Huddleston-Berry
Engineering & Testing, LLC

GEOTECHNICAL INVESTIGATION
SUNSET POINTE SUBDIVISION
FILINGS 1, 2, AND FUTURE FILING
FRUITA, COLORADO
PROJECT# 179-07

SUNSHINE DEVELOPMENT CO
PO BOX 516
FRUITA, CO 81521

JUNE 13, 2007

Huddleston-Berry Engineering and Testing, LLC
640 White Avenue, Unit B
Grand Junction, Colorado 81501

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A geotechnical investigation was conducted for the proposed Sunset Pointe subdivision in Fruita, Colorado. The project location is shown on Figure 1 – Site Plan. The purpose of the investigation was to evaluate the subsurface conditions at the site with respect to foundation design, pavement design, and earthwork for the proposed construction. This summary has been prepared to include the information required by civil engineers, structural engineers, and contractors involved in the project.

Subsurface Conditions (p. 2)

The subsurface investigation consisted of five borings, drilled on April 19, 2007. The locations of the borings are shown on Figure 1 – Site Plan. The borings generally encountered silt and sand soils above sandstone bedrock. Groundwater was not encountered in the borings at the time of the investigation. The native soils were indicated to be non-plastic and are anticipated to be slightly collapsible.

Summary of Foundation Recommendations

- *Foundation Type* – Spread Footings or Monolithic Structural Slabs (p. 3)
- *Structural Fill* – Minimum 12-inches in Filings 1 and 2. Up to 6-inches in the future filing above competent sandstone bedrock. Native silt and sand soils are suitable for reuse as structural fill. Imported structural fill should consist of pit-run, CDOT Class 6 base course, or other material approved by engineer. (p. 4)
- *Maximum Allowable Bearing Capacity* – 1,250 psf in Filings 1 and 2. 4,000 psf in the future filing where competent sandstone bedrock present in subgrade. (p. 4)
- *Lateral Earth Pressure* – 50 pcf (p. 8)

Summary of Pavement Recommendations (p. 8)

Soil Present in Subgrade (Filings 1 and 2, and possibly parts of the future filing)
EDLA = 5, Structural Number = 2.75

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 2 Subbase Course	Rigid Pavement	TOTAL
Full Depth HMA	7.0				7.0
A	3.0	11.0			14.0
B	4.0	7.0			11.0
C	3.0	6.0	6.0		15.0
Full Depth RP				6.0	6.0

Competent Sandstone Bedrock Present in Subgrade (Most of the future filing)

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 2 Subbase Course	Rigid Pavement	TOTAL
A	3.0	6.0			9.0

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1.0 INTRODUCTION

As part of extensive development in Fruita, Colorado and surrounding areas, Sunshine Development Company is proposing to subdivide three parcels south of Kings View Road in Fruita, Colorado to create the Sunset Pointe subdivision. The Parcel Identification Numbers are 2697-194-00-036, 2697-193-00-037, and 2697-194-00-038. As part of the development process, Huddleston-Berry Engineering & Testing, LLC (HBET) was retained by Sunshine Development Company to conduct a geotechnical investigation for Filings 1, 2, and a possible future filing of the proposed Sunset Pointe subdivision.

A geologic hazards investigation for the property was previously conducted by HBET. The report was titled: *Geologic Hazards Investigation, Kings View Point Subdivision, SW¼ SE¼, S ¾ of Lot 13, NE¼ SW ¼ Lying S of I 3/10 Road, SE¼ SW¼ , and NW¼ SE¼, Section 19, T1N, R2W, Mesa County, Colorado.* The report was produced for Sunshine of the Redlands, Inc. and dated April 11, 2006.

1.1 Scope

As discussed above, a geotechnical investigation was conducted for Filings 1, 2, and a possible future filing of the Sunset Pointe subdivision in Fruita, Colorado. The purpose of the investigation was to complement the geologic hazards report and provide specific recommendations for foundations, pavements, utilities, and earthwork. The scope of the investigation included the following components:

- Conducting a subsurface investigation to evaluate the subsurface conditions at the site.
- Collecting soil and bedrock samples and conducting laboratory testing to determine the engineering properties of the soils and bedrock at the site.
- Providing recommendations for foundation type and subgrade preparation.
- Providing recommendations for bearing capacity.
- Providing recommendations for lateral earth pressure.
- Providing recommendations for drainage, grading, utilities, and general earthwork.
- Providing recommendations for pavement section alternatives.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted engineering practices. This report has been prepared for the exclusive use of the Sunshine Development Company.

1.2 Site Location and Description

The site encompasses approximately 131 acres west of Kings View Road in Fruita, Colorado. Filings 1, 2, and the possible future filing comprise approximately 23 acres of the total property area. The project location is shown on Figure 1 – Site Plan.

At the time of the investigation the property was generally sparsely vegetated with grasses, low brush and occasional juniper trees. The site generally sloped gently to the north; however, the terrain was hilly in the north ¾ of the site and more rugged in the south. Slopes varied from slight to greater than 2H:1V. The steeper slopes were generally low profile (less than 20 feet in height) and associated with the incised drainages or the erosion resistant hard sandstone outcroppings in the southern portion of the site. The site was criss-crossed with dirt roads and paths. The site was otherwise vacant. No evidence of previous construction or development was encountered.

The site was bordered to the south and west by public lands. An existing development of single family residences existed to the east of the site. Kings View Drive bounded the north side of the site, except for the extreme northeast portion which was bounded by private land and the Colorado River. A gravel pit existed north of Kings View Drive and extended to the Colorado River.

1.3 Proposed Construction

The proposed construction is anticipated to include single-family residential structures, and utility and street pavement installation. Filings 1 and the future filing are proposed to include 6 lots each and Filing 2 is proposed to include 13 lots. The proposed residential structures are anticipated to be constructed of wood framing and will be built over reinforced concrete foundations. Basements are not anticipated. Foundation loads on the order of 600 to 2,000 pounds per linear foot wall loads and 8 to 12 kip column loads are expected.

2.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of five test borings, drilled to depths of between 15.0 and 28.0 feet below the existing ground surface with a truck mounted Simco 2000 drill rig on April 19, 2007. The locations of the test borings are shown on Figure 1 – Site Plan. The test borings were located in the field with a handheld GPS unit. Typed boring logs are included in Appendix A. Samples of the subsurface soils were collected using Standard Split-Spoon sampling methods at the locations shown on the logs. Bedrock encountered in the borings was continuously cored with an HQ sized core bit and split barrel.

As indicated on the logs, the subsurface conditions at the site are variable. Borings B-1 and B-2, drilled in proposed Filing 2, encountered 0.5 feet of silt with organics topsoil above brown, dry, very loose to medium dense sandy silt and silt with sand to depths of 15.0 and 8.5 feet, respectively. Below the sand, gray to brown, highly to moderately weathered, medium hard sandstone bedrock extended to the bottoms of the borings. Individual core recoveries ranged from 2 to 48 percent and Rock Quality Designations (RQD's) ranged from 0 to 26 percent, indicating very poor to poor quality bedrock.

Borings B-3 and B-4, drilled in proposed Filing 1, encountered 0.5 feet of silty sand with organics topsoil above reddish brown, dry, very loose to dense silty sand. In B-3, the silty sand extended to the bottom of the boring at 26.5 feet. In B-4, the sand extended to a depth of 26.0 feet and was underlain by gray to brown, highly weathered, medium hard sandstone bedrock to the bottom of the boring at 26.5 feet.

Boring B-5, drilled in the possible future filing, encountered 0.5 feet of silty sand with organics topsoil above reddish brown, dry, loose silty sand to a depth of 4.0 feet. Below the sand, gray, highly to moderately weathered, medium hard sandstone bedrock extended to the bottom of the boring. Individual core recoveries ranged from 33 to 92 percent and Rock Quality Designations (RQD's) ranged from 0 to 46 percent, indicating very poor to poor quality bedrock

Groundwater was not encountered in any of the borings at the time of the investigation.

The subsurface conditions encountered during the current investigation were generally consistent with those encountered during the previous investigation. Logs of the borings conducted as part of the previous geologic hazards investigation in areas of Filings 1, 2, and the future filing are included in Appendix B.

3.0 LABORATORY TESTING

Selected soil samples collected from the borings were tested in the Huddleston-Berry Engineering and Testing LLC geotechnical laboratory for natural moisture content, gradation, Atterberg limits, optimum moisture/maximum dry density (Proctor), and California Bearing Ratio (CBR). In addition, unconfined compression testing was conducted on an intact rock core sample from Boring B-5. The laboratory testing results are included in Appendix C.

The laboratory testing results indicate that the sand and silt soils at the site are non-plastic. Based upon the low Standard Penetration Test (SPT) N-values, the shallow silt and sand soils may be slightly collapsible. The unconfined compressive strength of the sandstone bedrock encountered in Boring B-5 was determined to be approximately 12,000 psi.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Foundations

Based upon the subsurface conditions and nature of the proposed construction, shallow foundations are recommended. Spread footing and monolithic structural slab foundations are both appropriate. However, due to the variation in the subsurface conditions across the property, specific recommendations were developed for each proposed filing and are discussed in the following sections.

Filing 1

As shown on Figure 1, proposed Filing 1 covers a fairly large area. In the northern portion of Filing 1, Borings B-1 and B-2, conducted during the geologic hazards investigation in the vicinity of Lots B-1 through B-4, encountered dense sandy gravel and cobbles soils and medium stiff/medium dense silty clay and sand soils. In the southern portion of Filing 1, Borings B-3 and B-4 conducted during the current investigation on Lots A-1 and A-2, encountered very loose to dense silty sand soils.

In general, the clay and sand soils are anticipated to be slightly collapsible whereas the gravel and cobble soils are anticipated to be fairly competent. However, due to the variability in the subsurface conditions, it is recommended that foundations in Filing 1 be constructed above a minimum of 12-inches of structural fill.

The native clay, sand, and gravel soils, exclusive of topsoil, are suitable for re-use as structural fill. Imported structural fill should consist of a granular, non-expansive, non-free draining material such as pit run or CDOT Class 6 base course. However, if the native gravel and cobble soils or pit-run are used as structural fill below foundations, a minimum of six inches of Class 6 base course should be placed above the gravel/pit-run to prevent large point stresses on the bottoms of the foundations due to large particles in the gravel/pit-run.

Prior to placement of structural fill, it is recommended that the bottoms of the foundation excavations be scarified to a depth of six to eight inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture content as determined in accordance with ASTM D698. Where gravel and cobble soils are present in the subgrade, the bottoms of the foundation excavations should be proofrolled to the Engineer's satisfaction.

Structural fill should extend laterally beyond the edges of the foundation a distance equal to the thickness of the structural fill. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils or modified Proctor maximum dry density for coarse grained soils, within ±2% of the optimum moisture content as determined in accordance with ASTM D698 or D1557C, respectively. Pit-run materials should be moisture conditioned and proofrolled to the Engineer's satisfaction.

For the foundation building pads prepared as recommended with structural fill consisting of the native soils or imported granular materials, a maximum allowable bearing capacity of 1,250 psf may be used. In addition, a modulus of subgrade reaction of 150 pci may be used for structural fill consisting of the native clay. A modulus of 200 pci may be used for structural fill consisting of the native sand soils and a modulus of 250 pci may be used for structural fill consisting of pit-run or CDOT Class 6 base course. It is recommended that the bottoms of exterior foundations be at least twenty-four inches below the final grade for frost protection.

Also, as discussed in the referenced geologic hazards report, Lots B-1 through B-4 lie adjacent to steep slopes running down toward the Colorado River. For these lots, foundations should be set-back a minimum of 20 feet from the crest of the steep slopes.

Filing 2

In Filing 2, the borings conducted during the geologic hazards and current investigations encountered sand and silt soils above weathered sandstone and siltstone bedrock. The depth to bedrock in the borings ranged from 5.0 to 15.0 feet.

In general, the sand and silt soils are anticipated to be slightly collapsible. Therefore, in order to limit the potential for excessive differential movements, it is recommended that foundations in Filing 2 be constructed above a minimum of 12-inches of structural fill.

The native sand and silt soils, exclusive of topsoil, are suitable for re-use as structural fill. Imported structural fill should consist of a granular, non-expansive, non-free draining material such as pit run or CDOT Class 6 base course. However, if pit-run is used as structural fill below foundations, a minimum of six inches of Class 6 base course should be placed above the pit-run to prevent large point stresses on the bottoms of the foundations due to large particles in the pit-run.

Prior to placement of structural fill, it is recommended that the bottoms of the foundation excavations be scarified to a depth of six to eight inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture content as determined in accordance with ASTM D698. Structural fill should extend laterally beyond the edges of the foundation a distance equal to the thickness of the structural fill. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils or modified Proctor maximum dry density for coarse grained soils, within ±2% of the optimum moisture content as determined in accordance with ASTM D698 or D1557C, respectively. Pit-run materials should be moisture conditioned and proofrolled to the Engineer's satisfaction.

For the foundation building pads prepared as recommended with structural fill consisting of the native soils or imported granular materials, a maximum allowable bearing capacity of 1,250 psf may be used. In addition, a modulus of 200 pci may be used for structural fill consisting of the native silt or sand soils and a modulus of 250 pci may be used for structural fill consisting of pit-run or CDOT Class 6 base course. It is recommended that the bottoms of exterior foundations be at least twenty-four inches below the final grade for frost protection.

The Future Filing

In the area of the possible future filing, sandstone bedrock outcrops were observed during the field investigation. During the geologic hazards investigation, Boring B-7 encountered hard sandstone bedrock at a depth of 0.5 feet. During the current investigation, Boring B-5 encountered sandstone bedrock at a depth of 4.0 feet.

Due to the presence of shallow, competent sandstone bedrock, it is recommended that foundations be constructed above competent sandstone bedrock. However, it is recommended that a representative of HBET examine the bedrock surface prior to concrete placement. Where a non-uniform bedrock surface is present, a minimum 6-inch thick leveling pad consisting of a granular, non-expansive material approved by the Engineer is recommended. The leveling pad materials should be moisture conditioned and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained fill or modified Proctor maximum dry density for coarse grained fill, within ±2% of optimum moisture content as determined in accordance with ASTM D698 or D1557, respectively.

For foundation building pads prepared as recommended, a maximum allowable bearing capacity of 4,000 psf may be used. In addition, a modulus of subgrade reaction of 300 pci may be used for structural fill consisting of CDOT Class 6 base course or equivalent material. Spread footings should not be less than 12-inches wide. For foundations resting directly on competent sandstone bedrock, frost depth protection is not required. However, it is generally recommended that the bottoms of foundations be at least 12-inches below the final grade.

As discussed in the geologic hazards report, due to the presence of water soluble sulfates in the native soils, Type V sulfate resistant cement is recommended for all construction on the site.

4.2 Floor Slabs and Exterior Flatwork

In order to limit the potential for movement of floor slabs and/or exterior flatwork, it is recommended that slabs-on-grade be constructed above native soils below the topsoil that have been scarified to a depth of 9 to 12-inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of the optimum moisture content as determined in accordance with ASTM D698. In the possible future filing, where shallow sandstone bedrock may be present, slabs-on-grade may be constructed directly on competent sandstone bedrock. Slabs-on-grade should not be connected to the foundations in any manner.

4.3 Utilities

As discussed above, shallow bedrock was encountered in some areas of the site. This may impact utility installation. Utility installation in Filings 1, 2, and the future filing is discussed below. However, it is important to note that the following information

is based upon the results of the geotechnical borings. If additional, more specific information regarding bedrock rippability is required, it is recommended that a seismic refraction survey be conducted on the property.

Filing 1

In the southern portion of Filing 1, lots A-1 and A-2, it is anticipated that the only required utilities will be laterals from existing mainlines along Squire Court. Therefore, utility installation is not anticipated to present any problems in this area.

In the northern portion of Filing 1, lots B-1 through B-4, the borings encountered silty clay with sand and sandy gravel soils. Auger refusal was encountered in the borings at depths of between 14.0 and 21.0 feet. These depths corresponded with the elevations of sandstone outcrops observed along the steep slopes in this area. Based upon the results of the borings, most of the utilities in this area will be above the bedrock and installation of these utilities is not anticipated to be difficult. However, HBET understands that a sewer mainline for the subdivision is proposed to be constructed along an old roadbed that appeared to have been cut into the steep slopes.

It is likely that the old roadbed consists primarily of fill material. However, it is possible that shallow sandstone bedrock will be encountered along some portions of the sewer alignment. Based upon the condition of the sandstone in the observed outcrops and in other areas of the site, the sandstone is likely rippable with a Caterpillar D9R, or equivalent. However, small areas may require blasting.

Filing 2

The borings conducted in the vicinity of Filing 2 encountered sandstone and siltstone bedrock at depths of between 5.0 and 15.0 feet. As a result, gravity flow utilities such as sewer mainlines may encounter bedrock. However, sewer laterals and pressurized utilities such as water and natural gas would be anticipated to be above the bedrock.

Based upon the condition of the bedrock encountered in the borings, the shallow bedrock in this area may be able to be excavated with a large excavator. However, with increasing depth into the bedrock, large dozers, blasting, or chemical fracturing may be required.

The Future Filing

In the possible future filing, sandstone bedrock was observed at the ground surface in some locations and encountered in the borings at depths of between 0.5 and 4.0 feet. As a result, bedrock excavation will likely be required for utility installation in this area. Based upon the bedrock outcrop condition and RQD of the shallow bedrock encountered in the borings, the rock in this are ranges from fair to good quality. Based upon the condition of the rock mass, it is anticipated that the upper portion of the bedrock

will be rippable with a Caterpillar D9R, or equivalent. However, with increasing depth in the bedrock, blasting or chemical fracturing may be required.

4.4 Lateral Earth Pressures

Stemwalls or retaining walls should be designed to resist lateral earth pressures. For backfill consisting of the native soils or imported granular, non-free draining, non-expansive material, we recommend that the walls be designed for an equivalent fluid unit weight of 50 pcf in areas where no surcharge loads are present. Lateral earth pressures should be increased as necessary to reflect any surcharge loading behind the walls.

4.5 Drainage

In order to improve the long-term performance of the foundations and slabs-on-grade, grading around the structures should generally be designed to carry precipitation and runoff away from the structures. It is recommended that the finished ground surface drop at least six inches within the first ten feet away from the structures. Downspouts should empty beyond the backfill zone. It is recommended that landscaping within three feet of the structures include primarily desert plants with low water requirements. In addition, it is recommended that irrigation within ten feet of foundations be minimized or controlled with automatic shut off valves.

For Lots B-1 through B-4 in Filing 1, as discussed in the geologic hazards report, it is recommended that automatic irrigation systems not be used. In addition, it is recommended that downspouts from structures on these lots not be permitted to discharge into subsurface drains.

4.6 Excavations

Excavations in the native sand and silt soils at the site may stand for short periods of time but should not be considered to be stable. Trenching and excavations should be sloped back, shored, or shielded for worker protection in accordance with applicable OSHA standards. The native soils generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. For Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

In areas where competent bedrock is encountered, vertical cuts will be permitted. However, it is recommended that HBET be contacted to evaluate the bedrock prior to placing workers in areas where vertical cuts have been made.

4.7 Pavements

The proposed construction is anticipated to include residential street construction. From the subsurface investigation, the pavement subgrade soils at the site consist primarily of silty sand, silt with sand, and sandy silt. The design California Bearing Ratio (CBR) of the native soils was determined in the laboratory to be approximately 2.0. This corresponds to a Resilient Modulus of approximately 3,000 psi.

Based upon the subgrade conditions and anticipated traffic loading, pavement section alternatives were developed in accordance with the *Guideline for the Design and Use of Asphalt Pavements for Colorado Roadways* by the Colorado Asphalt Pavement Association. The following minimum pavement section alternatives are recommended:

Soil Present in Subgrade (Filings 2 and 3, and possibly parts of the future filing)
EDLA = 5, Structural Number = 2.75

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 2 Subbase Course	Rigid Pavement	TOTAL
Full Depth HMA	7.0				7.0
A	3.0	11.0			14.0
B	4.0	7.0			11.0
C	3.0	6.0	6.0		15.0
Full Depth RP				6.0	6.0

Competent Sandstone Bedrock Present in Subgrade (Most of the future filing)

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 2 Subbase Course	Rigid Pavement	TOTAL
A	3.0	6.0			9.0

Prior to roadway construction, the roadway prism should be stripped of all topsoil, fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture as determined by AASHTO T-99. Where sandstone bedrock is present in the subgrade, it is recommended that the subgrade be proofrolled to identify any soft or weak materials. Soft or weak materials should be removed and replaced with structural fill.

Aggregate base course and subbase course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% and 93% of the maximum dry density, respectively, at -2% to +3% of optimum moisture content as determined by AASHTO T-180.

It is recommended that Hot-Mix Asphaltic (HMA) pavement conform to CDOT grading SX or S specifications and consist of an approved 75 gyration Superpave method mix design. HMA pavement should be compacted to between 92% and 96% of the maximum theoretical density. An end point stress of 50 psi should be used. In addition, pavements should conform to local specifications.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement.

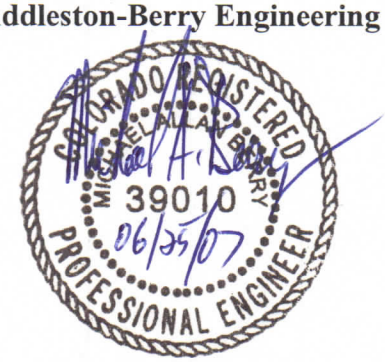
5.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction in Filings 1, 2, and the possible future filing.

As discussed previously, the subsurface conditions at the site were fairly consistent with those encountered during the Geologic Hazards Investigation. Although HBET believes that the investigation was sufficient to adequately characterize the range of subsurface conditions at the site, the precise nature and extent of subsurface variability may not become evident until construction. Therefore, it is recommended that a representative of HBET be retained to provide engineering oversight and construction materials testing services during the foundation, pavement, and earthwork phases of the construction. This is to verify compliance with the recommendations included in this report or permit identification of significant variations in the subsurface conditions which may require modification of the recommendations.

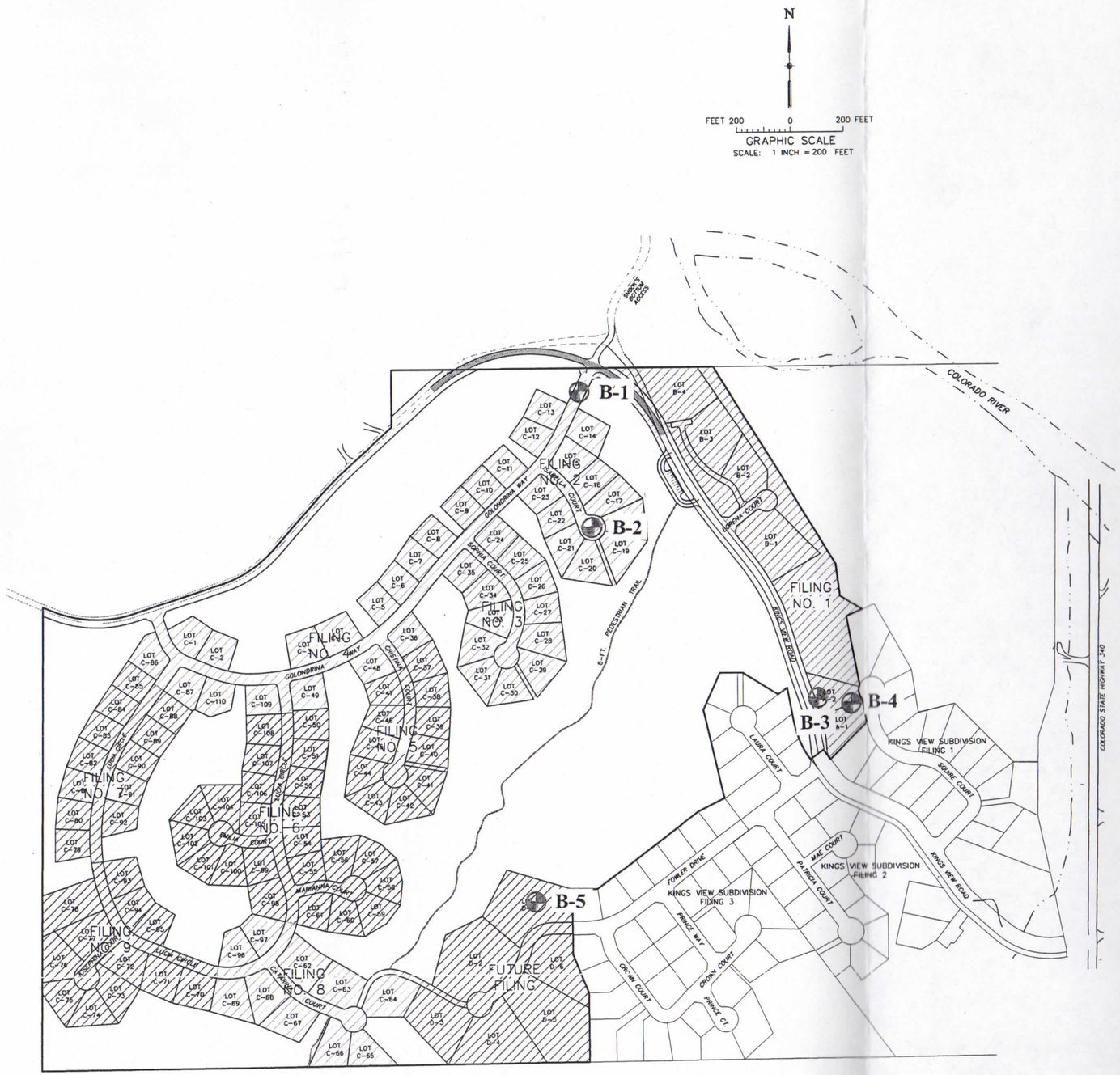
Huddleston-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

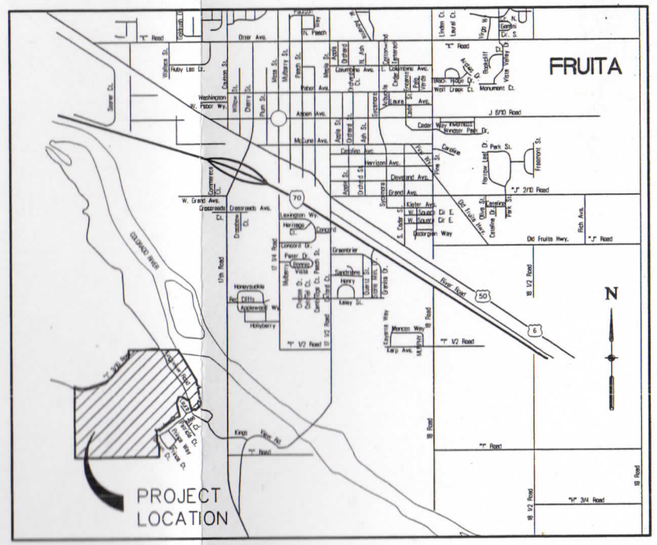
Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC



Michael A. Berry, P.E.
Vice President of Engineering

FIGURES





VICINITY MAP

FIGURE 1
Site Plan

DRAWN BY: F.J.B.	REVIEWED _____ DATE: _____ FOR _____	**VISTA ENGINEERING CORP.** CONSULTING ENGINEERS AND LAND SURVEYORS 605 28 1/4 ROAD, SUITE B • GRAND JUNCTION, CO 81506 • (970) 243-2242	SUNSHINE OF DELTA, INC. FRUITA, COLORADO
DESIGNED BY: D.E.C.			OVERVIEW/KEY SHEET SUNSET POINTE SUBDIVISION
CHECKED BY: D.E.C.	REVIEWED _____ DATE: _____ FOR VISTA ENGINEERING CORP		SCALE: 1" = 200' JOB NO: 4173.00-03 DATE: 6-25-07 SHEET NO: 1 of 1

REVISION	DATE	DESCRIPTION	BY	CH'D

APPENDIX A
Typed Boring Logs

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-1

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO

DATE STARTED 4/19/07 **COMPLETED** 4/19/07 **GROUND ELEVATION** _____ **HOLE SIZE** 4"

DRILLING CONTRACTOR S. McKracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **AT TIME OF DRILLING** dry

LOGGED BY JAH **CHECKED BY** MAB **AT END OF DRILLING** dry

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SILT with Sand and Organics (TOPSOIL), brown, dry										
		SILT with Sand (ML), brown, dry, very loose to medium dense										
			SS 1	67	3-2-2 (4)							
5												
		SS2: Lab Classified	SS 2	100	12-13-18 (31)			6	19	NP	NP	83
10												
15		SANDSTONE, grey to brown, highly to moderately weathered, medium hard	RC 1	48 (26)								
20			RC 2	9 (0)								
25			RC 3	5 (0)								
		Bottom of hole at 28.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
640 White Avenue, Unit B
Grand Junction, CO 81501
970-255-8005
970-255-6818

BORING NUMBER B-2

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO

DATE STARTED 4/19/07 **COMPLETED** 4/19/07 **GROUND ELEVATION** _____ **HOLE SIZE** 4"

DRILLING CONTRACTOR S. McKracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **AT TIME OF DRILLING** dry

LOGGED BY JAH **CHECKED BY** MAB **AT END OF DRILLING** dry

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Sandy SILT with Organics (TOPSOIL), brown, dry										
		Sandy SILT (ML) with Sandstone lenses, reddish brown, dry medium dense	SS 1	100	11-11							
			RC 1	21 (0)								
5			RC 2	18 (0)								
		SS2: Lab Classified	SS 2	100	5-6			7	17	NP	NP	58
		SANDSTONE, grey to brown, highly weathered, medium hard	RC 3	17 (0)								
10			RC 4	2 (0)								
15			RC 5	21 (0)								
			RC 6	10 (0)								
20		Bottom of hole at 20.0 feet.										

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BORING NUMBER B-3

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO

DATE STARTED 4/19/07 **COMPLETED** 4/19/07 **GROUND ELEVATION** _____ **HOLE SIZE** 4"

DRILLING CONTRACTOR S. McKracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **AT TIME OF DRILLING** dry

LOGGED BY JAH **CHECKED BY** MAB **AT END OF DRILLING** dry

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		Silty SAND (SM), reddish brown, dry, loose to dense										
			SS 1	94	4-3-3 (6)							
5												
			SS 2	100	7-12-14 (26)							
10												
			SS 3	83	9-9-14 (23)							
15		SS4: Lab Classified	SS 4	94	11-13-22 (35)			5	15	NP	NP	43
20												
25			SS 5	100	9-12-17 (29)							
		Bottom of hole at 26.5 feet.										

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BORING NUMBER B-4

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO

DATE STARTED 4/19/07 **COMPLETED** 4/19/07 **GROUND ELEVATION** _____ **HOLE SIZE** 4"

DRILLING CONTRACTOR S. McKracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **AT TIME OF DRILLING** dry

LOGGED BY JAH **CHECKED BY** MAB **AT END OF DRILLING** dry

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		Silty SAND (SM), reddish brown, dry, very loose to dense										
			SS 1	6	1-1-2 (3)							
5												
			SS 2	100	4-7-9 (16)							
10												
		SS3: Lab Classified	SS 3	100	8-13-24 (37)			2	NP	NP	NP	19
15												
			SS 4	100	4-13							
20												
25												
			SS 5	56	9-11-14 (25)							
		SANDSTONE, gray to brown, highly weathered, medium hard										
		Bottom of hole at 26.5 feet.										

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BORING NUMBER B-5

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO

DATE STARTED 4/19/07 **COMPLETED** 4/19/07 **GROUND ELEVATION** _____ **HOLE SIZE** 4"

DRILLING CONTRACTOR S. McKracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **AT TIME OF DRILLING** dry

LOGGED BY JAH **CHECKED BY** MAB **AT END OF DRILLING** dry

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		Silty SAND (sm), reddish brown, dry, loose	SS 1	83	5-4-6 (10)							
5		SANDSTONE, gray, highly to moderately weathered, medium hard										
			RC 1	92 (35)								
10			RC 2	33 (0)								
			RC 3	92 (46)								
15		Bottom of hole at 15.0 feet.										

APPENDIX B
Boring Logs from Geologic Hazards Investigation

FIGURE 2
SITE PLAN

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BORING NUMBER B-1

CLIENT Sunshine of the Redlands
PROJECT NAME Kings View Point
PROJECT NUMBER 2030-06
PROJECT LOCATION Fruita, CO
DATE STARTED 3/20/06 **COMPLETED** 3/20/06
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY MAB **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		Sandy GRAVEL and COBBLES (gw), brown, dry, very dense	SS 1	50	10-15-50/4"							
5												
10		**Auger Refusal at 14.0 ft**										
		Bottom of hole at 14.0 feet.										

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BORING NUMBER B-2

CLIENT Sunshine of the Redlands
PROJECT NAME Kings View Point
PROJECT NUMBER 2030-06
PROJECT LOCATION Fruita, CO
DATE STARTED 3/20/06 **COMPLETED** 3/20/06
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY MAB **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Silty CLAY with Sand and Organics (TOPSOIL), brown, dry										
		Silty CLAY with Sand (CL) to SAND (sp), brown, dry, medium stiff / medium dense										
		SS1: Lab Classified	SS 1	72	7-10-8 (18)			8	23	15	8	79
5			MC 1	83	4-7-7 (14)		89	3				
10		Sandy GRAVEL and COBBLES (gw), brown, dry, dense to very dense	SS 2	50	12-17							
15												
20		**Auger Refusal at 21.0 ft**										
		Bottom of hole at 21.0 feet.										

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BORING NUMBER B-3

CLIENT Sunshine of the Redlands
PROJECT NAME Kings View Point
PROJECT NUMBER 2030-06
PROJECT LOCATION Fruita, CO
DATE STARTED 3/20/06 **COMPLETED** 3/20/06
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY MAB **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		Silty SAND (SM), brown, dry, loose										
		SS1: Lab Classified	SS 1	72	2-3-7 (10)			6	17	14	3	42
5		SANDSTONE and SILTSTONE, reddish brown, soft to medium hard, slightly to moderately weathered										
			RC 1	95 (40)								
10												
			RC 2	97 (70)								
15		Bottom of hole at 15.0 feet.										

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BORING NUMBER B-7

CLIENT Sunshine of the Redlands
PROJECT NAME Kings View Point
PROJECT NUMBER 2030-06
PROJECT LOCATION Fruita, CO
DATE STARTED 3/20/06 **COMPLETED** 3/20/06
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Truck Rig
AT TIME OF DRILLING dry
LOGGED BY MAB **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND with Organics (TOPSOIL), brown, dry										
		SANDSTONE, white to tan, medium hard to hard, slightly weathered to fresh	RC 1	100 (89)								
5			RC 2	98 (80)								
10			RC 3	100 (97)								
15		Bottom of hole at 15.0 feet.										

APPENDIX C
Laboratory Testing Results

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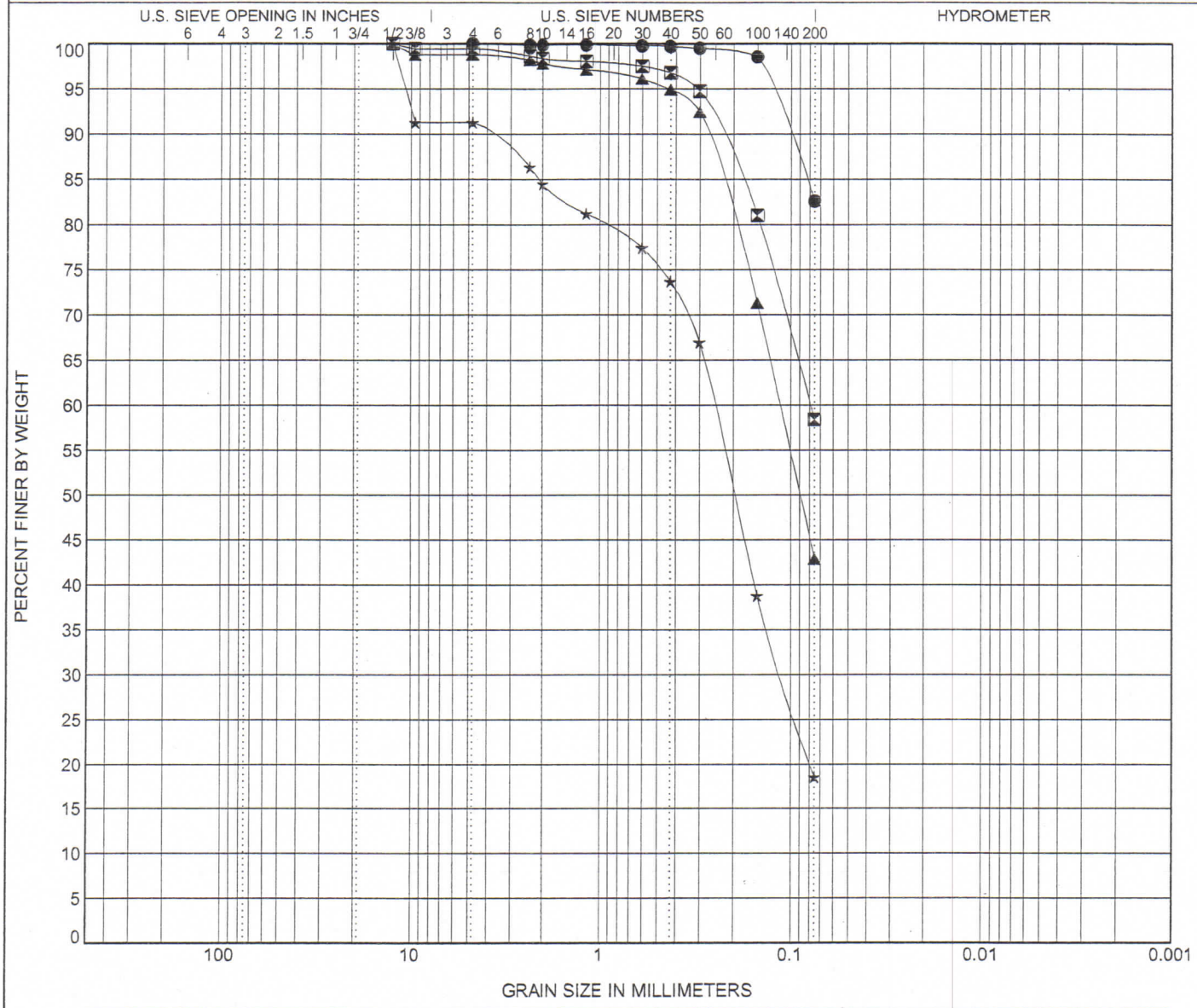
GRAIN SIZE DISTRIBUTION

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● B-1, SS2	4/07	SILT with SAND(ML)	19	NP	NP		
⊠ B-2, SS2	4/07	SANDY SILT(ML)	17	NP	NP		
▲ B-3, SS4	4/07	SILTY SAND(SM)	15	NP	NP		
★ B-4, SS3	4/07	SILTY SAND(SM)	NP	NP	NP		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1, SS2	4/07	4.75				0.0	17.4	82.6	
⊠ B-2, SS2	4/07	12.5	0.079			0.6	41.1	58.4	
▲ B-3, SS4	4/07	12.5	0.114			1.2	55.9	42.9	
★ B-4, SS3	4/07	12.5	0.253	0.111		8.7	72.7	18.6	

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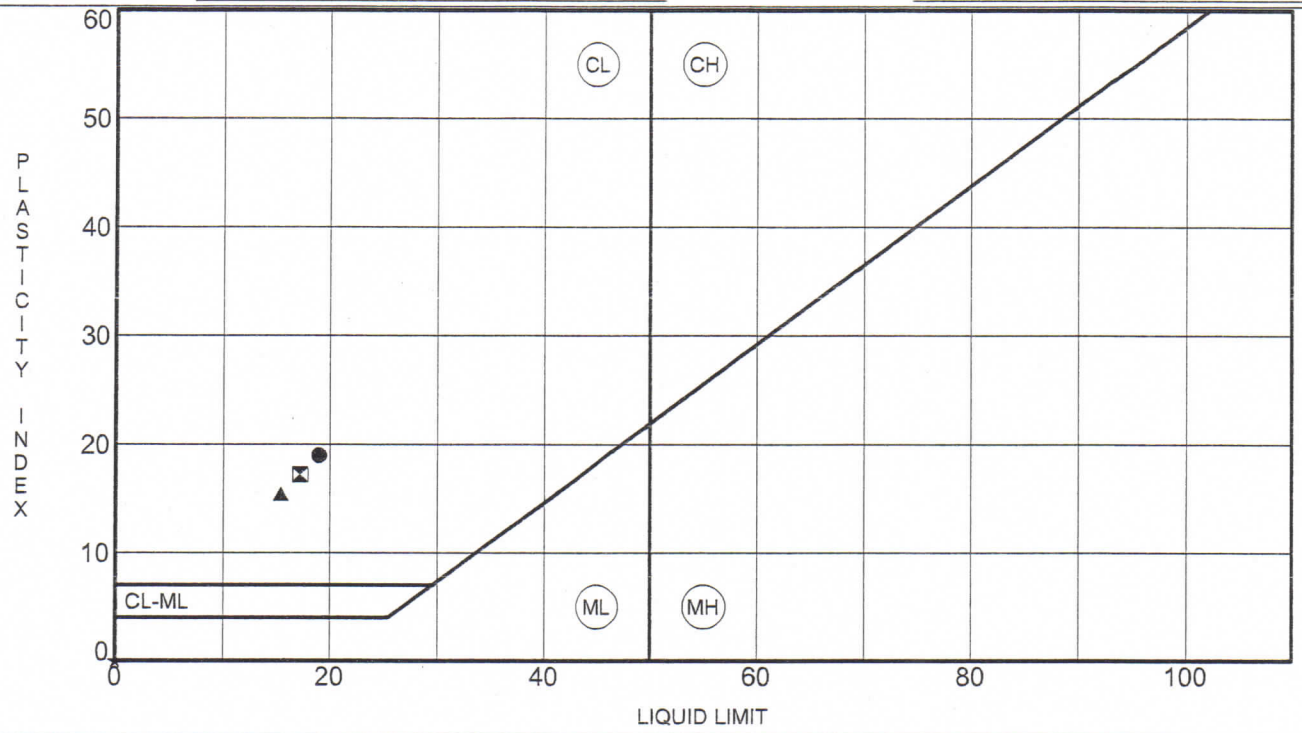
ATTERBERG LIMITS' RESULTS

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO



	Specimen Identification		LL	PL	PI	#200	Classification
●	B-1, SS2	4/19/2007	19	NP	NP	83	SILT with SAND(ML)
⊠	B-2, SS2	4/19/2007	17	NP	NP	58	SANDY SILT(ML)
▲	B-3, SS4	4/19/2007	15	NP	NP	43	SILTY SAND(SM)
★	B-4, SS3	4/19/2007	NP	NP	NP	19	SILTY SAND(SM)

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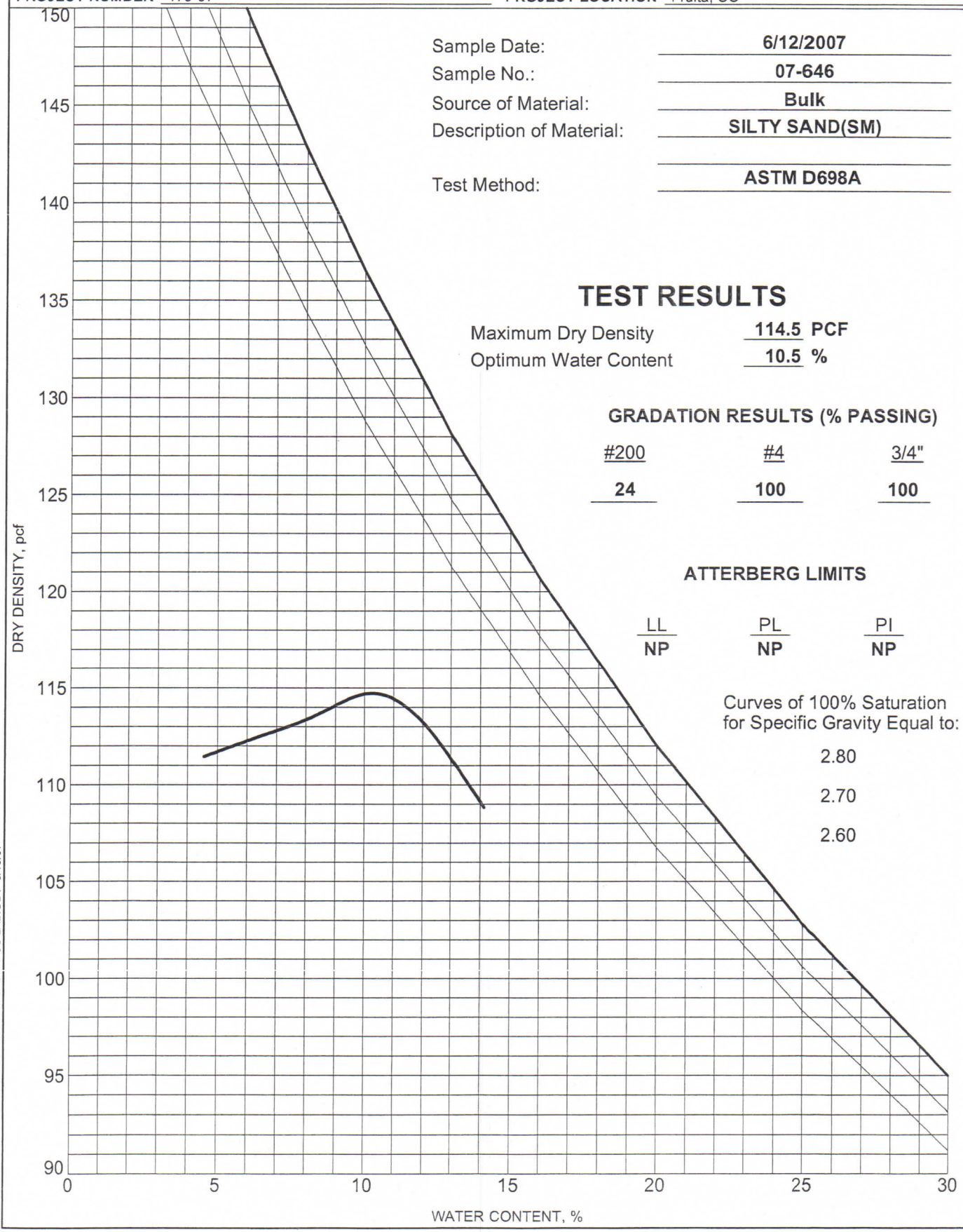
MOISTURE-DENSITY RELATIONSHIP

CLIENT Sunshine Development Co. **PROJECT NAME** Sunset Pointe

PROJECT NUMBER 179-07 **PROJECT LOCATION** Fruita, CO



Sample Date: **6/12/2007**

Sample No.: **07-646**

Source of Material: **Bulk**

Description of Material: **SILTY SAND(SM)**

Test Method: **ASTM D698A**

TEST RESULTS

Maximum Dry Density **114.5** PCF

Optimum Water Content **10.5** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
24	100	100

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 179-07 SUNSET POINTE.GPJ GINT US LAB.GDT 6/19/07

Huddleston-Berry
Engineering & Testing, LLC

CALIFORNIA BEARING RATIO
ASTM D1883

Project No.:	179-07		**Authorized By:**	Client	**Date:** 04/19/07
Project Name:	Sunset Pointe		**Sampled By:**	JAH	**Date:** 04/19/07
Client Name:	Sunshine Development Co.		**Submitted By:**	JAH	**Date:** 06/12/07
Sample Number:	07-646	**Location:** B-1, Bulk	**Reviewed By:**	MAB	**Date:** 06/20/07

Compaction Method ASTM D698, Method A

Maximum Dry Density (pcf): 114.5

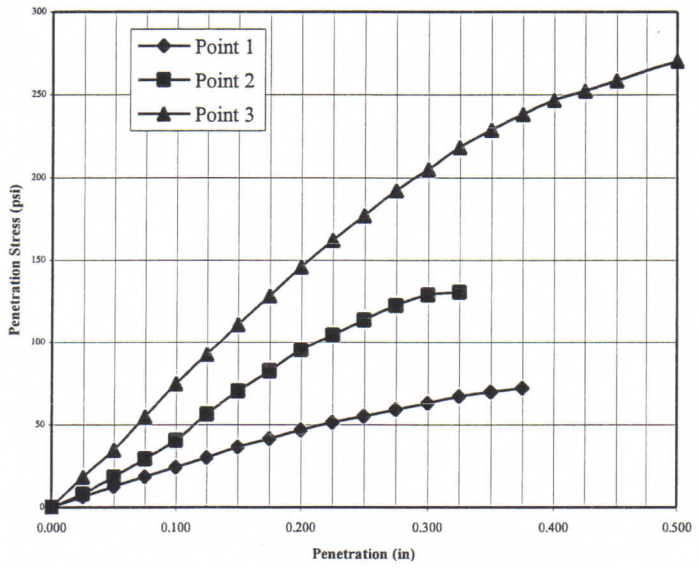
Opt. Moisture Content (%): 10.5

Sample Condition: Soaked

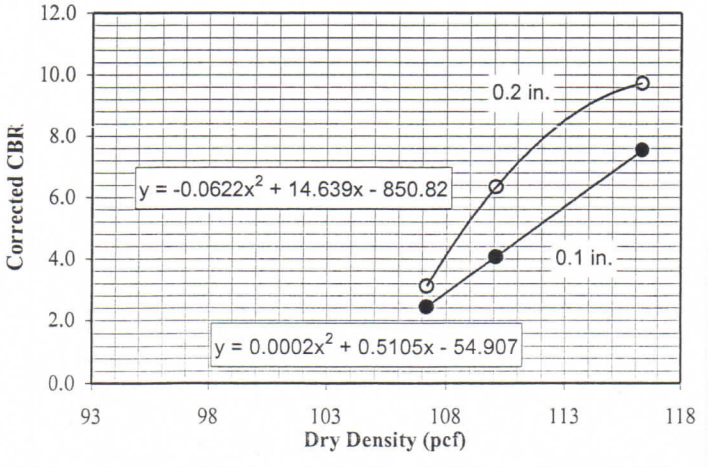
Remarks:

		Sample Data		
		Point 1	Point 2	Point 3
Blows per Compacted Lift:		15	25	56
Surcharge Weight (lbs):		10.0	10.0	10.0
Dry Density Before Soak (pcf):		107.2	110.1	116.3
Dry Density After Soak (pcf):		107.2	110.1	116.3
Moisture Content (%)	Before Compaction:	10.5	10.8	9.5
	After Compaction:	9.8	10.2	9.3
	Top 1" After Test	15.6	14.6	12.4
	Average After Soak:	15.5	13.3	12.1
Percent Swell After Soak:		0.0	0.0	0.0

Load Pentration Curve(s)



Dry Density vs CBR



Penetration Data								
Point 1			Point 2			Point 3		
Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)
0.000	0	0	0.000	0	0	0.000	0	0
0.025	19	6	0.025	24	8	0.025	54	18
0.050	37	13	0.050	54	18	0.050	103	35
0.075	55	19	0.075	87	29	0.075	162	55
0.100	72	24	0.100	120	41	0.100	221	75
0.125	89	30	0.125	167	56	0.125	273	92
0.150	108	37	0.150	208	70	0.150	328	111
0.175	123	42	0.175	243	82	0.175	379	128
0.200	138	47	0.200	281	95	0.200	431	146
0.225	152	51	0.225	309	105	0.225	479	162
0.250	163	55	0.250	336	114	0.250	523	177
0.275	175	59	0.275	362	122	0.275	568	192
0.300	186	63	0.300	381	129	0.300	606	205
0.325	198	67	0.325	386	131	0.325	645	218
0.350	206	70				0.350	676	229
0.375	213	72				0.375	704	238
						0.400	729	247
						0.425	746	252
						0.450	764	258
						0.500	799	270

Corrected CBR @ 0.1"		
2.4	4.1	7.5
Corrected CBR @ 0.2"		
3.1	6.3	9.7

Penetration Distance Correction (in)		
0.000	0.000	0.000

Figure: ____

Huddleston-Berry
Engineering & Testing, LLC

UNCONFINED COMPRESSION TEST REPORT

Task: Rock Core

Project No.: 179-07
Project Name: Sunset Point
Client Name: Sunshine Development
General Contractor:
Placement Contractor:

Authorized By: Client **Date:** 04/24/07
Sampled By: JAH **Date:** 04/24/07
Submitted By: JAH **Date:** 04/24/07
Reviewed By: MAB **Date:**
Contractor Representative:

Location of Placement:

Sample Location:

Mix Data	Specifications	Measured Properties
Supplier:	Temperature (deg. F):	Temperature (deg. F):
Mix ID:	Slump, C143 (in.):	Slump, C143 (in.):
Ticket No.:	Air Content, C231 (%):	Air Cont., C231 (%):
Batch Time (hh:mm):	Unit Weight (pcf):	Unit Weight (pcf): -
Sample Time (hh:mm):	Time in Mixer (min):	Time in Mixer (min):
Water Added (gal.):	Additional Water (gal.):	Cylinder Height (in.): 4
Batch Size (cy):	Compressive Str. (psi):	No. Cylinders Cast: 1

Tare Volume (cf): - Tare Weight (lbs): - Tare & Concrete Weight (lbs): -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Area (in.)	Weight (lbs)	Unit Wt. (pcf)	Break Information				
							Cap*	Load (lbs)	Strength (psi)	Break Type	Tech.
RC-1	06/08/07	-	2.37	4.39	-	-	S	54260	12350		JAH

*Cap Type: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks:

Field Set Number:
Field Scale: -

Compression Machine: 05155
Lab Scale: L129

Building Permit Number:

Record No. 1 C