hydrostatic pressures. Placement of loose soil

backfill around the casing prior to removal should be avoided. Drilled shaft concrete should be designed with a slump of approximately 6 to 8 inches to help facilitate casing removal and reduce the possibility of concrete arching.

4.3.3 ACIP Pile Construction Considerations

Installation of ACIP piles should generally be possible with conventional drilling equipment. Additional ACIP piles may be needed if cobbles, boulders or other subsurface conditions interfere with ACIP piles reaching their design lengths.

ACIP piles should only be installed by qualified, experienced contractors. At this site, care should be taken during the ACIP pile installation because of the potential for both "necking" and "overdrilling" during the installation procedure. Some of the existing fill and native soils are susceptible to loosening upon overdrilling, and can also cause necking if the auger withdrawal procedure is rushed. The augers should be removed in a slow and relatively continuous motion to avoid localized restrictions in the pile section. Sufficient grout pressure should be maintained to equal or exceed earth and hydrostatic pressures on the perimeter of the augers. Installing adjacent ACIP piles with clear distance spacing of less than 15 to 20 feet should be delayed until mortar in the initial pile has set. Field records should be maintained on the volume of grout used in construction of the pile to compare with the theoretical volume of the pile.

A Terracon representative should observe ACIP pile installations. A computerized instrumentation system is available to contractors so that grout pressure, grout volume and auger depth can be simultaneously monitored and recorded during pile installation. During drilling, this information is continuously displayed on a computer screen. In our opinion, this system can enhance quality assurance of the pile installation procedure.

4.4 Floor Slab Subgrade

Care should be taken to avoid disturbance of prepared subgrade soils. The native soils and new engineered fill soils are easily disturbed, especially by construction traffic. It is expected that some improvements to the subgrade soils will be required. Floor slab subgrade soils should be prepared as discussed in the **Earthwork** section (Section 4.2) of this report.

High plasticity clay soils were present at some boring locations near the expected finished hotel floor subgrade elevation, and these soils can undergo volume changes with changes in their moisture contents. Where present within 12 inches of the final subgrade elevation, subgrades should be prepared using LVC material as discussed in the **Geotechnical Considerations** and **Earthwork** sections (Sections 4.1 and 4.2) of this report. RHD should understand that using a limited thickness of LVC material beneath the floor slab will not eliminate the possibility of subgrade movement resulting from volume change of the soils. To further reduce the potential for subgrade movement, the use of a greater thickness of LVC material beneath the slabs could be considered.

4.4.1 Floor Slab Design Recommendations

Item	Description
Floor slab support[1, 3]	approved engineered fill placed and compacted in accordance with Section 4.2
Granular leveling course[2]	6 inches of well-graded granular material

1. Depending on the means of floor slab support, foundations and floor slabs could settle at different rates. Differential movement between foundations and grade-supported floors should be considered by the design team.
2. The floor slab should be placed on a leveling course comprised of well-graded granular material compacted to at least 95% of the material's standard Proctor maximum dry density (ASTM D 698)
3. Joints should be constructed at regular intervals as recommended by the American Concrete Institute (ACI) to help control the location of cracking.

If moisture vapor transmission through the concrete slab is a concern, a vapor retarder should be used. The need for, and placement of, the vapor retarder should be determined by SLA or the slab designer based on the proposed floor covering treatment, building function, concrete properties, placement techniques, and construction schedule. For further guidance concerning the use of a vapor retarder system, refer to Sections 302 and 360 of the American Concrete Institute (ACI) Manual of Concrete Practice.

4.4.2 Floor Slab Subgrade Construction Considerations

The floor slab subgrade should be prepared in accordance with the recommendations presented in the **Geotechnical Considerations** and **Earthwork** sections (Sections 4.1 and 4.2) of this report.

On most project sites, site grading is generally accomplished early in the construction phase. As construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, corrective action may be required prior to placement of the granular leveling course and concrete.

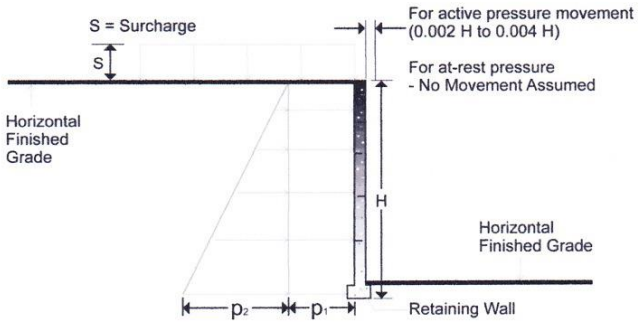
Terracon should review the condition of the floor slab subgrade immediately prior to slab construction. Particular attention should be given to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by scarification/compaction or by removing the affected material and replacing it with engineered fill.

4.5 Below Grade Levels

4.5.1 Lateral Earth Pressures

Reinforced concrete walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. Structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained will influence earth pressures. Two wall restraint conditions are shown. "Active" earth pressure is commonly used for design of freestanding cantilever retaining

walls and is based on some wall movement. The "at-rest" condition is based on no wall rotation and should be used for below grade building/elevator pit and swimming pool walls. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.



Lateral Earth Pressures

Pressure Conditions	Coefficient For Backfill Type	Equivalent Fluid Unit Weight (pcf)	Surcharge Pressure, P_1 (psf)	Earth Pressure, P_2 (psf)
Active (Ka)	Granular - 0.33	40	(0.33)S	(40)H
	Cohesive - 0.42	50	(0.42)S	(50)H
At-Rest (Ko)	Granular - 0.46	55	(0.46)S	(55)H
	Cohesive - 0.58	70	(0.58)S	(70)H
Passive (Kp)	Granular – 3.0	360	---	---
	Cohesive – 2.4	290	---	---

Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height.
- For passive earth pressure, wall must move horizontally to mobilize resistance.
- Uniform surcharge, where S is surcharge pressure.
- In-situ soil backfill weight a maximum of 120 pcf.
- Horizontal backfill, compacted to at least 95% of standard Proctor (ASTM D-698) maximum dry density.
- Loading from heavy compaction equipment not included.
- No groundwater acting on wall.
- No safety factor included.
- Ignore passive pressure in frost zone.

Backfill placed against walls should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45, 45 and 60 degrees from vertical for the active, at-rest and passive cases, respectively.

4.5.2 Subsurface Drainage

Subdrains should be constructed at the base of exterior retaining walls and below grade interior walls to reduce hydrostatic loading. The drain pipe should be located with its invert at least 6 inches below the foundation/grade beam bottom elevation and should be surrounded with free-draining granular material graded to prevent the intrusion of fines. A 2-foot wide layer of free-draining granular material should be placed adjacent to the wall. For exterior locations, the granular material should extend from the drainage pipe to within 18 inches of final grade and be capped with a cohesive fill material placed and compacted as recommended in **Earthwork** section (Section 4.2) of this report; for interior locations, the granular material should extend up to the floor slab subgrade elevation. As an alternative to filter graded gravel, free-draining 3/4-inch nominal size gravel could be used for the drain if the entire system, including the gravel, is encapsulated with an appropriate filter fabric. Pipes should be designed to discharge to a suitable outlet.

A prefabricated drainage structure placed against below grade walls may also be used as an alternative to free-draining granular fill above the pipe. A prefabricated drainage structure consists of a plastic drainage core or mesh that is covered with filter fabric to prevent soil intrusion. The drainage structure is fastened to the wall after the wall has been waterproofed.

As an alternative to installation of a subdrain, cantilever retaining walls can be designed to resist hydrostatic pressure. For the "active" condition, combined hydrostatic and lateral earth pressures should be calculated using equivalent fluid unit weights of 90 pcf and 85 pcf for lean clay and granular backfill soils, respectively.

The shallow subsurface water levels observed at the boring locations during drilling likely represent a perched condition within the existing fill. Water levels should be further evaluated during construction. If a shallow ground water level is observed, or if RHD would prefer, a subsurface drain system should be constructed beneath the hotel's floor slab and/or the parking structure's lower level pavement where they are below the adjacent grade. Upon request, we are available to discuss this with you further and to provide recommendations for the subsurface drain systems for beneath the floor slab and pavement.

4.6 Swimming Pool

We anticipate the swimming pool bottom slabs, walls and decks will be constructed using conventional concrete forming and placement techniques. Based on conditions encountered in the borings and recommendations presented in this report, the soils in the swimming pool excavation and at the pool deck levels are expected to consist of native soils and possibly new engineered fill.

4.6.1 Swimming Pool Design Recommendations

The pool deck and bottom slab subgrades should be prepared as previously discussed in the **Earthwork** section (Section 4.2) of this report. A minimum 12-inch thick layer of free-draining granular material (e.g., open-graded crushed limestone) should be placed at the base of the pool excavation (below the pool bottom slab) and beneath the pool deck slab. A system of collector drains should be constructed at the base of the free-draining granular layer. The drains should outlet to a sump or other suitable outlet where water can be collected and removed. Water stops should be placed at joints. The granular layer beneath the pool deck should hydraulically connect with the granular material placed adjacent to the pool walls and ultimately to the pool bottom drain.

The swimming pool walls should be designed to resist the "at-rest" lateral earth pressures provided in the **Lateral Earth Pressures** section (Section 4.5.1) of this report. These parameters are based on drainage being provided behind pool walls to reduce hydrostatic loading on the walls.

In our opinion, the pool walls should be excavated at least 2 feet laterally beyond the cast-in-place concrete pool walls to allow for forming and backfilling behind the walls with free-draining granular material (e.g., open-graded crushed limestone). The granular section behind the pool walls should be hydraulically connected to the drainage layer below the pool bottom slab. A geotextile filter fabric (e.g., Contech C60NW or equivalent) should be placed between the granular material and the adjacent soils to help prevent infiltration of fines into the granular material.

The deck area surrounding the pools should be sloped to allow surface drainage. A minimum 12-inch thick layer of free draining aggregate (e.g., open-graded crushed limestone) should be placed beneath pool deck slabs. Subdrains should be installed at regular intervals below the pool deck slab to collect and remove water from the free draining aggregate layer. Subdrains should consist of 4-inch diameter, perforated plastic pipes encapsulated in filter fabric (Contech C60NW or equivalent) and placed in shallow trenches at the base of the granular layer. The subdrains should slope to a suitable discharge point. All joints within the pool deck area should be properly sealed and maintained to prevent downward migration of water to the underlying subgrade soils.

Although a boring was not performed in the area of the proposed pool, sandy fat clays were encountered at Boring 6 located in the north end of the hotel, and these soils could be present at the proposed pool deck and bottom subgrade elevations. As discussed for the floor slab, these soils have high plasticity and could undergo volume changes with changes in their moisture contents. The resulting movement of the subgrade soil could have detrimental effects on the pool bottom and decks support over these soils. Installation of underdrain system will help remove a portion of these soils from beneath the pool bottom slab, and help maintain more consistent moisture contents; however, the decks will be exposed to drying and wetting cycles. RHD should understand that the underdrain system and partial removal of the fat clays from beneath the deck and pool bottom will help reduce this risk, but will not totally eliminate it. As a minimum, the fat clays should be maintained during construction at or above their optimum moisture contents as determined by the standard Proctor test to reduce the swell potential of the subgrades. If drying occurs, dry materials should be removed, and the deck subgrade re-established with low plasticity material as discussed above.

This risk can be further reduced by removing a greater amount of this material, but can only be completely eliminated by total removal of the fat clays. At your request, swell tests could be performed to better estimate the magnitude of movement that could occur.

Although specific details regarding the pool utilities were not provided to us, in our experience, these types of projects usually include several utility pits/basins (e.g., a pump pit, surge basin, backwash basin and recirculation pump pit). The lateral earth pressure, drainage, and fill placement recommendations provided for the pool in this report are also applicable to these structures. Permanent drainage systems should be installed at the base of all below grade pits/basins to remove groundwater and help reduce the potential for hydrostatic loading on below grade walls and slabs.

4.6.2 Swimming Pool Construction Considerations

If the pool walls will be constructed using any method other than conventional formed, cast-in-place concrete, Terracon should be contacted so we can provide supplemental recommendations. In particular, pool walls constructed by spraying of gunite directly on excavation sidewalls would require special geotechnical considerations that are not addressed in this report.

4.7 Parking Structure Pavement

Provided RHD accepts the risk of larger than normal pavement settlements and associated damage in exchange for reduced construction costs, the existing fill could be left in place for support of the parking structure's lower level pavement. To help control cracking, frequent control joints in the pavement are recommended. A higher than normal percentage of steel reinforcement should be considered to provide additional strength and help control crack displacement. Future replacement of the ground level ramp slab and/or entrance drive pavements may be required if larger than normal settlements and cracking of the pavement occurs and becomes a concern for RHD.

4.7.1 Pavement Subgrade Preparation

To help improve and provide more uniform support for of the pavement, the existing fill materials exposed at subgrade level should be observed and tested by Terracon during construction. Where unsuitable conditions are observed, the materials should be improved by scarification/compaction or densification, or be removed and replaced with engineered fill. It may be possible to improve subgrade support by removing the existing fill to a depth of at least 12 inches below final grade, scarifying/compacting or densifying the resulting subgrade soil, and bringing the subgrade to final grade with engineered fill.

Pavement subgrades should be prepared in accordance with the recommendations presented in the **Earthwork** section (Section 4.2) of this report. Non-uniform subgrades often result in poor pavement performance and local failures relatively soon after pavements are constructed. Since subgrades initially prepared early in the construction process may become disturbed over time, we recommend the subgrades be proofrolled and evaluated just prior to paving. The subgrade should

be evaluated by proofrolling using rubber tired equipment with a gross weight of at least 25 tons, such as a loaded tandem axle dump truck (e.g., heavily loaded asphalt or concrete truck). Where relatively clean sands are present, the subgrade should be proofrolled using a large, steel-drum, vibratory compactor. Particular attention should be given to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located. Areas where unsuitable conditions exist should be repaired by removing and replacing the materials with properly compacted fill. In addition, depending on the contractor's use of paving equipment, measures may be required to improve subgrade strength for support of heavily loaded concrete trucks. If a precipitation event occurs after the evaluation, the subgrade condition should be reviewed by Terracon immediately prior to paving. The subgrade should be in its finished condition at the time of Terracon's review.

4.7.2 Estimates of Minimum Pavement Thicknesses

The minimum pavement thicknesses are dependent upon:

- the anticipated traffic loading and number of repetitions during the design period
- subgrade and paving material characteristics
- climatic conditions at the project site

It is expected that the lower level parking structure's pavement will be constructed with portland cement concrete. Traffic patterns, number of repetitions and anticipated loading conditions were not provided by SLA at the time that this report was prepared; however, we anticipate that the lower level parking structure pavement will be primarily used by personal vehicles (cars and pick-up trucks). In the absence of specific pavement design information, the pavement thickness provided in the following table was based on the American Concrete Institute Design and Construction of Concrete Parking Lots. Upon request, specific pavement sections can be provided once the axle loads and number of repetitions is known. Periodic maintenance of the ground level pavement slab constructed with the recommended minimum thickness should be anticipated.

Pavement Area	Estimated Minimum Pavement Sections [1]
automobile parking	5" PCC

1. The trash container pad should be large enough to support the container and the tipping axle of the trash collection vehicle. Areas subjected to heavy static loads such as the trash container pad should be constructed with at least 7 inches of PCC pavement. Concrete pavement should be air-entrained and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing (ASTM C-31).
2. Iowa Department of Transportation (IDOT) road stone (Section 4120, gradation No. 11) or an approved alternate gradation

Construction traffic on the pavements was not considered in developing the estimated minimum pavement thicknesses. If the pavements will be subject to construction equipment/vehicles, the pavement section should be revised to consider the additional loading.

The following comments should be considered for the indicated concrete pavement design options.

- Control joints should have a maximum spacing of about 30 times the thickness of the concrete slab, as per American Concrete Institute (ACI) recommendations, and should be placed in a roughly square pattern (where possible).
- At construction joints, an adequately designed keyed construction joint or a butt end construction joint is recommended. For a butt end construction joint, an adequate number of deformed tie bars should be provided.
- Isolation joints are recommended where concrete pavements abut walls

4.7.3 Pavement Drainage Considerations

The pavement sections provided above are based on no significant increase in the subgrade soils' moisture contents. Paved areas should be sloped to provide rapid drainage of surface water and to drain water away from the pavement edges. Water should not be allowed to accumulate on or adjacent to the pavement, since this could saturate and soften the subgrade soils and subsequently accelerate pavement deterioration. Periodic maintenance of the pavements will be required. Cracks should be sealed, and areas exhibiting distress should be repaired promptly to help prevent further deterioration. Even with periodic maintenance, some movement and related cracking may still occur and repairs may be required.

Even in the absence of shallow groundwater, a drainable base and drains can substantially increase pavement life. We recommend that drains be installed where a granular base is used or subsurface water is within 4 feet of the final subgrade elevation. The drainable base should be constructed with at least 6 inches of clean, well-graded crushed limestone with less than 6% passing the No. 200 sieve. The drainable base should hydraulically connect to the drains to allow for proper drainage.

4.7.4 Pavement Maintenance Considerations

The pavement sections provided in this report represent minimum recommended thicknesses, and for this reason, periodic maintenance should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration. Preventive maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance.

Subgrade soils in unheated areas such as the ground level ramp slab will be subjected to freezing. Potential heaving of grade-supported slabs during the winter should be expected. Placing at least 12 inches of granular material beneath the slab could reduce this risk. A subdrain should also be installed if there is a concern regarding water collecting in the granular layer placed beneath the slab.

4.8 Seismic Site Considerations

Code Used	Site Classification
2012 International Building Code (IBC)[1]	D[2]

1. Section 1613.3.2
2. The 2012 International Building Code requires a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope of services did not include the required 100 foot soil profile determination, but the referenced site class is based on the weathered limestone extending to a depth of 100 feet. A site-specific seismic evaluation would be required to provide additional information on seismic site class.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during excavation, foundation construction and other earth-related construction phases of the project.

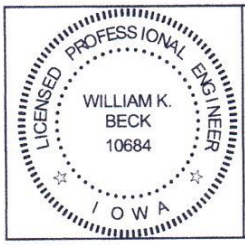
The recommendations presented in this report regarding high plasticity clay soils are based on our knowledge of the site soil conditions, our experience with similar sites and structures, and our understanding that RHD is willing to accept the potential risk of post construction movements and related damage in order to reduce construction costs. The recommendations provided in this report will not eliminate the risk of movement and cosmetic distress for slab-on-ground construction, but this risk could be further reduced if significantly more expensive measures are used during construction.

Support of the proposed parking ramp lower level pavement and utilities over existing fill is discussed in this report as an alternative to total removal of the fill. Even if the recommendations provided in this report are followed, there is a risk to RHD that unsuitable material within or buried by the fill will not be discovered which could result in larger than normal settlement. This risk cannot be eliminated without removing the fill.

The geotechnical scope of services for this project did not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. A Phase I Environmental Site Assessment Report and Limited Site Investigation Report will be provided by Terracon (Terracon Project Nos. 07147732 and 07147066, respectively) and are being submitted under separate covers. Please refer to those reports for further information.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety,

excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

W. Kay Beck 10/16/14

William K. Beck, P.E. Date

My license renewal date is December 31, 2014.

APPENDIX A
FIELD EXPLORATION

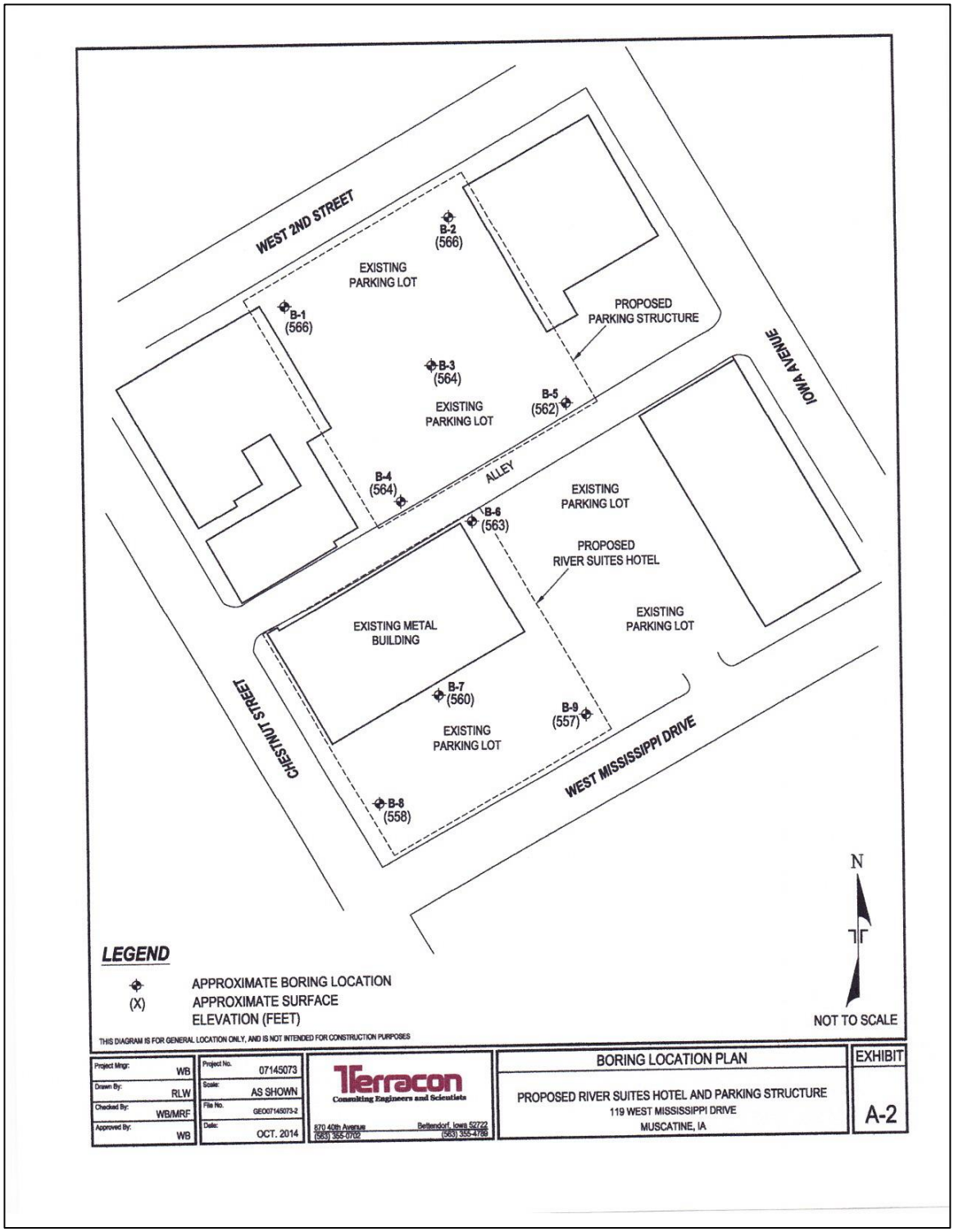
Field Exploration Description

The borings were performed at the approximate locations spotted in the field by Terracon personnel and shown on the attached Boring Location Plan (Exhibit A-2). The surface elevations (rounded to the nearest ½ foot) shown for the borings are approximate and were interpolated from a topographic plan of the site provided by SLA. Actual surface elevations could differ due to interpolation, and other differences could occur from superposing approximate boring locations on the topographic plan. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were performed with an ATV-mounted, rotary drill rig using continuous flight augers to advance the boreholes; however, a wash boring method was used in Boring 1 below a depth of about 35 feet. In Borings 2, 5 and 9, water was placed into the augers to help reduce disturbance of the soils at the bottom of the augers. Soil samples were obtained using a split-barrel sampling procedure, in which a standard 2-inch (outside diameter) split-barrel sampling spoon is driven into the ground with a Central Mine Equipment (CME) 140-pound automatic standard penetration test (SPT) hammer falling a distance of 30 inches. Greater energy efficiency is typically obtained using an automatic SPT hammer as compared to a hammer operated with a cathead and rope. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the standard penetration resistance value (N) and is used to help estimate the relative density of granular soils, the consistency of cohesive soils, and to a lesser extent, the hardness of weathered rock. These "N" values are indicated on the boring logs at their depths of occurrence. The samples were transported to our laboratory for testing and classification.

Borings 2, 6 and 8 were advanced into rock by coring with an NQ2-size diamond core barrel. The core recovered with this size core barrel is about 2 inches in diameter. The core samples were delivered to our laboratory for classification. Photographs of the cores are provided in Exhibits A-12 and 13 in this appendix.

The drill crew prepared a field log of each boring. Each log included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. The boring logs included with this report represent an interpretation of the field logs and include modifications based on laboratory observation and testing of the samples.


WEST 2ND STREET
B-2
(566)
EXISTING
PARKING LOT
B-1
(566)
PROPOSED
PARKING STRUCTURE
IOWA AVENUE
B-3
(564)
EXISTING
PARKING LOT
B-5
(562)
B-4
(564)
ALLEY
EXISTING
PARKING LOT
B-6
(563)
PROPOSED
RIVER SUITES HOTEL
EXISTING METAL
BUILDING
EXISTING
PARKING LOT
CHESTNUT STREET
B-7
(560)
B-9
(557)
EXISTING
PARKING LOT
WEST MISSISSIPPI DRIVE
B-8
(558)
N
LEGEND
APPROXIMATE BORING LOCATION
(X) APPROXIMATE SURFACE
ELEVATION (FEET)
NOT TO SCALE
THIS DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES
Project Mngr: WB
Drawn By: RLW
Checked By: WB/MRF
Approved By: WB
Project No. 07145073
Scale: AS SHOWN
File No. GEO07145073-2
Date: OCT. 2014
Terracon
Consulting Engineers and Scientists
870 40th Avenue
Bettendorf, Iowa 52722
(563) 355-0702
(563) 355-4799
BORING LOCATION PLAN
PROPOSED RIVER SUITES HOTEL AND PARKING STRUCTURE
119 WEST MISSISSIPPI DRIVE
MUSCATINE, IA
EXHIBIT
A-2

BORING LOG NO. 1

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 566 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.1	566	**ASPHALTIC CEMENT CONCRETE**, approx. 2"
		FILL- CLAY, SAND, trace brick and concrete, brown
3.0	563	
		FILL- FINE TO MEDIUM SAND, brown
8.0	558	
		SILT (ML), gray, very stiff
13.0	553	
		SILTY CLAY (CL/ML), gray, medium stiff
18.0	548	
		SANDY LEAN CLAY (CL), gray, stiff

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
			12	6-4-12 N=16	1		15	
			12	4-5-5 N=10	2		10	
5			12	3-3-3 N=6	3		10	
			12	4-9-10 N=19	4		20	
10								
			12	3-3-4 N=7	5	2000 (HP)	19	
15								
			12	3-4-4 N=8	6		23	
20								
			12	3-5-7 N=12	7		16	
25								
			0	3-5-8 N=13	8			
30								

Stratification lines are approximate. In-situ, the transition may be gradual.

Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger to about 35', Wash Boring Below 35'

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

None while drilling to 35'

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/24/2014 | Boring Completed: 9/24/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO. 1

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 566 (Ft.)

DEPTH	ELEVATION (FL.)	GRAPHIC LOG	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
		SANDY LEAN CLAY (CL), gray, stiff *(continued)*									
			35			12	3-4-8 N=12	9	4000 (HP)	18	
			40			12	4-8-12 N=20	10		19	
		very stiff at Samples 10 and 11	45			12	5-8-10 N=18	11	5000 (HP)	14	
46.0	520	**HIGHLY WEATHERED CLAY SHALE**, gray									
48.0	518	**HIGHLY WEATHERED LIMESTONE**	50			0	50/0"	12			
51.0	515	***Auger Refusal at 51 Feet***									

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger to about 35', Wash Boring Below 35'

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

None while drilling to 35'

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/24/2014 | Boring Completed: 9/24/2014
Drill Rig: 35E | Driller: RP
Project No.: 07145073 | Exhibit: A-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT... GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO. 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 566 (Ft.)

DEPTH	ELEVATION (FL)	Material Description	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
0.1	566	**ASPHALTIC CEMENT CONCRETE**, approx. 2"									
		FILL- SANDY LEAN CLAY, trace brick, dark brown and brown			X	12	3-3-4 N=7	1		17	
3.0	563										
		FILL- FINE TO MEDIUM SAND, with varying amounts of clay, trace brick, brown			X	12	2-1-2 N=3	2		17	
			5		X	12	4-6-7 N=13	3		9	
8.0	558										
		SANDY FAT CLAY (CH), gray, stiff			X	6	4-5-6 N=11	4		15	
			10								
		very stiff at Sample 5			X	18	4-7-8 N=15	5		15	
			15								
					X	12	3-4-6 N=10	6	3000	16	
			20								
					X	18	4-6-7 N=13	7	4000	17	
			25								
28.0	538										
		FINE TO MEDIUM SAND (SP), trace clay, gray, very loose			X	6	0-0-0 N=0	8		17	
			30								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated based on observation of disturbed samples. Petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
Low blow count at 28 ' is likely due to the water table.
Auger Refusal at 49'

WATER LEVEL OBSERVATIONS
None while drilling to 28'
NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/25/2014 | Boring Completed: 9/25/2014
Drill Rig: 35E | Driller: RP
Project No.: 07145073 | Exhibit: A-4

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BORING LOG NO. 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 566 (Ft.)

DEPTH	ELEVATION (FL)	Description	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
0.1	566	**ASPHALTIC CEMENT CONCRETE**, approx. 2"									
		FILL- SANDY LEAN CLAY, trace brick, dark brown and brown			X	12	3-3-4 N=7	1		17	
3.0	563										
		FILL- FINE TO MEDIUM SAND, with varying amounts of clay, trace brick, brown	5		X	12	2-1-2 N=3	2		17	
					X	12	4-6-7 N=13	3		9	
8.0	558										
		SANDY FAT CLAY (CH), gray, stiff	10		X	6	4-5-6 N=11	4		15	
		very stiff at Sample 5	15		X	18	4-7-8 N=15	5		15	
			20		X	12	3-4-6 N=10	6	3000	16	
			25		X	18	4-6-7 N=13	7	4000	17	
28.0	538										
		FINE TO MEDIUM SAND (SP), trace clay, gray, very loose	30		X	6	0-0-0 N=0	8		17	

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated based on observation of disturbed samples. Petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
Low blow count at 28 ' is likely due to the water table.
Auger Refusal at 49'

WATER LEVEL OBSERVATIONS
None while drilling to 28'
NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/25/2014 | Boring Completed: 9/25/2014
Drill Rig: 35E | Driller: RP
Project No.: 07145073 | Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO. 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 566 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
33.0	533	**SANDY LEAN CLAY (CL)**, gray, very stiff									
		higher sand content in Sample 9	35			6	10-8-10 N=18	9		12	
			40			18	5-8-10 N=18	10	5000	15	
43.0	523	**FINE TO MEDIUM GRAVEL WITH SAND AND CLAY (GP)**, gray, dense				12	18-28-16 N=44	11		12	
49.0	517	**SLIGHTLY WEATHERED LIMESTONE**, gray, hard, thinly bedded	45				50/0"	12			
			50				REC=100 R D=63	R1			
			55				REC=100 R D=98	R2			
59.0	507	***Boring Terminated at 59 Feet***									

Stratification lines are approximate. In-situ, the transition may be gradual.

Classification of rock materials has been estimated based on observation of disturbed samples. Petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method: Continuous Hollow Stem Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

None while drilling to 28'

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/25/2014 | Boring Completed: 9/25/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-4

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BORING LOG NO. 3

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 564 (Ft.)

DEPTH	ELEVATION (FL)	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
0.1	564									
ASPHALTIC CEMENT CONCRETE, approx. 2"										
SANDY FAT CLAY (CH), gray, medium stiff				X	12	3-3-5 N=8	1		19	
3.0	561									
CLAYEY SAND (SC), gray, loose				X	12	3-3-3 N=6	2		20	
		5		X	12	3-3-4 N=7	3		21	
8.0	556		▽							
SANDY LEAN CLAY (CL), gray, stiff to very stiff				X	12	5-6-8 N=14	4	4000 (HP)	16	
		10	▽							
				X	12	6-7-8 N=15	5	5000 (HP)	16	
very stiff at Samples 5 and 6		15								
				X	18	6-7-8 N=15	6		17	
20.0	544	20								
Boring Terminated at 20 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ 8' while drilling
▽ 10' at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/25/2014 | Boring Completed: 9/25/2014
Drill Rig: 35E | Driller: RP
Project No.: 07145073 | Exhibit: A-5

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BORING LOG NO. 4

Page 1 of 1

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 564 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
0.1	564	**ASPHALTIC CEMENT CONCRETE**, approx. 2"									
		SANDY FAT CLAY (CH), gray, medium stiff				12	2-2-3 N=5	1		20	51-16-35
				▽		12	3-3-3 N=6	2		22	
5.5	558.5	**FINE SAND WITH CLAY (SP)**, brown-gray, loose	5	▽		12	2-2-2 N=4	3		25	
8.0	556	**SANDY LEAN CLAY (CL)**, gray, stiff				12	3-5-6 N=11	4	4000 (HP)	16	31-13-18
		very stiff at Sample 5	10								
15.0	549	**FINE TO MEDIUM SAND WITH CLAY (SP)**, brown-gray, medium dense	15			12	4-6-9 N=15	5		15	
20.0	544	***Boring Terminated at 20 Feet***	20			12	3-5-8 N=13	6		17	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: Continuous Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ 7' while drilling

▽ 5' at completion of drilling

Terracon

870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/24/2014 | Boring Completed: 9/24/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO. 5

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 562 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.1	562	**ASPHALTIC CEMENT CONCRETE**, approx. 2"
		SANDY FAT CLAY (CH), gray, stiff
3.5	558.5	**FINE TO MEDIUM SAND WITH CLAY (SP)**, gray, medium dense
		loose at Sample 3
8.0	554	**SANDY LEAN CLAY (CL)**, gray, stiff
29.5	532.5	**FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP)**, gray, medium dense

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
			13	4-4-5 N=9	1		22	
5			18	3-5-5 N=10	2		20	
			1	3-3-3 N=6	3		23	
10			12	3-5-7 N=12	4		17	
15			18	3-5-6 N=11	5	3000 (HP)	17	
20			18	3-5-6 N=11	6		17	
25			18	4-4-6 N=10	7	3000 (HP)	19	
30	▽		12	6-10-17 N=27	8		19	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
Boring terminated on apparent bedrock

WATER LEVEL OBSERVATIONS

▽ 29.5' while drilling

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-7

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BORING LOG NO. 5

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 562 (Ft.)

DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
		FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP), gray, medium dense *(continued)*									
			35		X	12	6-10-12 N=22	9		11	
38.0	524										
		SANDY FAT CLAY (CH), gray, very stiff	40		X	18	6-8-10 N=18	10		17	
43.0	519										
		FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP), gray, medium dense	45		X	12	9-11-13 N=24	11		11	
47.5	514.5										
		Auger Refusal at 47.5 Feet				0	50/0"	12			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: Continuous Hollow Stem Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *29.5' while drilling*

NA at completion of drilling

Terracon

870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-7

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BORING LOG NO. 6

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 563 (Ft.)

DEPTH	ELEVATION (FL)	Material Description
0.5	562.5	**PORTLAND CEMENT CONCRETE**, approx. 6"
		FILL- SAND, CLAY WITH TRACE CONCRETE, brown
4.0	559	
		SANDY FAT CLAY (CH), gray, medium stiff
		stiff at Sample 3
		very stiff at Sample 4
13.0	550	
		LEAN CLAY (CL), gray, medium stiff
18.0	545	
		SANDY LEAN CLAY (CL), gray, stiff
28.0	535	
		FINE TO COARSE SAND WITH CLAY (SP), brown, loose

DEPTH (FL)	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	WATER CONTENT ( )
		6	2-2-2 N=4	1	17
5		10	3-3-3 N=6	2	17
		0	3-5-5 N=10	3	
		12	6-9-6 N=15	4	14
10					
		18	3-3-3 N=6	5	15
15					
		12	3-5-7 N=12	6	17
20					
		16	5-7-6 N=13	7	16
25					
		8	2-3-2 N=5	8	21
30					

Stratification lines are approximate. In-situ, the transition may be gradual.

Classification of rock materials has been estimated based on observation of disturbed samples. Petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger to about 49', Wash Bore Below 49'

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:
Auger refusal at 49'

WATER LEVEL OBSERVATIONS

28' while drilling

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO. 6

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 563 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	WATER CONTENT (%)
		FINE TO COARSE SAND WITH CLAY (SP), brown, loose *(continued)* higher clay content, medium dense at Sample 9						
35.0	528		35		18	6-10-15 N=25	9	17
		SANDY FAT CLAY (CH), gray, very stiff						
40.0	523		40		12	6-8-13 N=21	10	15
		CLAYEY GRAVEL WITH SAND (GC), gray, medium dense						
			45		12	6-7-8 N=15	11	15
49.0	514							
		SLIGHTLY WEATHERED LIMESTONE, gray and dark gray, hard, thinly bedded	50		0	50/0"	12	
						REC=100 R D=80	R1	
			55			REC=100 R D=98	R2	
59.0	504							
		Boring Terminated at 59 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Classification of rock materials has been estimated based on observation of disturbed samples. Petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger to about 49', Wash Bore Below 49'

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ 28' while drilling

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO.

Page 1 of 1

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 560 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (FL)	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
	0.1	560									
ASPHALTIC CEMENT CONCRETE, approx. 2" FILL- SAND AND CRUSHED LIMESTONE, gray					X	2	8-16-12 N=28	1		10	
					X	2	3-3-2 N=5	2			
	5.0	555	5		X	12	2-4-5 N=9	3		14	
SANDY FAT CLAY (CH), gray, stiff					X	12	3-6-7 N=13	4		21	
			10								
					X	12	4-5-7 N=12	5		13	
			15								
	20.0	540			X	18	4-5-7 N=12	6	3000 (HP)	15	
Boring Terminated at 20 Feet			20								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: Continuous Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

None while drilling

None at completion of drilling

Terracon

870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014 | Boring Completed: 9/29/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14

BORING LOG NO.

PROJECT: Proposed Riverview Suites Hotel and Parking Structure	**CLIENT:** Riverview Hotel Development
SITE: 119 West Mississippi Drive Muscatine, Iowa	Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 558 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
0.1	558	**ASPHALTIC CEMENT CONCRETE**, approx. 2"									
		FILL- SANDY LEAN CLAY, BRIC, brown				12	5-3-3 N=6	1		14	
						2	2-1-1 N=2	2		14	
6.0	552	**SANDY FAT CLAY (CH)**, gray, soft	5			12	1-1-2 N=3	3		16	
		stiff at Samples 4 5				18	3-4-7 N=11	4	3000 (HP)	16	
			10			18	2-6-7 N=13	5		16	
		very stiff with sand seams at Sample 6	15			18	3-7-8 N=15	6		19	
23.0	535	**FINE SAND WITH CLAY (SP)**, gray, medium dense	20	▽		18	3-5-13 N=18	7		16	
27.0	531	**SANDY LEAN CLAY (CL)**, gray, hard	25			18	13-23-25 N=48	8		18	
			30								

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method: Continuous Hollow Stem Flight Auger	See Exhibit A-1 for description of field procedures See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Auger Cuttings and Borehole Plug		

WATER LEVEL OBSERVATIONS

▽ 23' while drilling

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014	Boring Completed: 9/29/2014
Drill Rig: 35E	Driller: RP
Project No.: 07145073	Exhibit: A-10

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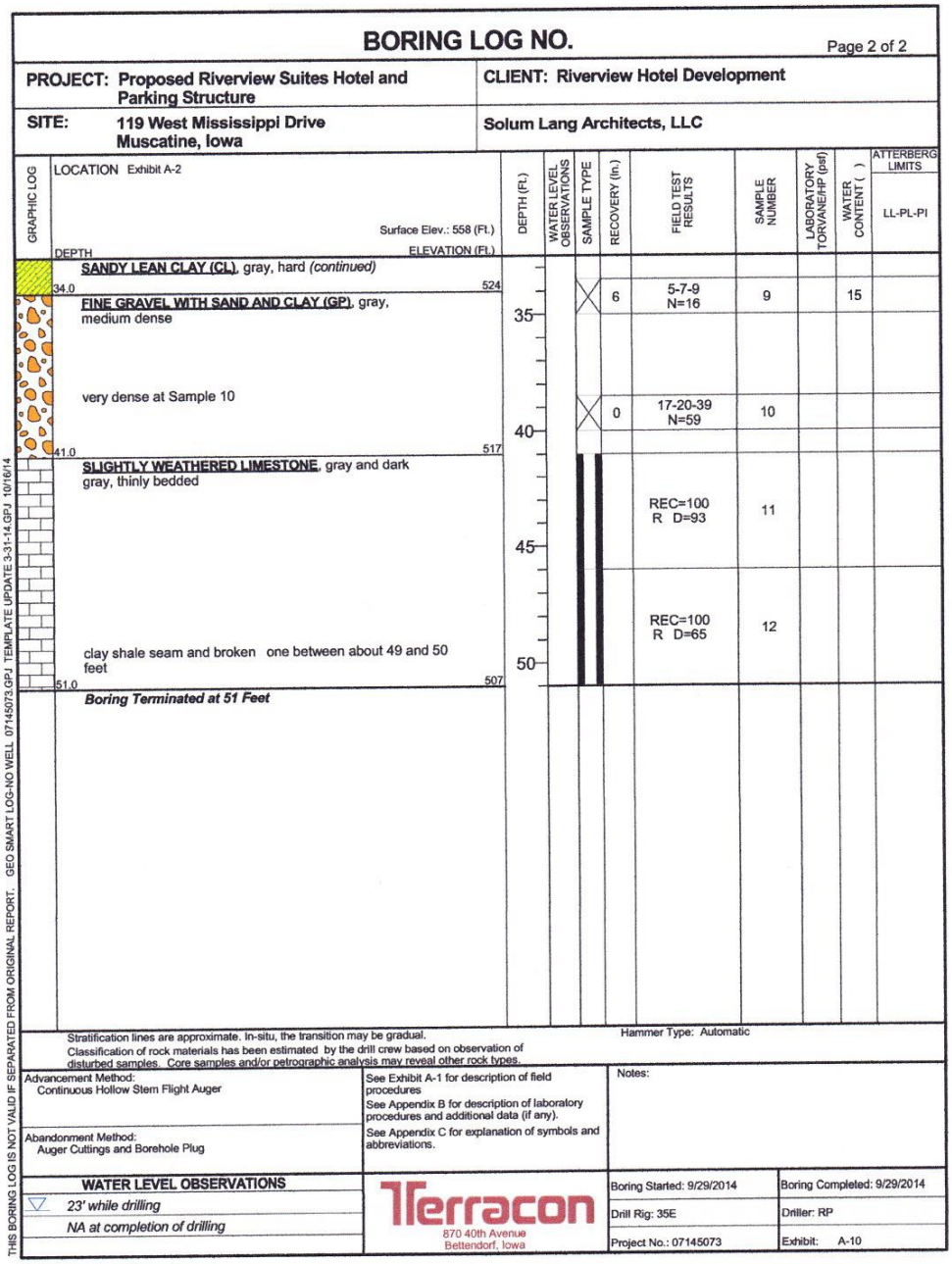

BORING LOG NO.

Page 2 of 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 558 (Ft.)

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
34.0	524	**SANDY LEAN CLAY (CL)**, gray, hard *(continued)*									
		FINE GRAVEL WITH SAND AND CLAY (GP), gray, medium dense	35			6	5-7-9 N=16	9		15	
		very dense at Sample 10				0	17-20-39 N=59	10			
41.0	517	**SLIGHTLY WEATHERED LIMESTONE**, gray and dark gray, thinly bedded	40								
			45				REC=100 R D=93	11			
		clay shale seam and broken one between about 49 and 50 feet					REC=100 R D=65	12			
51.0	507		50								
		Boring Terminated at 51 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method: Continuous Hollow Stem Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *23' while drilling*

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014 | Boring Completed: 9/29/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-10

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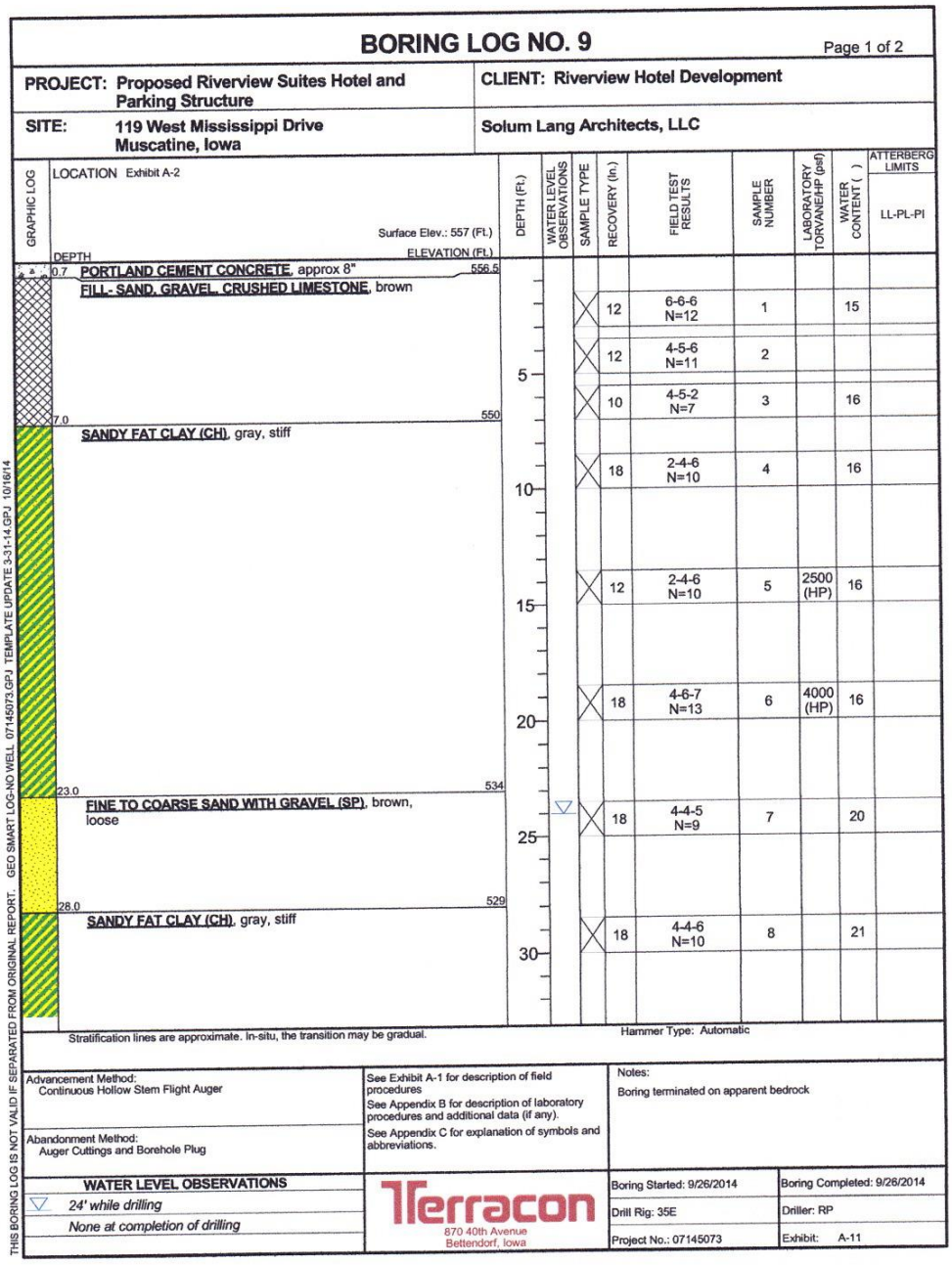

BORING LOG NO. 9

Page 1 of 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 557 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.7	556.5	**PORTLAND CEMENT CONCRETE**, approx 8"
		FILL- SAND, GRAVEL, CRUSHED LIMESTONE, brown
7.0	550	**SANDY FAT CLAY (CH)**, gray, stiff
23.0	534	**FINE TO COARSE SAND WITH GRAVEL (SP)**, brown, loose
28.0	529	**SANDY FAT CLAY (CH)**, gray, stiff

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
			12	6-6-6 N=12	1		15	
			12	4-5-6 N=11	2			
5			10	4-5-2 N=7	3		16	
			18	2-4-6 N=10	4		16	
10								
			12	2-4-6 N=10	5	2500 (HP)	16	
15								
			18	4-6-7 N=13	6	4000 (HP)	16	
20	▽							
			18	4-4-5 N=9	7		20	
25								
			18	4-4-6 N=10	8		21	
30								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:
Boring terminated on apparent bedrock

WATER LEVEL OBSERVATIONS

▽ 24' while drilling

None at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-11

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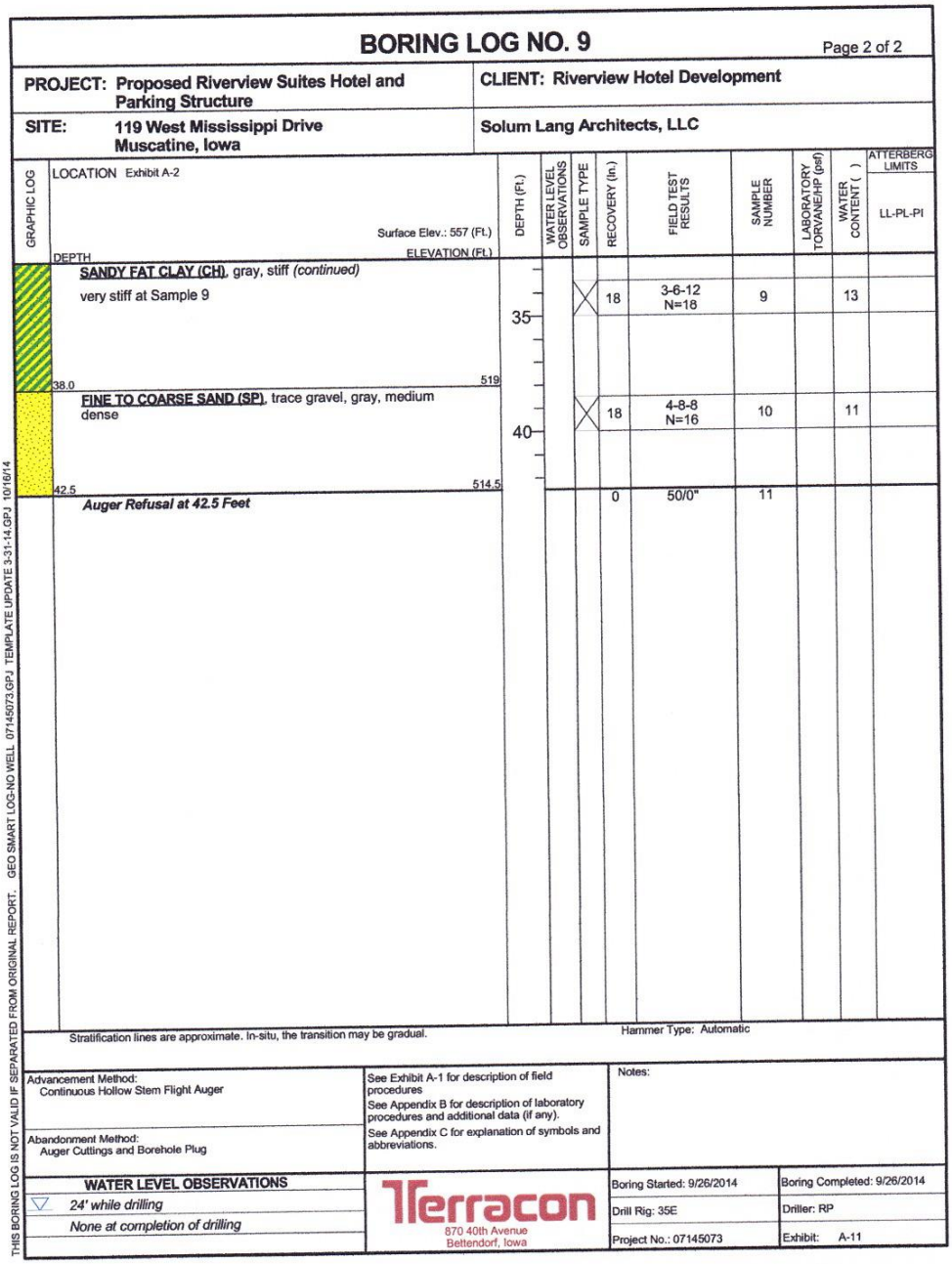


BORING LOG NO. 9

Page 2 of 2

PROJECT: Proposed Riverview Suites Hotel and Parking Structure

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive Muscatine, Iowa

Solum Lang Architects, LLC

LOCATION Exhibit A-2

Surface Elev.: 557 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (FL)	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	SAMPLE NUMBER	LABORATORY TORVANE/HP (psf)	WATER CONTENT ( )	ATTERBERG LIMITS LL-PL-PI
		SANDY FAT CLAY (CH), gray, stiff *(continued)* very stiff at Sample 9	35			18	3-6-12 N=18	9		13	
	38.0	519									
		FINE TO COARSE SAND (SP), trace gravel, gray, medium dense	40			18	4-8-8 N=16	10		11	
	42.5	514.5									
		Auger Refusal at 42.5 Feet				0	50/0"	11			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: Continuous Hollow Stem Flight Auger

Abandonment Method: Auger Cuttings and Borehole Plug

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ 24' while drilling

None at completion of drilling

Terracon

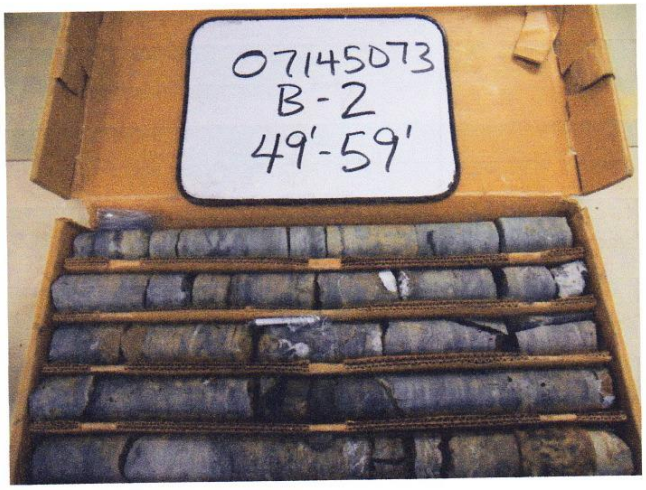
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07145073 | Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 07145073.GPJ TEMPLATE UPDATE 3-31-14.GPJ 10/16/14



Boring 2 – Runs 1 and 2

Boring 6 – Runs 1 and 2

Boring 8 – Runs 1 and 2

APPENDIX B
LABORATORY TESTING

Laboratory Testing

The soil samples obtained from the borings were tested in the laboratory to measure their natural water content. A pocket penetrometer was also used to help estimate the approximate unconfined compressive strength of some samples. Atterberg limits tests were performed on selected samples to better evaluate the soil's plasticity and shrink-swell potential. The test results are provided on the boring logs (Exhibits A-3 through A-11) in Appendix A.

The soil samples were also classified in the laboratory based on visual observation, texture and plasticity in general accordance with ASTM D 2216. The soil descriptions and estimated group symbols (for native soils) presented on the boring logs are in general accordance with the Unified Soil Classification System (USCS) (ASTM D 2487) and the General Notes in Appendix C (Exhibit C-1). A summary of the USCS is also included in Appendix C (Exhibit C-2).

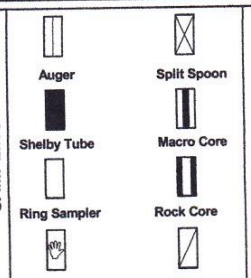
Rock sample classifications and descriptions are in accordance with the Description of Rock Properties (Exhibit C-3) in Appendix D, and are based on tactile and visual observations of the core samples. Percent recovery and rock quality designation (RQD) were also determined for the rock core samples and are provided on the boring logs. RQD is the percent of total length cored consisting of sound pieces at least 4 inches in length and is a measure of the in-situ rock quality. RQD values characterize rock quality as excellent (90-100%), good (75-90%), fair (50-75%), poor (25-50%) and very poor (<25%).

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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Exhibit C-1

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or 1 > Cc > 3 [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or 1 > Cc > 3 [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.

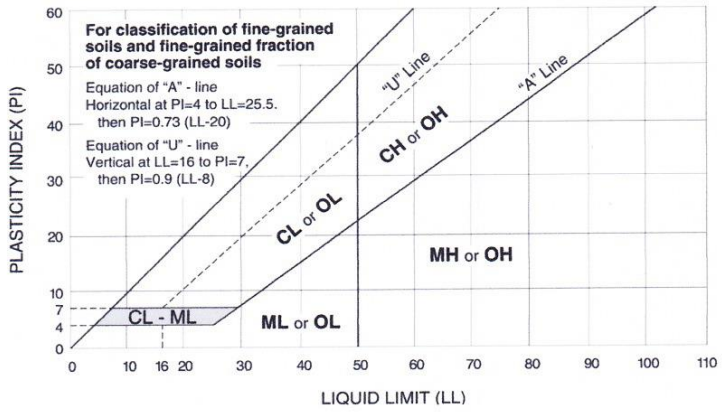

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Exhibit C-2

DESCRIPTION OF ROCK PROPERTIES

WEATHERING

Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately severe	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.
Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very severe	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete	Rock reduced to "soil". Rock "fabric" not discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)

Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

Joint, Bedding, and Foliation Spacing in Rock [a]

Spacing	Joints	Bedding/Foliation
Less than 2 in.	Very close	Very thin
2 in. – 1 ft.	Close	Thin
1 ft. – 3 ft.	Moderately close	Medium
3 ft. – 10 ft.	Wide	Thick
More than 10 ft.	Very wide	Very thick

a. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

Rock Quality Designator (RQD) a

RQD, as a percentage	Diagnostic description
Exceeding 90	Excellent
90 – 75	Good
75 – 50	Fair
50 – 25	Poor
Less than 25	Very poor

a. RQD (given as a percentage) = length of core in pieces 4 in. and longer/length of run.

Joint Openness Descriptors

Openness	Descriptor
No Visible Separation	Tight
Less than 1/32 in.	Slightly Open
1/32 to 1/8 in.	Moderately Open
1/8 to 3/8 in.	Open
3/8 in. to 0.1 ft.	Moderately Wide
Greater than 0.1 ft.	Wide

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976. U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.

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Exhibit C-3

Exhibit C.2: Hazardous Material Survey Report

Hazardous Materials Survey Report

Metal Warehouse Building

119 Mississippi Drive West

Muscatine, Muscatine County, Iowa

October 28, 2014

Terracon Project No. 07147066

Prepared for:
Riverview Development, LLC
Cumming, Georgia

Prepared by:
Terracon Consultants, Inc.
Bettendorf, Iowa

terracon.com

Terracon

Environmental ■ Facilities ■ Geotechnical ■ Materials

October 28, 2014

Terracon

Ms. Rebecca Howe
Riverview Development, LLC
6635 Chelsea Gardens Way
Cumming, Georgia 30040

Re: Hazardous Materials Survey Report
Metal Warehouse Building
119 Mississippi Drive West
Muscatine, Muscatine County, Iowa
Terracon Project No. 07147066

Dear Ms. Howe:

Terracon Consultants, Inc. (Terracon) is pleased to submit the attached report for the above referenced site to Riverview Development, LLC (Riverview). The purpose of this report is to present the results of a hazardous materials survey conducted at the site on October 8, 2014. The survey was conducted in general accordance with Terracon Proposal No. P07140094, dated September 15, 2014. Terracon understands that this survey was requested due to the planned demolition of the above-referenced structure.

Terracon appreciates the opportunity to provide this service to Riverview. If you have questions regarding this report, please feel free to contact us at 563-355-0702.

Sincerely,
Terracon Consultants, Inc.

James R. Baxter
Senior Staff Environmental Scientist

for Cindy A. Baldwin, CIH, LIH
Senior Industrial Hygienist

Terracon Consultants, Inc. 870 40th Avenue Bettendorf, Iowa 52722
P 563-355-0702 F 563-355-4789 terracon.com

Terracon

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HAZARDOUS MATERIALS SURVEY REPORT
Metal Warehouse Building
119 Mississippi Drive West
Muscatine, Muscatine County, Iowa
Terracon Project No. 07147066

October 28, 2014

1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) conducted a hazardous materials survey of the metal warehouse building located at 119 Mississippi Drive West in Muscatine, Muscatine County, Iowa.

The purpose of this survey report is to document the sample collection and quantification activities at the site. The scope of Terracon's services for the survey included the following:

- Sampling of suspect asbestos-containing materials (ACMs) and a lead-based paint (LBP) survey;
- Estimation of mercury, polychlorinated biphenyl (PCB), and/or other hazardous/regulated materials; and,
- The completion of this survey report.

Bulk suspect ACM and LBP sampling and quantification of other special/hazardous/regulated materials were conducted on October 8, 2014, by Mr. James R. Baxter, a State of Iowa licensed asbestos inspector in general accordance with Terracon Proposal No. P07140094, dated September 14, 2014.

Although reasonable effort was made to survey accessible suspect materials, additional suspect but unsampled materials could be located in walls, in voids, or in other concealed areas. Suspect ACM samples were collected in general accordance with the sampling protocols outlined in United States Environmental Protection Agency (USEPA) regulations under 40 Code of Federal Regulations (CFR) Part 763 Subpart E-Asbestos-Containing Materials in Schools, 763.86 Sampling. Samples were delivered to an accredited laboratory for analysis by polarized light microscopy (PLM).

1.1 Project Objective

We understand this asbestos survey was requested to satisfy requirements of USEPA 40 CFR 61-National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart M-Asbestos, which apply when buildings are demolished.

USEPA has defined LBP as containing 1.0 milligram of lead per square centimeter (mg/cm^2) or 0.5 percent (%) by weight. LBP waste from renovation or demolition activities, such as debris, paint chips, dust, and sludges, that exhibit the toxicity characteristic must be managed and disposed of as hazardous waste under the Resource Conservation and Recovery Act (RCRA), with the exception of whole-building demolition debris. For debris generated by renovation activities, a composite, representative sample of the debris must be tested to determine if it is regulated as hazardous waste under 40 CFR 261 Identification and Listing of Hazardous Waste.

Contractors should be notified of the presence of LBP in areas where demolition activities may result in potential employee exposure to lead so they may comply with Occupational Safety and Health Administration (OSHA) requirements under 29 CFR 1926.62 Lead.

Disposal of mercury-containing fluorescent lights tubes as universal waste is regulated under 40 CFR 273 Standards for Universal Waste Management. Disposal of mercury from other sources is regulated under 40 CFR 260-262 Hazardous Waste standards. Disposal of PCB-containing fluorescent light ballasts, caulks, transformers, and oils is regulated by the USEPA under 40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.

Although regulations requiring pre-demolition surveys do not exist for LBP, mercury-containing light tubes and equipment, or PCB-containing equipment, contractors should be notified of the presence of these materials in areas where renovation activities might result in potential employee exposure to lead, mercury, PCBs, or other hazardous materials, so that they can take the necessary actions to comply with OSHA requirements and disposal requirements.

1.2 Reliance

This report is for the exclusive use of Riverview Development, LLC (Riverview) for the project being discussed. Reliance on this report by other parties is prohibited without written authorization of Terracon and Riverview. Reliance on this report by Riverview and all authorized parties will be subject to the terms, conditions and limitations stated in the proposal, this report and Terracon's Agreement for Services. The limitation of liability defined in Terracon's Agreement for Services is the aggregate limit of Terracon's liability to Riverview.

2.0 BUILDING DESCRIPTION

According to information obtained from the Muscatine Area Geographic Information Consortium (MAGIC) database, the site consists of an approximately 0.45-acre parcel containing an approximately 8,750 square-foot single story structure which was constructed in 1975.

The west portion of the site building is occupied by Grapetree Medical Staffing and the east portion of the site building is used as general storage and maintenance by the current owner. The structure consists of slab-on-grade construction with wood framed walls covered in sheet metal siding. Interior finishes consist of carpeting, painted gypsum wallboard, and acoustical ceiling tiles.

3.0 FIELD ACTIVITIES

Terracon conducted the field activities on October 8, 2014. Mr. Lucas Meeker provided Terracon access to the structure.

3.1 Asbestos Survey

The survey was conducted by Mr. James R. Baxter, a State of Iowa licensed asbestos inspector. A copy of Mr. Baxter's asbestos inspector license is provided in Appendix C. The survey was conducted in general accordance with the sample collection protocols established in USEPA 40 CFR 763.86 - Sampling. A summary of survey activities is provided in the following subsections.

3.1.1 Asbestos Visual Assessment

Survey activities were initiated with visual observation of the interior and exterior of the building to identify homogeneous areas of suspect ACM. A homogeneous area (HA) consists of building materials that appear similar throughout in terms of color and texture with consideration given to the date of application. Interior and exterior assessment was conducted in visually accessible areas of the building.

3.1.2 Asbestos Physical Assessment

A physical assessment of each HA of suspect ACM was conducted to assess the friability and condition of the materials. A friable material is defined by the USEPA as a material that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friability was assessed by physically touching suspect materials.

3.1.3 Asbestos Sample Collection

Based on results of the visual assessment, bulk samples of suspect ACM were collected in general accordance with USEPA sampling protocols. Samples of suspect materials were collected from randomly selected locations in each HA. Bulk samples were collected using wet methods as applicable to reduce the potential for fiber release. Samples were placed in sealable containers and labeled with unique sample numbers using an indelible marker.

The selection of sample locations and frequency of sampling were based on Terracon's observations and the assumption that like materials in the same area are homogeneous in content.

Terracon collected 30 bulk samples containing 54 layers from 10 homogeneous areas of suspect ACM.

3.1.4 Asbestos Sample Analysis

Bulk samples were submitted under chain of custody to EMSL Analytical, Inc. (EMSL) of Cinnaminson, New Jersey, for analysis by PLM with dispersion staining techniques per USEPA's Method for the Determination of Asbestos in Bulk Building Materials (600/R-93/116). The percentage of asbestos, if present, was determined by microscopic visual estimation. EMSL is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), Accreditation No. 100194.

3.2 Lead-Based Paint Survey

A survey for LBP was conducted concurrently with the asbestos survey. Terracon used an x-ray fluorescence (XRF) analyzer, which has direct-reading capability, to screen for lead content in surface coatings. The purpose of the survey was to assess for the presence of LBP in surface coatings (i.e., paint, varnish, etc.), which might present a potential for airborne exposure to workers involved in the demolition activities and that might require special disposal.

The XRF analyzer was used to measure the lead content in interior and exterior surface coatings. An XRF is a portable electronic device containing a small, sealed nuclear source. The device emits x-rays at various energy levels. The x-ray energy excites electrons in the outer orbits of lead atoms. The detector in the XRF unit reads this excitation and translates it into a semi-quantitative reading of lead present per surface area. XRF technology allows detection of lead in a painted surface, even several layers below the surface, without disturbing the painted surface. Using the manufacturer provided block, Terracon calibrated the XRF unit (LPA-1 serial number 3445) to approximately 1.0 mg/cm^2 prior to and following the screening services. Using the XRF, Terracon obtained 26 readings of painted surfaces to evaluate for the presence of LBP. A summary of the readings obtained is included as Table 2 in Appendix A.

3.3 Mercury Survey

The mercury portion of the survey was conducted following the asbestos and lead survey. Terracon conducted a visual survey for potential mercury-containing thermostats, switches, and gauges. In addition, Terracon estimated the number of mercury-containing lamps and fluorescent light tubes.

3.4 Polychlorinated Biphenyls Survey

The PCB portion of the survey was conducted concurrently with the mercury survey. Terracon estimated the number of potential ballasts for contractor verification and proper disposal.

3.5 Other Regulated Materials Assessment

Terracon performed a limited visual survey for other potentially hazardous materials at the site. As the site building is still occupied, some of the materials Terracon observed may be removed and new materials may be brought in before the building is demolished. It should be understood that additional, different materials may be present when demolition activities commence.

Determining the exact contents of noted products was beyond the scope of the survey. Any unwanted/unused products should be disposed or recycled prior to the demolition activities in accordance with applicable federal, state, and local regulations.

4.0 REGULATORY OVERVIEW

4.1 Asbestos

In Iowa, asbestos activities are regulated by the Iowa Department of Natural Resources (IDNR) and the Division of Labor, Iowa Workforce Development (IWD). IDNR regulates asbestos fiber emissions under Iowa Administrative Code 567 Chapter 23 (IAC 567-23) and asbestos-containing waste disposal under IAC 567-109. IWD regulates occupational exposure to asbestos under IAC 875-10 and asbestos removal and encapsulation activities under IAC 875-155.

IAC 567-23.1(3) adopts USEPA's asbestos NESHAP (40 CFR Part 61, Subpart M) by reference. Subpart M regulates asbestos fiber emissions and asbestos waste disposal practices. It also requires the identification and classification of existing materials prior to demolition or renovation activity. Under NESHAP, asbestos-containing building materials are classified as friable, Category I nonfriable, or Category II nonfriable ACM. Friable materials are those that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. Category I nonfriable ACM includes packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than 1% asbestos. Category II nonfriable ACM are any materials other than Category I materials that contain more than 1% asbestos.

Regulated ACM (RACM) must be removed before renovation or demolition activities that will disturb the materials. RACM includes:

- Friable ACM;
- Category I nonfriable ACM that has become friable or will be subjected to drilling, sanding, grinding, cutting, or abrading; and
- Category II nonfriable ACM that could be crumbled, pulverized, or reduced to powder during renovation or demolition activities.

The owner or operator must provide the IDNR and IWD with written notification of planned removal activities at least 10 working days prior to the commencement of asbestos abatement activities. Removal of RACM must be conducted by an Iowa-permitted asbestos abatement contractor.

IAC 875-155 Asbestos Removal and Encapsulation requires that any asbestos-related activity conducted in a public building must be conducted by personnel licensed or permitted by the IWD. Inspections for ACM must be conducted by IWD-licensed inspectors. Asbestos abatement must be conducted by IWD-permitted asbestos abatement contractors. Management plans developed for the in-place management of ACM must be developed by an IWD-licensed management planner. When an abatement project design is prepared, it must be prepared by an IWD-licensed project designer.

IAC 875-10 adopts the OSHA Asbestos standard for construction (29 CFR 1926.1101) by reference. The OSHA standard requires that employee exposure to airborne asbestos fibers be maintained below the permissible exposure limits (PELs) of 0.1 asbestos fiber per cubic centimeter of air (0.1 f/cc) as an 8-hour time-weighted average (TWA) or 1.0 f/cc as a 30-minute excursion limit. The OSHA standard classifies construction and maintenance activities that could disturb ACM and specifies work practices and precautions that employers must follow when engaging in each class of regulated work.

4.2 Lead-Based Paint

USEPA has defined LBP as containing lead at a concentration of 1.0 mg/cm^2 or 0.5% by weight. LBP waste from renovation or demolition activities, such as debris, paint chips, dust, and sludges, that exhibit the toxicity characteristic must be managed and disposed as a hazardous waste under RCRA, with the exception of whole-building demolition debris. If it is not a whole-building demolition debris, a composite, representative sample of the debris must be tested to determine if it is regulated as hazardous waste under 40 CFR 261 Identification and Listing of Hazardous Waste.

IAC 875-10 adopts the OSHA Lead standard for construction (29 CFR 1926.62) by reference. For the purpose of the OSHA lead standard, lead includes metallic lead, all inorganic lead compounds, and organic lead soaps. The federal OSHA standard does not define the amount of lead in paint that constitutes lead-based paint.

The OSHA Lead standard for construction applies to all construction work where an employee may be occupationally exposed to lead. All work related to construction, alteration, or repair (including painting and decorating) is included. The lead-in-construction standard applies to any detectable concentration of lead in paint, as even small concentrations of lead can result in unacceptable employee exposures depending upon on the method of removal and other workplace conditions. Under this standard, construction includes, but is not limited to, the following:

- Demolition or salvage of structures where lead or materials containing lead are present;
- Removal or encapsulation of materials containing lead;
- New construction, alteration, repair, or renovation of structures, substrates, or portions containing lead, or materials containing lead;
- Installation of products containing lead;
- Lead contamination/emergency clean-up;
- Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and
- Maintenance operations associated with construction activities described above.

Employers must assure that no employee will be exposed to lead at concentrations greater than the PEL of 50 micrograms per cubic meter ($\mu g/m^3$) as an 8-hour TWA without adequate protection. The OSHA standard also establishes an action level of 30 $\mu g/m^3$, which if exceeded, triggers certain requirements, including periodic exposure monitoring and medical monitoring.

4.3 Mercury

Metallic mercury is a silver-white liquid at room temperature. Elemental and inorganic mercury compounds are used in the manufacture of scientific instruments, electric equipment, and mercury vapor and fluorescent electric lamps. Mercury-containing equipment, such as fluorescent light tubes, must be sent to an approved recycling facility that recovers mercury. The USEPA considers mercury a hazardous waste.

USEPA regulates disposal of mercury-containing fluorescent lights tubes as universal waste under 40 CFR 273. Disposal of mercury from other sources is regulated under 40 CFR 260-262.

OSHA regulates occupational exposure to mercury under 29 CFR 1910.1000 Air Contaminants, Table Z-1 – Limits for Air Contaminants. The PEL for mercury is 0.1 milligrams per cubic meter (mg/m^3) as an 8-hr TWA.

4.4 Polychlorinated Biphenyls

PCBs are clear, oily liquids to white or yellowish waxy solids, depending on the degree of chlorination. They are stable, thermoplastic, and nonflammable materials that were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, caulks, plastics, and rubber products; in pigments, dyes and carbonless copy paper and many other applications.

USEPA regulates transportation, disposal, and spill cleanup of PCB-containing light ballasts and oils under the Toxic Substances Control Act (TSCA), which can be found in 40 CFR 761. Nearly all fluorescent light ballasts manufactured prior to 1979 are assumed to contain PCBs unless clearly marked as containing "NO PCB."

OSHA regulates occupational exposure to certain PCBs under 29 CFR 1910.1000 Air Contaminants, Table Z-1 – Limits for Air Contaminants. The PEL for chlorodiphenyl (42% chlorine) is 1.0 mg/m^3 and for chlorodiphenyl (54% chlorine) is 0.5 mg/m^3, both as 8-hr TWAs.

5.0 FINDINGS

5.1 Asbestos Survey

ACMs were not identified in the samples collected from the site building on October 8, 2014.

It should be noted that suspect materials, other than those sampled during the October 8, 2014 survey may exist within the site building. Should suspect materials other than those which were identified during this survey be uncovered prior to or during the demolition process, those materials should be assumed asbestos-containing until sampling and analysis can confirm or deny their asbestos content.

A summary of the survey sample locations is included as Table 1 in Appendix A and a copy of the laboratory analytical report is included in Appendix B.

5.2 LBP XRF Survey

Based on direct readouts obtained during the XRF survey, LBP was not identified on the materials sampled at the site building.

Results less than (<) 1 mg/cm^2 indicate that lead is not present at or above the USEPA standard; however, lead was present in lower concentrations or at values less than the threshold specified on the XRF performance characteristic sheet. The LBP survey summary is included as Table 2 in Appendix A.

5.3 Mercury Survey

During the mercury survey visual inspection, Terracon counted approximately 100 fluorescent light tubes throughout the site building. Additionally, Terracon observed a mercury-containing thermostat on the east wall of the west hallway in the office area.

5.4 Polychlorinated Biphenyls Survey

Terracon counted approximately 30 light fixtures containing ballasts throughout the site building. Terracon did not observe transformers during the survey. Disposal of PCB-containing fluorescent light ballasts is regulated by the USEPA under 40 CFR 761.

5.5 Other Regulated Materials

Terracon observed potentially hazardous materials, including, but not limited to, paint cans, small gasoline containers, and other commercially available chemicals and household-type cleaning agents throughout the warehouse area and in the restroom area of the office space.

6.0 RECOMMENDATIONS

6.1 Lead-Containing Paint Recommendations

Terracon recommends that the contractor(s) responsible for demolition activities be notified of the presence of lead-containing paint prior to conducting any removal or demolition activities at the site.

6.2 Mercury Recommendations

Terracon recommends that a qualified contractor remove and dispose of mercury-containing devices in accordance with local, state, and federal regulations. The contractor should quantify the specific number of devices removed and written evidence should be provided by the disposal company certifying that the hazardous waste treatment, storage, or disposal facility is approved for mercury disposal by the USEPA and state or local regulatory agencies. Disposal of mercury-containing fluorescent lights tubes as universal waste is regulated under 40 CFR 273. Disposal of mercury from other sources is regulated under 40 CFR 260-262.

6.3 PCB Recommendations

Terracon recommends that a qualified contractor remove and dispose of such devices in accordance with local, state, and federal regulations. The contractor should quantify and segregate the PCB-containing ballasts (if found) and non-PCB-containing ballasts during the removal process. Disposal of PCB-containing fluorescent light ballasts and oils is regulated by the USEPA under 40 CFR 761.

7.0 LIMITATIONS/GENERAL COMMENTS

Terracon did not conduct sampling requiring demolition or destructive activities such as knocking holes in walls, dismantling of equipment or removal of protective coverings. Reasonable efforts to access suspect materials within known areas of restricted access (e.g., crawl spaces) were made; however, additional suspect but unsampled materials could be located in walls, in voids, or in other concealed areas.

The services were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions, and recommendations expressed in this report are based on conditions observed during our survey of the building. The information contained in this report is relevant to the date on which the services were conducted, and should not be relied upon to represent conditions at a later date. This report has been prepared on behalf of and exclusively for use by Riverview for specific application to their project as discussed. This report is not a bidding document. Contractors or consultants reviewing this report must draw their own conclusions regarding further investigation or remediation deemed necessary. Terracon does not warrant the work of regulatory agencies, laboratories, or other third parties supplying information that may have been used in the preparation of this report. No warranty, express or implied is made.

APPENDIX A

TABLES

Table 1 – Asbestos Survey Sample Location Summary

Table 2 – LBP XRF Survey Summary

APPENDIX A
Metal Warehouse Building
119 Mississippi Drive West, Muscatine, Iowa

TABLE 1
ASBESTOS SURVEY SAMPLE LOCATION SUMMARY

HA #	SAMPLE #	MATERIAL DESCRIPTION	LAYER	SAMPLE LOCATIONS	LAB RESULTS
1	1-AW1-1	Fiberglass insulation with brown paper backing and black mastic	Paper	South portion of the southeast interior area of the warehouse	ND[1]
			Mastic		ND
			Insulation		ND
	1-AW1-2		Paper	Center portion of the southeast interior corner wall of the warehouse	ND
			Mastic		ND
			Insulation		ND
	1-AW1-3		Paper	North portion of the southeast interior corner wall of the warehouse	ND
			Mastic		ND
			Insulation		ND
2	2-AW1-4	Fiberglass insulation with silver paper backing	Insulation	Southwest area of the warehouse	ND
	2-AW1-5		Insulation	Center portion of the southeast interior corner wall of the warehouse	ND
	2-AW1-6		Insulation	South-center of the warehouse	ND
3	3-WB2-7	Brown/white unfinished fire-resistant drywall material	Drywall	South-center of the warehouse portion of the building	ND
	3-WB2-8		Drywall	South-center of the warehouse portion of the building	ND
	3-WB2-9		Drywall	South-center of the warehouse portion of the building	ND
4	4-WB1-10	White finished drywall composite	Drywall	North area of the west wall of the warehouse	ND
			Joint compound		ND
	4-WB1-11		Drywall	Center area of the west wall of the warehouse	ND
			Joint compound		ND
	4-WB1-12		Drywall	South area of the west wall of the warehouse	ND
			Joint compound		ND
5	5-MG7-13	Yellow carpet glue	Carpet glue	Southeast corner of the southeast room in the warehouse	ND
	5-MG7-14		Carpet glue	Northeast corner of the southeast room in the warehouse	ND
	5-MG7-15		Carpet glue	West entryway of the west room in the warehouse	ND
6	6-CT4-16	2' X 4' Ceiling tile	Ceiling tile	Northeast area of the office portion of the building	ND
	6-CT4-17		Ceiling tile	Northwest area of the office portion of the building	ND
	6-CT4-18		Ceiling tile	Southwest area of the office portion of the building	ND

[1] ND = none detected

HA #	SAMPLE #	MATERIAL DESCRIPTION	LAYER	SAMPLE LOCATIONS	LAB RESULTS
7	7-FC3-19	Green cove base with yellow mastic	Cove base	Southwest area of the office portion of the building	ND
			Mastic		ND
	7-FC3-20		Cove base	West-center area of the office portion of the building	ND
			Mastic		ND
	7-FC3-21		Cove base	Northwest area of the office portion of the building	ND
			Mastic		ND
8	8-FT2-22	White/blue/purple vinyl floor tile and yellow mastic	Floor tile	Northwest area of the office portion of the building near the back exit	ND
			Mastic		ND
	8-FT2-23		Floor tile	Approximate north-center area of the office portion of the building, in the men's restroom	ND
			Mastic		ND
	8-FT2-24		Floor tile	Approximate north-center area of the office portion of the building, in the women's restroom	ND
			Mastic		ND
9	9-FT2-25	Beige ceramic floor tile with grey grout and yellow mastic	Ceramic tile	South portion of the kitchen in the office portion of the building	ND
			Grout		ND
			Mastic		ND
	9-FT2-26		Ceramic tile	South portion of the kitchen in the office portion of the building	ND
			Grout		ND
			Mastic		ND
	9-FT2-27		Ceramic tile	South portion of the kitchen in the office portion of the building	ND
			Grout		ND
			Mastic		ND
10	10-FC3-28	Tan cove base and yellow mastic	Cove base	South portion of the kitchen in the office portion of the building	ND
			Mastic		ND
	10-FC3-29		Cove base	South portion of the kitchen in the office portion of the building	ND
			Mastic		ND
	10-FC3-30		Cove base	South portion of the kitchen in the office portion of the building	ND
			Mastic		ND

APPENDIX A
TABLE 2
LBP XRF SURVEY SUMMARY

Terracon Project:		**Riverview Suites**			**Project Number:**		**07147066**
Facility Location:		**119 Mississippi Drive West, Muscatine, Iowa**			**Date of Survey:**		**October 13, 2014**
Building:		**Metal Warehouse Building**					
Inspector's Name:		**James R. Baxter**					
Sample Nos.	Substrate	Component	Color	Location	Reading (mg/cm^2)	Friction or Impact Surface (Y or N)	Notes
Pre-Calibration 1	NA	NA	NA	NA	1.0	NA	NA
Pre-Calibration 2	NA	NA	NA	NA	1.0	NA	NA
Pre-Calibration 3	NA	NA	NA	NA	1.0	NA	NA
1	Drywall	Wall	White	West entrance area to office portion of building	-0.1	No	Good overall condition
2	Drywall	Wall	Burnt Orange	Southwest office area	-0.1	No	Good overall condition
3	Drywall	Wall	Yellow/Tan	Second room to the north in the west office area	-0.1	No	Good overall condition
4	Drywall	Wall	White	West hallway of office area	-0.2	No	Good overall condition
5	Drywall	Wall	White	Center office room	0.0	No	Good overall condition
6	Drywall	Wall	Bright green	Far northeast office	-0.1	No	Good overall condition

APPENDIX A

TABLE 2

LBP XRF SURVEY SUMMARY

Terracon Project:		**Riverview Suites**			**Project Number:**		**07147066**
Facility Location:		**119 Mississippi Drive West, Muscatine, Iowa**			**Date of Survey:**		**October 13, 2014**
Building:		**Metal Warehouse Building**					
Inspector's Name:		**James R. Baxter**					
Sample Nos.	Substrate	Component	Color	Location	Reading (mg/cm^2)	Friction or Impact Surface (Y or N)	Notes
7	Drywall	Wall	Purple	Far northeast office	0.1	No	Good overall condition
8	Drywall	Wall	Light Purple	Far southeast office	0.2	No	Good overall condition
9	Drywall	Wall	White	East hallway of office area	0.0	No	Good overall condition
10	Drywall	Wall	White	North-center wall of north-center office	0.1	No	Good overall condition
11	Drywall	Wall	White	South wall in kitchen area	0.1	No	Good overall condition
12	Metal	Exterior Wall	Brown	East -center exterior siding	0.1	No	Good overall condition
13	Metal	Exterior Wall	Brown	North-center exterior siding	0.2	No	Good overall condition
14	Metal	Exterior Wall	Brown	South-center exterior siding	-0.1	No	Good overall condition

APPENDIX A
TABLE 2
LBP XRF SURVEY SUMMARY

Terracon Project:		**Riverview Suites**			**Project Number:**		**07147066**
Facility Location:		**119 Mississippi Drive West, Muscatine, Iowa**			**Date of Survey:**		**October 13, 2014**
Building:		**Metal Warehouse Building**					
Inspector's Name:		**James R. Baxter**					
Sample Nos.	Substrate	Component	Color	Location	Reading (mg/cm^2)	Friction or Impact Surface (Y or N)	Notes
15	Metal	Exterior Wall	Brown	West-center exterior siding	0.1	No	Good overall condition
23	Wood	Door Frame	White	Frame of entryway door on the south side	0.0	Yes	Good overall condition
24	Wood	Door Trim	White	Trim of entryway door on the south side	0.1	No	Good overall condition
25	Wood	Door Frame	White	Frame of entryway door on the north side	-0.1	Yes	Good overall condition
26	Wood	Door Trim	White	Trim of entryway door on the north side	0.0	No	Good overall condition
Post-Calibration 1	NA	NA	NA	NA	1.0	NA	NA
Post-Calibration 2	NA	NA	NA	NA	1.0	NA	NA
Post-Calibration 3	NA	NA	NA	NA	1.0	NA	NA

A *negative* classification indicates that lead is not present on the testing combination at or above the HUD/EPA standard. A negative XRF result is any value less than the lower bound of the inconclusive range, or less than the threshold specified on the XRF's performance characteristic sheet.
mg/cm^2 = milligrams per centimeter squared

APPENDIX B

ASBESTOS LABORATORY ANALYTICAL REPORT

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com cinnasblab@EMSL.com

EMSL Order:	041430163
CustomerID:	TEI93
CustomerPO:	
ProjectID:	

Attn: **James Baxter**
Terracon Consultants, Inc.
870 40th Avenue

BETTENDORF, IA 52722

Phone:	(563) 355-0702
Fax:	(319) 355-4789
Received:	10/13/14 8:40 AM
Analysis Date:	10/18/2014
Collected:	10/8/2014

Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
1-AW1-1-Paper *041430163-0001*	S Portion Of the SE Interior Corner Wall Of The Wa	Brown Fibrous Homogeneous	85% Cellulose	15% Non-fibrous (other)	None Detected
1-AW1-1-Mastic *041430163-0001A*	S Portion Of the SE Interior Corner Wall Of The Wa	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
1-AW1-1-Insulation *041430163-0001B*	S Portion Of the SE Interior Corner Wall Of The Wa	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (other)	None Detected
1-AW1-2-Paper *041430163-0002*	Center Portion Of the SE Interior Corner Wall Of	Brown Fibrous Homogeneous	85% Cellulose	15% Non-fibrous (other)	None Detected
1-AW1-2-Mastic *041430163-0002A*	Center Portion Of the SE Interior Corner Wall Of	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
1-AW1-2-Insulation *041430163-0002B*	Center Portion Of the SE Interior Corner Wall Of	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (other)	None Detected
1-AW1-3-Paper *041430163-0003*	N Portion Of the SE Interior Corner Wall Of Of The	Brown Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
1-AW1-3-Mastic *041430163-0003A*	N Portion Of the SE Interior Corner Wall Of Of The	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Analyst(s)
Michael Garrity (18)
Quynh Vu (36)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

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Initial report from 10/18/2014 14:03:06

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EMSL Order: 041430163
CustomerID: TEI93
CustomerPO:
ProjectID:

Attn: **James Baxter**
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870 40th Avenue

BETTENDORF, IA 52722

Phone: (563) 355-0702
Fax: (319) 355-4789
Received: 10/13/14 8:40 AM
Analysis Date: 10/18/2014
Collected: 10/8/2014

Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
1-AW1-3-Insulation *041430163-0003B*	N Portion Of the SE Interior Corner Wall Of The	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (other)	**None Detected**
2-AW1-4 *041430163-0004*	NE Area Of The Warehouse Portion Of The Bldg	White/Silver/Yellow Fibrous Homogeneous	40% Glass	60% Non-fibrous (other)	**None Detected**
2-AW1-5 *041430163-0005*	SW Area Of The Warehouse Portion Of The Bldg	White/Silver/Yellow Fibrous Homogeneous	45% Glass	55% Non-fibrous (other)	**None Detected**
2-AW1-6 *041430163-0006*	Center Portion Of The SE Interior Corner Wall Of T	White/Silver Fibrous Homogeneous	40% Glass	60% Non-fibrous (other)	**None Detected**
3-WB2-7 *041430163-0007*	S-Center Of The Warehouse Portion Of The Bldg	Brown/White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (other)	**None Detected**
3-WB2-8 *041430163-0008*	S-Center Of The Warehouse Portion Of The Bldg	Brown/White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (other)	**None Detected**
3-WB2-9 *041430163-0009*	S-Center Of The Warehouse Portion Of The Bldg	Brown/White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (other)	**None Detected**

Analyst(s)
Michael Garrity (18)
Quynh Vu (36)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

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Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
4-WB1-10-Drywall *041430163-0010*	N Area Of The W Wall Of The warehouse Portion Of T	Brown/White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (other)	None Detected
4-WB1-10-Joint Compound *041430163-0010A*	N Area Of The W Wall Of The warehouse Portion Of T	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
4-WB1-11-Drywall *041430163-0011*	Center Area Of The West Wall Of The Warehouse Port	Brown/White Fibrous Homogeneous	20% Cellulose 5% Glass	75% Non-fibrous (other)	None Detected
4-WB1-11-Joint Compound *041430163-0011A*	Center Area Of The West Wall Of The Warehouse Port	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
4-WB1-12-Drywall *041430163-0012*	S Area Of The W Wall Of The Warehouse Portion Of B	Brown/White Fibrous Homogeneous	15% Cellulose 5% Glass	80% Non-fibrous (other)	None Detected
4-WB1-12-Joint Compound *041430163-0012A*	S Area Of The W Wall Of The Warehouse Portion Of B	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
5-MG7-13 *041430163-0013*	SE Corner Of The SE Rm In The Warehouse Portion Of	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Recommend TEM

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Quynh Vu (36)

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Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
5-MG7-14 *041430163-0014*	NE Corner Of The SE Rm In The Warehouse Portion Of	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
		Recommend TEM			
5-MG7-15 *041430163-0015*	W Entryway Of The W Room On The S Side In The Ware	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
		Recommend TEM			
6-CT4-16 *041430163-0016*	NE Area Of The office Portion Of The Bldg, SE Corn	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (other)	**None Detected**
6-CT4-17 *041430163-0017*	NW Area Of The Office Portion Of The Bldg	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (other)	**None Detected**
6-CT4-18 *041430163-0018*	SE Area Of The Office Portion Of The Bldg	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (other)	**None Detected**
7-FC3-19-Cove Base *041430163-0019*	SW Area Of The Office Portion Of The Bldg	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
7-FC3-19-Mastic *041430163-0019A*	SW Area Of The Office Portion Of The Bldg	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Michael Garrity (18)
Quynh Vu (36)

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Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
7-FC3-20-Cove Base *041430163-0020*	West-Center Area Of The Office Portion Of The Bldg	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
7-FC3-20-Mastic *041430163-0020A*	West-Center Area Of The Office Portion Of The Bldg	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
7-FC3-21-Cove Base *041430163-0021*	NW Area Of The Office Portion Of The Bldg, End Of	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
7-FC3-21-Mastic *041430163-0021A*	NW Area Of The Office Portion Of The Bldg, End Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
8-FT2-22-Floor Tile *041430163-0022*	NW Area Of The Office Portion Of The Bldg, Near	White/Blue/Purple Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
8-FT2-22-Mastic *041430163-0022A*	NW Area Of The Office Portion Of The Bldg, Near	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
8-FT2-23-Floor Tile *041430163-0023*	Approx N-Center Area Of Office portion Of The Bldg	White/Blue/Purple Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
8-FT2-23-Mastic *041430163-0023A*	Approx N-Center Area Of Office portion Of The Bldg	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Project: **07147066 / Riverview Suites - Metal Building**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
8-FT2-24-Floor Tile *041430163-0024*	Approx N-Center Area Of Office portion Of The Bldg	White/Blue Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
8-FT2-24-Mastic *041430163-0024A*	Approx N-Center Area Of Office portion Of The Bldg	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-25-Ceramic Tile *041430163-0025*	S Portion Of The Kitchen In The Office Portion Of	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-25-Grout *041430163-0025A*	S Portion Of The Kitchen In The Office Portion Of	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-25-Mastic *041430163-0025B*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-26-Ceramic Tile *041430163-0026*	S Portion Of The Kitchen In The Office Portion Of	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-26-Grout *041430163-0026A*	S Portion Of The Kitchen In The Office Portion Of	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-26-Mastic *041430163-0026B*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
9-FT2-27-Ceramic Tile *041430163-0027*	S Portion Of The Kitchen In The Office Portion Of	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-27-Grout *041430163-0027A*	S Portion Of The Kitchen In The Office Portion Of	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
9-FT2-27-Mastic *041430163-0027B*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
10-FC3-28-Cove Base *041430163-0028*	S Portion Of The Kitchen In The Office Portion Of	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
10-FC3-28-Mastic *041430163-0028A*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
10-FC3-29-Cove Base *041430163-0029*	S Portion Of The Kitchen In The Office Portion Of	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
10-FC3-29-Mastic *041430163-0029A*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
10-FC3-30-Cove Base *041430163-0030*	S Portion Of The Kitchen In The Office Portion Of	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
10-FC3-30-Mastic *041430163-0030A*	S Portion Of The Kitchen In The Office Portion Of	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

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Test Report PLM-7.28.9 Printed: 10/18/2014 2:03:06 PM

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OrderID: 041430163

Asbestos Chain of Custody

EMSL Order Number (Lab Use Only): 041430163

EMSL ANALYTICAL, INC
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE. (800) 220-3675
FAX:

EMSL ANALYTICAL, INC.

Company : Terracon	**EMSL Account #: TEI93**	**EMSL-Bill to:** ☒ Same ☐ Different If Bill to is Different note instructions in Comments**	
Street: 870 40th Avenue		*Third Party Billing requires written authorization from third party*	
City: Bettendorf	**State/Province: Iowa**	**Zip/Postal Code: 52722**	**Country: USA**
Report To (Name): James Baxter		**Fax #: 563.355.4789**	
Telephone #: 563.468.4271		**Email Address: jrbaxter@terracon.com**	
Project Name/Number: 07147066 / Riverview Suites - Metal Building			
Please Provide Results: ☐ Fax ☒ Email	**Purchase Order:**	**U.S. State Samples Taken: Iowa**	

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hours ☐ 6 Hours ☐ 24 Hrs ☐ 48 Hrs ☐ 3 Days ☐ 4 Days ☒ 5 Days ☐ 10 Days

**For TEM Air 3 hours/6 hours, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
- ☒ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)

Point Count
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

Point Count w/Gravimetric
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NYS 198.1 (friable in NY)
- ☐ NYS 198.6 NOB (non-friable-NY)
- ☐ NIOSH 9002 (<1%)

TEM - Air
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☐ ISO 10312

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (non-friable-NY)
- ☐ Chatfield SOP
- ☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
- Fibers >10µm ☐ Waste ☐ Drinking
- All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
- ☐ PLM CARB 435 - A (0.25% sensitivity)
- ☐ PLM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - C (0.01% sensitivity)
- ☐ EPA Protocol (Semi-Quantitative)
- ☐ EPA Protocol (Quantitative)

Other:
- ☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group**

Samplers Name: James Baxter | **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
	Please refer to attached sample collection sheets		10/09/2014

RECEIVED
OCT 13 AM 10:00
EMSL
CINNAMINSON, NJ

Client Sample # (s): 1 - 30 **Total # of Samples:** 30

Relinquished (Client): **Date:** 10/10/2014 **Time:** 1800

Received (Lab): RD EMSL FX **Date:** 10-13-2014 **Time:** 8:40 AM

Comments/Special Instructions:

OrderID: 041430163

Terracon PN: 07147066

Asbestos Sample Location Log

Client Name: Riverview Development, LLC
Building Name: Metal Building/Shop
Inspector: James R. Baxter

041430163

Sample No: (HA, BS Code, Sample No.)	Written location where bulk sample is collected.	Collection Date
1 - AW1 - 1	South portion of the southeast interior corner wall of the warehouse portion of the building	10/08/2014
1 - AW1 - 2	Center portion of the southeast interior corner wall of the warehouse portion of the building	10/08/2014
1 - AW1 - 3	North portion of the southeast interior corner wall of the warehouse portion of the building	10/08/2014
2 - AW1 - 4	Northeast area of the warehouse portion of the building	10/08/2014
2 - AW1 - 5	Southwest area of the warehouse portion of the building	10/08/2014
2 - AW1 - 6	Center portion of the southeast interior corner wall of the warehouse portion of the building	10/08/2014
3 - WB2 - 7	South-center of the warehouse portion of the building (panel on floor)	10/08/2014
3 - WB2 - 8	South-center of the warehouse portion of the building (panel on floor)	10/08/2014
3 - WB2 - 9	South-center of the warehouse portion of the building (panel on floor)	10/08/2014
4 - WB1 - 10	North area of the west wall of the warehouse portion of the building	10/08/2014
4 - WB1 - 11	Center area of the west wall of the warehouse portion of the building	10/08/2014
4 - WB1 - 12	South area of the west wall of the warehouse portion of the building	10/08/2014
5 - MG7 - 13	Southeast corner of the southeast room in the warehouse portion of the building	10/08/2014
5 - MG7 - 14	Northeast corner of the southeast room in the warehouse portion of the building	10/08/2014
5 - MG7 - 15	Entryway of the west room on the south side in the warehouse portion of the building	10/08/2014
6 - CT4 - 16	Northeast area of the office portion of the building, southeast corner of room north of kitchen	10/08/2014
6 - CT4 - 17	Northwest area of the office portion of the building	10/08/2014
6 - CT4 - 18	Southeast area of the office portion of the building	10/08/2014
7 - FC3 - 19	Southwest area of the office portion of the building	10/08/2014
7 - FC3 - 20	West-center area of the office portion of the building, in the hallway	10/08/2014
7 - FC3 - 21	Northwest are of the office portion of the building, end of the hallway	10/08/2014

APPENDIX C

LICENSES AND CERTIFICATIONS

ASBESTOS LICENSE NO.: 14-3443I

EXPIRATION DATE: 1/22/2015

NAME: JAMES BAXTER JR
ADDRESS: 870 40TH AVE
CITY STATE ZIP: BETTENDORF IA 52722

Signature of Applicant

ISSUED
Division of Labor
WORKFORCE

Exhibit C.3: Limited Site Investigation Report

Limited Site Investigation Report

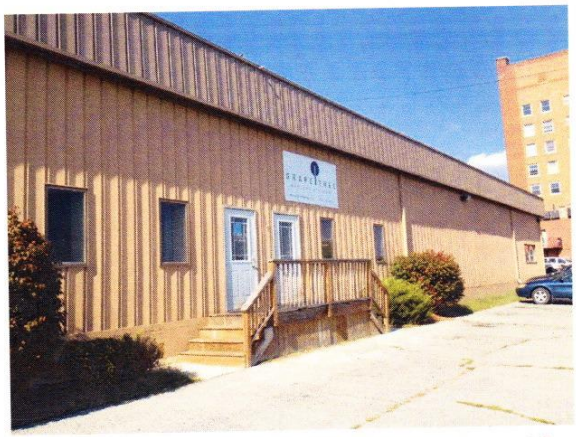
Proposed Muscatine Riverview Suites

119 Mississippi Drive West and 104, 112, 118, and 129 2nd Street West

Muscatine, Muscatine County, Iowa

November 13, 2014

Terracon Project No. 07147065



Prepared for:

Riverview Hotel Development

Cumming, Georgia

Prepared by:

Terracon Consultants, Inc.

Bettendorf, Iowa

terracon.com

Terracon

Environmental ■ Facilities ■ Geotechnical ■ Materials

Terracon

November 13, 2014

Riverview Hotel Development
6635 Chelsea Garden Way
Cummings, Georgia 30040

Attn: Ms. Rebecca Howe
P: (770) 630-8414
E: rhowe@riverviewhoteldev.com

Re: Limited Site Investigation
Proposed Muscatine Riverview Suites
119 Mississippi Drive West and 104, 112, 118, and 129 2nd Street West
Muscatine, Muscatine County, Iowa
Terracon Project No. 07147065

Dear Ms. Howe:

Terracon Consultants, Inc. (Terracon) is pleased to submit our report for the Limited Site Investigation (LSI) activities completed at the site referenced above. This assessment was performed in accordance with Terracon Proposal No. P07140094 dated September 15, 2014. The report presents data from recent field activities that included the completion of soil borings and the collection of soil and groundwater samples for chemical analysis.

We appreciate the opportunity to be of service to you on this project. For more detailed information on all of Terracon's services please visit our website at www.terracon.com. If there are any questions regarding this report or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
Terracon Consultants, Inc.

Krista A. Brodersen
Senior Project Manager

Kathleen E. Igl for
Kirk R. Johnson, PG, CGP
Environmental Project Manager

Terracon Consultants Inc. 870 40th Ave. Bettendorf, IA 52722
P (563) 355 0702 F (563) 355 4789 terracon.com

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APPENDICES

Appendix A - Exhibits
Exhibit 1 – Topographic Vicinity Map
Exhibit 2 – Boring Location Plan

Appendix B - Soil Boring Logs
General Notes
Unified Soil Classification System
Boring Logs for B-5, B-7, B-8, B-9, B-10, and B-11

Appendix C - Analytical Reports and Chain of Custody

Terracon

LIMITED SITE INVESTIGATION
PROPOSED MUSCATINE RIVERVIEW SUITES
119 MISSISSIPPI DRIVE WEST AND 104, 112, 118, AND 129 2ND STREET WEST
MUSCATINE, MUSCATINE COUNTY, IOWA

Project No. 07147065
November 13, 2014

1.0 INTRODUCTION

Terracon has completed Limited Site Investigation (LSI) activities at the proposed Muscatine Riverview Suites property as described in our proposal dated September 15, 2014.

Site Name	Proposed Muscatine Riverview Suites
Site Location/Address	119 Mississippi Drive West and 104, 112, 118, and 129 2nd Street West, Muscatine, Muscatine County, Iowa
General Site Description	The site is developed with an approximately 9,000 square foot commercial building located at 119 Mississippi Drive; an approximately 10,000 square foot commercial building located at 129 2nd Street West; and a parking lot addressed as 104, 112, and 118 2nd Street West.

The LSI was conducted in conjunction with a geotechnical investigation at the site. A Geotechnical Engineering Report dated October 16, 2014 has been provided under separate cover (Terracon Project No. 07145073). The designer of any project on this site should be aware of the contents of the Geotechnical Engineering Report. A Topographic Vicinity Map is included as Exhibit 1 in Appendix A. A Boring Location Diagram is included as Exhibit 2 in Appendix A.

2.0 SCOPE OF SERVICES

As indicated in the proposal, Terracon's LSI was conducted in conjunction with the geotechnical exploration and was based on our brief review of the available Iowa Department of Natural Resources (IDNR) records in preparation of the proposal. The review indicated the site had at least one Recognized Environmental Condition (REC), which is a leaking underground storage tank (LUST) site (leak number 8LTK81). The LUST site has the address 101 Chestnut Street and appears to be located in the southwest portion of the hotel site currently addressed 119 Mississippi Drive West.

Information regarding additional RECs was not obtained from IDNR, other regulatory agencies, and site reconnaissance until after the geotechnical field work was complete. Additional RECs were identified in the Phase I ESA October 28, 2014 (Terracon Project # 07147732) for the site and included the following:

- The former use of the site as a gasoline station, auto repair, auto sales, tin shop, and a machine shop;
- The staining observed in the elevator pit of the 129 West 2nd Street building; and,
- The lack of documentation related to the removal of the former in-ground hydraulic lift in the 119 Mississippi Drive West building.

Based on the RECs identified after the geotechnical field work was complete, it became apparent that the initial laboratory analyses may be insufficient to fully evaluate potential impacts. In consultation with the client, a second mobilization was made to the site and two additional soil borings were advanced.

The objective of the LSI was to explore for the presence or absence (above regulatory levels) of indicator contaminants associated with the LUST facility at the site and identified RECs in soil and groundwater at the exploratory boring locations.

3.0 FIELD SERVICES

3.1 Soil Borings and Temporary Monitor Wells

Terracon performed field activities on September 26 and 29, 2014 and October 30, 2014, under Level D safety precautions consisting of a washable work uniform including safety shoes, hardhat, rubber gloves, and appropriate eye protection. Drilling and sample collection equipment was cleaned before beginning the project and before beginning each borehole. Terracon cleaned non-expendable sampling supplies at the beginning of the project and between each soil sample by hand scrubbing in an Alconox™ and potable water solution followed by rinsing in potable water.

Terracon mobilized a track-mounted Central Mine Equipment (CME) 550 hollow-stem auger rig to advance nine boreholes at the site for the collection of geotechnical soil samples. Soil and groundwater samples were collected for laboratory analysis from geotechnical borings B-5, B-7, B-8 and B-9. B-5 was located at the southeast corner of the 104 2nd Street West address. B-7 was located south of the metal building at 119 West Mississippi Drive. B-8 was located in the southwest corner of the 119 West Mississippi Drive address. B-9 was located in the southeast corner of the 119 West Mississippi Drive address. One soil sample was collected from each boring, except for B-7, for laboratory analysis. Two soil samples were collected in boring B-7 as groundwater was not encountered.

On October 30, 2014, Terracon mobilized a track-mounted CME 550 hollow-stem auger rig to advance two additional boreholes at the site. Soil and groundwater samples were collected for laboratory analysis from borings B-10 and B-11. B-10 was located approximately five feet north of B-9. B-11 was located approximately five feet north of B-8.

Upon completion of sampling, the borings were backfilled to ground surface with soil cuttings. Excess soil cuttings and groundwater generated during the field activities were left on-site.

3.2 Soil and Groundwater Sampling

At each borehole location, Terracon field screened soil samples for organic vapors using a photoionization detector (PID) while drilling. This device provides a direct reading in parts per million (ppm) isobutylene equivalents. Upon removal of the sampler from the borehole, Terracon put a portion of each sample in a sealed bag. After a stabilization period, Terracon screened the headspace above the soil using the PID equipped with a 10.6 electron-volt ultraviolet lamp source. Terracon calibrated the PID in accordance with the manufacturer's recommendations before the field activities. The boring logs in Appendix B include the field screening results for each soil boring. Elevated PID responses were observed in borings B8, B9, and B11.

Terracon collected soil samples continuously throughout the drilled borings using 2-foot long split barrel samplers to approximately 7 to 8 feet when till was encountered. Terracon logged the recovered soil based on visual classification and apparent textural properties of the recovered samples. The boring logs in Appendix B describe the soil types observed. Soil samples were collected for laboratory analysis from soil borings B-5 at 5-6 feet below ground surface (bgs), B-7 at 4-5 bgs and 19-20, B-8 at 5-6 feet bgs, B-9 at 3-4 feet bgs, B-10 at 3-4 feet bgs, and B-11 at 1-2 feet bgs.

Groundwater was encountered in borings B-5, B-8, B-9, B-10, and B-11 from between approximately 11 and 29 feet bgs. Once groundwater was encountered, the borings were drilled approximately five additional feet. A disposable bailer was inserted into the augers to collect the water samples. The groundwater was placed into laboratory-provided containers. Groundwater samples collected from borings B-5, B-8, B-9, B-10, and B-11 were designated B5-W, B8-W, B9-W, B10-W, and B11-W, respectively. The groundwater samples to be analyzed for Resource Conservation and Recovery Act (RCRA) metals were filtered through a 0.45-micron filter prior to preservation.

After packaging the soil and groundwater samples in laboratory-provided containers, Terracon recorded the sample time on the container labels in permanent ink and placed the containers on ice in a cooler for transport to TestAmerica, Inc. in Cedar Falls, Iowa, an Iowa and National Environmental Laboratory Accreditation Program (NELAP)-accredited laboratory.

The soil and groundwater samples collected from borings B-5 and B-7 through B-9 were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by Iowa Method OA-1, total extractable hydrocarbons (TEH) by Iowa Method OA-2, and RCRA Metals by United States Environmental Protection Agency (USEPA) Method 6010/7471. The soil and groundwater

samples collected from borings B-10 and B-11 were analyzed for volatile organic compounds (VOCs) by USEPA Method 8260.

4.0 DATA EVALUATION

The laboratory analytical report and chain of custody are attached in Appendix D. The following sections describe the results of the testing.

4.1 Soil Samples

Table 1 below lists the reported concentrations of TEH constituents, RCRA metals, and VOCs in soil samples above the laboratory's reporting limits. For comparative purposes, the Iowa Statewide Standards (SWS)[1] are included on Table 1.

Table 1: Laboratory Analytical Results for Soil (mg/kg)

Parameter	B-5 (5'-6')	B-7 (4'-5')	B-7 (19'-20')	B-8 (5'-6')	B-9 (3' – 4')	B-11 (1'-2')	SWS
VOCs							
n-Butylbenzene	na	na	na	na	na	0.0148	3,800
Ethylbenzene	na	na	na	na	na	0.0226	7,600
N-Propylbenzene	na	na	na	na	na	0.0391	7,600
TEH Constituents							
Diesel	<9.83	<9.70	15.2	<9.64	<9.67	na	28,000
Waste Oil	<9.83	<9.70	<14.1	<9.64	25.5	na	9,400
Total Extractable Hydrocarbons	<9.83	23.8	25.5	<9.64	25.3	na	---
RCRA Metals							
Barium	24.3	95.9	80.8	111	64.8	na	15,000
Chromium	12.0	13.3	16.7	11.6	9.10	na	97,000
Lead	<4.99	58.1	8.03	305	269	na	400
Mercury	<0.0237	0.390	<0.0206	0.489	0.348	na	23

mg/kg = milligrams of contaminant per kilogram of soil
na = not analyzed

VOCs were reported for the soil sample from B-11 at concentrations below their respective SWS.

TEH analyses are reported as gasoline, diesel, waste oil and total extractable hydrocarbons. TEH diesel and waste oil were reported in soil samples B-7 and B-9, respectively at concentrations below the SWS. Results reported as total extractable hydrocarbons include organic compounds that are not identified and not subject to assignment of risks.

[1] Iowa Administrative Code 567, Chapter 137.5

The metals barium, chromium, lead and mercury were reported in the soil samples at concentrations below their respective SWS. These metals occur naturally in soil, and the reported concentrations of barium and chromium are within published background concentrations for soils in the area.[2] The lead and mercury concentrations reported for the shallow soil sample collected from boring B-7 and the soil samples from B-8 and B-9 were above published background concentrations.

4.2 Groundwater Samples

VOCs were not reported for the groundwater samples. Table 2 below lists the reported concentrations of TEH constituents and RCRA metals in groundwater samples above the laboratory's reporting limits. For comparative purposes, the SWS are included on Table 2.

Table 2: Laboratory Analytical Results for Groundwater (mg/L)

Parameter	B5-W	B8-W	B9-W	SWS for Protected Groundwater
TEH Constituents				
Total Extractable Hydrocarbons	0.58	<0.463	0.513	---
Dissolved Metals				
Arsenic	**0.0302**	**0.0346**	**0.0205**	0.01
Barium	0.92	1.27	0.772	2

mg/L = milligrams of contaminant per liter of groundwater
BOLD = detection above the SWS

Results reported as total extractable hydrocarbons include organic compounds that are not identified and not subject to assignment of risks.

Arsenic was reported for the groundwater samples at concentrations above the SWS, and barium was reported for the groundwater samples at concentrations below the SWS.

5.0 CONCLUSIONS

Soil and groundwater samples were collected for laboratory analysis from four of the nine soil borings drilled for the geotechnical exploration and two additional borings drilled at a later date. Soil samples were screened for volatile organic vapors using a PID, and elevated PID responses were observed in borings B-8, B-9, and B-11.

Diesel, waste oil, VOCs, and the metals barium, chromium, lead and mercury were reported in the soil samples at concentrations below their respective SWS. Lead and mercury were

[2] The Iowa State-Wide Trace Element Soil Sampling Project, RD Rowden, June 2010

reported for some of the soil samples at concentrations above published background concentrations for the area.

VOCs were not reported for the groundwater samples.

Total extractable hydrocarbons were reported for two of the groundwater samples. Results reported as total extractable hydrocarbons include organic compounds that are not identified and not subject to assignment of risks.

Arsenic was reported for the groundwater samples at concentrations above the SWS, and barium was reported for the groundwater samples at concentrations below the SWS.

An LSI was conducted to evaluate whether past onsite and offsite operations may have impacted soil or groundwater at the site. Results of laboratory chemical analysis of soil and groundwater samples confirm the presence of some of the constituents analyzed. Arsenic impacts have been identified in groundwater at the site at concentrations above the SWS. The source of the arsenic impact is unknown and it is uncertain whether the impacts may be related to the former operations.

Given the planned redevelopment of the site, proper procedures should be followed with respect to worker health and safety during any excavation activities and dewatering. The findings of this report should be incorporated into a construction health and safety plan and reviewed with construction workers. If potentially impacted soils are encountered during any excavations, these materials should be segregated, stockpiled, and placed on and covered with plastic sheeting pending arrangements for proper disposal. If dewatering is required to support construction, groundwater should be monitored for concentrations of organics and metals to ensure that local, state, and federal discharge criteria are met.

6.0 GENERAL COMMENTS

Terracon has performed these LSI activities in general accordance with the scope and limitations of the Agreement for Services between Terracon and the client. The analysis presented in this report is based upon data obtained from field activities and from other information discussed in this report. The findings summarized above have documented the presence of chemicals of concern in soil and groundwater at the property at the locations tested. The client should understand the limitations of this data in formulating conclusions regarding the environmental risks associated with this property. Fate and transport of chemicals in the subsurface can vary significantly across a given site. Additional testing would be required to define the lateral and vertical extent of the chemicals of concern in the subsurface.

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either express or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of other consultants, laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report.

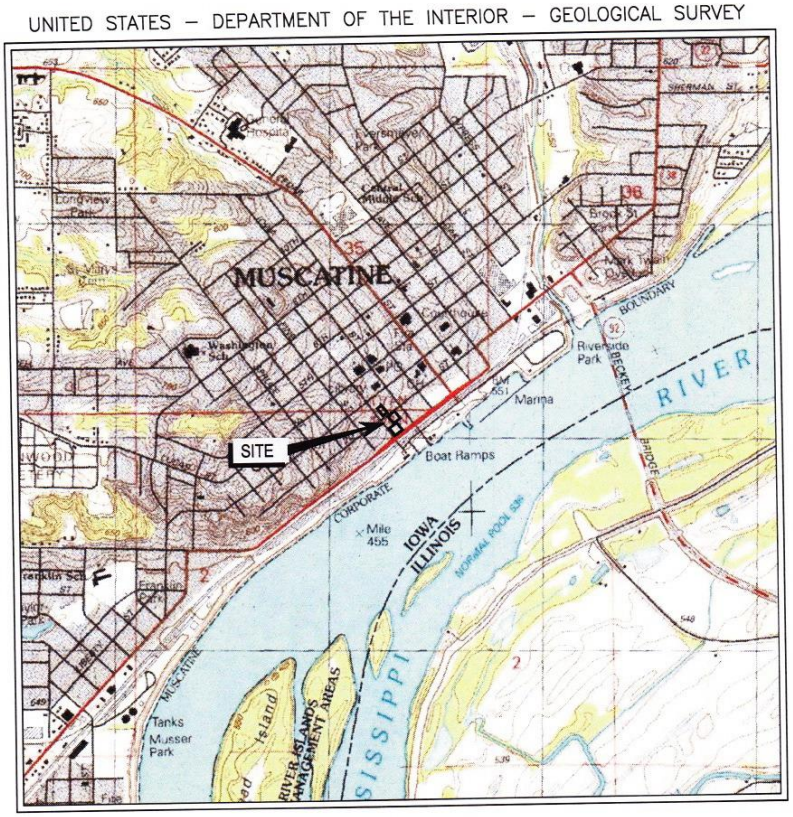
Findings, conclusions, and recommendations resulting from these services are based upon information derived from the onsite activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this rec's. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

Terracon

APPENDIX A

EXHIBIT 1 – TOPOGRAPHIC VICINITY MAP
EXHIBIT 2 – BORING LOCATION DIAGRAM

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



SCALE 1:24 000

1 .5 0 KILOMETERS 1 2

1000 0 METERS 1000 2000

1 .5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000

FEET

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE
MUSCATINE, IA–ILL
1991
7.5 MINUTE SERIES (TOPOGRAPHIC)

N

*INDICATES WHICH MAP SITE IS LOCATED ON

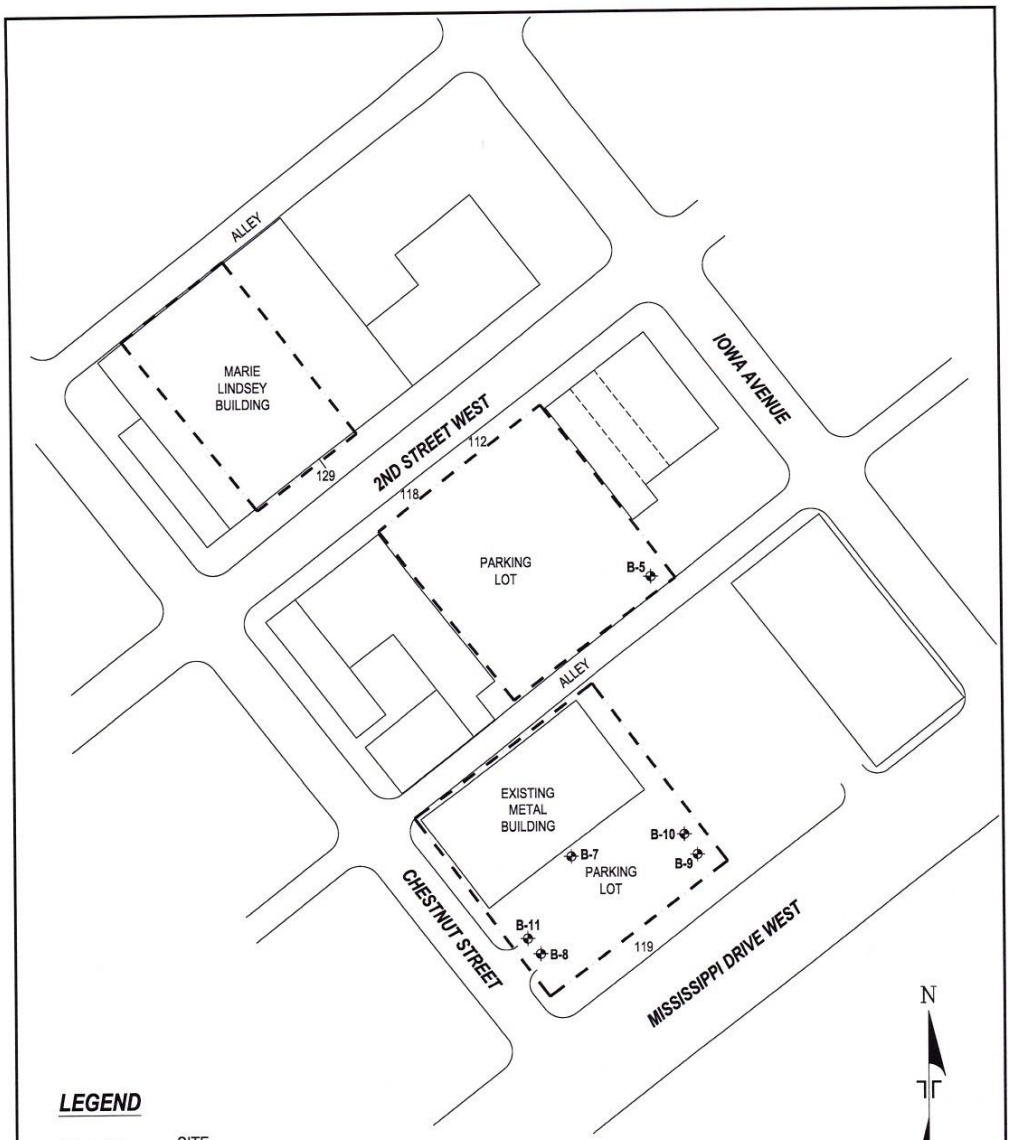
Project Mngr:	KAB
Drawn By:	RLW
Checked By:	MRF/KAB
Approved By:	JRB

Project No.	07147065
Scale:	AS SHOWN
File No.	LSI07147065-1
Date:	NOVEMBER 2014

Terracon
Consulting Engineers and Scientists
870 40th Avenue Bettendorf, Iowa 52722
(563) 355-0702 (563) 355-4789

TOPOGRAPHIC VICINITY MAP
LIMITED SITE INVESTIGATION
PROPOSED RIVERVIEW SUITES
119 MISSISSIPPI DRIVE WEST & 104, 112, 118, & 129 2ND STREET WEST
MUSCATINE, IOWA

EXHIBIT
1



Project Mngr: KAB	Project No. 07147065	Terracon Consulting Engineers and Scientists	BORING LOCATION DIAGRAM
Drawn By: RLW	Scale: AS SHOWN	870 40th Avenue Bettendorf, Iowa 52722	LIMITED SITE INVESTIGATION
Checked By: MRF/KAB	File No. LSI07147065-2	(563) 355-0702 (563) 355-4789	PROPOSED RIVERVIEW SUITES
Approved By: JRB	Date: NOVEMBER 2014		119 MISSISSIPPI DRIVE WEST & 104, 112, 118, & 129 2ND STREET WEST
			MUSCATINE, IOWA

EXHIBIT 2

Terracon

APPENDIX B

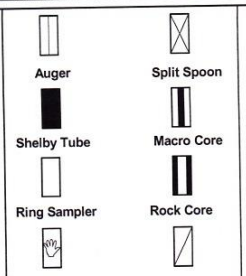
SOIL BORING LOGS

Responsive ▪ Resourceful ▪ Reliable

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

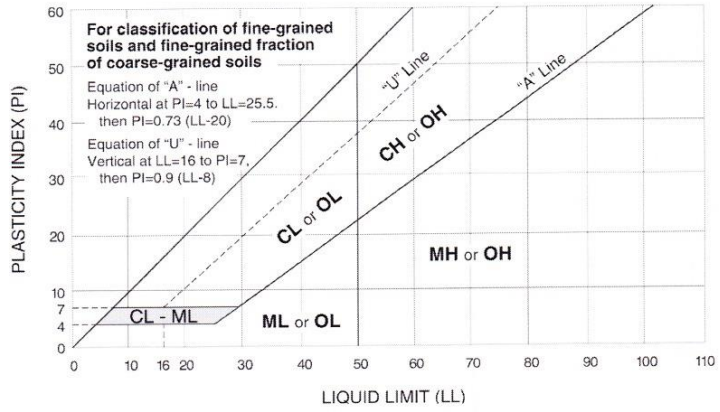
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Terracon

BORING LOG NO. B-5

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 562 (Ft.)

DEPTH	ELEVATION (Ft.)		OVA/PID (ppm)
0.1	562	**ASPHALTIC CEMENT CONCRETE**, approx. 2"	NA
		SANDY FAT CLAY (CH), gray, stiff	0
			0
3.5	558.5		0
		FINE TO MEDIUM SAND WITH CLAY (SP), gray, medium dense	0
			0
		loose	0
			0
8.0	554		0
		SANDY LEAN CLAY (CL), gray, stiff	
29.5	532.5		
		FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP), gray, medium dense	

DEPTH (Ft.): 5, 10, 15, 20, 25, 30

WATER LEVEL OBSERVATIONS: ▽ 29.5' while drilling

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:
Boring terminated on apparent bedrock.
PID readings were not collected beyond 8 feet.

WATER LEVEL OBSERVATIONS

▽ *29.5' while drilling*

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07147065 | Exhibit: B-1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14

BORING LOG NO. B-5

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

GRAPHIC LOG | LOCATION Exhibit B | DEPTH (FT.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | OVA/PID (ppm)

Surface Elev.: 562 (Ft.)

DEPTH | ELEVATION (Ft.)

FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP), gray, medium dense *(continued)*

35

38.0 | 524

SANDY FAT CLAY (CH), gray, very stiff

40

43.0 | 519

FINE TO MEDIUM SAND WITH CLAY AND GRAVEL (SP), gray, medium dense

45

47.5 | 514.5

Auger Refusal at 47.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:

WATER LEVEL OBSERVATIONS

▽ *29.5' while drilling*

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014 | Boring Completed: 9/26/2014

Drill Rig: 35E | Driller: RP

Project No.: 07147065 | Exhibit: B-1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14

BORING LOG NO. B-7

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 560 (Ft.)

DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	OVA/PID (ppm)
0.1	**ASPHALTIC CEMENT CONCRETE**, approx. 2"	560				NA
	FILL- SAND AND CRUSHED LIMESTONE, gray					0
						1
						2
						3
5.0		555	5			1
	SANDY FAT CLAY (CH), gray, stiff					1
						2
						2
						1
			10			1
						1
						1
						0
						0
			15			0
						0
						0
						0
20.0		540				0
	Boring Terminated at 20 Feet		20			1

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:

WATER LEVEL OBSERVATIONS

None while drilling

None at completion of drilling

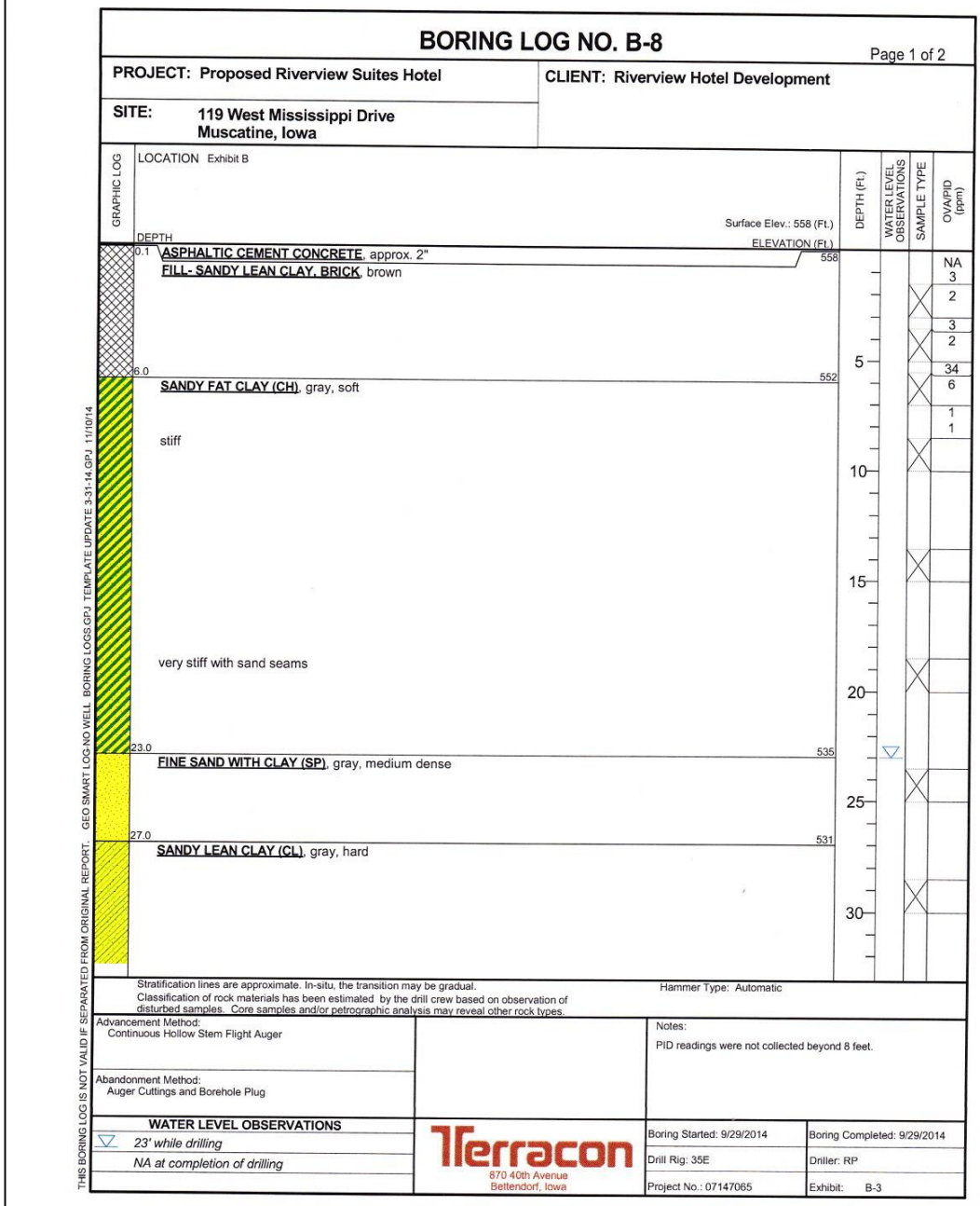
Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014 | Boring Completed: 9/29/2014

Drill Rig: 35E | Driller: RP

Project No.: 07147065 | Exhibit: B-2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14



BORING LOG NO. B-8

Page 1 of 2

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 558 (Ft.)

DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	OVA/PID (ppm)
0.1	558	**ASPHALTIC CEMENT CONCRETE**, approx. 2"				NA
		FILL- SANDY LEAN CLAY, BRICK, brown				3
						2
						3
						2
6.0	552	**SANDY FAT CLAY (CH)**, gray, soft	5			34
						6
		stiff				1
						1
			10			
			15			
		very stiff with sand seams				
			20	▽		
23.0	535	**FINE SAND WITH CLAY (SP)**, gray, medium dense				
			25			
27.0	531	**SANDY LEAN CLAY (CL)**, gray, hard				
			30			

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:
PID readings were not collected beyond 8 feet.

WATER LEVEL OBSERVATIONS

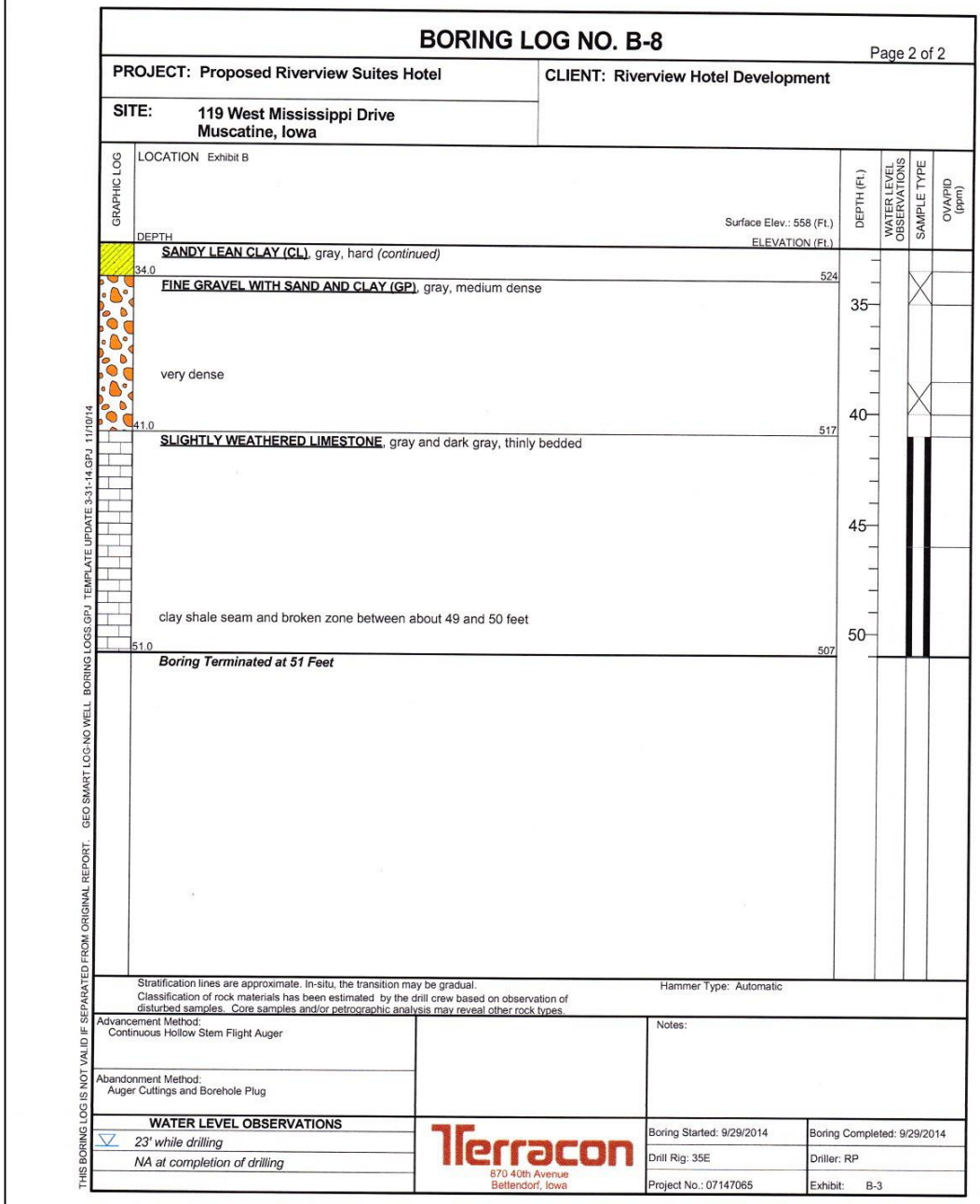
▽ *23' while drilling*

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014	Boring Completed: 9/29/2014
Drill Rig: 35E	Driller: RP
Project No.: 07147065	Exhibit: B-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14



BORING LOG NO. B-8

Page 2 of 2

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 558 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	OVA/PID (ppm)
		SANDY LEAN CLAY (CL), gray, hard *(continued)*				
	34.0	524				
		FINE GRAVEL WITH SAND AND CLAY (GP), gray, medium dense	35			
		very dense				
	41.0	517	40			
		SLIGHTLY WEATHERED LIMESTONE, gray and dark gray, thinly bedded				
			45			
		clay shale seam and broken zone between about 49 and 50 feet				
	51.0	507	50			
		Boring Terminated at 51 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.
Classification of rock materials has been estimated by the drill crew based on observation of disturbed samples. Core samples and/or petrographic analysis may reveal other rock types.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:

WATER LEVEL OBSERVATIONS

▽ *23' while drilling*

NA at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/29/2014	Boring Completed: 9/29/2014
Drill Rig: 35E	Driller: RP
Project No.: 07147065	Exhibit: B-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14

BORING LOG NO. B-9

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 557 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	OVA/PID (ppm)
	0.7	556.5	**PORTLAND CEMENT CONCRETE**, approx 8"				NA
			FILL- SAND, GRAVEL, CRUSHED LIMESTONE, brown				2
							1
							21
				5			42
							6
	7.0	550					5
			SANDY FAT CLAY (CH), gray, stiff				3
							2
				10			
				15			
				20			
	23.0	534					
			FINE TO COARSE SAND WITH GRAVEL (SP), brown, loose		▽		
				25			
	28.0	529					
			SANDY FAT CLAY (CH), gray, stiff				
				30			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:
Boring terminated on apparent bedrock.
PID readings were not collected beyond 8 feet.

WATER LEVEL OBSERVATIONS

▽ *24' while drilling*

None at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014	Boring Completed: 9/26/2014
Drill Rig: 35E	Driller: RP
Project No.: 07147065	Exhibit: B-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14

BORING LOG NO. B-9

PROJECT: Proposed Riverview Suites Hotel

CLIENT: Riverview Hotel Development

SITE: 119 West Mississippi Drive
Muscatine, Iowa

LOCATION Exhibit B

Surface Elev.: 557 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	OVA/PID (ppm)
		SANDY FAT CLAY (CH), gray, stiff *(continued)*				
		very stiff	35			
	38.0	519				
		FINE TO COARSE SAND (SP), trace gravel, gray, medium dense	40			
	42.5	514.5				
		Auger Refusal at 42.5 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Hollow Stem Flight Auger

Abandonment Method:
Auger Cuttings and Borehole Plug

Notes:

WATER LEVEL OBSERVATIONS

▽ *24' while drilling*

None at completion of drilling

Terracon
870 40th Avenue
Bettendorf, Iowa

Boring Started: 9/26/2014	Boring Completed: 9/26/2014
Drill Rig: 35E	Driller: RP
Project No.: 07147065	Exhibit: B-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BORING LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 11/10/14

Terracon

APPENDIX C

ANALYTICAL REPORTS AND CHAIN OF CUSTODY

Responsive ■ Resourceful ■ Reliable

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Cedar Falls
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319)277-2401

TestAmerica Job ID: 310-40138-1
TestAmerica Sample Delivery Group: 07147065
Client Project/Site: Muscatine Riverview Suites LSI

For:
Terracon Consulting Eng & Scientists
870 40th Avenue
Bettendorf, Iowa 52722

Attn: Carla Duncan

Authorized for release by:
10/7/2014 4:40:56 PM

Shawn Hayes, Project Manager II
(319)277-2401
shawn.hayes@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Job ID: 310-40138-1

Laboratory: TestAmerica Cedar Falls

Narrative

Job Narrative
310-40138-1

Comments
No additional comments.

Receipt
The samples were received on 9/30/2014 9:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

GC VOA
Method(s) OA-1 (GC): The following sample(s) were collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, the pH was outside the required criteria when verified by the laboratory, and corrective action was not possible: B5-W (310-40138-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) OA-2: The method blank for preparation batch 62878 contained Total Extractable Hydrocarbons above the reporting limit (RL).

Method(s) OA-2: The continuing calibration verification (CCV) associated with batch 63424 recovered above the upper control limit for Diesel. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method(s) 6010C: The following samples were diluted due to the presence of an interferent. B-9 3-4 (310-40138-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-40138-1	B-5 5-6	Soil	09/26/14 10:50	09/30/14 09:05
310-40138-2	B5-W	Ground Water	09/26/14 11:37	09/30/14 09:05
310-40138-3	B-9 3-4	Soil	09/26/14 13:45	09/30/14 09:05
310-40138-4	B9-W	Ground Water	09/26/14 14:33	09/30/14 09:05

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B-5 5-6
Date Collected: 09/26/14 10:50
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-1
Matrix: Soil

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0953		0.0953		mg/Kg		09/30/14 14:46	09/30/14 17:32	1
Toluene	<0.0953		0.0953		mg/Kg		09/30/14 14:46	09/30/14 17:32	1
Ethylbenzene	<0.0953		0.0953		mg/Kg		09/30/14 14:46	09/30/14 17:32	1
Xylenes, Total	<0.286		0.286		mg/Kg		09/30/14 14:46	09/30/14 17:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*60 - 145*	*09/30/14 14:46*	*09/30/14 17:32*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<9.83		9.83		mg/Kg		10/02/14 00:00	10/05/14 10:05	1
Gasoline	<9.83		9.83		mg/Kg		10/02/14 00:00	10/05/14 10:05	1
Waste Oil	<9.83		9.83		mg/Kg		10/02/14 00:00	10/05/14 10:05	1
Total Extractable Hydrocarbons	<9.83		9.83		mg/Kg		10/02/14 00:00	10/05/14 10:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*121*		*60 - 150*	*10/02/14 00:00*	*10/05/14 10:05*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<3.99		3.99		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Barium	**24.3**		0.499		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Cadmium	<0.997		0.997		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Chromium	**12.0**		0.997		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Lead	<4.99		4.99		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Selenium	<7.48		7.48		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1
Silver	<0.997		0.997		mg/Kg	☼	10/01/14 08:00	10/01/14 18:02	1

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0237		0.0237		mg/Kg	☼	09/30/14 11:08	10/01/14 11:04	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B5-W
Date Collected: 09/26/14 11:37
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-2
Matrix: Ground Water

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			10/01/14 17:07	1
Toluene	<2.00		2.00		ug/L			10/01/14 17:07	1
Ethylbenzene	<2.00		2.00		ug/L			10/01/14 17:07	1
Xylenes, Total	<3.00		3.00		ug/L			10/01/14 17:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*89*		*80 - 125*		*10/01/14 17:07*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<300		300		ug/L		10/02/14 00:00	10/04/14 03:18	1
Gasoline	<300		300		ug/L		10/02/14 00:00	10/04/14 03:18	1
Waste Oil	<300		300		ug/L		10/02/14 00:00	10/04/14 03:18	1
Total Extractable Hydrocarbons	**580**	**Z**	500		ug/L		10/02/14 00:00	10/04/14 03:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*76*		*45 - 140*	*10/02/14 00:00*	*10/04/14 03:18*	*1*

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0302**		0.00200		mg/L		10/02/14 08:00	10/03/14 14:26	1
Barium	**0.692**		0.0100		mg/L		10/02/14 08:00	10/03/14 15:08	5
Cadmium	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:26	1
Chromium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:26	1
Lead	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:26	1
Selenium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:26	1
Silver	<0.00100		0.00100		mg/L		10/02/14 08:00	10/03/14 14:26	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/14 12:42	10/03/14 11:33	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B-9 3-4
Date Collected: 09/26/14 13:45
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-3
Matrix: Soil

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0929		0.0929		mg/Kg		09/30/14 14:46	09/30/14 18:12	1
Toluene	<0.0929		0.0929		mg/Kg		09/30/14 14:46	09/30/14 18:12	1
Ethylbenzene	<0.0929		0.0929		mg/Kg		09/30/14 14:46	09/30/14 18:12	1
Xylenes, Total	<0.279		0.279		mg/Kg		09/30/14 14:46	09/30/14 18:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*60 - 145*	*09/30/14 14:46*	*09/30/14 18:12*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<9.67		9.67		mg/Kg		10/02/14 00:00	10/06/14 23:55	1
Gasoline	<9.67		9.67		mg/Kg		10/02/14 00:00	10/06/14 23:55	1
Waste Oil	**25.5**		9.67		mg/Kg		10/02/14 00:00	10/06/14 23:55	1
Total Extractable Hydrocarbons	**25.3**	**B**	9.67		mg/Kg		10/02/14 00:00	10/06/14 23:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*91*		*60 - 150*	*10/02/14 00:00*	*10/06/14 23:55*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<7.47		7.47		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Barium	**64.8**		0.934		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Cadmium	<1.87		1.87		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Chromium	**9.10**		1.87		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Lead	**269**		9.34		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Selenium	<14.0		14.0		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2
Silver	<1.87		1.87		mg/Kg	☼	10/01/14 08:00	10/01/14 18:14	2

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.348**		0.0206		mg/Kg	☼	09/30/14 11:08	10/01/14 11:06	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B9-W
Date Collected: 09/26/14 14:33
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-4
Matrix: Ground Water

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			10/01/14 17:36	1
Toluene	<2.00		2.00		ug/L			10/01/14 17:36	1
Ethylbenzene	<2.00		2.00		ug/L			10/01/14 17:36	1
Xylenes, Total	<3.00		3.00		ug/L			10/01/14 17:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*80 - 125*		*10/01/14 17:36*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<278		278		ug/L		10/02/14 00:00	10/04/14 02:26	1
Gasoline	<278		278		ug/L		10/02/14 00:00	10/04/14 02:26	1
Waste Oil	<278		278		ug/L		10/02/14 00:00	10/04/14 02:26	1
Total Extractable Hydrocarbons	**513**	**Z**	463		ug/L		10/02/14 00:00	10/04/14 02:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*83*		*45 - 140*	*10/02/14 00:00*	*10/04/14 02:26*	*1*

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0205**		0.00200		mg/L		10/02/14 08:00	10/03/14 14:30	1
Barium	**0.772**		0.0100		mg/L		10/02/14 08:00	10/03/14 15:12	5
Cadmium	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:30	1
Chromium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:30	1
Lead	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:30	1
Selenium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:30	1
Silver	<0.00100		0.00100		mg/L		10/02/14 08:00	10/03/14 14:30	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/14 12:42	10/03/14 11:34	1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Z	The chromatographic response does not resemble a typical fuel pattern.
B	Compound was found in the blank and sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Ground Water — **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB (80-125)
310-40138-2	B5-W	89
310-40138-4	B9-W	88

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Soil — **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB (60-145)
310-40138-1	B-5 5-6	93
310-40138-3	B-9 3-4	92

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Solid — **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB (60-145)
LCS 310-62629/2-A	Lab Control Sample	97
LCSD 310-62629/16-A	Lab Control Sample Dup	95
MB 310-62629/1-A	Method Blank	83

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Water — **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB (80-125)
LCS 310-62807/5	Lab Control Sample	102
LCSD 310-62807/30	Lab Control Sample Dup	94
MB 310-62807/4	Method Blank	98

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Ground Water — **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	OTC (45-140)
310-40138-2	B5-W	76

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC) (Continued)

Matrix: Ground Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(45-140)
310-40138-4	B9-W	83

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Soil — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(60-150)
310-40138-1	B-5 5-6	121
310-40138-3	B-9 3-4	91

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(60-150)
LCS 310-62878/2-A	Lab Control Sample	89
MB 310-62878/1-A	Method Blank	92

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(45-140)
LCS 310-62837/2-A	Lab Control Sample	95
LCSD 310-62837/3-A	Lab Control Sample Dup	87
MB 310-62837/1-A	Method Blank	94

Surrogate Legend
OTC = n-Octacosane

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 310-62629/1-A
Matrix: Solid
Analysis Batch: 62657

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62629

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0989		0.0989		mg/Kg		09/30/14 08:41	09/30/14 12:12	1
Toluene	<0.0989		0.0989		mg/Kg		09/30/14 08:41	09/30/14 12:12	1
Ethylbenzene	<0.0989		0.0989		mg/Kg		09/30/14 08:41	09/30/14 12:12	1
Xylenes, Total	<0.297		0.297		mg/Kg		09/30/14 08:41	09/30/14 12:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*60 - 145*	*09/30/14 08:41*	*09/30/14 12:12*	*1*

Lab Sample ID: LCS 310-62629/2-A
Matrix: Solid
Analysis Batch: 62657

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62629

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	4.68	5.088		mg/Kg		109	70 - 130
Toluene	4.68	4.796		mg/Kg		103	70 - 130
Ethylbenzene	4.68	5.115		mg/Kg		109	70 - 130
Xylenes, Total	14.0	15.04		mg/Kg		107	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*60 - 145*

Lab Sample ID: LCSD 310-62629/16-A
Matrix: Solid
Analysis Batch: 62657

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 62629

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	4.74	5.141		mg/Kg		109	70 - 130	1	35
Toluene	4.74	4.812		mg/Kg		102	70 - 130	0	35
Ethylbenzene	4.74	5.107		mg/Kg		108	70 - 130	0	35
Xylenes, Total	14.2	14.96		mg/Kg		105	70 - 130	1	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*60 - 145*

Lab Sample ID: MB 310-62807/4
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			10/01/14 10:08	1
Toluene	<2.00		2.00		ug/L			10/01/14 10:08	1
Ethylbenzene	<2.00		2.00		ug/L			10/01/14 10:08	1
Xylenes, Total	<3.00		3.00		ug/L			10/01/14 10:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 125*		*10/01/14 10:08*	*1*

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: LCS 310-62807/5
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	100	87.35		ug/L		87	45 - 120
Toluene	100	98.91		ug/L		99	65 - 115
Ethylbenzene	100	102.3		ug/L		102	65 - 130
Xylenes, Total	300	311.8		ug/L		104	65 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*80 - 125*

Lab Sample ID: LCSD 310-62807/30
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	100	93.61		ug/L		94	45 - 120	7	20
Toluene	100	96.71		ug/L		97	65 - 115	2	20
Ethylbenzene	100	97.46		ug/L		97	65 - 130	5	20
Xylenes, Total	300	298.9		ug/L		100	65 - 130	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*80 - 125*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 310-62837/1-A
Matrix: Water
Analysis Batch: 63424

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62837

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<300		300		ug/L		10/02/14 00:00	10/06/14 15:14	1
Gasoline	<300		300		ug/L		10/02/14 00:00	10/06/14 15:14	1
Waste Oil	<300		300		ug/L		10/02/14 00:00	10/06/14 15:14	1
Total Extractable Hydrocarbons	545.2		500		ug/L		10/02/14 00:00	10/06/14 15:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*94*		*45 - 140*	*10/02/14 00:00*	*10/06/14 15:14*	*1*

Lab Sample ID: LCS 310-62837/2-A
Matrix: Water
Analysis Batch: 63219

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62837

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	2000	1261		ug/L		63	35 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane	*95*		*45 - 140*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: LCSD 310-62837/3-A
Matrix: Water
Analysis Batch: 63424

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 62837

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel	2000	1479		ug/L		74	35 - 125	16	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
n-Octacosane	*87*		*45 - 140*

Lab Sample ID: MB 310-62878/1-A
Matrix: Solid
Analysis Batch: 63218

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62878

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Gasoline	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Waste Oil	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Total Extractable Hydrocarbons	12.09		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*92*		*60 - 150*	*10/02/14 00:00*	*10/04/14 16:00*	*1*

Lab Sample ID: LCS 310-62878/2-A
Matrix: Solid
Analysis Batch: 63218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62878

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	133	94.74		mg/Kg		71	45 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane	*89*		*60 - 150*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 310-62709/1-A
Matrix: Solid
Analysis Batch: 62973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62709

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<3.89		3.89		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Barium	<0.486		0.486		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Cadmium	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Chromium	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Lead	<4.86		4.86		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Selenium	<7.29		7.29		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Silver	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 310-62709/2-A
Matrix: Solid
Analysis Batch: 62973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62709

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	190	207.6		mg/Kg		109	80 - 115
Barium	94.9	97.80		mg/Kg		103	80 - 110
Cadmium	94.9	102.9		mg/Kg		108	80 - 115
Chromium	94.9	97.61		mg/Kg		103	85 - 110
Lead	190	198.0		mg/Kg		104	80 - 115
Selenium	380	417.6		mg/Kg		110	85 - 110
Silver	94.9	101.0		mg/Kg		106	80 - 120

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-62923/1-A
Matrix: Water
Analysis Batch: 63348

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62923

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/02/14 08:00	10/03/14 14:07	1
Barium	<0.00200		0.00200		mg/L		10/02/14 08:00	10/03/14 14:07	1
Cadmium	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Chromium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Lead	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Selenium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Silver	<0.00100		0.00100		mg/L		10/02/14 08:00	10/03/14 14:07	1

Lab Sample ID: LCS 310-62923/2-A
Matrix: Water
Analysis Batch: 63348

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62923

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0400	0.03880		mg/L		97	85 - 115
Barium	0.0400	0.04415		mg/L		110	85 - 115
Cadmium	0.0200	0.02105		mg/L		105	85 - 115
Chromium	0.0400	0.04263		mg/L		107	85 - 115
Lead	0.0200	0.02106		mg/L		105	85 - 115
Selenium	0.0400	0.04379		mg/L		109	85 - 115
Silver	0.0200	0.02152		mg/L		108	85 - 115

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-63055/1-A
Matrix: Water
Analysis Batch: 63238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63055

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/14 12:42	10/03/14 11:17	1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 310-63055/2-A
Matrix: Water
Analysis Batch: 63238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63055

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00167	0.001559		mg/L		94	80 - 120

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Lab Sample ID: MB 310-62692/1-A
Matrix: Solid
Analysis Batch: 62860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62692

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0189		0.0189		mg/Kg		09/30/14 11:08	10/01/14 10:28	1

Lab Sample ID: LCS 310-62692/2-A
Matrix: Solid
Analysis Batch: 62860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62692

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.157	0.1482		mg/Kg		94	80 - 120

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

GC VOA

Prep Batch: 62629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	5030B	
310-40138-3	B-9 3-4	Total/NA	Soil	5030B	
LCS 310-62629/2-A	Lab Control Sample	Total/NA	Solid	5030B	
LCSD 310-62629/16-A	Lab Control Sample Dup	Total/NA	Solid	5030B	
MB 310-62629/1-A	Method Blank	Total/NA	Solid	5030B	

Analysis Batch: 62657

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	OA-1 (GC)	62629
310-40138-3	B-9 3-4	Total/NA	Soil	OA-1 (GC)	62629
LCS 310-62629/2-A	Lab Control Sample	Total/NA	Solid	OA-1 (GC)	62629
LCSD 310-62629/16-A	Lab Control Sample Dup	Total/NA	Solid	OA-1 (GC)	62629
MB 310-62629/1-A	Method Blank	Total/NA	Solid	OA-1 (GC)	62629

Analysis Batch: 62807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Total/NA	Ground Water	OA-1 (GC)	
310-40138-4	B9-W	Total/NA	Ground Water	OA-1 (GC)	
LCS 310-62807/5	Lab Control Sample	Total/NA	Water	OA-1 (GC)	
LCSD 310-62807/30	Lab Control Sample Dup	Total/NA	Water	OA-1 (GC)	
MB 310-62807/4	Method Blank	Total/NA	Water	OA-1 (GC)	

GC Semi VOA

Prep Batch: 62837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Total/NA	Ground Water	3510C	
310-40138-4	B9-W	Total/NA	Ground Water	3510C	
LCS 310-62837/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 310-62837/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 310-62837/1-A	Method Blank	Total/NA	Water	3510C	

Prep Batch: 62878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	3546	
310-40138-3	B-9 3-4	Total/NA	Soil	3546	
LCS 310-62878/2-A	Lab Control Sample	Total/NA	Solid	3546	
MB 310-62878/1-A	Method Blank	Total/NA	Solid	3546	

Analysis Batch: 63194

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Total/NA	Ground Water	OA-2	62837
310-40138-4	B9-W	Total/NA	Ground Water	OA-2	62837

Analysis Batch: 63218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	OA-2	62878
LCS 310-62878/2-A	Lab Control Sample	Total/NA	Solid	OA-2	62878
MB 310-62878/1-A	Method Blank	Total/NA	Solid	OA-2	62878

GC Semi VOA (Continued)

Analysis Batch: 63219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-62837/2-A	Lab Control Sample	Total/NA	Water	OA-2	62837

Analysis Batch: 63424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-3	B-9 3-4	Total/NA	Soil	OA-2	62878
LCSD 310-62837/3-A	Lab Control Sample Dup	Total/NA	Water	OA-2	62837
MB 310-62837/1-A	Method Blank	Total/NA	Water	OA-2	62837

Metals

Prep Batch: 62692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	7471B	
310-40138-3	B-9 3-4	Total/NA	Soil	7471B	
LCS 310-62692/2-A	Lab Control Sample	Total/NA	Solid	7471B	
MB 310-62692/1-A	Method Blank	Total/NA	Solid	7471B	

Prep Batch: 62709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	3050B	
310-40138-3	B-9 3-4	Total/NA	Soil	3050B	
LCS 310-62709/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 310-62709/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 62860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	7471B	62692
310-40138-3	B-9 3-4	Total/NA	Soil	7471B	62692
LCS 310-62692/2-A	Lab Control Sample	Total/NA	Solid	7471B	62692
MB 310-62692/1-A	Method Blank	Total/NA	Solid	7471B	62692

Prep Batch: 62923

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Dissolved	Ground Water	3010A	
310-40138-4	B9-W	Dissolved	Ground Water	3010A	
LCS 310-62923/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 310-62923/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 62973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-1	B-5 5-6	Total/NA	Soil	6010C	62709
310-40138-3	B-9 3-4	Total/NA	Soil	6010C	62709
LCS 310-62709/2-A	Lab Control Sample	Total/NA	Solid	6010C	62709
MB 310-62709/1-A	Method Blank	Total/NA	Solid	6010C	62709

Prep Batch: 63055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Dissolved	Ground Water	7470A	
310-40138-4	B9-W	Dissolved	Ground Water	7470A	
LCS 310-63055/2-A	Lab Control Sample	Total/NA	Water	7470A	

Metals (Continued)

Prep Batch: 63055 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-63055/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 63238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Dissolved	Ground Water	7470A	63055
310-40138-4	B9-W	Dissolved	Ground Water	7470A	63055
LCS 310-63055/2-A	Lab Control Sample	Total/NA	Water	7470A	63055
MB 310-63055/1-A	Method Blank	Total/NA	Water	7470A	63055

Analysis Batch: 63348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40138-2	B5-W	Dissolved	Ground Water	6020A	62923
310-40138-2	B5-W	Dissolved	Ground Water	6020A	62923
310-40138-4	B9-W	Dissolved	Ground Water	6020A	62923
310-40138-4	B9-W	Dissolved	Ground Water	6020A	62923
LCS 310-62923/2-A	Lab Control Sample	Total/NA	Water	6020A	62923
MB 310-62923/1-A	Method Blank	Total/NA	Water	6020A	62923

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B-5 5-6
Date Collected: 09/26/14 10:50
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-1
Matrix: Soil

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			62629	09/30/14 14:46	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		1	62657	09/30/14 17:32	CMM	TAL CF
Total/NA	Prep	3546			62878	10/02/14 00:00	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63218	10/05/14 10:05	DLK	TAL CF
Total/NA	Prep	3050B			62709	10/01/14 08:00	OAD	TAL CF
Total/NA	Analysis	6010C		1	62973	10/01/14 18:02	OAD	TAL CF
Total/NA	Prep	7471B			62692	09/30/14 11:08	JCM	TAL CF
Total/NA	Analysis	7471B		1	62860	10/01/14 11:04	JCM	TAL CF

Client Sample ID: B5-W
Date Collected: 09/26/14 11:37
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	62807	10/01/14 17:07	CMM	TAL CF
Total/NA	Prep	3510C			62837	10/02/14 00:00	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63194	10/04/14 03:18	BKT	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		1	63348	10/03/14 14:26	OAD	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		5	63348	10/03/14 15:08	OAD	TAL CF
Dissolved	Prep	7470A			63055	10/02/14 12:42	JCM	TAL CF
Dissolved	Analysis	7470A		1	63238	10/03/14 11:33	OAD	TAL CF

Client Sample ID: B-9 3-4
Date Collected: 09/26/14 13:45
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-3
Matrix: Soil

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			62629	09/30/14 14:46	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		1	62657	09/30/14 18:12	CMM	TAL CF
Total/NA	Prep	3546			62878	10/02/14 00:00	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63424	10/06/14 23:55	BKT	TAL CF
Total/NA	Prep	3050B			62709	10/01/14 08:00	OAD	TAL CF
Total/NA	Analysis	6010C		2	62973	10/01/14 18:14	OAD	TAL CF
Total/NA	Prep	7471B			62692	09/30/14 11:08	JCM	TAL CF
Total/NA	Analysis	7471B		1	62860	10/01/14 11:06	JCM	TAL CF

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Client Sample ID: B9-W
Date Collected: 09/26/14 14:33
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40138-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	62807	10/01/14 17:36	CMM	TAL CF
Total/NA	Prep	3510C			62837	10/02/14 00:00	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63194	10/04/14 02:26	BKT	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		1	63348	10/03/14 14:30	OAD	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		5	63348	10/03/14 15:12	OAD	TAL CF
Dissolved	Prep	7470A			63055	10/02/14 12:42	JCM	TAL CF
Dissolved	Analysis	7470A		1	63238	10/03/14 11:34	OAD	TAL CF

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

Certification Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Laboratory: TestAmerica Cedar Falls

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-16
Georgia	State Program	4	N/A	09-29-15
Illinois	NELAP	5	200024	11-29-14
Iowa	State Program	7	007	12-01-15
Kansas	NELAP	7	E-10341	01-31-15
Minnesota	NELAP	5	019-999-319	12-31-14
North Dakota	State Program	8	R-186	09-29-14 *
Oregon	NELAP	10	IA100001	09-29-15
Wisconsin	State Program	5	999917270	08-31-15

* Certification renewal pending - certification considered valid.

Method Summary

Client: Terracon Consulting Engineers & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-40138-1
SDG: 07147065

Method	Method Description	Protocol	Laboratory
OA-1 (GC)	Volatile Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
OA-2	Iowa - Extractable Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
6010C	Metals (ICP)	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
7471B	Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)	SW846	TAL CF

Protocol References:

Iowa DNR = Iowa Department of Natural Resources

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
704 Enterprise Drive • Cedar Falls, IA 50613
Tel 319-277-2401 • Fax 319-277-2425

TestAmerica Sample Receipt and Cedar Falls Facility

310-40138 Chain of Custody

Client: Terracon Project: Muscatine

City: _____ State: _____

Date: 9-30-14 Receiver's Initials: CH Time (Delivered): 9:05

Temperature Record:

Cooler ID# (If Applicable): QC

Uncorrected Temp: 0.7 °C

Corrected Temp: 0.6 °C

Thermometer:

- [ ] IR "E" - 111531506
- [ ] IR "Front" - 61854108
- [ ] IR "G" - 130195822
- [x] IR "H" - 130195853
- [ ] Other:

Courier:

- [x] UPS
- [ ] FedEx
- [ ] FedEx Ground
- [ ] US Postal Service
- [ ] Spee-Dee
- [ ] TA Courier
- [ ] TA Field Services
- [ ] Client
- [ ] Other: _____

- [x] Temperature blank
- [ ] Temperature out of compliance

Coolant Record:

- [x] Received on ice
  - [x] Wet ice
  - [ ] Blue ice
  - [ ] Dry ice
  - [ ] Other: _____
- [ ] NONE

Exceptions Noted:

- [ ] Sample(s) not received in cooler
- [ ] Sample(s) received same day of sampling
  - [ ] Evidence of chilling process
- [ ] Temp blank <0°C, samples NOT FROZEN
- [ ] Temp blank <0°C, samples FROZEN
- [ ] Temperature not taken: *(indicate reason)*

_____

- [ ] Non-Conformance Report Started

Custody Seals:

Cooler Custody Seals Present? [x] Yes [ ] No

Cooler Custody Seals Intact? [x] Yes [ ] No [ ] N/A

Sample Custody Seals Present? [ ] Yes [x] No

Sample Custody Seals Intact? [ ] Yes [ ] No [x] N/A

Cedar Falls
704 Enterprise Drive

Cedar Falls, IA 50613
phone 319.277.2401 fax 319.277.2425

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Carla S. Duncan	Site Contact: esduncan@terracon.com	Date: 9/26/2014	COC No:
Terracon	Tel/Fax: 563-355-0702	Lab Contact:	Carrier:	of COCs
870 40th Avenue	Analysis Turnaround Time			Job No. 07147065
Bettendorf, Iowa 52722	Calendar (C) or Work Days (W) W			
(563) 355-0702 Phone	TAT if different from Below			SDG No.
(563) 355-4789 FAX	☐ 2 weeks			
Project Name: Muscatine Riverview Suites LSI	☒ 1 week			
Site: Muscatine, Iowa	☐ 2 days			
P O # 07147065	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	BTEX (OA-1)	TEH (OA-2)	Metals (6010B)	Sample Specific Notes:
B5-5-6	9/26/2014	10:50	Grab	SL	3		X	X	X	
B5-W	9/26/2014	11:37	Grab	GW	5	x	X	X	X	
B9-3-4	9/26/2014	13:45	Grab	SL	3		X	X	X	
B9-W	9/26/2014	14:33	Grab	GW	5	x	X	X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by: Josh Lopez	Company: Terracon	Date/Time: 9/29/2014	Received by: Matt Hall	Company: TA	Date/Time: 9/29/14 9:45
Relinquished by: Tony Bolen	Company:	Date/Time: 9/29/14 1650	Received by: Melissa Parker CAM	Company: TA BOE	Date/Time: 9/30/14 905
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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10/7/2014

9/30/2014

Login Container Summary Report

310-40138

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
B5-W	310-40138-B-2	Plastic 250ml - w/nitric - dis	<2		
B9-W	310-40138-B-4	Plastic 250ml - w/nitric - dis	<2		

MB 9/30/14

Page 1 of 1

10/7/2014

Login Sample Receipt Checklist

Client: Terracon Consulting Eng & Scientists

Job Number: 310-4013 8-1
SDG Num ber: 07147065

List Source: TestAmerica Cedar Falls

Login Number: 40138
List Number: 1
Creator: Facciani, Melene K

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N /A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Cedar Falls
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319)277-2401

TestAmerica Job ID: 310-40135-1
TestAmerica Sample Delivery Group: 07147065
Client Project/Site: Muscatine

For:
Terracon Consulting Eng & Scientists
870 40th Avenue
Bettendorf, Iowa 52722

Attn: Carla Duncan

Authorized for release by:
10/9/2014 1:59:08 PM

Shawn Hayes, Project Manager II
(319)277-2401
shawn.hayes@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 310-40135-1

Laboratory: TestAmerica Cedar Falls

Narrative

Job Narrative
310-40135-1

Comments
No additional comments.

Receipt
The samples were received on 9/30/2014 9:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

GC VOA
Method(s) OA-1 (GC): The following samples was collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, the pH was outside the required criteria when verified by the laboratory, and corrective action was not possible: B8-W (310-40135-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) OA-2: The continuing calibration verification (CCV) associated with batch 63424 recovered above the upper control limit for Diesel. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method(s) 6010C: The following samples were diluted due to the presence of an interferent. B7-4-5 (310-40135-1), B8-5-6 (310-40135-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Terracon Consulting Engineers & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147 065

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-40135-1	B7-4-5	Soil	09/29/14 10:05	09/30/14 09:05
310-40135-2	B7-19-20	Soil	09/29/14 10:30	09/30/14 09:05
310-40135-3	B8-5-6	Soil	09/29/14 10:55	09/30/14 09:05
310-40135-4	B8-W	Ground Water	09/29/14 11:40	09/30/14 09:05

Detection Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B7-4-5

Lab Sample ID: 310-40135-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Extractable Hydrocarbons	23.8	Z	14.6		mg/Kg	1		OA-2	Total/NA
Barium	95.9		0.908		mg/Kg	2	☼	6010C	Total/NA
Chromium	13.3		1.82		mg/Kg	2	☼	6010C	Total/NA
Lead	58.1		9.08		mg/Kg	2	☼	6010C	Total/NA
Mercury	0.390		0.0202		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: B7-19-20

Lab Sample ID: 310-40135-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel	15.2		14.1		mg/Kg	1		OA-2	Total/NA
Total Extractable Hydrocarbons	25.5		21.1		mg/Kg	1		OA-2	Total/NA
Barium	80.8		0.477		mg/Kg	1	☼	6010C	Total/NA
Chromium	16.7		0.953		mg/Kg	1	☼	6010C	Total/NA
Lead	8.03		4.77		mg/Kg	1	☼	6010C	Total/NA

Client Sample ID: B8-5-6

Lab Sample ID: 310-40135-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	111		1.58		mg/Kg	3	☼	6010C	Total/NA
Chromium	11.6		3.17		mg/Kg	3	☼	6010C	Total/NA
Lead	305		15.8		mg/Kg	3	☼	6010C	Total/NA
Mercury	0.489		0.0246		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: B8-W

Lab Sample ID: 310-40135-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0346		0.00200		mg/L	1		6020A	Dissolved
Barium	1.27		0.0100		mg/L	5		6020A	Dissolved

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B7-4-5
Date Collected: 09/29/14 10:05
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-1
Matrix: Soil

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0997		0.0997		mg/Kg		10/02/14 12:18	10/03/14 08:05	1
Toluene	<0.0997		0.0997		mg/Kg		10/02/14 12:18	10/03/14 08:05	1
Ethylbenzene	<0.0997		0.0997		mg/Kg		10/02/14 12:18	10/03/14 08:05	1
Xylenes, Total	<0.299		0.299		mg/Kg		10/02/14 12:18	10/03/14 08:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*60 - 145*	*10/02/14 12:18*	*10/03/14 08:05*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<9.70		9.70		mg/Kg		10/02/14 00:00	10/06/14 23:03	1
Gasoline	<9.70		9.70		mg/Kg		10/02/14 00:00	10/06/14 23:03	1
Waste Oil	<9.70		9.70		mg/Kg		10/02/14 00:00	10/06/14 23:03	1
Total Extractable Hydrocarbons	**23.8**	**Z**	14.6		mg/Kg		10/02/14 00:00	10/06/14 23:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*120*		*60 - 150*	*10/02/14 00:00*	*10/06/14 23:03*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<7.26		7.26		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Barium	**95.9**		0.908		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Cadmium	<1.82		1.82		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Chromium	**13.3**		1.82		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Lead	**58.1**		9.08		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Selenium	<13.6		13.6		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2
Silver	<1.82		1.82		mg/Kg	☼	10/01/14 08:00	10/01/14 17:45	2

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.390**		0.0202		mg/Kg	☼	09/30/14 11:08	10/01/14 10:59	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B7-19-20
Date Collected: 09/29/14 10:30
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-2
Matrix: Soil

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0959		0.0959		mg/Kg		10/02/14 12:18	10/03/14 08:33	1
Toluene	<0.0959		0.0959		mg/Kg		10/02/14 12:18	10/03/14 08:33	1
Ethylbenzene	<0.0959		0.0959		mg/Kg		10/02/14 12:18	10/03/14 08:33	1
Xylenes, Total	<0.288		0.288		mg/Kg		10/02/14 12:18	10/03/14 08:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*60 - 145*	*10/02/14 12:18*	*10/03/14 08:33*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	**15.2**		14.1		mg/Kg		10/06/14 10:21	10/07/14 14:09	1
Gasoline	<14.1		14.1		mg/Kg		10/06/14 10:21	10/07/14 14:09	1
Waste Oil	<14.1		14.1		mg/Kg		10/06/14 10:21	10/07/14 14:09	1
Total Extractable Hydrocarbons	**25.5**		21.1		mg/Kg		10/06/14 10:21	10/07/14 14:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*130*		*60 - 150*	*10/06/14 10:21*	*10/07/14 14:09*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<3.81		3.81		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Barium	**80.8**		0.477		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Cadmium	<0.953		0.953		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Chromium	**16.7**		0.953		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Lead	**8.03**		4.77		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Selenium	<7.15		7.15		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1
Silver	<0.953		0.953		mg/Kg	☼	10/01/14 08:00	10/01/14 17:24	1

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0206		0.0206		mg/Kg	☼	09/30/14 11:08	10/01/14 11:01	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B8-5-6
Date Collected: 09/29/14 10:55
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-3
Matrix: Soil

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0963		0.0963		mg/Kg		10/02/14 12:18	10/03/14 09:02	1
Toluene	<0.0963		0.0963		mg/Kg		10/02/14 12:18	10/03/14 09:02	1
Ethylbenzene	<0.0963		0.0963		mg/Kg		10/02/14 12:18	10/03/14 09:02	1
Xylenes, Total	<0.289		0.289		mg/Kg		10/02/14 12:18	10/03/14 09:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*60 - 145*	*10/02/14 12:18*	*10/03/14 09:02*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<9.64		9.64		mg/Kg		10/06/14 10:21	10/07/14 15:04	1
Gasoline	<9.64		9.64		mg/Kg		10/06/14 10:21	10/07/14 15:04	1
Waste Oil	<9.64		9.64		mg/Kg		10/06/14 10:21	10/07/14 15:04	1
Total Extractable Hydrocarbons	<14.5		14.5		mg/Kg		10/06/14 10:21	10/07/14 15:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*109*		*60 - 150*	*10/06/14 10:21*	*10/07/14 15:04*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<12.7		12.7		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Barium	**111**		1.58		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Cadmium	<3.17		3.17		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Chromium	**11.6**		3.17		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Lead	**305**		15.8		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Selenium	<23.7		23.7		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3
Silver	<3.17		3.17		mg/Kg	☼	10/01/14 08:00	10/01/14 17:51	3

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.489**		0.0246		mg/Kg	☼	09/30/14 11:08	10/01/14 11:03	1

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B8-W
Date Collected: 09/29/14 11:40
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-4
Matrix: Ground Water

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			10/01/14 16:39	1
Toluene	<2.00		2.00		ug/L			10/01/14 16:39	1
Ethylbenzene	<2.00		2.00		ug/L			10/01/14 16:39	1
Xylenes, Total	<3.00		3.00		ug/L			10/01/14 16:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 125*		*10/01/14 16:39*	*1*

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<278		278		ug/L		10/03/14 08:49	10/07/14 15:59	1
Gasoline	<278		278		ug/L		10/03/14 08:49	10/07/14 15:59	1
Waste Oil	<278		278		ug/L		10/03/14 08:49	10/07/14 15:59	1
Total Extractable Hydrocarbons	<463		463		ug/L		10/03/14 08:49	10/07/14 15:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*133*		*45 - 140*	*10/03/14 08:49*	*10/07/14 15:59*	*1*

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.0346**		0.00200		mg/L		10/02/14 08:00	10/03/14 14:15	1
Barium	**1.27**		0.0100		mg/L		10/02/14 08:00	10/03/14 14:57	5
Cadmium	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:15	1
Chromium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:15	1
Lead	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:15	1
Selenium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:15	1
Silver	<0.00100		0.00100		mg/L		10/02/14 08:00	10/03/14 14:15	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/14 12:42	10/03/14 11:31	1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Z	The chromatographic response does not resemble a typical fuel pattern.

Metals

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-125)
310-40135-4	B8-W	94

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Soil

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(60-145)
310-40135-1	B7-4-5	88
310-40135-1 MS	B7-4-5	88
310-40135-1 MSD	B7-4-5	92
310-40135-2	B7-19-20	98
310-40135-3	B8-5-6	88

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(60-145)
LCS 310-63045/2-A	Lab Control Sample	92
LCSD 310-63045/24-A	Lab Control Sample Dup	84
MB 310-63045/1-A	Method Blank	85

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-125)
LCS 310-62807/5	Lab Control Sample	102
LCSD 310-62807/30	Lab Control Sample Dup	94
MB 310-62807/4	Method Blank	98

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Ground Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(45-140)
310-40135-4	B8-W	133

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Soil — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(60-150)
310-40135-1	B7-4-5	120
310-40135-2	B7-19-20	130
310-40135-2 MS	B7-19-20	130
310-40135-2 MSD	B7-19-20	140
310-40135-3	B8-5-6	109

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(60-150)
LCS 310-62878/2-A	Lab Control Sample	89
LCS 310-63417/2-A	Lab Control Sample	71
MB 310-62878/1-A	Method Blank	92
MB 310-63417/1-A	Method Blank	99

Surrogate Legend
OTC = n-Octacosane

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTC
Lab Sample ID	Client Sample ID	(45-140)
LCS 310-63147/2-A	Lab Control Sample	105
LCSD 310-63147/3-A	Lab Control Sample Dup	123
MB 310-63147/1-A	Method Blank	115

Surrogate Legend
OTC = n-Octacosane

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 310-62807/4
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<2.00		2.00		ug/L			10/01/14 10:08	1
Toluene	<2.00		2.00		ug/L			10/01/14 10:08	1
Ethylbenzene	<2.00		2.00		ug/L			10/01/14 10:08	1
Xylenes, Total	<3.00		3.00		ug/L			10/01/14 10:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 125*		*10/01/14 10:08*	*1*

Lab Sample ID: LCS 310-62807/5
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	100	87.35		ug/L		87	45 - 120
Toluene	100	98.91		ug/L		99	65 - 115
Ethylbenzene	100	102.3		ug/L		102	65 - 130
Xylenes, Total	300	311.8		ug/L		104	65 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*80 - 125*

Lab Sample ID: LCSD 310-62807/30
Matrix: Water
Analysis Batch: 62807

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	100	93.61		ug/L		94	45 - 120	7	20
Toluene	100	96.71		ug/L		97	65 - 115	2	20
Ethylbenzene	100	97.46		ug/L		97	65 - 130	5	20
Xylenes, Total	300	298.9		ug/L		100	65 - 130	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*80 - 125*

Lab Sample ID: MB 310-63045/1-A
Matrix: Solid
Analysis Batch: 63100

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63045

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.0962		0.0962		mg/Kg		10/02/14 12:18	10/03/14 04:46	1
Toluene	<0.0962		0.0962		mg/Kg		10/02/14 12:18	10/03/14 04:46	1
Ethylbenzene	<0.0962		0.0962		mg/Kg		10/02/14 12:18	10/03/14 04:46	1
Xylenes, Total	<0.289		0.289		mg/Kg		10/02/14 12:18	10/03/14 04:46	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*85*		*60 - 145*	*10/02/14 12:18*	*10/03/14 04:46*	*1*

Method: OA-1 (GC) - Volatile Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: LCS 310-63045/2-A
Matrix: Solid
Analysis Batch: 63100

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63045

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	4.86	5.147		mg/Kg		106	70 - 130
Toluene	4.86	4.678		mg/Kg		96	70 - 130
Ethylbenzene	4.86	4.560		mg/Kg		94	70 - 130
Xylenes, Total	14.6	13.96		mg/Kg		96	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*92*		*60 - 145*

Lab Sample ID: LCSD 310-63045/24-A
Matrix: Solid
Analysis Batch: 63100

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 63045

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	4.70	5.364		mg/Kg		114	70 - 130	4	35
Toluene	4.70	4.753		mg/Kg		101	70 - 130	2	35
Ethylbenzene	4.70	4.589		mg/Kg		98	70 - 130	1	35
Xylenes, Total	14.1	13.82		mg/Kg		98	70 - 130	1	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*84*		*60 - 145*

Lab Sample ID: 310-40135-1 MS
Matrix: Soil
Analysis Batch: 63100

Client Sample ID: B7-4-5
Prep Type: Total/NA
Prep Batch: 63045

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.0997		4.86	5.236		mg/Kg		108	70 - 150
Toluene	<0.0997		4.86	4.732		mg/Kg		97	70 - 150
Ethylbenzene	<0.0997		4.86	4.564		mg/Kg		93	70 - 150
Xylenes, Total	<0.299		14.6	13.89		mg/Kg		95	70 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*88*		*60 - 145*

Lab Sample ID: 310-40135-1 MSD
Matrix: Soil
Analysis Batch: 63100

Client Sample ID: B7-4-5
Prep Type: Total/NA
Prep Batch: 63045

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.0997		4.67	4.474		mg/Kg		96	70 - 150	16	40
Toluene	<0.0997		4.67	4.184		mg/Kg		89	70 - 150	12	40
Ethylbenzene	<0.0997		4.67	4.129		mg/Kg		88	70 - 150	10	40
Xylenes, Total	<0.299		14.0	12.62		mg/Kg		90	70 - 150	10	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*92*		*60 - 145*

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC)

Lab Sample ID: MB 310-62878/1-A
Matrix: Solid
Analysis Batch: 63218

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62878

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Gasoline	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Waste Oil	<10.0		10.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1
Total Extractable Hydrocarbons	<15.0		15.0		mg/Kg		10/02/14 00:00	10/04/14 16:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*92*		*60 - 150*	*10/02/14 00:00*	*10/04/14 16:00*	*1*

Lab Sample ID: LCS 310-62878/2-A
Matrix: Solid
Analysis Batch: 63218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62878

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	133	94.74		mg/Kg		71	45 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane	*89*		*60 - 150*

Lab Sample ID: MB 310-63147/1-A
Matrix: Water
Analysis Batch: 63617

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63147

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<300		300		ug/L		10/03/14 08:49	10/07/14 13:58	1
Gasoline	<300		300		ug/L		10/03/14 08:49	10/07/14 13:58	1
Waste Oil	<300		300		ug/L		10/03/14 08:49	10/07/14 13:58	1
Total Extractable Hydrocarbons	<500		500		ug/L		10/03/14 08:49	10/07/14 13:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane	*115*		*45 - 140*	*10/03/14 08:49*	*10/07/14 13:58*	*1*

Lab Sample ID: LCS 310-63147/2-A
Matrix: Water
Analysis Batch: 63617

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63147

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	2000	1484		ug/L		74	35 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane	*105*		*45 - 140*

Lab Sample ID: LCSD 310-63147/3-A
Matrix: Water
Analysis Batch: 63617

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 63147

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel	2000	1801		ug/L		90	35 - 125	19	35

Method: OA-2 - Iowa - Extractable Petroleum Hydrocarbons (GC) (Continued)

Lab Sample ID: LCSD 310-63147/3-A
Matrix: Water
Analysis Batch: 63617

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 63147

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
n-Octacosane	123		45 - 140

Lab Sample ID: MB 310-63417/1-A
Matrix: Solid
Analysis Batch: 63613

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63417

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel	<10.0		10.0		mg/Kg		10/06/14 10:21	10/07/14 12:18	1
Gasoline	<10.0		10.0		mg/Kg		10/06/14 10:21	10/07/14 12:18	1
Waste Oil	<10.0		10.0		mg/Kg		10/06/14 10:21	10/07/14 12:18	1
Total Extractable Hydrocarbons	<15.0		15.0		mg/Kg		10/06/14 10:21	10/07/14 12:18	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
n-Octacosane	99		60 - 150	10/06/14 10:21	10/07/14 12:18	1

Lab Sample ID: LCS 310-63417/2-A
Matrix: Solid
Analysis Batch: 63613

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63417

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	133	88.83		mg/Kg		67	45 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
n-Octacosane	71		60 - 150

Lab Sample ID: 310-40135-2 MS
Matrix: Soil
Analysis Batch: 63613

Client Sample ID: B7-19-20
Prep Type: Total/NA
Prep Batch: 63417

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel	15.2		126	105.8		mg/Kg		72	30 - 125

Surrogate	MS %Recovery	MS Qualifier	Limits
n-Octacosane	130		60 - 150

Lab Sample ID: 310-40135-2 MSD
Matrix: Soil
Analysis Batch: 63613

Client Sample ID: B7-19-20
Prep Type: Total/NA
Prep Batch: 63417

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel	15.2		130	112.6		mg/Kg		75	30 - 125	6	40

Surrogate	MSD %Recovery	MSD Qualifier	Limits
n-Octacosane	140		60 - 150

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 310-62709/1-A
Matrix: Solid
Analysis Batch: 62973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62709

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<3.89		3.89		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Barium	<0.486		0.486		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Cadmium	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Chromium	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Lead	<4.86		4.86		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Selenium	<7.29		7.29		mg/Kg		10/01/14 08:00	10/01/14 16:52	1
Silver	<0.972		0.972		mg/Kg		10/01/14 08:00	10/01/14 16:52	1

Lab Sample ID: LCS 310-62709/2-A
Matrix: Solid
Analysis Batch: 62973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62709

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	190	207.6		mg/Kg		109	80 - 115
Barium	94.9	97.80		mg/Kg		103	80 - 110
Cadmium	94.9	102.9		mg/Kg		108	80 - 115
Chromium	94.9	97.61		mg/Kg		103	85 - 110
Lead	190	198.0		mg/Kg		104	80 - 115
Selenium	380	417.6		mg/Kg		110	85 - 110
Silver	94.9	101.0		mg/Kg		106	80 - 120

Lab Sample ID: 310-40135-3 DU
Matrix: Soil
Analysis Batch: 62973

Client Sample ID: B8-5-6
Prep Type: Total/NA
Prep Batch: 62709

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	<12.7		<12.2		mg/Kg	☼	NC	15
Barium	111		108.8		mg/Kg	☼	2	20
Cadmium	<3.17		<3.05		mg/Kg	☼	NC	20
Chromium	11.6		10.19		mg/Kg	☼	13	20
Lead	305		1790	F3	mg/Kg	☼	142	20
Selenium	<23.7		<22.9		mg/Kg	☼	NC	20
Silver	<3.17		<3.05		mg/Kg	☼	NC	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-62923/1-A
Matrix: Water
Analysis Batch: 63348

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62923

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/02/14 08:00	10/03/14 14:07	1
Barium	<0.00200		0.00200		mg/L		10/02/14 08:00	10/03/14 14:07	1
Cadmium	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Chromium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Lead	<0.000500		0.000500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Selenium	<0.00500		0.00500		mg/L		10/02/14 08:00	10/03/14 14:07	1
Silver	<0.00100		0.00100		mg/L		10/02/14 08:00	10/03/14 14:07	1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-62923/2-A
Matrix: Water
Analysis Batch: 63348

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62923

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0400	0.03880		mg/L		97	85 - 115
Barium	0.0400	0.04415		mg/L		110	85 - 115
Cadmium	0.0200	0.02105		mg/L		105	85 - 115
Chromium	0.0400	0.04263		mg/L		107	85 - 115
Lead	0.0200	0.02106		mg/L		105	85 - 115
Selenium	0.0400	0.04379		mg/L		109	85 - 115
Silver	0.0200	0.02152		mg/L		108	85 - 115

Lab Sample ID: 310-40135-4 MS
Matrix: Ground Water
Analysis Batch: 63348

Client Sample ID: B8-W
Prep Type: Dissolved
Prep Batch: 62923

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0346		0.0400	0.07328		mg/L		97	75 - 125
Cadmium	<0.000500		0.0200	0.02123		mg/L		106	75 - 125
Chromium	<0.00500		0.0400	0.04333		mg/L		108	75 - 125
Lead	<0.000500		0.0200	0.02203		mg/L		110	75 - 125
Selenium	<0.00500		0.0400	0.04447		mg/L		111	75 - 125
Silver	<0.00100		0.0200	0.02079		mg/L		104	75 - 125

Lab Sample ID: 310-40135-4 MS
Matrix: Ground Water
Analysis Batch: 63348

Client Sample ID: B8-W
Prep Type: Dissolved
Prep Batch: 62923

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	1.27		0.0400	1.202	4	mg/L		-179	75 - 125

Lab Sample ID: 310-40135-4 MSD
Matrix: Ground Water
Analysis Batch: 63348

Client Sample ID: B8-W
Prep Type: Dissolved
Prep Batch: 62923

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0346		0.0400	0.07271		mg/L		95	75 - 125	1	20
Cadmium	<0.000500		0.0200	0.02099		mg/L		105	75 - 125	1	20
Chromium	<0.00500		0.0400	0.04267		mg/L		107	75 - 125	2	20
Lead	<0.000500		0.0200	0.02154		mg/L		108	75 - 125	2	20
Selenium	<0.00500		0.0400	0.04391		mg/L		110	75 - 125	1	20
Silver	<0.00100		0.0200	0.02053		mg/L		102	75 - 125	1	20

Lab Sample ID: 310-40135-4 MSD
Matrix: Ground Water
Analysis Batch: 63348

Client Sample ID: B8-W
Prep Type: Dissolved
Prep Batch: 62923

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	1.27		0.0400	1.275	4	mg/L		5	75 - 125	6	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-63055/1-A
Matrix: Water
Analysis Batch: 63238

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 63055

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/14 12:42	10/03/14 11:17	1

Lab Sample ID: LCS 310-63055/2-A
Matrix: Water
Analysis Batch: 63238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 63055

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00167	0.001559		mg/L		94	80 - 120

Method: 7471B - Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Lab Sample ID: MB 310-62692/1-A
Matrix: Solid
Analysis Batch: 62860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62692

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0189		0.0189		mg/Kg		09/30/14 11:08	10/01/14 10:28	1

Lab Sample ID: LCS 310-62692/2-A
Matrix: Solid
Analysis Batch: 62860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62692

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.157	0.1482		mg/Kg		94	80 - 120

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

GC VOA

Analysis Batch: 62807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Total/NA	Ground Water	OA-1 (GC)	
LCS 310-62807/5	Lab Control Sample	Total/NA	Water	OA-1 (GC)	
LCSD 310-62807/30	Lab Control Sample Dup	Total/NA	Water	OA-1 (GC)	
MB 310-62807/4	Method Blank	Total/NA	Water	OA-1 (GC)	

Prep Batch: 63045

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	5030B	
310-40135-1 MS	B7-4-5	Total/NA	Soil	5030B	
310-40135-1 MSD	B7-4-5	Total/NA	Soil	5030B	
310-40135-2	B7-19-20	Total/NA	Soil	5030B	
310-40135-3	B8-5-6	Total/NA	Soil	5030B	
LCS 310-63045/2-A	Lab Control Sample	Total/NA	Solid	5030B	
LCSD 310-63045/24-A	Lab Control Sample Dup	Total/NA	Solid	5030B	
MB 310-63045/1-A	Method Blank	Total/NA	Solid	5030B	

Analysis Batch: 63100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	OA-1 (GC)	63045
310-40135-1 MS	B7-4-5	Total/NA	Soil	OA-1 (GC)	63045
310-40135-1 MSD	B7-4-5	Total/NA	Soil	OA-1 (GC)	63045
310-40135-2	B7-19-20	Total/NA	Soil	OA-1 (GC)	63045
310-40135-3	B8-5-6	Total/NA	Soil	OA-1 (GC)	63045
LCS 310-63045/2-A	Lab Control Sample	Total/NA	Solid	OA-1 (GC)	63045
LCSD 310-63045/24-A	Lab Control Sample Dup	Total/NA	Solid	OA-1 (GC)	63045
MB 310-63045/1-A	Method Blank	Total/NA	Solid	OA-1 (GC)	63045

GC Semi VOA

Prep Batch: 62878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	3546	
LCS 310-62878/2-A	Lab Control Sample	Total/NA	Solid	3546	
MB 310-62878/1-A	Method Blank	Total/NA	Solid	3546	

Prep Batch: 63147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Total/NA	Ground Water	3510C	
LCS 310-63147/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 310-63147/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 310-63147/1-A	Method Blank	Total/NA	Water	3510C	

Analysis Batch: 63218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-62878/2-A	Lab Control Sample	Total/NA	Solid	OA-2	62878
MB 310-62878/1-A	Method Blank	Total/NA	Solid	OA-2	62878

Prep Batch: 63417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-2	B7-19-20	Total/NA	Soil	3546	

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

GC Semi VOA (Continued)

Prep Batch: 63417 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-2 MS	B7-19-20	Total/NA	Soil	3546	
310-40135-2 MSD	B7-19-20	Total/NA	Soil	3546	
310-40135-3	B8-5-6	Total/NA	Soil	3546	
LCS 310-63417/2-A	Lab Control Sample	Total/NA	Solid	3546	
MB 310-63417/1-A	Method Blank	Total/NA	Solid	3546	

Analysis Batch: 63424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	OA-2	62878

Analysis Batch: 63613

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-2	B7-19-20	Total/NA	Soil	OA-2	63417
310-40135-2 MS	B7-19-20	Total/NA	Soil	OA-2	63417
310-40135-2 MSD	B7-19-20	Total/NA	Soil	OA-2	63417
310-40135-3	B8-5-6	Total/NA	Soil	OA-2	63417
310-40135-4	B8-W	Total/NA	Ground Water	OA-2	63147
LCS 310-63417/2-A	Lab Control Sample	Total/NA	Solid	OA-2	63417
MB 310-63417/1-A	Method Blank	Total/NA	Solid	OA-2	63417

Analysis Batch: 63617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-63147/2-A	Lab Control Sample	Total/NA	Water	OA-2	63147
LCSD 310-63147/3-A	Lab Control Sample Dup	Total/NA	Water	OA-2	63147
MB 310-63147/1-A	Method Blank	Total/NA	Water	OA-2	63147

Metals

Prep Batch: 62692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	7471B	
310-40135-2	B7-19-20	Total/NA	Soil	7471B	
310-40135-3	B8-5-6	Total/NA	Soil	7471B	
LCS 310-62692/2-A	Lab Control Sample	Total/NA	Solid	7471B	
MB 310-62692/1-A	Method Blank	Total/NA	Solid	7471B	

Prep Batch: 62709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	3050B	
310-40135-2	B7-19-20	Total/NA	Soil	3050B	
310-40135-3	B8-5-6	Total/NA	Soil	3050B	
310-40135-3 DU	B8-5-6	Total/NA	Soil	3050B	
LCS 310-62709/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 310-62709/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 62860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	7471B	62692
310-40135-2	B7-19-20	Total/NA	Soil	7471B	62692
310-40135-3	B8-5-6	Total/NA	Soil	7471B	62692

Metals (Continued)

Analysis Batch: 62860 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-62692/2-A	Lab Control Sample	Total/NA	Solid	7471B	62692
MB 310-62692/1-A	Method Blank	Total/NA	Solid	7471B	62692

Prep Batch: 62923

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Dissolved	Ground Water	3010A	
310-40135-4 MS	B8-W	Dissolved	Ground Water	3010A	
310-40135-4 MSD	B8-W	Dissolved	Ground Water	3010A	
LCS 310-62923/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 310-62923/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 62973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-1	B7-4-5	Total/NA	Soil	6010C	62709
310-40135-2	B7-19-20	Total/NA	Soil	6010C	62709
310-40135-3	B8-5-6	Total/NA	Soil	6010C	62709
310-40135-3 DU	B8-5-6	Total/NA	Soil	6010C	62709
LCS 310-62709/2-A	Lab Control Sample	Total/NA	Solid	6010C	62709
MB 310-62709/1-A	Method Blank	Total/NA	Solid	6010C	62709

Prep Batch: 63055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Dissolved	Ground Water	7470A	
LCS 310-63055/2-A	Lab Control Sample	Total/NA	Water	7470A	
MB 310-63055/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 63238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Dissolved	Ground Water	7470A	63055
LCS 310-63055/2-A	Lab Control Sample	Total/NA	Water	7470A	63055
MB 310-63055/1-A	Method Blank	Total/NA	Water	7470A	63055

Analysis Batch: 63348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-40135-4	B8-W	Dissolved	Ground Water	6020A	62923
310-40135-4	B8-W	Dissolved	Ground Water	6020A	62923
310-40135-4 MS	B8-W	Dissolved	Ground Water	6020A	62923
310-40135-4 MS	B8-W	Dissolved	Ground Water	6020A	62923
310-40135-4 MSD	B8-W	Dissolved	Ground Water	6020A	62923
310-40135-4 MSD	B8-W	Dissolved	Ground Water	6020A	62923
LCS 310-62923/2-A	Lab Control Sample	Total/NA	Water	6020A	62923
MB 310-62923/1-A	Method Blank	Total/NA	Water	6020A	62923

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B7-4-5
Date Collected: 09/29/14 10:05
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-1
Matrix: Soil

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			63045	10/02/14 12:18	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		1	63100	10/03/14 08:05	CMM	TAL CF
Total/NA	Prep	3546			62878	10/02/14 00:00	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63424	10/06/14 23:03	BKT	TAL CF
Total/NA	Prep	3050B			62709	10/01/14 08:00	OAD	TAL CF
Total/NA	Analysis	6010C		2	62973	10/01/14 17:45	OAD	TAL CF
Total/NA	Prep	7471B			62692	09/30/14 11:08	JCM	TAL CF
Total/NA	Analysis	7471B		1	62860	10/01/14 10:59	JCM	TAL CF

Client Sample ID: B7-19-20
Date Collected: 09/29/14 10:30
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-2
Matrix: Soil

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			63045	10/02/14 12:18	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		1	63100	10/03/14 08:33	CMM	TAL CF
Total/NA	Prep	3546			63417	10/06/14 10:21	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63613	10/07/14 14:09	BKT	TAL CF
Total/NA	Prep	3050B			62709	10/01/14 08:00	OAD	TAL CF
Total/NA	Analysis	6010C		1	62973	10/01/14 17:24	OAD	TAL CF
Total/NA	Prep	7471B			62692	09/30/14 11:08	JCM	TAL CF
Total/NA	Analysis	7471B		1	62860	10/01/14 11:01	JCM	TAL CF

Client Sample ID: B8-5-6
Date Collected: 09/29/14 10:55
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-3
Matrix: Soil

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			63045	10/02/14 12:18	CMM	TAL CF
Total/NA	Analysis	OA-1 (GC)		1	63100	10/03/14 09:02	CMM	TAL CF
Total/NA	Prep	3546			63417	10/06/14 10:21	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63613	10/07/14 15:04	BKT	TAL CF
Total/NA	Prep	3050B			62709	10/01/14 08:00	OAD	TAL CF
Total/NA	Analysis	6010C		3	62973	10/01/14 17:51	OAD	TAL CF
Total/NA	Prep	7471B			62692	09/30/14 11:08	JCM	TAL CF
Total/NA	Analysis	7471B		1	62860	10/01/14 11:03	JCM	TAL CF

Client Sample ID: B8-W
Date Collected: 09/29/14 11:40
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	OA-1 (GC)		1	62807	10/01/14 16:39	CMM	TAL CF

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Client Sample ID: B8-W
Date Collected: 09/29/14 11:40
Date Received: 09/30/14 09:05

Lab Sample ID: 310-40135-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			63147	10/03/14 08:49	EEE	TAL CF
Total/NA	Analysis	OA-2		1	63613	10/07/14 15:59	BKT	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		1	63348	10/03/14 14:15	OAD	TAL CF
Dissolved	Prep	3010A			62923	10/02/14 08:00	CJT	TAL CF
Dissolved	Analysis	6020A		5	63348	10/03/14 14:57	OAD	TAL CF
Dissolved	Prep	7470A			63055	10/02/14 12:42	JCM	TAL CF
Dissolved	Analysis	7470A		1	63238	10/03/14 11:31	OAD	TAL CF

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

Certification Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Laboratory: TestAmerica Cedar Falls

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-16
Georgia	State Program	4	N/A	09-29-15
Illinois	NELAP	5	200024	11-29-14
Iowa	State Program	7	007	12-01-15
Kansas	NELAP	7	E-10341	01-31-15
Minnesota	NELAP	5	019-999-319	12-31-14
North Dakota	State Program	8	R-186	09-29-14 *
Oregon	NELAP	10	IA100001	09-29-15
Wisconsin	State Program	5	999917270	08-31-15

* Certification renewal pending - certification considered valid.

Method Summary

Client: Terracon Consulting Engineers & Scientists
Project/Site: Muscatine

TestAmerica Job ID: 310-40135-1
SDG: 07147065

Method	Method Description	Protocol	Laboratory
OA-1 (GC)	Volatile Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
OA-2	Iowa - Extractable Petroleum Hydrocarbons (GC)	Iowa DNR	TAL CF
6010C	Metals (ICP)	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
7471B	Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)	SW846	TAL CF

Protocol References:

Iowa DNR = Iowa Department of Natural Resources

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
704 Enterprise Drive • Cedar Falls, IA 50613
Tel 319-277-2401 • Fax 319-277-2425

TestAmerica Sample Receipt and Ter
Cedar Falls Facility

310-40135 Chain of Custody

Client: Terracon Project: Muscatine

City: _____ State: _____

Date: 9-30-14 Receiver's Initials: CH Time (Delivered): 09:05

Temperature Record:

Cooler ID# (If Applicable): Canton

Uncorrected Temp: 2.1 °C

Corrected Temp: 2.0 °C

[X] Temperature blank

[ ] Temperature out of compliance

Thermometer:

[ ] IR "E" - 111531506

[ ] IR "Front" - 61854108

[ ] IR "G" - 130195822

[X] IR "H" - 130195853

[ ] Other:

Courier:

[X] UPS [ ] TA Courier

[ ] FedEx [ ] TA Field Services

[ ] FedEx Ground [ ] Client

[ ] US Postal Service [ ] Other:

[ ] Spee-Dee _____

Coolant Record:

[X] Received on ice

- [X] Wet ice
- [ ] Blue ice
- [ ] Dry ice
- [ ] Other: _____

[ ] NONE

Exceptions Noted:

[ ] Sample(s) not received in cooler

[ ] Sample(s) received same day of sampling

- [ ] Evidence of chilling process

[ ] Temp blank <0°C, samples NOT FROZEN

[ ] Temp blank <0°C, samples FROZEN

[ ] Temperature not taken: *(indicate reason)*

_____

[ ] Non-Conformance Report Started

Custody Seals:

Cooler Custody Seals Present? [X] Yes [ ] No

Cooler Custody Seals Intact? [X] Yes [ ] No [ ] N/A

Sample Custody Seals Present? [ ] Yes [X] No

Sample Custody Seals Intact? [ ] Yes [ ] No [N/A]

Document No.: CF-LG-WI-002
Revision: 20
Date: 7/31/2013

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613

Phone 319-277-2401 or 800-750-2401
Fax 319-277-2425

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring _____

Client Name: Terracon Client #: _____
Address: 870 40th Avenue
City/State/Zip Code: Bettendorf, IA, 52722
Project Manager: Carla Duncan
Email Address: CSDuncan@terracon.com
Telephone Number: 563-355-0702 Fax: _____
Sampler Name: (Print Name) Joshua Lopez
Sampler Signature:

Project Name: Muscatine
Project #: 07147069
Site/Location ID: _____ State: Iowa
Report To: Carla Duncan
Invoice To: _____
Quote #: _____ PO#: _____

TAT
___ Standard
___ Rush (surcharges may apply)
Date Needed: _____
Fax Results: Y N
Email Results: Y N

QC Deliverables
___ None
___ Level 2 (Batch QC)
___ Level 3
___ Level 4
Other: _____

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify, Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: VOC (Meth) (6010B)	BTEX (OA-1)	TEH (OA-2)	REMARKS
B7-4-5	9/29/14	10:05	G		S								X	X	X	
B7-19-20	9/29/14	10:30	G		S								X	X	X	
B8-5-6	9/29/14	10:55	G		S								X	X	X	
B8-W	9/29/14	11:40	G	X	GW								X	X	X	

Special Instructions:

LABORATORY COMMENTS:

	Date:	Time:		Date:	Time:
Relinquished By:	9/29/14	15:45	Received By:	9/29/14	15:45
Relinquished By:	9/29/14	16:15	Received By:	9/30/14	9:10
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAL-0033 (0708)

Page _____ of _____

9/30/2014 **Login Container Summary Report** 310-40135

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
B8-W	310-40135-D-4	Plastic 250ml - w/nitric - dis	>2	2 ml	565345

Page 1 of 1

Login Sample Receipt Checklist

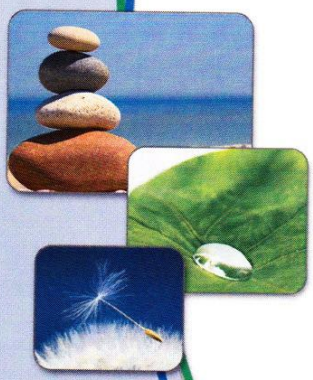
Client: Terracon Consulting Eng & Scientists

Job Number: 310-4013 5-1
SDG Num ber: 07147065

List Source: TestAmerica Cedar Falls

Login Number: 40135
List Number: 1
Creator: Wilson, Cheryl L

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Cedar Falls
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319)277-2401

TestAmerica Job ID: 310-42843-1
TestAmerica Sample Delivery Group: 07147065
Client Project/Site: Muscatine Riverview Suites LSI

For:
Terracon Consulting Eng & Scientists
870 40th Avenue
Bettendorf, Iowa 52722

Attn: Carla Duncan

Angela Muehling

Authorized for release by:
11/5/2014 12:35:11 PM
Angela Muehling, Project Manager I
angela.muehling@testamericainc.com

Designee for

Shawn Hayes, Project Manager II
(319)277-2401
shawn.hayes@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Job ID: 310-42843-1

Laboratory: TestAmerica Cedar Falls

Narrative

Job Narrative
310-42843-1

Comments
No additional comments.

Receipt
The samples were received on 11/1/2014 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.5° C.

GC/MS VOA
Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 66705 recovered above the upper control limit for 1,1,1-Trichloroethane (21.3 %D). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCV 310-66705/3).

Method(s) 8260C: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for batch 67086 recovered outside control limits for the following analytes: Methylene chloride and Hexane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-42843-1	B10-3-4	Soil	10/30/14 09:40	11/01/14 09:30
310-42843-2	B10-W	Ground Water	10/30/14 10:50	11/01/14 09:30
310-42843-3	B11-1-2	Soil	10/30/14 11:40	11/01/14 09:30
310-42843-4	B11-W	Ground Water	10/30/14 12:10	11/01/14 09:30

Detection Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-3-4 — **Lab Sample ID: 310-42843-1**

No Detections.

Client Sample ID: B10-W — **Lab Sample ID: 310-42843-2**

No Detections.

Client Sample ID: B11-1-2 — **Lab Sample ID: 310-42843-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
n-Butylbenzene	14.8		13.7		ug/Kg	1	☼	8260C	Total/NA
Ethylbenzene	22.6		13.7		ug/Kg	1	☼	8260C	Total/NA
N-Propylbenzene	39.1		13.7		ug/Kg	1	☼	8260C	Total/NA

Client Sample ID: B11-W — **Lab Sample ID: 310-42843-4**

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-3-4
Date Collected: 10/30/14 09:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-1
Matrix: Soil
Percent Solids: 87.6

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<138		138		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Benzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Bromobenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Bromochloromethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Bromodichloromethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Bromoform	<27.6		27.6		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Bromomethane	<55.2		55.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
2-Butanone (MEK)	<138		138		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
n-Butylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
sec-Butylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
tert-Butylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Carbon disulfide	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Carbon tetrachloride	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Chlorobenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Chlorodibromomethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Chloroethane	<55.2		55.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Chloroform	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Chloromethane	<55.2		55.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
2-Chlorotoluene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
4-Chlorotoluene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2-Dibromo-3-Chloropropane	<138		138		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2-Dibromoethane (EDB)	<138		138		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Dibromomethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2-Dichlorobenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,3-Dichlorobenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,4-Dichlorobenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Dichlorodifluoromethane	<41.4		41.4		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1-Dichloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2-Dichloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1-Dichloroethene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
cis-1,2-Dichloroethene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
trans-1,2-Dichloroethene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2-Dichloropropane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,3-Dichloropropane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
2,2-Dichloropropane	<55.2		55.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1-Dichloropropene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
cis-1,3-Dichloropropene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
trans-1,3-Dichloropropene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Ethylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Hexachlorobutadiene	<69.0		69.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Hexane	<69.0	*	69.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Isopropylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
p-Isopropyltoluene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Methylene Chloride	<138	*	138		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Methyl tert-butyl ether	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Naphthalene	<69.0		69.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
N-Propylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Styrene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1,1,2-Tetrachloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-3-4
Date Collected: 10/30/14 09:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-1
Matrix: Soil
Percent Solids: 87.6

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Tetrachloroethene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Toluene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2,3-Trichlorobenzene	<69.0		69.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2,4-Trichlorobenzene	<69.0		69.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1,1-Trichloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,1,2-Trichloroethane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Trichloroethene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Trichlorofluoromethane	<55.2		55.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2,3-Trichloropropane	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,2,4-Trimethylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
1,3,5-Trimethylbenzene	<13.8		13.8		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Vinyl chloride	<41.4		41.4		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1
Xylenes, Total	<41.4		41.4		ug/Kg	☼	11/04/14 10:24	11/04/14 14:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*11/04/14 10:24*	*11/04/14 14:32*	*1*
Dibromofluoromethane (Surr)	*94*		*75 - 125*	*11/04/14 10:24*	*11/04/14 14:32*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*	*11/04/14 10:24*	*11/04/14 14:32*	*1*

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-W
Date Collected: 10/30/14 10:50
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-2
Matrix: Ground Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			11/02/14 13:41	1
Benzene	<0.500		0.500		ug/L			11/02/14 13:41	1
Bromobenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Bromochloromethane	<5.00		5.00		ug/L			11/02/14 13:41	1
Bromodichloromethane	<1.00		1.00		ug/L			11/02/14 13:41	1
Bromoform	<5.00		5.00		ug/L			11/02/14 13:41	1
Bromomethane	<4.00		4.00		ug/L			11/02/14 13:41	1
2-Butanone (MEK)	<10.0		10.0		ug/L			11/02/14 13:41	1
n-Butylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
sec-Butylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
tert-Butylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Carbon disulfide	<1.00		1.00		ug/L			11/02/14 13:41	1
Carbon tetrachloride	<2.00		2.00		ug/L			11/02/14 13:41	1
Chlorobenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Chlorodibromomethane	<5.00		5.00		ug/L			11/02/14 13:41	1
Chloroethane	<4.00		4.00		ug/L			11/02/14 13:41	1
Chloroform	<1.00		1.00		ug/L			11/02/14 13:41	1
Chloromethane	<3.00		3.00		ug/L			11/02/14 13:41	1
2-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 13:41	1
4-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2-Dibromo-3-Chloropropane	<10.0		10.0		ug/L			11/02/14 13:41	1
1,2-Dibromoethane (EDB)	<10.0		10.0		ug/L			11/02/14 13:41	1
Dibromomethane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			11/02/14 13:41	1
1,1-Dichloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2-Dichloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,1-Dichloroethene	<2.00		2.00		ug/L			11/02/14 13:41	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 13:41	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2-Dichloropropane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,3-Dichloropropane	<1.00		1.00		ug/L			11/02/14 13:41	1
2,2-Dichloropropane	<4.00		4.00		ug/L			11/02/14 13:41	1
1,1-Dichloropropene	<1.00		1.00		ug/L			11/02/14 13:41	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 13:41	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 13:41	1
Ethylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Hexachlorobutadiene	<5.00		5.00		ug/L			11/02/14 13:41	1
Hexane	<1.00		1.00		ug/L			11/02/14 13:41	1
Isopropylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
p-Isopropyltoluene	<1.00		1.00		ug/L			11/02/14 13:41	1
Methylene Chloride	<5.00		5.00		ug/L			11/02/14 13:41	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			11/02/14 13:41	1
Naphthalene	<5.00		5.00		ug/L			11/02/14 13:41	1
N-Propylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Styrene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-W
Date Collected: 10/30/14 10:50
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-2
Matrix: Ground Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1
Tetrachloroethene	<1.00		1.00		ug/L			11/02/14 13:41	1
Toluene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 13:41	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 13:41	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			11/02/14 13:41	1
Trichloroethene	<1.00		1.00		ug/L			11/02/14 13:41	1
Trichlorofluoromethane	<4.00		4.00		ug/L			11/02/14 13:41	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			11/02/14 13:41	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 13:41	1
Vinyl chloride	<1.00		1.00		ug/L			11/02/14 13:41	1
Xylenes, Total	<3.00		3.00		ug/L			11/02/14 13:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*75 - 120*		*11/02/14 13:41*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 120*		*11/02/14 13:41*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*11/02/14 13:41*	*1*

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B11-1-2
Date Collected: 10/30/14 11:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-3
Matrix: Soil
Percent Solids: 82.1

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<137		137		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Benzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Bromobenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Bromochloromethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Bromodichloromethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Bromoform	<27.5		27.5		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Bromomethane	<55.0		55.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
2-Butanone (MEK)	<137		137		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
n-Butylbenzene	**14.8**		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
sec-Butylbenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
tert-Butylbenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Carbon disulfide	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Carbon tetrachloride	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Chlorobenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Chlorodibromomethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Chloroethane	<55.0		55.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Chloroform	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Chloromethane	<55.0		55.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
2-Chlorotoluene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
4-Chlorotoluene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2-Dibromo-3-Chloropropane	<137		137		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2-Dibromoethane (EDB)	<137		137		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Dibromomethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2-Dichlorobenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,3-Dichlorobenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,4-Dichlorobenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Dichlorodifluoromethane	<41.2		41.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1-Dichloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2-Dichloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1-Dichloroethene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
cis-1,2-Dichloroethene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
trans-1,2-Dichloroethene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2-Dichloropropane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,3-Dichloropropane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
2,2-Dichloropropane	<55.0		55.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1-Dichloropropene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
cis-1,3-Dichloropropene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
trans-1,3-Dichloropropene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Ethylbenzene	**22.6**		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Hexachlorobutadiene	<68.7		68.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Hexane	<68.7	*	68.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Isopropylbenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
p-Isopropyltoluene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Methylene Chloride	<137	*	137		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Methyl tert-butyl ether	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Naphthalene	<68.7		68.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
N-Propylbenzene	**39.1**		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Styrene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1,1,2-Tetrachloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B11-1-2
Date Collected: 10/30/14 11:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-3
Matrix: Soil
Percent Solids: 82.1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Tetrachloroethene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Toluene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2,3-Trichlorobenzene	<68.7		68.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2,4-Trichlorobenzene	<68.7		68.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1,1-Trichloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,1,2-Trichloroethane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Trichloroethene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Trichlorofluoromethane	<55.0		55.0		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2,3-Trichloropropane	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,2,4-Trimethylbenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
1,3,5-Trimethylbenzene	<13.7		13.7		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Vinyl chloride	<41.2		41.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1
Xylenes, Total	<41.2		41.2		ug/Kg	☼	11/04/14 10:24	11/04/14 14:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*	*11/04/14 10:24*	*11/04/14 14:57*	*1*
Dibromofluoromethane (Surr)	*99*		*75 - 125*	*11/04/14 10:24*	*11/04/14 14:57*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*	*11/04/14 10:24*	*11/04/14 14:57*	*1*

Client Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B11-W
Date Collected: 10/30/14 12:10
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-4
Matrix: Ground Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			11/02/14 14:07	1
Benzene	<0.500		0.500		ug/L			11/02/14 14:07	1
Bromobenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Bromochloromethane	<5.00		5.00		ug/L			11/02/14 14:07	1
Bromodichloromethane	<1.00		1.00		ug/L			11/02/14 14:07	1
Bromoform	<5.00		5.00		ug/L			11/02/14 14:07	1
Bromomethane	<4.00		4.00		ug/L			11/02/14 14:07	1
2-Butanone (MEK)	<10.0		10.0		ug/L			11/02/14 14:07	1
n-Butylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
sec-Butylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
tert-Butylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Carbon disulfide	<1.00		1.00		ug/L			11/02/14 14:07	1
Carbon tetrachloride	<2.00		2.00		ug/L			11/02/14 14:07	1
Chlorobenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Chlorodibromomethane	<5.00		5.00		ug/L			11/02/14 14:07	1
Chloroethane	<4.00		4.00		ug/L			11/02/14 14:07	1
Chloroform	<1.00		1.00		ug/L			11/02/14 14:07	1
Chloromethane	<3.00		3.00		ug/L			11/02/14 14:07	1
2-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 14:07	1
4-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2-Dibromo-3-Chloropropane	<10.0		10.0		ug/L			11/02/14 14:07	1
1,2-Dibromoethane (EDB)	<10.0		10.0		ug/L			11/02/14 14:07	1
Dibromomethane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			11/02/14 14:07	1
1,1-Dichloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2-Dichloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,1-Dichloroethene	<2.00		2.00		ug/L			11/02/14 14:07	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 14:07	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2-Dichloropropane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,3-Dichloropropane	<1.00		1.00		ug/L			11/02/14 14:07	1
2,2-Dichloropropane	<4.00		4.00		ug/L			11/02/14 14:07	1
1,1-Dichloropropene	<1.00		1.00		ug/L			11/02/14 14:07	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 14:07	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 14:07	1
Ethylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Hexachlorobutadiene	<5.00		5.00		ug/L			11/02/14 14:07	1
Hexane	<1.00		1.00		ug/L			11/02/14 14:07	1
Isopropylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
p-Isopropyltoluene	<1.00		1.00		ug/L			11/02/14 14:07	1
Methylene Chloride	<5.00		5.00		ug/L			11/02/14 14:07	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			11/02/14 14:07	1
Naphthalene	<5.00		5.00		ug/L			11/02/14 14:07	1
N-Propylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Styrene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B11-W
Date Collected: 10/30/14 12:10
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-4
Matrix: Ground Water

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1
Tetrachloroethene	<1.00		1.00		ug/L			11/02/14 14:07	1
Toluene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 14:07	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 14:07	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			11/02/14 14:07	1
Trichloroethene	<1.00		1.00		ug/L			11/02/14 14:07	1
Trichlorofluoromethane	<4.00		4.00		ug/L			11/02/14 14:07	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			11/02/14 14:07	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 14:07	1
Vinyl chloride	<1.00		1.00		ug/L			11/02/14 14:07	1
Xylenes, Total	<3.00		3.00		ug/L			11/02/14 14:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*		*11/02/14 14:07*	*1*
Dibromofluoromethane (Surr)	*109*		*75 - 120*		*11/02/14 14:07*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*11/02/14 14:07*	*1*

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD exceeds the control limits
F1	MS and/or MSD Recovery exceeds the control limits
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Ground Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(75-120)	(75-120)	(80-120)
310-42843-2	B10-W	98	107	98
310-42843-2 MS	B10-W	95	108	96
310-42843-2 MSD	B10-W	95	107	97
310-42843-4	B11-W	97	109	99

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Soil

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(75-125)	(80-120)
310-42843-1	B10-3-4	98	94	97
310-42843-1 MS	B10-3-4	99	103	101
310-42843-1 MSD	B10-3-4	100	101	101
310-42843-3	B11-1-2	99	99	101

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(75-125)	(80-120)
LCS 310-67085/2-A	Lab Control Sample	100	102	100
MB 310-67085/1-A	Method Blank	98	96	101

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(75-120)	(75-120)	(80-120)
LCS 310-66705/4	Lab Control Sample	97	106	97
MB 310-66705/7	Method Blank	97	104	97

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 310-66705/7
Matrix: Water
Analysis Batch: 66705

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			11/02/14 05:34	1
Benzene	<0.500		0.500		ug/L			11/02/14 05:34	1
Bromobenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Bromochloromethane	<5.00		5.00		ug/L			11/02/14 05:34	1
Bromodichloromethane	<1.00		1.00		ug/L			11/02/14 05:34	1
Bromoform	<5.00		5.00		ug/L			11/02/14 05:34	1
Bromomethane	<4.00		4.00		ug/L			11/02/14 05:34	1
2-Butanone (MEK)	<10.0		10.0		ug/L			11/02/14 05:34	1
n-Butylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
sec-Butylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
tert-Butylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Carbon disulfide	<1.00		1.00		ug/L			11/02/14 05:34	1
Carbon tetrachloride	<2.00		2.00		ug/L			11/02/14 05:34	1
Chlorobenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Chlorodibromomethane	<5.00		5.00		ug/L			11/02/14 05:34	1
Chloroethane	<4.00		4.00		ug/L			11/02/14 05:34	1
Chloroform	<1.00		1.00		ug/L			11/02/14 05:34	1
Chloromethane	<3.00		3.00		ug/L			11/02/14 05:34	1
2-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 05:34	1
4-Chlorotoluene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2-Dibromo-3-Chloropropane	<10.0		10.0		ug/L			11/02/14 05:34	1
1,2-Dibromoethane (EDB)	<10.0		10.0		ug/L			11/02/14 05:34	1
Dibromomethane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			11/02/14 05:34	1
1,1-Dichloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2-Dichloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,1-Dichloroethene	<2.00		2.00		ug/L			11/02/14 05:34	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 05:34	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2-Dichloropropane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,3-Dichloropropane	<1.00		1.00		ug/L			11/02/14 05:34	1
2,2-Dichloropropane	<4.00		4.00		ug/L			11/02/14 05:34	1
1,1-Dichloropropene	<1.00		1.00		ug/L			11/02/14 05:34	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 05:34	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			11/02/14 05:34	1
Ethylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Hexachlorobutadiene	<5.00		5.00		ug/L			11/02/14 05:34	1
Hexane	<1.00		1.00		ug/L			11/02/14 05:34	1
Isopropylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
p-Isopropyltoluene	<1.00		1.00		ug/L			11/02/14 05:34	1
Methylene Chloride	<5.00		5.00		ug/L			11/02/14 05:34	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			11/02/14 05:34	1
Naphthalene	<5.00		5.00		ug/L			11/02/14 05:34	1
N-Propylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Styrene	<1.00		1.00		ug/L			11/02/14 05:34	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-66705/7
Matrix: Water
Analysis Batch: 66705

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
Tetrachloroethene	<1.00		1.00		ug/L			11/02/14 05:34	1
Toluene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 05:34	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			11/02/14 05:34	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			11/02/14 05:34	1
Trichloroethene	<1.00		1.00		ug/L			11/02/14 05:34	1
Trichlorofluoromethane	<4.00		4.00		ug/L			11/02/14 05:34	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			11/02/14 05:34	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			11/02/14 05:34	1
Vinyl chloride	<1.00		1.00		ug/L			11/02/14 05:34	1
Xylenes, Total	<3.00		3.00		ug/L			11/02/14 05:34	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*		*11/02/14 05:34*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 120*		*11/02/14 05:34*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*11/02/14 05:34*	*1*

Lab Sample ID: LCS 310-66705/4
Matrix: Water
Analysis Batch: 66705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	40.0	43.98		ug/L		110	60 - 150
Benzene	20.0	21.95		ug/L		110	70 - 130
Bromobenzene	20.0	21.41		ug/L		107	75 - 130
Bromochloromethane	20.0	23.15		ug/L		116	65 - 145
Bromodichloromethane	20.0	21.68		ug/L		108	60 - 130
Bromoform	20.0	19.26		ug/L		96	30 - 125
Bromomethane	20.0	18.76		ug/L		94	35 - 130
2-Butanone (MEK)	40.0	39.09		ug/L		98	55 - 140
n-Butylbenzene	20.0	20.64		ug/L		103	55 - 135
sec-Butylbenzene	20.0	22.62		ug/L		113	65 - 135
tert-Butylbenzene	20.0	22.53		ug/L		113	60 - 135
Carbon disulfide	20.0	21.83		ug/L		109	40 - 130
Carbon tetrachloride	20.0	23.21		ug/L		116	55 - 130
Chlorobenzene	20.0	21.88		ug/L		109	75 - 125
Chlorodibromomethane	20.0	21.09		ug/L		105	45 - 125
Chloroethane	20.0	21.12		ug/L		106	55 - 135
Chloroform	20.0	23.76		ug/L		119	70 - 125
Chloromethane	20.0	16.92		ug/L		85	30 - 125
2-Chlorotoluene	20.0	21.46		ug/L		107	75 - 135
4-Chlorotoluene	20.0	22.03		ug/L		110	70 - 140
1,2-Dibromo-3-Chloropropane	20.0	17.90		ug/L		89	35 - 130
1,2-Dibromoethane (EDB)	20.0	21.59		ug/L		108	70 - 135

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-66705/4
Matrix: Water
Analysis Batch: 66705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dibromomethane	20.0	21.77		ug/L		109	75 - 130
1,2-Dichlorobenzene	20.0	21.43		ug/L		107	65 - 135
1,3-Dichlorobenzene	20.0	21.12		ug/L		106	70 - 130
1,4-Dichlorobenzene	20.0	20.94		ug/L		105	60 - 140
Dichlorodifluoromethane	20.0	18.39		ug/L		92	35 - 130
1,1-Dichloroethane	20.0	22.50		ug/L		113	60 - 130
1,2-Dichloroethane	20.0	23.08		ug/L		115	65 - 140
1,1-Dichloroethene	20.0	22.65		ug/L		113	60 - 135
cis-1,2-Dichloroethene	20.0	22.28		ug/L		111	70 - 135
trans-1,2-Dichloroethene	20.0	23.24		ug/L		116	60 - 145
1,2-Dichloropropane	20.0	22.52		ug/L		113	65 - 130
1,3-Dichloropropane	20.0	22.15		ug/L		111	75 - 125
2,2-Dichloropropane	20.0	22.59		ug/L		113	25 - 120
1,1-Dichloropropene	20.0	23.77		ug/L		119	60 - 140
cis-1,3-Dichloropropene	20.0	21.77		ug/L		109	30 - 120
trans-1,3-Dichloropropene	20.0	20.17		ug/L		101	35 - 120
Ethylbenzene	20.0	22.52		ug/L		113	70 - 130
Hexachlorobutadiene	20.0	20.20		ug/L		101	60 - 135
Hexane	20.0	21.24		ug/L		106	40 - 135
Isopropylbenzene	20.0	22.76		ug/L		114	70 - 125
p-Isopropyltoluene	20.0	20.92		ug/L		105	60 - 140
Methylene Chloride	20.0	22.31		ug/L		112	55 - 145
Methyl tert-butyl ether	20.0	22.61		ug/L		113	50 - 135
Naphthalene	20.0	19.18		ug/L		96	40 - 135
N-Propylbenzene	20.0	22.30		ug/L		112	70 - 135
Styrene	20.0	22.45		ug/L		112	70 - 130
1,1,1,2-Tetrachloroethane	20.0	21.86		ug/L		109	65 - 120
1,1,2,2-Tetrachloroethane	20.0	18.85		ug/L		94	65 - 130
Tetrachloroethene	20.0	24.87		ug/L		124	70 - 135
Toluene	20.0	22.43		ug/L		112	70 - 135
1,2,3-Trichlorobenzene	20.0	19.59		ug/L		98	55 - 130
1,2,4-Trichlorobenzene	20.0	19.51		ug/L		98	40 - 135
1,1,1-Trichloroethane	20.0	24.42		ug/L		122	60 - 125
1,1,2-Trichloroethane	20.0	20.91		ug/L		105	75 - 125
Trichloroethene	20.0	22.88		ug/L		114	70 - 130
Trichlorofluoromethane	20.0	23.44		ug/L		117	55 - 145
1,2,3-Trichloropropane	20.0	19.50		ug/L		97	60 - 150
1,2,4-Trimethylbenzene	20.0	21.84		ug/L		109	70 - 140
1,3,5-Trimethylbenzene	20.0	22.77		ug/L		114	70 - 140
Vinyl chloride	20.0	20.02		ug/L		100	45 - 135
Xylenes, Total	40.0	44.48		ug/L		111	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*
Dibromofluoromethane (Surr)	*106*		*75 - 120*
Toluene-d8 (Surr)	*97*		*80 - 120*

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-2 MS
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	<10.0		40.0	45.52		ug/L		114	45 - 150
Benzene	<0.500		20.0	19.02		ug/L		95	50 - 130
Bromobenzene	<1.00		20.0	19.15		ug/L		96	60 - 135
Bromochloromethane	<5.00		20.0	23.06		ug/L		115	55 - 145
Bromodichloromethane	<1.00		20.0	19.74		ug/L		99	50 - 130
Bromoform	<5.00		20.0	19.40		ug/L		97	30 - 125
Bromomethane	<4.00		20.0	14.49		ug/L		72	30 - 130
2-Butanone (MEK)	<10.0		40.0	40.42		ug/L		101	45 - 140
n-Butylbenzene	<1.00		20.0	13.70		ug/L		69	40 - 135
sec-Butylbenzene	<1.00		20.0	15.83		ug/L		79	40 - 135
tert-Butylbenzene	<1.00		20.0	18.06		ug/L		90	40 - 135
Carbon disulfide	<1.00		20.0	18.06		ug/L		90	30 - 130
Carbon tetrachloride	<2.00		20.0	18.30		ug/L		91	35 - 130
Chlorobenzene	<1.00		20.0	19.32		ug/L		97	60 - 130
Chlorodibromomethane	<5.00		20.0	20.41		ug/L		102	35 - 130
Chloroethane	<4.00		20.0	19.80		ug/L		99	40 - 135
Chloroform	<1.00		20.0	21.61		ug/L		108	55 - 125
Chloromethane	<3.00		20.0	16.88		ug/L		84	25 - 125
2-Chlorotoluene	<1.00		20.0	18.02		ug/L		90	55 - 140
4-Chlorotoluene	<1.00		20.0	18.48		ug/L		92	50 - 140
1,2-Dibromo-3-Chloropropane	<10.0		20.0	18.25		ug/L		91	35 - 130
1,2-Dibromoethane (EDB)	<10.0		20.0	21.41		ug/L		107	55 - 140
Dibromomethane	<1.00		20.0	22.50		ug/L		113	60 - 135
1,2-Dichlorobenzene	<1.00		20.0	18.45		ug/L		92	55 - 140
1,3-Dichlorobenzene	<1.00		20.0	18.21		ug/L		91	55 - 135
1,4-Dichlorobenzene	<1.00		20.0	17.70		ug/L		89	55 - 140
Dichlorodifluoromethane	<3.00		20.0	15.38		ug/L		77	15 - 130
1,1-Dichloroethane	<1.00		20.0	20.42		ug/L		102	50 - 130
1,2-Dichloroethane	<1.00		20.0	24.15		ug/L		121	55 - 140
1,1-Dichloroethene	<2.00		20.0	18.68		ug/L		93	35 - 135
cis-1,2-Dichloroethene	<1.00		20.0	20.80		ug/L		104	45 - 135
trans-1,2-Dichloroethene	<1.00		20.0	20.06		ug/L		100	45 - 145
1,2-Dichloropropane	<1.00		20.0	20.16		ug/L		101	55 - 130
1,3-Dichloropropane	<1.00		20.0	21.26		ug/L		106	60 - 135
2,2-Dichloropropane	<4.00		20.0	16.27		ug/L		81	20 - 120
1,1-Dichloropropene	<1.00		20.0	19.53		ug/L		98	40 - 140
cis-1,3-Dichloropropene	<5.00		20.0	19.91		ug/L		100	25 - 120
trans-1,3-Dichloropropene	<5.00		20.0	20.75		ug/L		104	25 - 120
Ethylbenzene	<1.00		20.0	18.79		ug/L		94	45 - 135
Hexachlorobutadiene	<5.00		20.0	11.47		ug/L		57	40 - 135
Hexane	<1.00		20.0	11.11		ug/L		56	25 - 135
Isopropylbenzene	<1.00		20.0	17.77		ug/L		89	45 - 125
p-Isopropyltoluene	<1.00		20.0	14.78		ug/L		74	40 - 140
Methylene Chloride	<5.00		20.0	21.55		ug/L		108	45 - 145
Methyl tert-butyl ether	<1.00		20.0	22.42		ug/L		112	40 - 135
Naphthalene	<5.00		20.0	15.80		ug/L		79	40 - 135
N-Propylbenzene	<1.00		20.0	17.13		ug/L		86	45 - 140
Styrene	<1.00		20.0	18.95		ug/L		95	40 - 135

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-2 MS
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	<1.00		20.0	20.07		ug/L		100	50 - 130
1,1,2,2-Tetrachloroethane	<1.00		20.0	19.58		ug/L		98	55 - 140
Tetrachloroethene	<1.00		20.0	18.36		ug/L		92	40 - 135
Toluene	<1.00		20.0	19.54		ug/L		98	45 - 135
1,2,3-Trichlorobenzene	<5.00		20.0	15.14		ug/L		76	50 - 140
1,2,4-Trichlorobenzene	<5.00		20.0	13.59		ug/L		68	40 - 135
1,1,1-Trichloroethane	<1.00		20.0	19.92		ug/L		100	40 - 125
1,1,2-Trichloroethane	<1.00		20.0	20.67		ug/L		103	60 - 130
Trichloroethene	<1.00		20.0	19.73		ug/L		99	50 - 130
Trichlorofluoromethane	<4.00		20.0	19.80		ug/L		99	40 - 145
1,2,3-Trichloropropane	<1.00		20.0	20.44		ug/L		102	55 - 150
1,2,4-Trimethylbenzene	<1.00		20.0	17.71		ug/L		89	45 - 140
1,3,5-Trimethylbenzene	<1.00		20.0	18.16		ug/L		91	45 - 140
Vinyl chloride	<1.00		20.0	21.35		ug/L		107	30 - 135
Xylenes, Total	<3.00		40.0	38.22		ug/L		96	40 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*75 - 120*
Dibromofluoromethane (Surr)	*108*		*75 - 120*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: 310-42843-2 MSD
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	<10.0		40.0	44.83		ug/L		112	45 - 150	2	20
Benzene	<0.500		20.0	19.94		ug/L		100	50 - 130	5	20
Bromobenzene	<1.00		20.0	19.11		ug/L		96	60 - 135	0	20
Bromochloromethane	<5.00		20.0	24.06		ug/L		120	55 - 145	4	20
Bromodichloromethane	<1.00		20.0	20.65		ug/L		103	50 - 130	5	20
Bromoform	<5.00		20.0	19.40		ug/L		97	30 - 125	0	20
Bromomethane	<4.00		20.0	18.96	F2	ug/L		95	30 - 130	27	20
2-Butanone (MEK)	<10.0		40.0	39.55		ug/L		99	45 - 140	2	20
n-Butylbenzene	<1.00		20.0	14.63		ug/L		73	40 - 135	7	20
sec-Butylbenzene	<1.00		20.0	16.89		ug/L		84	40 - 135	6	15
tert-Butylbenzene	<1.00		20.0	18.62		ug/L		93	40 - 135	3	15
Carbon disulfide	<1.00		20.0	18.76		ug/L		94	30 - 130	4	20
Carbon tetrachloride	<2.00		20.0	18.83		ug/L		94	35 - 130	3	20
Chlorobenzene	<1.00		20.0	19.46		ug/L		97	60 - 130	1	20
Chlorodibromomethane	<5.00		20.0	20.80		ug/L		104	35 - 130	2	20
Chloroethane	<4.00		20.0	19.79		ug/L		99	40 - 135	0	20
Chloroform	<1.00		20.0	21.98		ug/L		110	55 - 125	2	20
Chloromethane	<3.00		20.0	17.89		ug/L		89	25 - 125	6	20
2-Chlorotoluene	<1.00		20.0	18.58		ug/L		93	55 - 140	3	20
4-Chlorotoluene	<1.00		20.0	18.79		ug/L		94	50 - 140	2	20
1,2-Dibromo-3-Chloropropane	<10.0		20.0	18.44		ug/L		92	35 - 130	1	20
1,2-Dibromoethane (EDB)	<10.0		20.0	21.93		ug/L		110	55 - 140	2	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-2 MS
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	<1.00		20.0	20.07		ug/L		100	50 - 130
1,1,2,2-Tetrachloroethane	<1.00		20.0	19.58		ug/L		98	55 - 140
Tetrachloroethene	<1.00		20.0	18.36		ug/L		92	40 - 135
Toluene	<1.00		20.0	19.54		ug/L		98	45 - 135
1,2,3-Trichlorobenzene	<5.00		20.0	15.14		ug/L		76	50 - 140
1,2,4-Trichlorobenzene	<5.00		20.0	13.59		ug/L		68	40 - 135
1,1,1-Trichloroethane	<1.00		20.0	19.92		ug/L		100	40 - 125
1,1,2-Trichloroethane	<1.00		20.0	20.67		ug/L		103	60 - 130
Trichloroethene	<1.00		20.0	19.73		ug/L		99	50 - 130
Trichlorofluoromethane	<4.00		20.0	19.80		ug/L		99	40 - 145
1,2,3-Trichloropropane	<1.00		20.0	20.44		ug/L		102	55 - 150
1,2,4-Trimethylbenzene	<1.00		20.0	17.71		ug/L		89	45 - 140
1,3,5-Trimethylbenzene	<1.00		20.0	18.16		ug/L		91	45 - 140
Vinyl chloride	<1.00		20.0	21.35		ug/L		107	30 - 135
Xylenes, Total	<3.00		40.0	38.22		ug/L		96	40 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*75 - 120*
Dibromofluoromethane (Surr)	*108*		*75 - 120*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: 310-42843-2 MSD
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	<10.0		40.0	44.83		ug/L		112	45 - 150	2	20
Benzene	<0.500		20.0	19.94		ug/L		100	50 - 130	5	20
Bromobenzene	<1.00		20.0	19.11		ug/L		96	60 - 135	0	20
Bromochloromethane	<5.00		20.0	24.06		ug/L		120	55 - 145	4	20
Bromodichloromethane	<1.00		20.0	20.65		ug/L		103	50 - 130	5	20
Bromoform	<5.00		20.0	19.40		ug/L		97	30 - 125	0	20
Bromomethane	<4.00		20.0	18.96	F2	ug/L		95	30 - 130	27	20
2-Butanone (MEK)	<10.0		40.0	39.55		ug/L		99	45 - 140	2	20
n-Butylbenzene	<1.00		20.0	14.63		ug/L		73	40 - 135	7	20
sec-Butylbenzene	<1.00		20.0	16.89		ug/L		84	40 - 135	6	15
tert-Butylbenzene	<1.00		20.0	18.62		ug/L		93	40 - 135	3	15
Carbon disulfide	<1.00		20.0	18.76		ug/L		94	30 - 130	4	20
Carbon tetrachloride	<2.00		20.0	18.83		ug/L		94	35 - 130	3	20
Chlorobenzene	<1.00		20.0	19.46		ug/L		97	60 - 130	1	20
Chlorodibromomethane	<5.00		20.0	20.80		ug/L		104	35 - 130	2	20
Chloroethane	<4.00		20.0	19.79		ug/L		99	40 - 135	0	20
Chloroform	<1.00		20.0	21.98		ug/L		110	55 - 125	2	20
Chloromethane	<3.00		20.0	17.89		ug/L		89	25 - 125	6	20
2-Chlorotoluene	<1.00		20.0	18.58		ug/L		93	55 - 140	3	20
4-Chlorotoluene	<1.00		20.0	18.79		ug/L		94	50 - 140	2	20
1,2-Dibromo-3-Chloropropane	<10.0		20.0	18.44		ug/L		92	35 - 130	1	20
1,2-Dibromoethane (EDB)	<10.0		20.0	21.93		ug/L		110	55 - 140	2	20

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-2 MSD
Matrix: Ground Water
Analysis Batch: 66705

Client Sample ID: B10-W
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromomethane	<1.00		20.0	21.92		ug/L		110	60 - 135	3	20
1,2-Dichlorobenzene	<1.00		20.0	19.05		ug/L		95	55 - 140	3	20
1,3-Dichlorobenzene	<1.00		20.0	18.65		ug/L		93	55 - 135	2	20
1,4-Dichlorobenzene	<1.00		20.0	18.41		ug/L		92	55 - 140	4	20
Dichlorodifluoromethane	<3.00		20.0	16.05		ug/L		80	15 - 130	4	20
1,1-Dichloroethane	<1.00		20.0	20.91		ug/L		105	50 - 130	2	20
1,2-Dichloroethane	<1.00		20.0	24.38		ug/L		122	55 - 140	1	20
1,1-Dichloroethene	<2.00		20.0	18.03		ug/L		90	35 - 135	3	20
cis-1,2-Dichloroethene	<1.00		20.0	21.22		ug/L		106	45 - 135	2	20
trans-1,2-Dichloroethene	<1.00		20.0	20.81		ug/L		104	45 - 145	4	20
1,2-Dichloropropane	<1.00		20.0	20.87		ug/L		104	55 - 130	3	20
1,3-Dichloropropane	<1.00		20.0	22.08		ug/L		110	60 - 135	4	20
2,2-Dichloropropane	<4.00		20.0	17.11		ug/L		86	20 - 120	5	20
1,1-Dichloropropene	<1.00		20.0	19.91		ug/L		100	40 - 140	2	20
cis-1,3-Dichloropropene	<5.00		20.0	20.68		ug/L		103	25 - 120	4	20
trans-1,3-Dichloropropene	<5.00		20.0	21.96		ug/L		110	25 - 120	6	20
Ethylbenzene	<1.00		20.0	18.99		ug/L		95	45 - 135	1	20
Hexachlorobutadiene	<5.00		20.0	11.31		ug/L		57	40 - 135	1	20
Hexane	<1.00		20.0	11.68		ug/L		58	25 - 135	5	20
Isopropylbenzene	<1.00		20.0	18.29		ug/L		91	45 - 125	3	20
p-Isopropyltoluene	<1.00		20.0	15.92		ug/L		80	40 - 140	7	20
Methylene Chloride	<5.00		20.0	21.65		ug/L		108	45 - 145	0	20
Methyl tert-butyl ether	<1.00		20.0	23.58		ug/L		118	40 - 135	5	20
Naphthalene	<5.00		20.0	16.95		ug/L		85	40 - 135	7	20
N-Propylbenzene	<1.00		20.0	17.85		ug/L		89	45 - 140	4	20
Styrene	<1.00		20.0	19.43		ug/L		97	40 - 135	3	20
1,1,1,2-Tetrachloroethane	<1.00		20.0	20.87		ug/L		104	50 - 130	4	20
1,1,2,2-Tetrachloroethane	<1.00		20.0	19.25		ug/L		96	55 - 140	2	20
Tetrachloroethene	<1.00		20.0	18.60		ug/L		93	40 - 135	1	20
Toluene	<1.00		20.0	19.79		ug/L		99	45 - 135	1	20
1,2,3-Trichlorobenzene	<5.00		20.0	16.03		ug/L		80	50 - 140	6	20
1,2,4-Trichlorobenzene	<5.00		20.0	15.21		ug/L		76	40 - 135	11	20
1,1,1-Trichloroethane	<1.00		20.0	20.11		ug/L		101	40 - 125	1	20
1,1,2-Trichloroethane	<1.00		20.0	21.55		ug/L		108	60 - 130	4	20
Trichloroethene	<1.00		20.0	20.13		ug/L		101	50 - 130	2	20
Trichlorofluoromethane	<4.00		20.0	19.80		ug/L		99	40 - 145	0	20
1,2,3-Trichloropropane	<1.00		20.0	20.42		ug/L		102	55 - 150	0	20
1,2,4-Trimethylbenzene	<1.00		20.0	18.90		ug/L		94	45 - 140	6	20
1,3,5-Trimethylbenzene	<1.00		20.0	19.12		ug/L		96	45 - 140	5	20
Vinyl chloride	<1.00		20.0	22.96		ug/L		115	30 - 135	7	20
Xylenes, Total	<3.00		40.0	38.24		ug/L		96	40 - 135	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*75 - 120*
Dibromofluoromethane (Surr)	*107*		*75 - 120*
Toluene-d8 (Surr)	*97*		*80 - 120*

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-67085/1-A
Matrix: Solid
Analysis Batch: 67086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 67085

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<124		124		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Benzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Bromobenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Bromochloromethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Bromodichloromethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Bromoform	<24.8		24.8		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Bromomethane	<49.6		49.6		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
2-Butanone (MEK)	<124		124		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
n-Butylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
sec-Butylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
tert-Butylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Carbon disulfide	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Carbon tetrachloride	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Chlorobenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Chlorodibromomethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Chloroethane	<49.6		49.6		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Chloroform	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Chloromethane	<49.6		49.6		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
2-Chlorotoluene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
4-Chlorotoluene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2-Dibromo-3-Chloropropane	<124		124		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2-Dibromoethane (EDB)	<124		124		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Dibromomethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2-Dichlorobenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,3-Dichlorobenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,4-Dichlorobenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Dichlorodifluoromethane	<37.2		37.2		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1-Dichloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2-Dichloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1-Dichloroethene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
cis-1,2-Dichloroethene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
trans-1,2-Dichloroethene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2-Dichloropropane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,3-Dichloropropane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
2,2-Dichloropropane	<49.6		49.6		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1-Dichloropropene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
cis-1,3-Dichloropropene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
trans-1,3-Dichloropropene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Ethylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Hexachlorobutadiene	<62.0		62.0		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Hexane	<62.0		62.0		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Isopropylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
p-Isopropyltoluene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Methylene Chloride	<124		124		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Methyl tert-butyl ether	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Naphthalene	<62.0		62.0		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
N-Propylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Styrene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-67085/1-A
Matrix: Solid
Analysis Batch: 67086

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 67085

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1,2,2-Tetrachloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Tetrachloroethene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Toluene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2,3-Trichlorobenzene	<62.0		62.0		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2,4-Trichlorobenzene	<62.0		62.0		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1,1-Trichloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,1,2-Trichloroethane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Trichloroethene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Trichlorofluoromethane	<49.6		49.6		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2,3-Trichloropropane	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,2,4-Trimethylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
1,3,5-Trimethylbenzene	<12.4		12.4		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Vinyl chloride	<37.2		37.2		ug/Kg		11/04/14 10:24	11/04/14 12:29	1
Xylenes, Total	<37.2		37.2		ug/Kg		11/04/14 10:24	11/04/14 12:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*11/04/14 10:24*	*11/04/14 12:29*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 125*	*11/04/14 10:24*	*11/04/14 12:29*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*	*11/04/14 10:24*	*11/04/14 12:29*	*1*

Lab Sample ID: LCS 310-67085/2-A
Matrix: Solid
Analysis Batch: 67086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	88.4	103.1	J	ug/Kg		117	65 - 150
Benzene	44.2	43.87		ug/Kg		99	55 - 135
Bromobenzene	44.2	44.11		ug/Kg		100	65 - 125
Bromochloromethane	44.2	46.33		ug/Kg		105	65 - 130
Bromodichloromethane	44.2	45.11		ug/Kg		102	65 - 130
Bromoform	44.2	49.48		ug/Kg		112	50 - 135
Bromomethane	44.2	37.58	J	ug/Kg		85	45 - 135
2-Butanone (MEK)	88.4	92.19	J	ug/Kg		104	50 - 145
n-Butylbenzene	44.2	42.22		ug/Kg		96	55 - 130
sec-Butylbenzene	44.2	42.53		ug/Kg		96	60 - 125
tert-Butylbenzene	44.2	44.58		ug/Kg		101	55 - 125
Carbon disulfide	44.2	43.31		ug/Kg		98	40 - 135
Carbon tetrachloride	44.2	43.43		ug/Kg		98	55 - 130
Chlorobenzene	44.2	44.45		ug/Kg		101	60 - 120
Chlorodibromomethane	44.2	44.52		ug/Kg		101	55 - 130
Chloroethane	44.2	36.53	J	ug/Kg		83	50 - 145
Chloroform	44.2	43.90		ug/Kg		99	65 - 130
Chloromethane	44.2	34.62	J	ug/Kg		78	40 - 135
2-Chlorotoluene	44.2	43.02		ug/Kg		97	60 - 125
4-Chlorotoluene	44.2	43.57		ug/Kg		99	60 - 125
1,2-Dibromo-3-Chloropropane	44.2	42.92	J	ug/Kg		97	50 - 140
1,2-Dibromoethane (EDB)	44.2	45.53	J	ug/Kg		103	55 - 140

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-67085/2-A
Matrix: Solid
Analysis Batch: 67086

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dibromomethane	44.2	46.42		ug/Kg		105	65 - 135
1,2-Dichlorobenzene	44.2	45.43		ug/Kg		103	65 - 120
1,3-Dichlorobenzene	44.2	44.28		ug/Kg		100	60 - 125
1,4-Dichlorobenzene	44.2	44.66		ug/Kg		101	60 - 125
Dichlorodifluoromethane	44.2	32.71	J	ug/Kg		74	40 - 135
1,1-Dichloroethane	44.2	44.35		ug/Kg		100	55 - 135
1,2-Dichloroethane	44.2	45.71		ug/Kg		103	60 - 140
1,1-Dichloroethene	44.2	45.45		ug/Kg		103	50 - 145
cis-1,2-Dichloroethene	44.2	44.95		ug/Kg		102	60 - 135
trans-1,2-Dichloroethene	44.2	45.15		ug/Kg		102	55 - 135
1,2-Dichloropropane	44.2	44.81		ug/Kg		101	55 - 130
1,3-Dichloropropane	44.2	45.45		ug/Kg		103	55 - 140
2,2-Dichloropropane	44.2	44.47		ug/Kg		101	40 - 135
1,1-Dichloropropene	44.2	42.56		ug/Kg		96	55 - 130
cis-1,3-Dichloropropene	44.2	44.24		ug/Kg		100	50 - 115
trans-1,3-Dichloropropene	44.2	44.51		ug/Kg		101	55 - 130
Ethylbenzene	44.2	43.24		ug/Kg		98	60 - 125
Hexachlorobutadiene	44.2	41.86	J	ug/Kg		95	40 - 135
Hexane	44.2	107.4	*	ug/Kg		243	45 - 140
Isopropylbenzene	44.2	43.62		ug/Kg		99	60 - 125
p-Isopropyltoluene	44.2	43.14		ug/Kg		98	60 - 120
Methylene Chloride	44.2	70.79	J *	ug/Kg		160	55 - 145
Methyl tert-butyl ether	44.2	45.87		ug/Kg		104	55 - 130
Naphthalene	44.2	44.83	J	ug/Kg		101	50 - 130
N-Propylbenzene	44.2	41.91		ug/Kg		95	50 - 125
Styrene	44.2	43.84		ug/Kg		99	60 - 125
1,1,1,2-Tetrachloroethane	44.2	44.75		ug/Kg		101	65 - 125
1,1,2,2-Tetrachloroethane	44.2	47.14		ug/Kg		107	60 - 125
Tetrachloroethene	44.2	41.23		ug/Kg		93	55 - 125
Toluene	44.2	44.36		ug/Kg		100	60 - 130
1,2,3-Trichlorobenzene	44.2	44.88	J	ug/Kg		102	50 - 130
1,2,4-Trichlorobenzene	44.2	44.89	J	ug/Kg		102	45 - 135
1,1,1-Trichloroethane	44.2	44.88		ug/Kg		102	60 - 125
1,1,2-Trichloroethane	44.2	47.47		ug/Kg		107	55 - 135
Trichloroethene	44.2	45.12		ug/Kg		102	60 - 130
Trichlorofluoromethane	44.2	35.23	J	ug/Kg		80	50 - 145
1,2,3-Trichloropropane	44.2	46.40		ug/Kg		105	50 - 145
1,2,4-Trimethylbenzene	44.2	43.72		ug/Kg		99	55 - 125
1,3,5-Trimethylbenzene	44.2	43.63		ug/Kg		99	50 - 130
Vinyl chloride	44.2	33.65		ug/Kg		76	45 - 140
Xylenes, Total	88.4	88.76		ug/Kg		100	50 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*75 - 125*
Toluene-d8 (Surr)	*100*		*80 - 120*

Surrogate Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

QC Sample Results

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-1 MS
Matrix: Soil
Analysis Batch: 67086

Client Sample ID: B10-3-4
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	<138		106	147.8		ug/Kg	☼	118	55 - 150
Benzene	<13.8		53.2	51.36		ug/Kg	☼	96	40 - 135
Bromobenzene	<13.8		53.2	43.16		ug/Kg	☼	80	30 - 125
Bromochloromethane	<13.8		53.2	55.86		ug/Kg	☼	103	55 - 130
Bromodichloromethane	<13.8		53.2	51.17		ug/Kg	☼	96	50 - 130
Bromoform	<27.6		53.2	53.03		ug/Kg	☼	77	35 - 135
Bromomethane	<55.2		53.2	<53.2		ug/Kg	☼	80	40 - 135
2-Butanone (MEK)	<138		106	<133		ug/Kg	☼	105	40 - 145
n-Butylbenzene	<13.8		53.2	34.26		ug/Kg	☼	63	20 - 130
sec-Butylbenzene	<13.8		53.2	37.15		ug/Kg	☼	69	25 - 125
tert-Butylbenzene	<13.8		53.2	40.82		ug/Kg	☼	75	25 - 125
Carbon disulfide	<13.8		53.2	47.41		ug/Kg	☼	85	35 - 135
Carbon tetrachloride	<13.8		53.2	48.48		ug/Kg	☼	90	45 - 130
Chlorobenzene	<13.8		53.2	46.37		ug/Kg	☼	87	35 - 120
Chlorodibromomethane	<13.8		53.2	49.17		ug/Kg	☼	92	45 - 130
Chloroethane	<55.2		53.2	<53.2		ug/Kg	☼	86	45 - 145
Chloroform	<13.8		53.2	52.82		ug/Kg	☼	95	55 - 130
Chloromethane	<55.2		53.2	<53.2		ug/Kg	☼	77	40 - 135
2-Chlorotoluene	<13.8		53.2	40.46		ug/Kg	☼	76	25 - 125
4-Chlorotoluene	<13.8		53.2	40.27		ug/Kg	☼	76	25 - 125
1,2-Dibromo-3-Chloropropane	<138		53.2	<133		ug/Kg	☼	78	35 - 140
1,2-Dibromoethane (EDB)	<138		53.2	<133		ug/Kg	☼	94	45 - 140
Dibromomethane	<13.8		53.2	54.03		ug/Kg	☼	100	50 - 135
1,2-Dichlorobenzene	<13.8		53.2	39.13		ug/Kg	☼	73	25 - 120
1,3-Dichlorobenzene	<13.8		53.2	38.05		ug/Kg	☼	70	25 - 125
1,4-Dichlorobenzene	<13.8		53.2	38.58		ug/Kg	☼	72	20 - 125
Dichlorodifluoromethane	<41.4		53.2	40.07		ug/Kg	☼	75	35 - 135
1,1-Dichloroethane	<13.8		53.2	53.45		ug/Kg	☼	100	50 - 135
1,2-Dichloroethane	<13.8		53.2	53.60		ug/Kg	☼	101	50 - 140
1,1-Dichloroethene	<13.8		53.2	52.82		ug/Kg	☼	98	45 - 145
cis-1,2-Dichloroethene	<13.8		53.2	53.85		ug/Kg	☼	101	50 - 135
trans-1,2-Dichloroethene	<13.8		53.2	52.54		ug/Kg	☼	97	45 - 135
1,2-Dichloropropane	<13.8		53.2	52.85		ug/Kg	☼	99	50 - 130
1,3-Dichloropropane	<13.8		53.2	52.07		ug/Kg	☼	97	45 - 140
2,2-Dichloropropane	<55.2		53.2	<53.2		ug/Kg	☼	98	40 - 135
1,1-Dichloropropene	<13.8		53.2	49.16		ug/Kg	☼	91	40 - 130
cis-1,3-Dichloropropene	<13.8		53.2	50.31		ug/Kg	☼	94	35 - 115
trans-1,3-Dichloropropene	<13.8		53.2	49.72		ug/Kg	☼	92	35 - 130
Ethylbenzene	<13.8		53.2	44.64		ug/Kg	☼	84	30 - 125
Hexachlorobutadiene	<69.0		53.2	<66.6		ug/Kg	☼	55	10 - 135
Hexane	<69.0	*	53.2	129.4	F1	ug/Kg	☼	193	20 - 140
Isopropylbenzene	<13.8		53.2	42.23		ug/Kg	☼	78	25 - 125
p-Isopropyltoluene	<13.8		53.2	37.12		ug/Kg	☼	68	20 - 120
Methylene Chloride	<138	*	53.2	<133		ug/Kg	☼	85	35 - 145
Methyl tert-butyl ether	<13.8		53.2	54.67		ug/Kg	☼	101	55 - 130
Naphthalene	<69.0		53.2	<66.6		ug/Kg	☼	66	15 - 130
N-Propylbenzene	<13.8		53.2	39.78		ug/Kg	☼	73	20 - 125
Styrene	<13.8		53.2	43.70		ug/Kg	☼	81	20 - 125

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-1 MS
Matrix: Soil
Analysis Batch: 67086

Client Sample ID: B10-3-4
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	<13.8		53.2	48.42		ug/Kg	☼	91	45 - 120
1,1,2,2-Tetrachloroethane	<13.8		53.2	49.36		ug/Kg	☼	93	40 - 125
Tetrachloroethene	<13.8		53.2	43.48		ug/Kg	☼	80	30 - 125
Toluene	<13.8		53.2	48.58		ug/Kg	☼	91	35 - 130
1,2,3-Trichlorobenzene	<69.0		53.2	<66.6		ug/Kg	☼	55	10 - 130
1,2,4-Trichlorobenzene	<69.0		53.2	<66.6		ug/Kg	☼	55	15 - 135
1,1,1-Trichloroethane	<13.8		53.2	52.43		ug/Kg	☼	98	45 - 125
1,1,2-Trichloroethane	<13.8		53.2	51.84		ug/Kg	☼	97	45 - 135
Trichloroethene	<13.8		53.2	49.02		ug/Kg	☼	91	40 - 130
Trichlorofluoromethane	<55.2		53.2	<53.2		ug/Kg	☼	77	45 - 145
1,2,3-Trichloropropane	<13.8		53.2	53.04		ug/Kg	☼	100	50 - 145
1,2,4-Trimethylbenzene	<13.8		53.2	40.11		ug/Kg	☼	75	20 - 125
1,3,5-Trimethylbenzene	<13.8		53.2	40.48		ug/Kg	☼	75	20 - 130
Vinyl chloride	<41.4		53.2	42.55		ug/Kg	☼	80	40 - 140
Xylenes, Total	<41.4		106	92.36		ug/Kg	☼	87	30 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*75 - 125*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 310-42843-1 MSD
Matrix: Soil
Analysis Batch: 67086

Client Sample ID: B10-3-4
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	<138		108	148.0		ug/Kg	☼	117	55 - 150	0	40
Benzene	<13.8		53.8	48.76		ug/Kg	☼	91	40 - 135	5	40
Bromobenzene	<13.8		53.8	41.75		ug/Kg	☼	76	30 - 125	3	40
Bromochloromethane	<13.8		53.8	54.73		ug/Kg	☼	100	55 - 130	2	35
Bromodichloromethane	<13.8		53.8	50.37		ug/Kg	☼	94	50 - 130	2	35
Bromoform	<27.6		53.8	52.28		ug/Kg	☼	75	35 - 135	1	40
Bromomethane	<55.2		53.8	<53.8		ug/Kg	☼	78	40 - 135	2	35
2-Butanone (MEK)	<138		108	<134		ug/Kg	☼	104	40 - 145	0	40
n-Butylbenzene	<13.8		53.8	33.68		ug/Kg	☼	61	20 - 130	2	40
sec-Butylbenzene	<13.8		53.8	36.54		ug/Kg	☼	67	25 - 125	2	40
tert-Butylbenzene	<13.8		53.8	39.14		ug/Kg	☼	72	25 - 125	4	40
Carbon disulfide	<13.8		53.8	44.03		ug/Kg	☼	78	35 - 135	7	40
Carbon tetrachloride	<13.8		53.8	45.66		ug/Kg	☼	84	45 - 130	6	35
Chlorobenzene	<13.8		53.8	43.91		ug/Kg	☼	82	35 - 120	5	35
Chlorodibromomethane	<13.8		53.8	48.38		ug/Kg	☼	90	45 - 130	2	40
Chloroethane	<55.2		53.8	<53.8		ug/Kg	☼	82	45 - 145	3	35
Chloroform	<13.8		53.8	51.11		ug/Kg	☼	91	55 - 130	3	35
Chloromethane	<55.2		53.8	<53.8		ug/Kg	☼	77	40 - 135	0	40
2-Chlorotoluene	<13.8		53.8	39.40		ug/Kg	☼	73	25 - 125	3	40
4-Chlorotoluene	<13.8		53.8	38.75		ug/Kg	☼	72	25 - 125	4	40
1,2-Dibromo-3-Chloropropane	<138		53.8	<134		ug/Kg	☼	76	35 - 140	1	40
1,2-Dibromoethane (EDB)	<138		53.8	<134		ug/Kg	☼	94	45 - 140	1	35

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-42843-1 MSD
Matrix: Soil
Analysis Batch: 67086

Client Sample ID: B10-3-4
Prep Type: Total/NA
Prep Batch: 67085

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromomethane	<13.8		53.8	52.71		ug/Kg	☼	96	50 - 135	2	35
1,2-Dichlorobenzene	<13.8		53.8	38.54		ug/Kg	☼	72	25 - 120	1	40
1,3-Dichlorobenzene	<13.8		53.8	37.15		ug/Kg	☼	68	25 - 125	2	40
1,4-Dichlorobenzene	<13.8		53.8	37.01		ug/Kg	☼	69	20 - 125	4	40
Dichlorodifluoromethane	<41.4		53.8	<40.3		ug/Kg	☼	70	35 - 135	6	35
1,1-Dichloroethane	<13.8		53.8	51.61		ug/Kg	☼	96	50 - 135	4	35
1,2-Dichloroethane	<13.8		53.8	50.15		ug/Kg	☼	93	50 - 140	7	40
1,1-Dichloroethene	<13.8		53.8	48.69		ug/Kg	☼	89	45 - 145	8	35
cis-1,2-Dichloroethene	<13.8		53.8	50.48		ug/Kg	☼	94	50 - 135	6	35
trans-1,2-Dichloroethene	<13.8		53.8	50.01		ug/Kg	☼	92	45 - 135	5	40
1,2-Dichloropropane	<13.8		53.8	50.04		ug/Kg	☼	93	50 - 130	5	35
1,3-Dichloropropane	<13.8		53.8	50.39		ug/Kg	☼	93	45 - 140	3	40
2,2-Dichloropropane	<55.2		53.8	<53.8		ug/Kg	☼	95	40 - 135	2	35
1,1-Dichloropropene	<13.8		53.8	46.09		ug/Kg	☼	84	40 - 130	6	35
cis-1,3-Dichloropropene	<13.8		53.8	48.73		ug/Kg	☼	91	35 - 115	3	40
trans-1,3-Dichloropropene	<13.8		53.8	48.05		ug/Kg	☼	88	35 - 130	3	40
Ethylbenzene	<13.8		53.8	42.50		ug/Kg	☼	79	30 - 125	5	40
Hexachlorobutadiene	<69.0		53.8	<67.2		ug/Kg	☼	57	10 - 135	4	40
Hexane	<69.0	*	53.8	128.2	F1	ug/Kg	☼	189	20 - 140	1	40
Isopropylbenzene	<13.8		53.8	40.55		ug/Kg	☼	74	25 - 125	4	40
p-Isopropyltoluene	<13.8		53.8	35.67		ug/Kg	☼	65	20 - 120	4	40
Methylene Chloride	<138	*	53.8	<134		ug/Kg	☼	79	35 - 145	3	35
Methyl tert-butyl ether	<13.8		53.8	54.46		ug/Kg	☼	100	55 - 130	0	40
Naphthalene	<69.0		53.8	<67.2		ug/Kg	☼	67	15 - 130	3	40
N-Propylbenzene	<13.8		53.8	38.22		ug/Kg	☼	70	20 - 125	4	40
Styrene	<13.8		53.8	41.87		ug/Kg	☼	77	20 - 125	4	40
1,1,1,2-Tetrachloroethane	<13.8		53.8	46.82		ug/Kg	☼	87	45 - 120	3	35
1,1,2,2-Tetrachloroethane	<13.8		53.8	48.51		ug/Kg	☼	90	40 - 125	2	40
Tetrachloroethene	<13.8		53.8	41.02		ug/Kg	☼	75	30 - 125	6	40
Toluene	<13.8		53.8	45.92		ug/Kg	☼	85	35 - 130	6	40
1,2,3-Trichlorobenzene	<69.0		53.8	<67.2		ug/Kg	☼	59	10 - 130	9	40
1,2,4-Trichlorobenzene	<69.0		53.8	<67.2		ug/Kg	☼	58	15 - 135	6	40
1,1,1-Trichloroethane	<13.8		53.8	49.53		ug/Kg	☼	92	45 - 125	6	35
1,1,2-Trichloroethane	<13.8		53.8	52.26		ug/Kg	☼	97	45 - 135	1	40
Trichloroethene	<13.8		53.8	46.65		ug/Kg	☼	85	40 - 130	5	35
Trichlorofluoromethane	<55.2		53.8	<53.8		ug/Kg	☼	71	45 - 145	7	35
1,2,3-Trichloropropane	<13.8		53.8	50.06		ug/Kg	☼	93	50 - 145	6	40
1,2,4-Trimethylbenzene	<13.8		53.8	38.66		ug/Kg	☼	72	20 - 125	4	40
1,3,5-Trimethylbenzene	<13.8		53.8	39.42		ug/Kg	☼	72	20 - 130	3	35
Vinyl chloride	<41.4		53.8	<40.3		ug/Kg	☼	74	40 - 140	6	40
Xylenes, Total	<41.4		108	87.10		ug/Kg	☼	81	30 - 130	6	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 125*
Toluene-d8 (Surr)	*101*		*80 - 120*

QC Association Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

GC/MS VOA

Analysis Batch: 66705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-42843-2	B10-W	Total/NA	Ground Water	8260C	
310-42843-2 MS	B10-W	Total/NA	Ground Water	8260C	
310-42843-2 MSD	B10-W	Total/NA	Ground Water	8260C	
310-42843-4	B11-W	Total/NA	Ground Water	8260C	
LCS 310-66705/4	Lab Control Sample	Total/NA	Water	8260C	
MB 310-66705/7	Method Blank	Total/NA	Water	8260C	

Prep Batch: 67085

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-42843-1	B10-3-4	Total/NA	Soil	5030B	
310-42843-1 MS	B10-3-4	Total/NA	Soil	5030B	
310-42843-1 MSD	B10-3-4	Total/NA	Soil	5030B	
310-42843-3	B11-1-2	Total/NA	Soil	5030B	
LCS 310-67085/2-A	Lab Control Sample	Total/NA	Solid	5030B	
MB 310-67085/1-A	Method Blank	Total/NA	Solid	5030B	

Analysis Batch: 67086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-42843-1	B10-3-4	Total/NA	Soil	8260C	67085
310-42843-1 MS	B10-3-4	Total/NA	Soil	8260C	67085
310-42843-1 MSD	B10-3-4	Total/NA	Soil	8260C	67085
310-42843-3	B11-1-2	Total/NA	Soil	8260C	67085
LCS 310-67085/2-A	Lab Control Sample	Total/NA	Solid	8260C	67085
MB 310-67085/1-A	Method Blank	Total/NA	Solid	8260C	67085

Lab Chronicle

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Client Sample ID: B10-3-4
Date Collected: 10/30/14 09:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-1
Matrix: Soil
Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			67085	11/04/14 10:24	TCH	TAL CF
Total/NA	Analysis	8260C		1	67086	11/04/14 14:32	TCH	TAL CF

Client Sample ID: B10-W
Date Collected: 10/30/14 10:50
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	66705	11/02/14 13:41	SJN	TAL CF

Client Sample ID: B11-1-2
Date Collected: 10/30/14 11:40
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-3
Matrix: Soil
Percent Solids: 82.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			67085	11/04/14 10:24	TCH	TAL CF
Total/NA	Analysis	8260C		1	67086	11/04/14 14:57	TCH	TAL CF

Client Sample ID: B11-W
Date Collected: 10/30/14 12:10
Date Received: 11/01/14 09:30

Lab Sample ID: 310-42843-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	66705	11/02/14 14:07	SJN	TAL CF

Laboratory References:
TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

Certification Summary

Client: Terracon Consulting Eng & Scientists
Project/Site: Muscatine Riverview Suites LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147065

Laboratory: TestAmerica Cedar Falls

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-16
Georgia	State Program	4	N/A	09-29-15
Illinois	NELAP	5	200024	11-29-14
Iowa	State Program	7	007	12-01-15
Kansas	NELAP	7	E-10341	01-31-15
Minnesota	NELAP	5	019-999-319	12-31-14
North Dakota	State Program	8	R-186	09-29-14 *
Oregon	NELAP	10	IA100001	09-29-15
Wisconsin	State Program	5	999917270	08-31-15

* Certification renewal pending - certification considered valid.

Method Summary

Client: Terracon Consulting Engineers & Scientists
Project/Site: Muscatine Riverview Suite LSI

TestAmerica Job ID: 310-42843-1
SDG: 07147 065

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL CF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
704 Enterprise Drive • Cedar Falls, IA 50613
Tel 319-277-2401 • Fax 319-277-2425

TestAmerica Sample Rec
Cedar Falls Facility

310-42843 Chain of Custody

Client: Terracon Project: _____

City: _____ State: _____

Date: 11-1-14 Receiver's Initials: CH Time (Delivered): 9:30

Temperature Record:

Cooler ID# (If Applicable): QC

Uncorrected Temp: 0.6 °C

Corrected Temp: 0.5 °C

Thermometer:

- [ ] IR "E" - 111531506
- [ ] IR "Front" - 61854108
- [ ] IR "G" - 130195822
- [x] IR "H" - 130195853
- [ ] Other:

Courier:

- [ ] UPS
- [x] FedEx
- [ ] FedEx Ground
- [ ] US Postal Service
- [ ] Spee-Dee
- [ ] TA Courier
- [ ] TA Field Services
- [ ] Client
- [ ] Other: _____

- [x] Temperature blank
- [ ] Temperature out of compliance

Coolant Record:

- [x] Received on ice
  - [x] Wet ice
  - [ ] Blue ice
  - [ ] Dry ice
  - [ ] Other: _____
- [ ] NONE

Exceptions Noted:

- [ ] Sample(s) not received in cooler
- [ ] Sample(s) received same day of sampling
  - [ ] Evidence of chilling process
- [ ] Temp blank <0°C, samples NOT FROZEN
- [ ] Temp blank <0°C, samples FROZEN
- [ ] Temperature not taken: *(indicate reason)*

_____

- [ ] Non-Conformance Report Started

Custody Seals:

Cooler Custody Seals Present? [x] Yes [ ] No

Cooler Custody Seals Intact? [x] Yes [ ] No [ ] N/A

Sample Custody Seals Present? [ ] Yes [x] No

Sample Custody Seals Intact? [ ] Yes [ ] No [x] N/A

Cedar Falls
704 Enterprise Drive

Cedar Falls, IA 50613
phone 319.277.2401 fax 319.277.2425

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Carla S. Duncan	Site Contact: csduncan@terracon.com	Date: 10/30/2014	COC No:
Terracon	Tel/Fax: 563-355-0702	Lab Contact:	Carrier:	1 of 1COCs
870 40th Avenue	Analysis Turnaround Time			Job No. 07147065
Bettendorf, Iowa 52722	Calendar (C) or Work Days (W) W			
(563) 355-0702 Phone	TAT if different from Below			SDG No.
(563) 355-4789 FAX	☐ 2 weeks			
Project Name: Muscatine Riverview Suites LSI	☒ 1 week			
Site: Muscatine, Iowa	☐ 2 days			
P O # 07147065	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	VOCs	Sample Specific Notes:
B10- 3-4	10/30/2014	9:40	Grab	SL	2		X	
B10- W	10/30/2014	10:50	Grab	GW	3		X	
B11- 1-2	10/30/2014	11:40	Grab	SL	2		X	
B11- W	10/30/2014	12:10	Grab	GW	3		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by: Josh Lopez	Company: Terracon	Date/Time: 10/31/14 9:00	Received by:	Company: TA	Date/Time: 10/31/14 9:00
Relinquished by:	Company: TA	Date/Time: 10/31/14 16:00	Received by:	Company: TA CDC	Date/Time: 11/1/14 930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Terracon Consulting Eng & Scientists

Job Number: 310-42843-1
SDG Number: 07147065

Login Number: 42843
List Number: 1
Creator: Facciani, Melene K

List Source: TestAmerica Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	